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Early Progressive Mobility in the Intensive Care Unit Adult Patient Population

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Early Progressive Mobility in the Intensive Care Unit Adult Patient Population

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GRAND VALLEY STATE UNIVERSITY

In

Partial Fulfillment of the Requirements

For the Degree of

MASTER OF SCIENCE IN NURSING

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EARLY PROGRESSIVE MOBILITY IN THE INTENSIVE CARE UNIT

ADULT PATIENT POPULATION

Chapter 1: Introduction to the Microsystem

Each year in the United States, more than five million patients are admitted to the

Intensive Care Unit (ICU) for medical management of a critical illness and/or life-threatening

conditions (SCCM Critical Care, 2017). Traditional treatment for ICU patients has involved

long- term, enforced bedrest and sedation to promote rest and recovery (Koo, Choong and Fan,

2011). More recent studies, however, contradict this traditional treatment, linking long-term,

enforced bedrest and sedation to longer ICU length of stay (LOS) (Koo, et al. 2011). An

alternative to this traditional treatment, which has been studied recently, promotes "early

progressive mobility." This would be defined as a series of planned movements in a sequential

manner beginning at a patient's current mobility status with a goal of returning to his/her

baseline (Engel, Needham, Morris, & Gropper, 2013). Results from one study demonstrated a

decrease in LOS with traditional treatment from between 13.7 to 24.9 days to between 13.3 to

6.3 days when patients participated in early mobility (Ronnebaum, Weir, & Hilsabeck, 2012).

This study and many others support early progressive mobility in the ICU patient population.

Therefore, the purpose of this Capstone project is to conduct a gap analysis and rapid cycle

improvement to decrease variation in the process nurses use to make decisions in when and how

to mobilize patients in the ICU.

Description of the Microsystem Assessment

Within any large healthcare system are many small units designed to meet the medical needs of specific patient populations. These units are referred to as microsystems (Nelson, Batalden, Godfrey, & Lazar, 2013). An intensive care unit in a large community hospital is an example of a microsystem. Each microsystem has a purpose, patients, processes, patterns, and professionals known as the five P's (Nelson et al., 2013). To describe these five components further, they include the purpose of the microsystem, the patients in the microsystem, the processes and patterns used in the microsystem, and the healthcare professionals who work in the microsystem.

Each of the five P's uniquely contributes to the effectiveness and efficiency of the microsystem (Nelson, et al., 2013). To assess this effectiveness and efficiency, a thorough microsystem assessment is necessary to identify strengths and opportunities for improvement within the microsystem. Information and data collected during this assessment can then be utilized to improve quality, processes, and outcomes of patient care in the microsystem. The following is a microsystem assessment of the five P's in the ICU at a local community hospital.

Purpose

The ICU is an 18-bed unit where the most critically ill patients receive intensive clinical management from specially trained staff. The average daily census is 18, and there are usually patients in the Emergency Department (ED) waiting for an open ICU bed. Common admitting medical conditions for the ICU patients include post-op open heart patients, transcatheter aortic valve replacement (TAVR) procedures, sepsis, respiratory failure, and associated medical complications, and victims of motor vehicle

accidents with serious injuries. Any of these patients could potentially be admitted to the ICU

from the ED or transferred from another microsystem in the hospital to the ICU.

Patients

Some patients are admitted to the ICU from the ED or one of the three intermediate

medical care units. Other patients are admitted from medical surgical units due to a sudden

decline in their medical condition. Once admitted to the ICU, initial care is focused on medically

stabilizing the patient. It is during this time of stabilization that patients have traditionally been

and continue to be subjected to long-term enforced bedrest and sedation. After patients are

medically stabilized, they are usually transferred to one of three places, which include being sent

to the stepdown unit, the Long Term Acute Care Hospital (LTACH) within the hospital, or to a

Sub-Acute Rehabilitation facility (SAR). Daily electronic ICU mobility reports revealed roughly

70% of the ICU patients are transferred to a step-down unit or to a SAR. The high percentage of

patients transferring from the ICU to a step-down unit or to a SAR is associated with the need for

additional recovery and physical rehabilitation. Data also demonstrated 20% of the ICU patients

are discharged to a skilled care facility, indicating the need for long-term, 24-hour medical care.

About 10% percent expire from cardiac arrest or are treated with comfort care measures while

still in the ICU.

Professionals

Patients in the ICU are cared for by a specially trained, multi-disciplinary team of

professionals. Team members include registered nurses (RN), patient care techs (PCT), health

unit coordinators (HUC), department managers (DM), assistant department managers (ADM),

clinical nurse leaders (CNL), clinical nurse specialists (CNS), nurse educators, and other ICU

supporting staff. Additional professionals include respiratory therapists (RT), physical therapists

(PT), pharmacists and various physicians. The ICU is considered an open unit, allowing physicians with hospital admitting privileges to admit their patients to the ICU. Three physician groups are responsible for intensive care for most of the ICU admissions. These groups include the five physicians from the care critical care group, three physicians from the cardiologist group, and several physicians from the Michigan State University surgery group. Due to the severe and intensive medical management of ICU patients, the ICU attending physician and team do rounds for collaboration and close patient monitoring.

During these intra-disciplinary care coordination rounds, the team discusses each patient to determine and or adjust the plan of care. The physician begins with a brief description of the reason for admission, recent procedures, and any significant physiological insults. Next, the staff nurse shares pertinent patient information and any concerns with the team. This process continues until each team member has shared their clinical expertise and pertinent information with the entire team. RT discusses the patient's respiratory function and any necessary changes in respiratory treatments. PT shares the patient's mobility status and mobility recommendations. The pharmacist shares recommended medication adjustments, more specifically the monitoring and titration of sedation medications, and adjustments to vasopressors or antibiotics treatment. This type of collaborative care and communication among the intra-professional healthcare team is beneficial to ICU patients, because it decreases fragmentation in patient care. Improved communication also helps the team quickly identify and address barriers that may result in poor patient outcomes. Barriers include prolonged bedrest and sedation that lead to longer ICU LOS for patients.

Processes

Mobility assessment is a process that each ICU nurse should perform when the patient is admitted to the ICU, or within 8 hours of admission, and at least once a shift. Initial and frequent mobility assessments help determine the patient's baseline mobility and their readiness to progress to the next mobility level. In this ICU, mobility processes are very chaotic and nurses perform mobility interventions and documentation in a very disorganized fashion. For example, many nurses inadequately assess patients for baseline mobility, mobility readiness, and mobility progression. Some nurses are more aggressive with mobility and will reach out to the physician for an order for a PT consult when the patient is ready to participate in mobility. Other nurses, not so aggressive with mobilizing their patients, will wait for the physician to place an order for a PT consult or deem the patient mobility ready themselves. To eliminate variation and increase proper mobility, a standardized process for an early progressive mobility protocol will be implemented.

Another important process in the ICU population is PT consults. Once ordered, PT assesses the patient and develops an individualized rehabilitation and mobility plan based on current mobility levels and medical conditions. The plan usually includes regularly scheduled PT and occupational therapy OT sessions to help improve patient mobility. These plans can vary from daily exercise sessions, to reevaluation later for medically unstable patients. For patients who can participate, PT sessions vary in length and frequency, based on the patient's ability and ongoing mobility assessments. Until patients can participate, staff nurses are expected to perform passive range of motion (ROM) and every two-hour repositioning for the patient.

Patterns

Common patterns in ICU include tasks the nurses should perform on a routine basis, but they are frequently overlooked. Examples of patterns include bedside shift report (BSSR) by the nurse handing off care of the patient and the nurse assuming care. Nurses should use BSSRs to share pertinent information, including plan of care, current mobility level, and mobility goals for the day. Another pattern is daily safety huddles, which are used to communicate important safety concerns and other pressing issues between shifts. Examples include monitoring of mobility assessments and mobilization of patients as a quality measure. Safety huddles occur at shift change, allowing information sharing to occur with both shifts. Often shared at huddles are barriers, benefits, progress, and data trends, regarding how the unit is doing with mobility or other metrics being measured.

Summary

Assessment of the ICU at this community hospital revealed several strengths and opportunities for improvement regarding mobilization of ICU patients. Strengths of the unit include the multidisciplinary team of professionals available to help facilitate early progressive mobility. Interdisciplinary rounding is also a strength because it promotes collaboration and could potentially close gaps that may prevent or delay mobilizing patients. Opportunities for improvement include elimination of process variations used to determine mobility readiness for patients. Another opportunity for improvement of a weak process is in the variation in documentation of mobility assessments. Lack of a standardized process for early progressive mobility in the ICU population results in delayed mobilization and prolonged bedrest in critically ill patients.

Introduction to the Literature

There is accumulating evidence supporting the positive impact early progressive mobility has on decreasing LOS for the ICU patient population. A study by Hester, et al., (2017), showed a 20 to 44 percent reduction in ICU LOS after implementing and sustaining an early progressive mobility protocol. Results from a study by Winkelman et al., (2012), concluded as little as 20 minutes of exercise twice daily in mechanically ventilated and critically ill patient, decreased ICU length of stay (LOS) from 19 days to 14 days. The impact of early progressive mobility is most effective at reducing ICU LOS when it is introduced early (Engel et al, 2013).

Starting with a mobility assessment within 24 hours of admission to determine baseline mobility status, the five levels of early progressive mobility include:

- Level 1, Breathe: Maintain head of bed >30 degree, turn every (q) 2 hours, Consider Continuous Lateral Rotation, Passive Range of motion (ROM) 2X daily. Up to 20-degree reverse Trendelenburg 15 to 60 min daily. When patient tolerates without a decline in condition, move to level 2.

- Level 2, Tilt: Maintain Head of bed >30 degree, turn q 2 hrs., Passive ROM 3X daily, Up to 20-degree reverse Trendelenburg **1**5 to 60 minutes 3X daily. Legs dependent 15 to 20 min 3X daily, PT consult. When patient tolerates without decline in condition, move to level 3

- Level 3, Sit: HOB >30 degree, q 2 hr. turns assisted, Active ROM 3X daily, encourage activities of daily living (ADL) as tolerated, bed to full chair position (as tolerated 60 minutes 3X daily), dangling legs as tolerated, PT/OT daily. When patient tolerates without decline in condition, move to level 4.

- Level 4, Stand: HOB >30 degree, q 2 hr. turns self/assisted, Active ROM 3X daily, encourage (ADL) as tolerated, bed to full chair position (as tolerated 60 minutes 3X daily), stand attempts 3X daily, pivot to chair if weight baring 2X daily, PT/OT daily. When patient tolerates without decline in condition, move to level 5.

- Level 5, Move: HOB >30 degree, q 2 hr. turns self/assisted, Active ROM 3X daily, Encourage ADL's as tolerated, patient stands and bears weight > 1min 3X daily, march in place 3X daily, ambulate to bedside chair 3X daily, PT/OT actively involved. Once the

patient reaches this level, continue ambulating progressively longer distances as tolerated until

patient consistently moves independently (Hillrom, 2017). See Appendix A.

  The term *early* in reference to early progressive mobility refers to introducing

mobility to patients when they are hemodynamically stable, with stable oxygenation

levels (Parker, Sricharoenchai, & Needham, 2013). The percentage of ICU patients who

are hemodynamically stable with oxygenation levels stable enough upon assessment to

participate in early mobility is roughly 73% (Klein, Mulkey, Bena & Albert, 2015).

Mobilizing ICU patients early and progressively decreases the risk of mobility loss

during their ICU stay. Prolonged bedrest and the resulting mobility loss in the ICU

population lead to longer ICU LOS for patients. Unfortunately, increased ICU LOS stays

contribute to increased cost for patients and healthcare organizations. Despite these and

numerous other research studies clearly illustrating the benefits and importance of early

progressive mobility in the ICU, the delay of practice continues to be a significant issue

for this patient population.

Project Description

This quality improvement (QI) is aimed at implementing a standardized mobility protocol to decrease the ICU LOS at a local community hospital. Upon ICU admission, every patient will be properly assessed to identify their baseline mobility level. The nurse performing the initial mobility assessment will thoroughly document the assessment in the Electronic Patient Information Chart (EPIC). This will allow other members of the patients' care team to have access to the assessment results. The staff will monitor the patient's early mobility progress and promote progressive mobilization of the patient. In addition, the initial assessment will identify those patients with hemodynamic and oxygenation levels stable enough to immediately begin participation in early progressive mobility. This is important because "Hemodynamic instability can be a significant barrier to the start or progression of a mobility protocol." (Vollman, 2010 p. 4), hence the importance of the on-admission mobility assessment as well continuous mobility assessments. If the patient can participate in early progressive mobility, the nurse and the PT discuss the individuals' mobility plan with the patient and family, including the benefits of early progressive mobility.

Chapter 2: Review of the Literature

Evidence supports the importance of early progressive mobility in the ICU population, revealing 50% of ICU patients suffer physical impairment because of critical illness (Armstrong Institute). To mitigate this physical impairment, the Armstrong Institute recommends early mobilization of ICU patients. At this ICU immersion site, data compiled from a mobility report revealed only 73.5% of the ICU patients received mobility interventions over a 3-month period. This is 26.5% below the organization's established goal of 100%. This is a problem, because research has demonstrated immobility in the ICU is associated with increases in LOS in the ICU (Engel et al. 2013). Research has shown routine mobilization decreases in the ICU LOS by 1. 4 days for ICU patients (Dammeyer, Dickinson, Packard, Baldwin & Ricklemann, 2013). The average ICU LOS in the United States is 3.8 days (SCCM | Critical Care Statistics, 2017). The average ICU LOS for this immersion site is 4 days, this is .2 days above national average ICU LOS. The focus of this project will be to conduct a gap analysis and rapid cycle improvement to decrease variation in the process nurses use to make decisions in when and how to mobilize patients.

Literature Search

The search strategy used to identify related research articles included electronic databases of PubMed, CINAHL Complete, and Web of Science. The key search terms included "Early Progressive Mobility in the ICU," "length of hospital stay," "Early Ambulation," "Length of Stay," and "ICU". Inclusion criteria included journal articles published in the last five years, all adults, and printed in the English language. The search

terms and inclusion criteria yielded 22 results from the PubMed database, 9 results from the

CINAHL Complete database, and 32 from the Web of Science database.

Selection Criteria

Nine articles with varying levels of evidence were selected for the literature review.

Evidence levels included the following: systemic reviews, randomized control trials,

retrospective cohort studies, comparative studies, retrospective review studies, multicenter ICU

collaboratives, retrospective longitudinal studies, and comparative study designs. For ease of

reading, the articles were organized based on early progressive mobility and LOS, complications

of bedrest and LOS, and mechanical ventilator weaning.

Population, Intervention, Comparison, Outcome, and Time (PICOT) Question

To gain a better understanding of the impact of mobility on the ICU population, the

question to guide this Clinical Nurse Leader student capstone project is: "in the ICU adult patient

population does the implementation of a standardized early progressive mobility process

decrease ICU LOS by .4 days over a 90-day period?"

Early Progressive Mobility and Length of Stay

There were four studies that evaluated the impact early mobility had on LOS.

Commonalities between the studies were: early progressive mobility protocol interventions with

pre-and post-intervention comparisons, or mobility interventions compared to standard care. All

four studies demonstrated early mobility led to decreased LOS for participating patients.

In one study, comparing a pre-mobility intervention group of ICU patients with a post-

mobility intervention protocol group demonstrated that patients were more likely to be

progressively mobilized when mobility orders were written and staff advocated for early

mobility (Klein, et al. 2015). The mobility protocol intervention applied in this study included

four progressive mobility milestones within each of the four levels of progressive

mobility. Milestones were described as mini mobility activities within each of the

mobility levels. A patient progressing from bedrest without passive range of motion

(ROM) to tolerating rotation therapy continuous lateral (CLRT), is an example of a

milestone.

In the same study, mobility level one ranged from bedrest without passive range

of motion ROM, to continuous lateral rotation. Mobility level two ranged from head of

bed elevation >45 degree for 60 minutes, to the ability to dangle feet at the edge of the

bed with assistance. Mobility level three ranged from standing at bedside to standing and

pivoting to a chair. Mobility level four ranged from walking with assistance to walking

independently (Klein et al. 2015). Study results showed their mobility protocol increased

mobility on the unit and decreased LOS in the post intervention group by 33% (for

hospital LOS) and 45% (for ICU LOS) (Klein, et al. 2015).

Similar methods and results were shown in a study by Clark, Lowman, Griffin,

Matthews, & Reiff, (2012) who like Klein, et al. (2015), compared a pre-mobility

intervention group with a post intervention group, the intervention being an early

progressive mobility protocol. Results illustrated ICU LOS in the early progressive

mobility intervention group decreased by 2.4 days compared with the pre-intervention

group. Researchers suggest variables such as standardized mobility, multidisciplinary

team involvement early physical therapy involvement and decreased number of missed

therapy session with patients, contribute to decreased LOS (Clark, Lowman, Griffin,

Matthews, & Reiff, 2012). The study also examined the association between patients

admitted to the ICU, early progressive mobility and the development of intensive care

unit acquired weakness (ICUAW). ICUAW is diagnosed when a patient develops clinical

weakness and critical illness is the only plausible explanation (Kress, & Hall, 2014). The

results showed those who developed ICUAW spent 26 days in the ICU compared to 11 days for

patients who did not develop ICUAW.

Similarly, Winkelman et al. (2012), in their study compared mechanically ventilated

patients placed in a mobility protocol intervention group with similar patients placed in the

standard care group. Patients in the intervention group received 20 minutes of in bed exercise at

least once a day for a minimum of two consecutive days. When compared to the standard care

group, mechanically ventilated patients who received 20 minutes of exercise at least once a day

for two consecutive days, demonstrated reduced ICU LOS from 19.6 to 14.6 days (Winkelman et

al. 2012).

Complications of Prolonged Bedrest and Length of Stay

A serious complication of prolonged bedrest in ICU patients is Intensive Care Acquired

weakness (ICUAW) as described previously. The condition causes profound muscle weakness

and is associated with increased ICU LOS (Sidiras et al., 2013). Two studies highlighted

ICUAW and extended ICU LOS, demonstrating a strong correlation between the two.

In a study by Sidiras et al. (2013), thirty-seven ICU patients were assessed daily,

beginning on the day they were alert and awake enough to follow simple commands like:

"open/close your eyes," "look at me," "put out your tongue," nod your head," and "raise your

eyebrows, "and daily thereafter. These assessments were performed to help clinicians identify

patients who met the criteria for a diagnosis of ICUAW.   Results demonstrated that patients

admitted to the ICU who developed ICUAW had significantly longer ICU and hospital LOS.

Hospital LOS in patients who developed ICUAW was 28 days, compared to 13 days for patients

who did not develop ICUAW. Results also demonstrated the development of ICUAW

impacted duration of ICU LOS and functional mobility after -hospital discharge.

Taking a different approach, a study by Rukstele and Gagnon (2013) focused on

family involvement to help prevent the development of ICUAW with early progressive

mobility. The implementation process involved inviting the family member to actively

participate in their loved one's care. Family involvement included: educating family

members on the goal of mobilizing patients within 24 hours of admission, teaching them

the benefits of early progressive mobility in preventing ICUAW, and encouraging them

to support their loved ones during the recovery process. After implementation of family

involvement in early progressive mobility, a 94% increase in activity sessions was

achieved in the surgical ICU population (Rukstele & Gagnon, 2013). Combining family

engagement with early progressive mobility interventions is associated with decreased

complications of prolonged bedrest such as ICUAW and increased LOS.

Delayed Mechanical Ventilator Weaning

Prolonged bedrest in the Mechanically Ventilated (MV) ICU population is

associated with severe weakness of the respiratory muscles. Severe weakness in

respiratory muscles decreases the ability for MV patients to breathe independently,

making them ventilator dependent for a longer time-period and difficult to wean from the

ventilator (Sidiras et al. 2013). Two studies examined the impact mobility interventions

in the ICU had on the number of days patients spent mechanically-ventilated. Although

the studies focused on various topics, from integrating a multidisciplinary mobility

program in the ICU to decreased LOS in mobilized ICU patients, the results were similar.

A study by Ronnebaum, Weir, and Hilsabeck, (2012) compared two groups of mechanically ventilated patients, those mobilized based on an early mobility protocol (MP) and those treated with standard physical therapy (SPT). The authors included detailed algorithms for MP and SPT groups. Results favored the implementation of the mobility protocol in the ICU mechanically ventilated patient, reporting that patients in the MP group experienced fewer ventilator days. Results showed ventilator days in the MP group were 8.7 days compared to 14.5 days in the SPT group.

Economic Impact of Immobility

Two studies examined the positive financial impacts of early mobility in the ICU population. In a study by Hester et al. (2017), the authors performed a retrospective analysis of both economic and clinical outcomes of pre-and post-early mobility protocol implementation. The study included a two-year period in a Florida health system. Results demonstrated patients in the progressive upright post mobility protocol program experienced a decreased ICU LOS. The average ICU LOS for these patients decreased from 6.5 to 5.8 days. The mobility protocol also resulted in a 16% cost savings per patient. Authors reported a $12,000,000-dollar reduction in direct care costs from implementation of the program in 2001 to late 2013 (Hester et al. 2017).

A study by Corcoran et al. (2017) demonstrated similar results. In this study, the implementation of a mobility program included increased daily physical therapy sessions by 60 minutes per patient. In the pre-implementation group the ICU cost per day was $2072.00. In the post implementation group the ICU cost per day was $1983.00 per day. This resulted in a direct savings of $2,200,000, a 29% decrease in direct cost (Corcoran et al. 2017). In addition to the cost reduction, authors reported a significant increase in the number of patients discharged to their homes with the need for additional services in the post-implementation groups.

Strengths and Weakness of Current Literature

Strengths of the current literature on early progressive mobility in the ICU include overwhelming statistical evidence for the use of early mobility protocols or interventions for the patient population. It has clearly demonstrated a strong association between early progressive mobility and decreased LOS. Research of the literature also demonstrated evidence of complications of prolonged bed rest (such as ICUAW), increased ventilator dependence, and increased ICU LOS. Another strength of the current literature is the reliability of the results. Many of the research studies used comparative methods with pre-and post-early progressive mobility intervention groups in various ICU settings, using various levels of evidence. They also studied a variety of organizations, all sharing favorable results.

The most significant weakness in the current literature is there are no clinical practice guidelines to help translate the evidence into practice. The current literature also offers very little insight into the common culture of enforced bedrest and sedation in the ICU and the difficulties involved in changing that culture. Moving toward early progressive mobility in the ICU must begin with a culture and practice change. This will facilitate newly implemented evidence based practice, such as early progressive mobility, to become a standardized process for ICU staff and adult patients. This culture and practice change will also decrease ICU LOS and complications of prolonged bedrest for ICU patients.

Summary

The ICU adult population is susceptible to the unfavorable effects of prolonged bedrest. Research has shown that muscle strength declines between 3% and 11% with

each day of bed rest (Fraser, Spiva, Forman, & Hallen, 2015). To mitigate the progressive

decline in muscle strength, progressive mobility in the ICU population prevents the

development of ICUAW and profound muscle weakness. Multiple studies have demonstrated the

use of an early progressive mobility protocol in the ICU population is effective at decreasing the

ICU LOS and results in cost savings and reduction of complications from prolonged bedrest.

Despite overwhelming evidence demonstrating the positive health and financial benefits of early

progressive mobility in the ICU, transition from evidence to practice is a slow process.

Chapter 3: Conceptual/Theoretical Context

The recent pay for performance initiatives for healthcare have forced the

healthcare industry to focus on providing safe, high quality patient care. The penalties for

healthcare organizations that fail to achieve high level quality care and safety goals for

patients include partial or no reimbursement for services provided. This has led

healthcare organizations across the United States to focus attention on quality

improvement initiatives (QI) and projects that efficiently and effectively, produce and

sustain the best patient outcomes. One popular approach used to improve the quality of

healthcare is the DMAIC methodology (Appendix E).

 DMAIC is a Six Sigma method often used in problem solving (Millham, 2015).

"The roots of DMAIC come from the plan-do-check-act (PDCA) cycle, a method for

learning and improvement, also referred to as the "Shewhart Cycle," 1930s (Millham,

2015 p. 15).

Each letter in the DMAIC acronym represents a step in the process improvement cycle

that drives and sustains safe high-quality patient care. The first letter "D" stands for defining the

problem needing to be resolved. The "M" stands for measurement. This step involves baseline

data and identifying the root cause of the problem. The "A" stands for analyze. This step

involves analyzing the data collected to narrow down the root cause of the problem. The "I"

stands for improve. In this step, the team brainstorms, selects a solution and implements the

process. The final letter is "C" and it stands for control. In this step, the team simply maintains

the improved process (Lean Six Sigma Training & Certification- GoLeanSixSigma.com, 2012).

The DMAIC method will be a useful guide for the project team to utilize to

improve, standardize, and sustain the process of early progressive mobility in the adult

ICU population. This QI project has the characteristics of a sustainable improvement process

since the improvements will reduce costs and improve efficiency (Lean Six Sigma Training &

Certification- GoLeanSixSigma.com, 2012). The DMAIC process therefore will be used to help

reduce process variation of early progressive mobility in the adult ICU patient population at a

local community hospital.

Define

The first step in the DMAIC process is to define the problem. Problems result from gaps

between current practice and expected practice or protocol (Worth et al., 2012). Sharing the

identified problem and supporting data with a team of stakeholders helps them fully grasp the

scope of the problem and focus the efforts. At this immersion site, data collected to identify the

problem included chart audits and unit mobility reports. Data revealed only 73.5% of the ICU

adult population have documented mobility interventions over a three-month period. This is a

problem because research has demonstrated that prolonged bedrest in this population leads to

increased ICU LOS and increased healthcare cost. This problem statement and data were shared

with an early progressive mobility team before proceeding to the next step in the DMAIC

process.

In this ICU, data compiled from electronic mobility reports, revealed only 73.5% of the

ICU patients received mobility interventions over a three-month period. This is 26.5% below the

organizations' established goal of 100%. This is a problem because research has demonstrated

immobility in the ICU is associated with increases in length of ICU stay (Engel et al. 2013).

Research has shown early progressive mobility decreases ICU LOS by 1. 4 days for ICU patients

(Dammeyer et al. 2013). The average ICU LOS in the United States is 3.8 days (SCCM | Critical

Care Statistics, 2017). The focus of this project will be to conduct a gap analysis and rapid cycle

improvement to decrease variation in the process nurses use to make decisions in when and how to mobilize patients.

Measure

The second step in the DMAIC process is measurement. In this step, focus shifts from data collection to determining the baseline or starting point of the problem and looking at its root cause (Lean Six Sigma Training & Certification-GoLeanSixSigma.com, 2012). The focus of data collection in this step included chart audit, doing the gemba, and communication with various disciplines involved in the early progressive mobility quality improvement project in the ICU. Chart audits included accessing the Electronic Patient Information Records (EPIC) of adult patients in the ICU to determine if mobility interventions were documented. In addition to the chart audits, several staff members and bedside caregivers involved in the mobilization of ICU patients were interviewed. From these interviews, several themes and barriers to mobility in the ICU were identified. This data was presented to the team for analysis. The next step in the DMAIC process.

Analyze

The third step of the DMAIC process is analyze. In this step, the focus of the team is to analyze the data and validate gaps and barriers between current and expected practice (Lean Six Sigma Training & Certification-GoLeanSixSigma.com, 2012). Analysis of the chart audits N=10, revealed six of the ten (60%) charts audited had mobility interventions documented. Four of the ten (40%) patients had documented baseline mobility assessments. Chart audits also revealed of the six patients with

documented mobility, half were mobilized in a disorganized and chaotic fashion (according to the EPIC levels 1-4).

The team also identified common themes from various disciplines involved in the mobilization of ICU patients. Themes from this communication were used to help identify the root of the problem. Staff (N=10) were asked "Why are ICU patients not being properly mobilized"? Each staff response was followed with another question to the staff member asking why. This technique is called the Five Whys and is a useful technique to help identify the root cause of the problem (Nelson, et al. 2013) (Appendix C) The Five Whys technique revealed the reason patients in the ICU are not properly mobilized. It was related to inconsistent leadership over the last several years and failure to implement a standardized early progressive mobility process. Staff also perceived, lack of PT consult orders from physicians, the feeling that their patient is too sick to participate, and lack of staffing resources as barriers to the early and progressive mobilization of their patients.

Once the team analyzed the collected data and brainstormed over the causes, they attributed the variations in mobility, lack of mobility, and disorganized mobilization, to no standardized early progressive mobility process in place to guide practice. This information will help the team implement a standardized early progressive mobility process for the ICU adult population, in the next step of the DMAIC process. (Appendix E)

Improve

The fourth step in the DMAIC process is improve. In this process, the team implements specific strategies to improve early progressive mobility in the ICU. The team goal in the improvement step is to fix the problem. To achieve this, the team brainstorms how to achieve resolution of the problem.

During a progressive mobility meeting, the team discussed ways to standardize early progressive mobility, the potential barriers to early progressive mobility implementation, and the solutions to those barriers. It is important for the interdisciplinary team to strategize, develop and test various solutions, before selecting the most efficient and effective solution to the problem. Some of the barriers and solutions the team discussed included the following:

- How to coordinate care at the bedside to ensure resources are available for the mobilization of patients that require more assistance?

- How do we improve the communication between physicians and nurses to expedite the ordering of PT evaluations and can nurses place these orders independently?

- How do we increase nurses' knowledge level and educate staff regarding early progressive mobility?

- Who will be a resource for other patients on the unit if a team involved in the ambulation of a patient who is on a mechanical ventilator?

- What can be done to change the culture of mobility on the unit?

After coming up with barriers and concerns, the team decided to schedule another meeting to further elaborate on these topics. The next meeting will also involve solidifying and increasing sustainability of the new early progressive mobility process. Solidifying and sustaining the new process is important for the next step in the DMAIC process.

Control

The fifth and final step of the DMAIC process is the control phase. In this phase, the team's focus is to implement the new process. This is one of the most important steps

in the DMAIC process because the focus is promoting a smooth transition to the new process

(Rever, 2012). To ensure the success of a smooth transition and sustainability of the newly

implemented process, stakeholders must remain engaged and the new process should be

documented in a flowchart on the unit to increase staff adherence. These steps are an important

safeguard against staff "drift" back to the previous practice (Rever, 2012). The expected outcome

of the control phase is to transfer the responsibility of sustainability to the individuals doing the

work and randomly assess the effectiveness of the new process (Rever, 2012).

The team is currently in the process of developing a standardized early progressive

mobility process with a focus on addressing concerns identified in the improve phase. Next, a

plan will be developed, including a flowchart to standardize the process for the early and

progressive mobilization of the ICU population. The new process will include coordination of

care teams to early and progressively mobilize patients. This will close the gaps that delay or

prevent mobilization of ICU patients. To address the lack of knowledge of early progressive

mobility, the team will discuss and plan interdisciplinary early progressive mobility education

and demonstration for all staff involved in the process of mobilization of patients.

Conclusion

Defining the problem, measuring the data, identifying the root cause of the problem,

developing and improving a process to address barriers, and implementing and sustaining the

change are simple steps necessary to standardize the early progressive mobility process in the

ICU adult population. QI teams that properly follow each step in the DMAIC methodology for

process improvement, will lead to a structured and successful problem-solving approach (Rever,

2012). Successful implementation of a standardized and sustained early progressive mobility

protocol is important, as research has demonstrated a link between early progressive

mobility and decreased ICU LOS.

Chapter 4: Clinical Protocol

Traditionally ICU nurses have embraced the practice of sedation and enforced prolonged bedrest as medical management of their patients (Fraser et al. 2015) Current research, however, has demonstrated that enforced and prolonged bedrest are associated with poor patient outcomes, including increased ICU LOS (Fraser et al. 2015) Despite this research and the many benefits of early progressive mobility in the ICU adult population, immobility and prolonged bedrest is still a common practice. Consequences of the current practice in this ICU have contributed to increased healthcare cost and more, importantly, increased ICU LOS. This issue has caught the attention of the hospital's Chief Nursing Officer (CNO), and decreasing ICU LOS is now a 2017 organizational goal.

Multidisciplinary Team of Key Stakeholders

Once mobility issues were identified as a problem, a multidisciplinary team of key stakeholders was assembled. The units' Clinical Nurse Leader (CNL) connected with the department managers (DM) from PT, OT and RT, to ask for their support. The CNL has also reached out to the lift team for additional mobility support for difficult to mobilize patients. Once the team was assembled, an invitation for the first early progressive mobility team meeting was sent out.

The CNL led the first meeting. Team goals for the first meeting included introducing the team members and establishing the purpose of the team, the project goals and objectives, and the desired outcome of the early progressive mobility project. The team agreed upon the following: (1) Goal- Implementation of a standardized early progressive mobility process in the ICU adult population to decrease ICU LOS; (2) Objective- Decrease the variation in the mobility process by standardizing the process; and (3) Desired Outcome (AIM) - Increase mobilization of ICU

adult patients from 73.5 % to the organizational goal of 100 % over a six-month period.

To help keep the teams focused, tasks were assigned, due dates and completion dates

were determined, and the CNL initiated an implementation guide. After the meeting, each

team member had an assigned role and task to complete before the next meeting aimed

toward data collection or communication about early progressive mobility.

Gaps in Current Practice

Data collected for this project were amid identifying current mobility practices on

the unit to help expose problems with the process. According to Smith et al. (2016) this is

key for the team to identify gaps and opportunities for improvement in current practices.

This also provides the team with baseline data or a starting point. To isolate gaps in

current practice, the CNL used the Five Whys, did the Gemba, performed chart audits,

surveyed staff to determine baseline knowledge, interviewed team member intimately

involved in mobilization of ICU patients, monitored unit mobility reports, and flow

charted the current practice (Appendix G). Electronic data from performance

improvement department sends reports to the unit to monitor ICU LOS (Appendix F).

The Information sharing of data collected revealed the following themes about the

process of mobility in the ICU.

- The five Whys revealed the root cause of the problem is that there is no standardized

  process in place to mobilize ICU patients. (Appendix C)

- The Gemba revealed variations and barriers in the mobility process for various reasons

  including, nurses saying the patient was too sick, or sufficient staff was unavailable to assist

  with mobilizing the patient, or a PT consult orders were not available.

- Chart audits revealed sporadic charting and inconsistencies in mobility documentation and disorganized progression of mobility.

- Run charts based on unit mobility reports revealed variations in mobility practices. (Appendix B)

- Staff surveys N=10 demonstrated knowledge deficits on questions 1, 2, 5, and 7. (Appendix D)

- Average ICU LOS chart (Appendix F)

Documented Mobility intervention chart (Appendix B)

Plans for Implementation

The next step for the team is to brainstorm and develop a plan to standardize and implement the early progressive mobility process. The plan is to address the gaps and variations in the current mobility process. In general, the team will incorporate daily multidisciplinary team huddles on the unit. The purpose of the team huddles is to discuss each patient on the unit that needs to be mobilized. Huddle team members would include the RN, RT, PT, PCT, and the lift team. One gap in this plan is how to establish an exact meeting time and place for this activity.

To address knowledge deficits in the staff, the PT department manager (DM) has formed a special taskforce to perform a series of mini-mobility-demonstrations of each of the mobility levels. The plan is to do inter-professional demonstration sessions to increase staff knowledge about the five levels of early progressive mobility. In addition to the mobility demonstration sessions, the CNL and PT DM have developed a Power Point presentation to share with the mobility team and all ICU staff in order to share key points of information and increase knowledge on early progressive mobility. To expedite the sharing of the presentation with all the staff, the CNL connected with the educators of the PT, RT, and nursing departments to have the

presentation included in the Learning Module System (LMS). Placing the presentation in the LMS allows all staff to view the Power Point and take the accompanying post-test to confirm competency.

The team is still working on how to address communication gaps regarding the process of obtaining a physician order to obtain a PT consult. The current practice causes delays in mobility for many patients. Ideally the process needs to be more nurse driven.

Next Steps

Once the standardized process is established, the team will continue moving forward with implementation of a standardized early progressive mobility process. A general idea of the what the process may look like is in a flow chart in Appendix E, pending mutual team agreement. The next mobility team meeting is scheduled for June 20, 2017. The objective of the meeting will be revisit the gaps the team brainstormed at the last meeting, focus on the low hanging fruit, and develop a plan to further discuss follow up and finalize implementation plans.

Chapter 5: Clinical Evaluation

The DMAIC method helped guide the steps throughout this quality improvement project. In this chapter, the CNL student will illustrate the work that has been done and the work that is in process to implement a standardized early progressive mobility process in the ICU to increase mobility and decrease ICU LOS for patients. This chapter also includes examples of how the CNL communicated and collaborated with a team of key stakeholders to overcome the many challenges of moving QI projects forward.

Define

Before attempting to solve a problem, the problem needs to be defined. In this ICU only 73.5 % of the patients have documented mobility interventions over a 90-day period. This data was collected with the assistance of the data analytics department and daily unit updates on documented mobility interventions. Decreased mobility is a problem in the ICU population because it increases the ICU LOS for the patient and increases healthcare cost. This CNL student used surveys, chart audits, existing data, and the five Why's to develop a deeper understanding of why only 73.5% of the patients in this hospital ICU are being mobilized.

Measure

To better understand a problem, it must be measured. To measure this problem, the CNL student used the same data presented in the define phase of the DMAIC process. Measurement consisted of the total number of mobility interventions and the ICU LOS for each patient over a 3-month period. This CNL student monitored daily mobility interventions via unit mobility reports and performed ten random charts audits illustrated in Appendix J. This CNL student also communicated with several staff on the unit about the current mobility practices on the unit.

(Appendix G). Trends from staff communication revealed that there is no standardized early progressive mobility in place.

Analyze

A thorough analysis of the data collected revealed only 73.5% of the ICU patients had mobility interventions documented. Using the Five Why's method to identify the cause of the problem revealed there is no standardized mobility process in place for mobilization of the ICU patient population. To implement a standardized early progressive mobility, process an interdisciplinary mobility team comprised of key stakeholders was established. The team assisted the CNL with the development of a standardized process for early progressive mobility. The team's goal, therefore is implementation of a standardized early progressive mobility process to improve mobilization in the ICU population to help decrease ICU LOS and reduce healthcare costs.

Survey Results

Results from staff surveys illustrated in Appendix D revealed significant knowledge deficits surrounding early progressive mobility. To help increase staff knowledge, a Power Point presentation was created to share best evidence, expected practice, and actions or interventions that should be implemented. The goal is to have each staff member view the presentation and successfully pass the accompanying post-test to validate competency (Appendix I). To reach the largest number of staff in a timely fashion, the team decided to have educators from the RT, PT and the nursing departments place the power point in Learning Management System (LMS). This would allow staff electronic access to the Power Point presentation and the post-test. To date, the only department that does not have access to the Power Point in the LMS is nursing. The PT

and RT educators have the Power Point in LMS and the 100% of the PT and RT have

demonstrated competency by completing and passing the mobility posttest in LMS. The

nursing educator has yet to enter the Power Point presentation into the LMS. This presents a

barrier since nursing is the largest and most intimately involved group of key stakeholders

involved in the early progressive mobility process.

To bypass this barrier, the team discussed possibly using a Power Point presentation from

an outside source. A Hill-Rom representative was present at the meeting and informed the team

that Hill-Rom had an early progressive mobility program online that the staff could use instead

of the LMS. Some of the team members entertained the idea, while several leadership members

spoke to the importance of utilizing current tools the organization has in place for staff to ensure

consistency. The team agreed with the latter idea and decided against using the outside resource.

Available Resources

To ensure staff resources are available for mobilization of all patients, the team decided

to coordinate care at the bedside**.** This CNL student looked at the most effective use of unit staff

resources and presented to the team the idea of coordinating "mobility teams." The mobility

team would meet on the unit daily and discuss plans for mobilization of difficult to mobilize

patients. This team would include the nurses, PT, RT, and PCT's. This process would provide a

plan for mobilization of patients and more efficient use of time for staff. The team agreed and are

considering a designated meeting places and communication methods.

Physical Therapy Consult

Several staff expressed frustration to this CNL student with the process of having to

obtain a PT consult from a physician. To improve this process, some team members suggested

this be a nurse driven process. This would allow the nurse to place an order for the PT

consults for their hemodynamically stable patients without having to contact a physician.

Another suggestion was to program EPIC to notify the nurse when the patient

meets criteria for a PT consult. This process would include an electronic message in

EPIC alerting the nurse that the patient meets criteria for a PT consult. The nurse would

then contact the physician either electronically or by phone to place the order. The team

determined additional discussion with the ICU attending physician was needed to

establish support for modifying how PT consults are expedited. For this reason, it was

decided to revisit this process later.

Improve

Unfortunately, at the time of implementation this CNL student will no longer be

in this microsystem to experience the process. Fortunately, this CNL student and mobility

team developed key steps in the early progressive mobility process. To help improve the

mobilization of ICU patients in this ICU, the team recommended following the five

mobility levels and the activities included in each level. The mobility levels and activities

are illustrated in Appendix H.

In preparation for the implementation of the early progressive mobility process

this CNL student and the unit CNL created a rough draft of the new process to discuss

with the team. The process was flowcharted and presented to the mobility team at the

next meeting. Several team members felt the flow chart was confusing and some key

pieces were missing. The team recommended making the following changes to the

process: (a) adding the PT consult to the step two; (b) removing OT from step five, if it is

only for ambulation; and (c) styling the flow chart from left to right using columns, as it

would be easier to read and understand. The team also questioned where obtaining a physician order for a physical therapy consult should be placed in the process. It was decided to wait for the updates from the documentation committee before addressing where this step fits in the process. The CNL agreed to make the adjustments and create a flowchart that was more user friendly to present at the next mobility meeting for team approval.

Successes

There were many successes during various phases of this QI project. One of the more memorable successes for the CNL was building relationships with different team members in the microsystem, specifically the nurses. Being a CNL student in an unfamiliar microsystem was initially somewhat intimidating. To develop and gain the trust of the staff this CNL student began asking questions which allowed staff to share their expertise on the ICU patient population. The staff enjoyed teaching and this CNL student enjoyed learning. This two-way communication helped develop a good and trusting relationship between this CNL student and the nurses. While building relationships with the staff, this CNL student identified the informal leaders and high performers within the microsystem.

Several high performing informal leaders are in support of the early progressive mobility project. Having the support of these informal leaders was beneficial because they helped this CNL student gain the buy-in of other staff who initially did not support this project. This allowed the CNL student to share information about the benefits of early progressive mobility and the mobility project with additional staff. When this CNL student performed chart audits, staff were more forthcoming with information about patients' mobility status and perceived barriers to mobility. Eventually some staff began asking this CNL student more about early progressive mobility and notified this CNL student when they had a patient they thought would be

appropriate to participate in mobility. Two of those patients were mechanically ventilated and the other was recently extubated.

Difficulties

Being a CNL student in a new microsystem, this CNL student encountered several difficulties while working on the early progressive mobility project. One of the more frustrating situations was the variation in data collected. Determining the average LOS for patients in the ICU required multiple meetings and phone conversations with numerous hospital associates across the organization. The frustration stemmed from the different answers the CNL student received from various staff. For example, this CNL student was directed to the Finance Department by a seasoned CNS to get data on the LOS. The individual in the Finance Department assured this CNL student the ICU LOS was 14 days. This was much longer than the ICU LOS given to this CNL student by the unit department manager which was 4.0 days. The CNL student reconnected with the Finance Department and it was determined that ICU LOS data from the unit manager was the most accurate. Further probing into this data gap revealed the department manager and Finance Department use different methods to determine the ICU LOS.

Another difficulty encountered stemmed from the barriers surrounding the Power Point presentation and the lack of access to this presentation for unit nurses. Nurses are key stakeholders in the early progressive mobility project and not being able to provide necessary information to them about the importance of early progressive mobility essentially put a hold on the project. The four components of the project included having hands-on demonstration sessions of the various levels of early progressive mobility, utilizing knowledge enhancing Power Point presentation, process development, and

implementation. The team decided the Power Point presentation complimented the

demonstration and it was important for the nurses to have the information before

attending the demonstration sessions. The project therefore, was placed on hold pending the

Power Point presentation being placed in LMS for the nursing staff.

Strengths

Strength of the project includes the positive impact it will have on patient outcomes and

the revenue early progressive mobility will save the organization. Research has shown patients

who are mobilized early and progressively have decreased ICU LOS. These patients also

experience physiological improvements faster compared to immobile patients. There are

numerous benefits of early progressive mobility that this CNL student discovered during the

literature review which strengthen the case for early progressive mobility in the ICU patient

population.

Another strength is the support received from the staff at the microsystem level for the

project. Without the support of the bedside nurses, this CNL student and the rest of the team

would have had a very difficult time with this project and would not have progressed this far.

Staff's willingness to help, teach, and communicate with this CNL student was invaluable and

assisted the team in identifying and addressing some of the smaller barriers surrounding early

progressive mobility.

Weakness

The project did have a few weaknesses. Three of the team members left the team after the

first meeting. This left the team with no representation from the bedside caregivers who play a

crucial role in the early progressive mobility process. After about a month, the CNL student was

able to recruit three new bedside caregivers to the team. This slowed the team down a

little, since the new members had to be brought up to speed on the project.

Another weakness included the size of the team for the project, which included 15

to 20 participants. Having such a large team can often present challenges to effective and

efficient meetings. Team size can also cause delays in meetings due to scheduling

conflicts among team members. Having larger team sizes can create a lot of very

different ideas and perspectives which makes it more difficult to identify agree upon

solutions or processes. The team overcame these weaknesses, but it did present several

challenges for this CNL student and the team.

Sustainability

This quality improvement project remains in the early stages and implementation

of the newly developed process has not yet occurred. Sustainability, however of early

progressive mobility process is likely to be a success based on the highly engaged

mobility team members dedicated to improving the quality of care for the ICU patient

population. Several team members were involved in the ambulation of two mechanically

ventilated patients. These success stories were shared throughout the organization and

made believers out of some of the ICU staff. Gaining the buy-in of more bedside

caregivers will further contribute to the sustainability of the early progressive mobility

process.

Evaluation of Implementation

Plans to implement a standardized early progressive mobility process did not

develop as planned. Instead the mobility team was faced with many unavoidable

challenges and implementation delays. The process of getting the early progressive

mobility Power Point presentation in the LMS for nursing access is currently the teams' biggest

barrier. Unfortunately, the team has had to delay moving forward with implementation until all

the ICU nurses have access to the Power Point presentation and are able to demonstrate

competency.

Expected Outcomes

Implementation of a standardized early progressive mobility process in the ICU is

expected to decrease the variation in the mobilization of the patients. Staff adherence to the

mobility process for a sustained period is expected to improve documented mobility

interventions from 73.5% to 100% in the ICU population. This increase in the early and

progressive mobility of the ICU population is associated with decreased ICU LOS and decreased

healthcare costs as stated in Chapter two. The following success stories illustrate the benefits of

early progressive mobility and the positive impact it has on patient outcomes and ICU LOS.

On May 18, 2017, the CNL coordinated a small multidisciplinary group of caregivers to

ambulate a patient who was mechanically ventilated. Team members included a physical

therapist, respiratory therapist, occupational therapist, registered nurse, lift team and the CNL.

Equipment gathered to safely ambulate the patient included a portable mechanical ventilator, a

spare trach kit, a walker, a wheelchair, and a portable monitor for monitoring the patients' vital

signs. The patient ambulated over 350 feet before returning to the patient's room. The patient

tolerated ambulating well and was extubated later that day. The following day the patient was

discharged from the ICU.

On May 23, 2017, the unit CNL and this CNL student coordinated team of

multidisciplinary caregivers to ambulate a patient. The patient had been admitted to the ICU

earlier that day from surgery and was on a mechanical ventilator. The medical team decided to

extubate the patient and within minutes of extubating, the team was at the bedside to ambulate the patient. Once standing the patient seemed to become more alert almost immediately. It was as if a cloud of fog had been lifted and things seemed clearer to the patient. After walking over 1000 feet, the patient asked when the Foley catheter and peripheral IV could be removed. After communicating with the nurse, the Foley catheter was removed and the IV saline locked. This all went well, and the patient was transferred to a medical surgical unit later that day. These patient success stories are examples of the benefits and positive impact early progressive mobility has on patients and the medical condition. Both success stories spread across the unit and hospital and the early progressive mobility project gained more support.

Implications for Practice

Although this quality improvement process is in the very early stages and has not yet been implemented, the process is likely to change the current mobility practice on the unit. This is in part because this CNL student spent a great deal of time communicating with random nurses and other staff members about early progressive mobility. Another reason for the likely success of this quality improvement process is the highly engaged team of key stakeholders involved. Monitoring documented mobility interventions and average ICU LOS provide important metrics to measure post implementation of early progressive mobility. Improvements in these metrics will indicate the success of this quality improvement process.

Reflection on Enactment of Masters of Science in Nursing

During this quality improvement process this CNL student addressed MSN essentials two and seven. MSN essentials two consisted of organizational and system leadership for quality improvement and system, thinking and seven addresses Inter-

Professional Collaboration for improving patient and population health outcomes. To demonstrate competencies, this CNL student developed and worked with a multidisciplinary team of key stakeholders to improve the quality of care for a specific patient population. The goal of the team was to develop a standardized early progressive mobility process that would decrease variation in mobility of patients in the ICU. Increased mobility in this population is associated with decreased ICU LOS and healthcare cost. One of the key roles of the CNL is utilizing effective communication and collaborating with the various members of the healthcare team. This CNL student frequently collaborated with and communicated with care team members in the microsystem about the benefits of early progressive mobility. To ensure a patient -centered approach to the mobility process, this mobility communication and collaboration often occurred at the bedside in order to include the patient.

Conclusion

Healthcare is continuously changing and the need for quality and process improvements are in high demand. Using the DMAIC method allows clinicians to define the problem, clearly understand the scope of the problem, perform a thorough analysis of the problem, make process improvements, and sustain the improvement. Each step of this process helped this CNL student and the mobility team move this project forward toward implementation of a standardized early progressive mobility process. Although the project has not reached the implementation stage, this CNL student and the mobility team are confident the results will be beneficial. Post-implementation of a standardized early progressive mobility process in this ICU will increase patient mobility, decrease ICU LOS and reduce healthcare cost, thus improving the overall quality of patient care.

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Appendix A

Steps in the Early Progressive Mobility Process

(Hill-Rom progressive mobility program)

Appendix B

Run charts illustrating variation mobility in the ICU

.

Appendix B continued

MOBILITY INTERVENTIONS DOCUMENTED TID IN MARCH
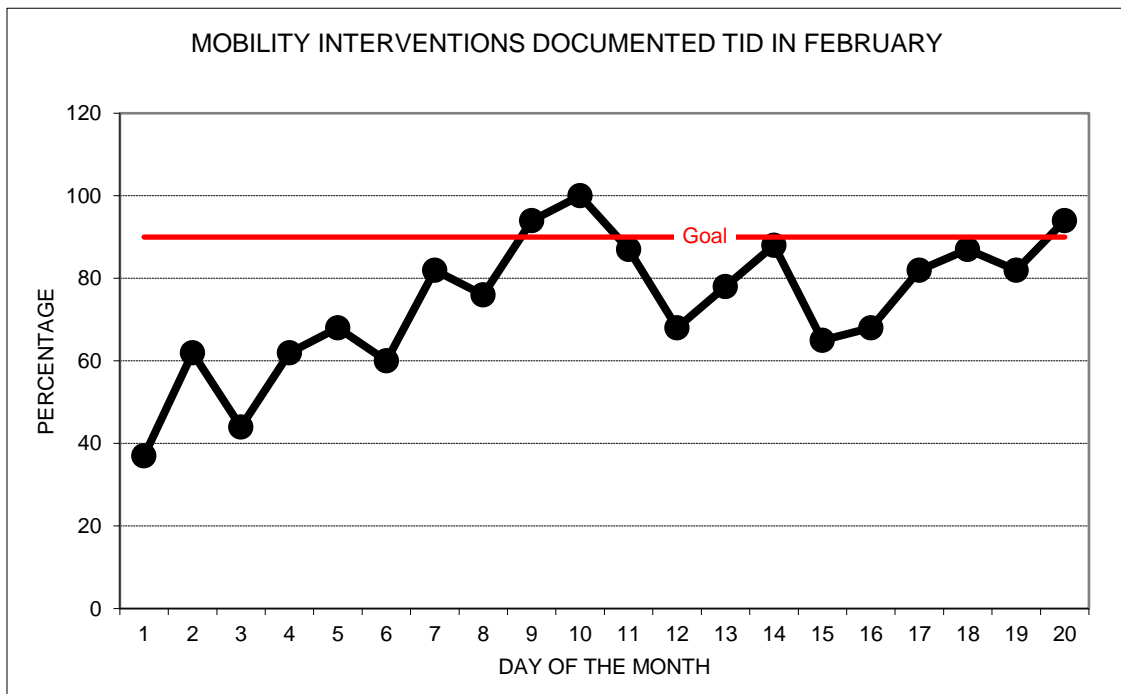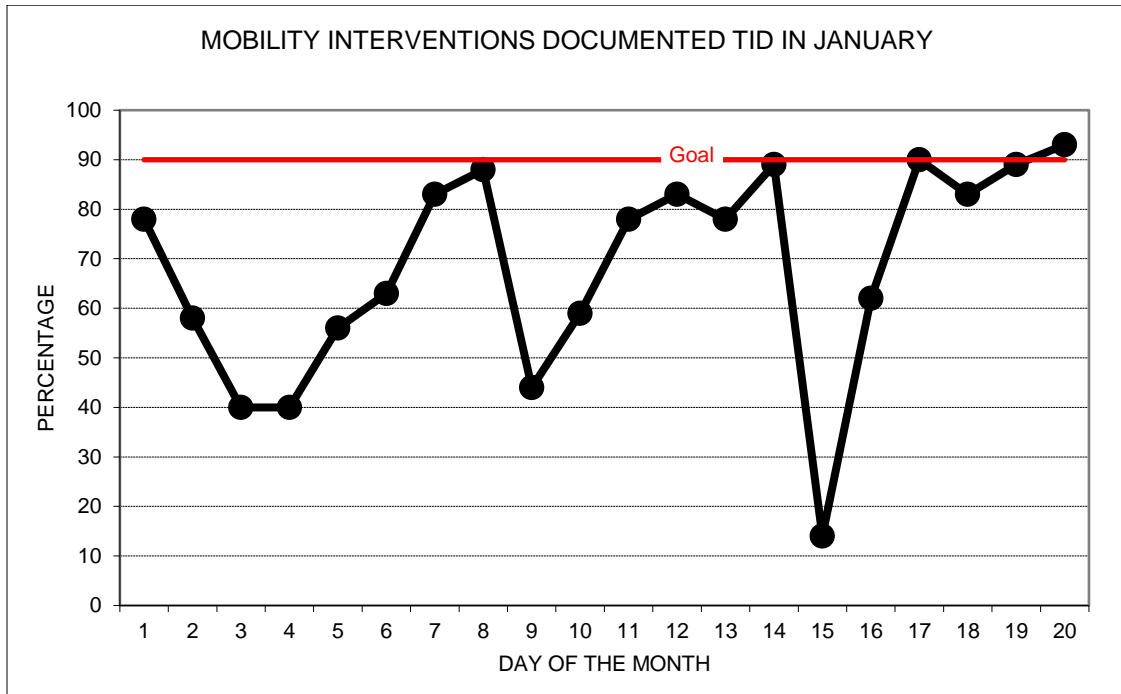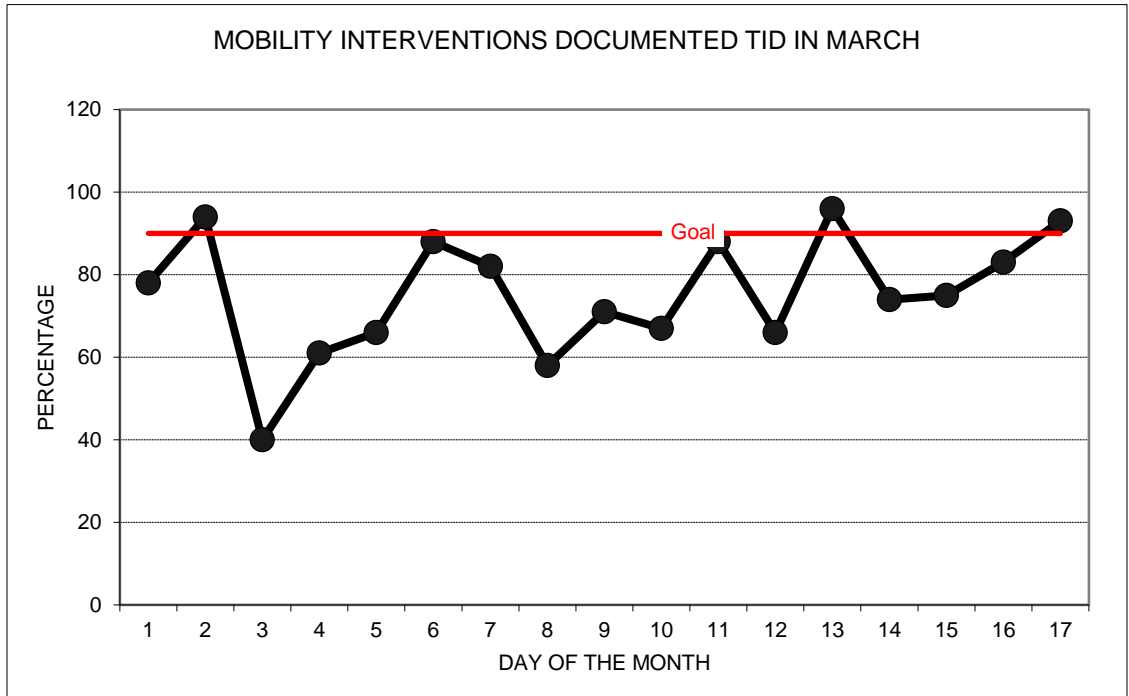
Appendix C

Five WHY's tool to identify the root cause of the mobility problem

Why? Staff don't think about early progressive mobility.

Why? Not a part of our process.

Why? No process in place for early mobilization of our patients.

Why? No leadership in place to implement the early progressive mobility process.

Why? Frequent changes and inconsisitancies in the ICU leadership team over the last several years.
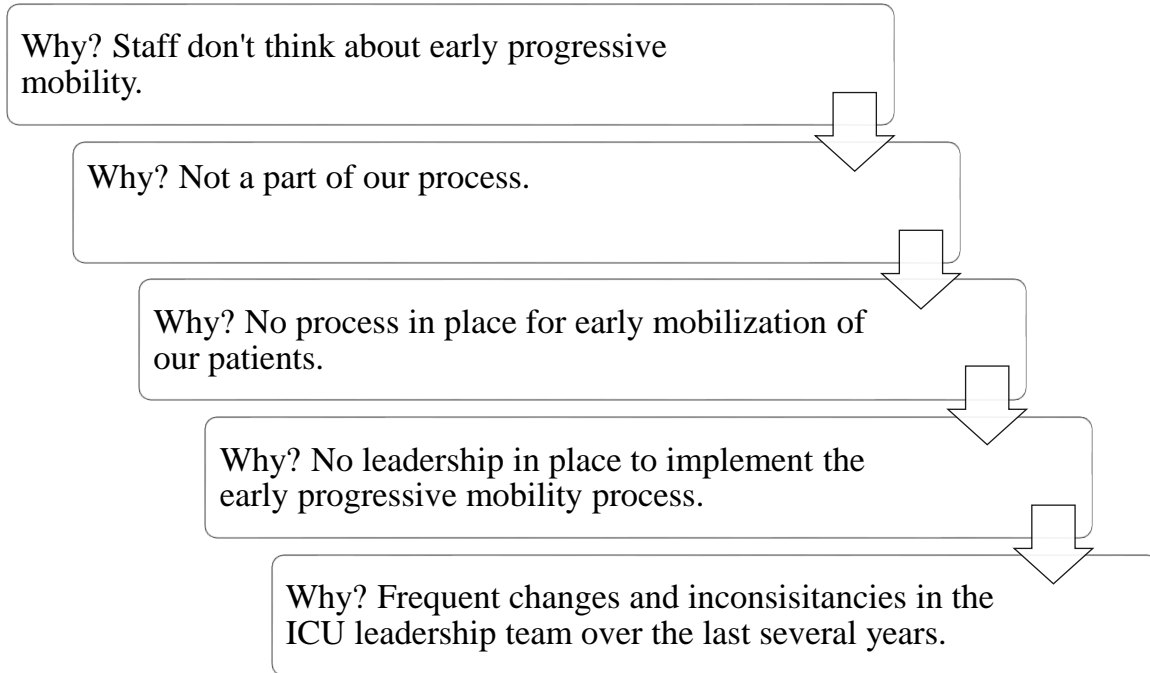
(Nelson, Batalden, Godfrey & Lazar, 2017)

Appendix D

Staff Survey to help determine baseline knowledge of EPM

Pre-Implementation Survey

What does Early Progressive Mobility (EPM) mean to You?

1. **What are the components of Early Progressive Mobility (EMP)?**

o   Active ROM

o   Q 2 hour turning

o   Ambulation

o   Lifting patient up to chair.

2. **When should early progressive mobility be initiated?**

o   On admission.

o   Within 8 hours of admission to ICU

o   After assessment to determine if patient meets criteria for EPM.

3. **How often should patients be assessed for EMP?**

    o   Once every 12 hours

    o   Once every 24 hours

    o   Once every 48 hours

4. **Who is your EPM team (select all that apply)?**

    o   PT & RT

    o   OT

    o   RN & PCT

    o   Lift team

    o   All the above

5. **What are the goals of EPM (select all that apply)?**

    o   Decrease LOS

    o   Decrease days on Vent

    o   Decreased incidences of VAE.

6. **What is the number one barrier to EMP?**

    o   Knowledge

    o   Resources

    o   Staffing

    o   Processes

7. **Name three benefits of EPM (for patients).**

    1

    2

    3

8. **Is it important to assess baseline mobility levels prior to initiating early progressive mobility?**
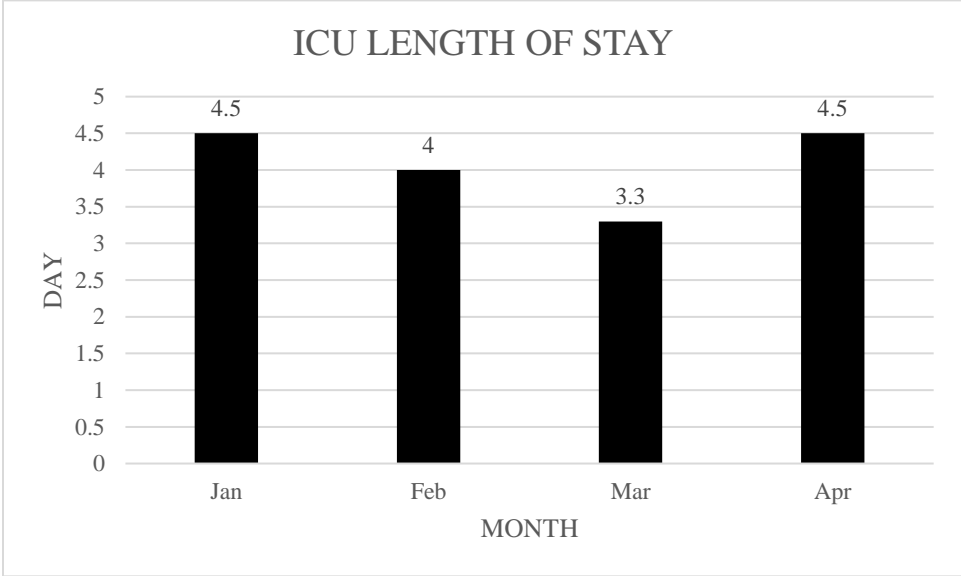
    o   True

    o   False
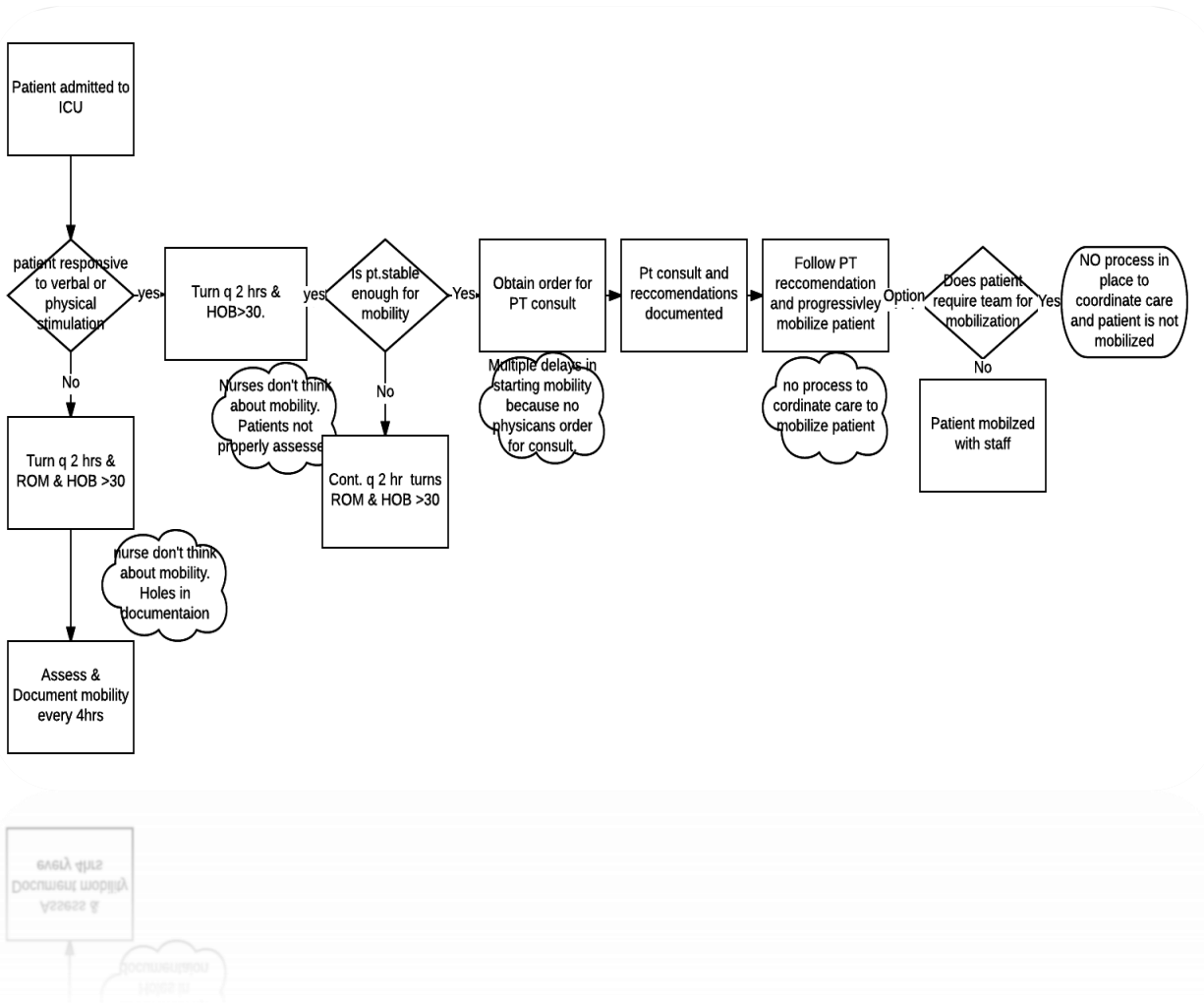
Appendix E

DMAIC Model

(DMAIC, n.d)

Appendix F

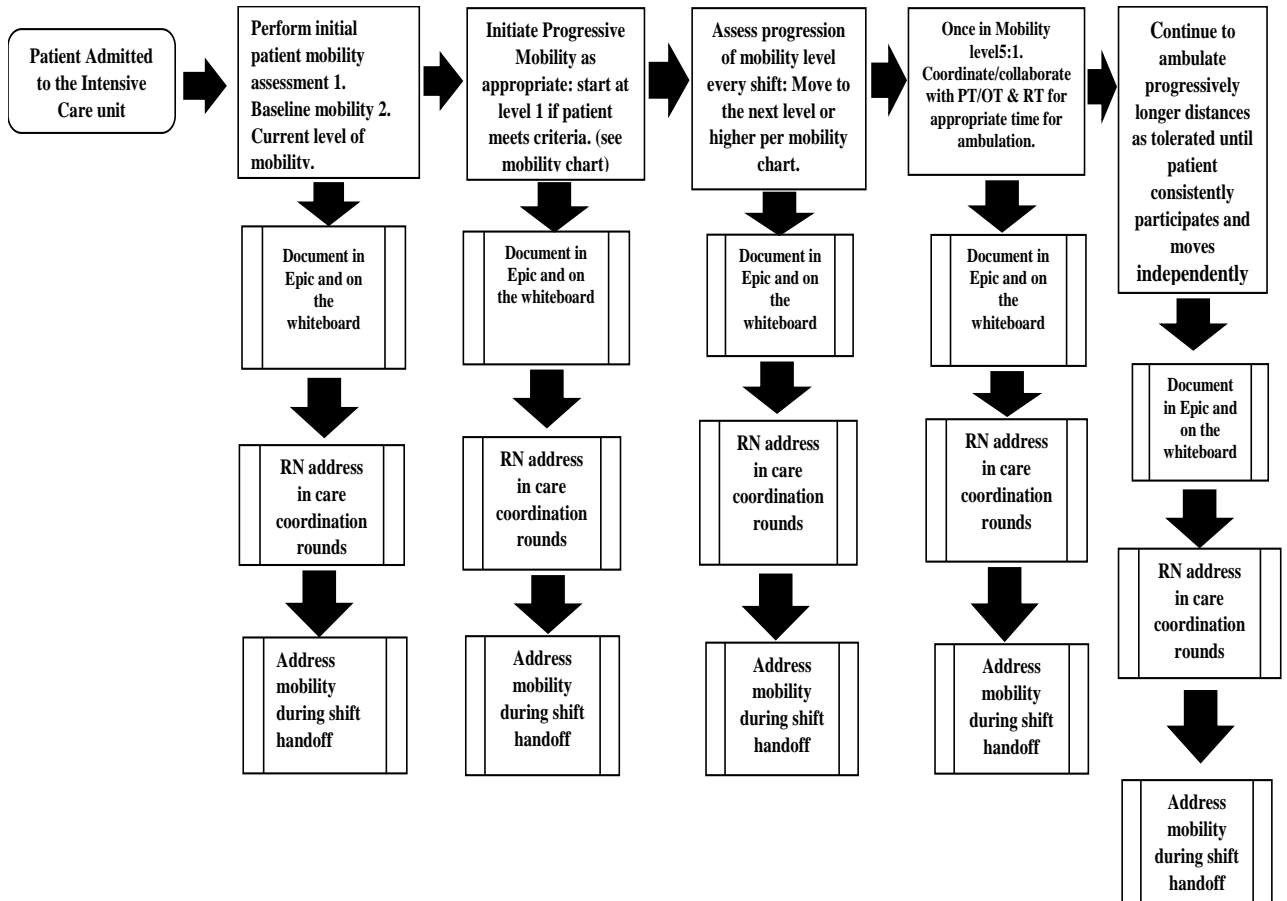Intensive Care Unit Length of Stay for January -April 2017

ICU LENGTH OF STAY

Appendix G

Current mobility practice in the ICU

Appendix H

Future process of Early Progressive Mobility in the ICU

| Patient Admitted to the Intensive Care unit | → | Perform initial patient mobility assessment 1. Baseline mobility 2. Current level of mobility. | → | Initiate Progressive Mobility as appropriate: start at level 1 if patient meets criteria. (see mobility chart) | → | Assess progression of mobility level every shift: Move to the next level or higher per mobility chart. | → | Once in Mobility level5:1. Coordinate/collaborate with PT/OT & RT for appropriate time for ambulation. | → | Continue to ambulate progressively longer distances as tolerated until patient consistently participates and moves independently |

Column 1 (Perform initial patient mobility assessment):
↓ Document in Epic and on the whiteboard
↓ RN address in care coordination rounds
↓ Address mobility during shift handoff

Column 2 (Initiate Progressive Mobility):
↓ Document in Epic and on the whiteboard
↓ RN address in care coordination rounds
↓ Address mobility during shift handoff

Column 3 (Assess progression of mobility level):
↓ Document in Epic and on the whiteboard
↓ RN address in care coordination rounds
↓ Address mobility during shift handoff

Column 4 (Once in Mobility level 5:1):
↓ Document in Epic and on the whiteboard
↓ RN address in care coordination rounds
↓ Address mobility during shift handoff

Column 5 (Continue to ambulate progressively):
↓ Document in Epic and on the whiteboard
↓ RN address in care coordination rounds
↓ Address mobility during shift handoff

<u>Appendix I</u>

<u>Early Progressive Mobility Test</u>

1. List three patient benefits of Early Progressive Mobility.
    a. Decreased ventilator day
    b. Improved Circulation
    c. Edema
    d. Decreased risk of pneumonia

2. When is mobility contraindicated?
    a. If patient is on vasopressors.
    b. Patients with ICP or multiple fractures.
    c. Patients receiving paralytics.

3. Early Mobility is planned movement in a sequential manner beginning at a patient's current mobility status and returning to baseline.
    a. True
    b. False

4. Early Progressive Mobility includes the following (select all that apply)
    a. Head movement
    b. Manual turning
    c. Passive and active ROM
    d. CLRT
    e. Movement against gravity
    f. Chair position
    g. Dangling
    h. Ambulation

5. How often should you assess patient's mobility level?

6. Early Progressive Mobility Will Length of Stay
    a. True
    b. False

7. Continuous Lateral Rotation Therapy (CLRT) is a gentle side to side motion in which one lung is placed above the other with the full body in motion. This motion allows gravitational flow as well as mobilization of pulmonary secretions to better allow ventilation and perfusion matching to take place.
   a. True
   b. False

8. Lifting a patient from the bed to the (without their help) chair is considered Early Progressive Mobility
   a. True
   b. False

9. Determining the patient's baseline mobility level on admission is important?
   a. True
   b. False

10. When should Early Progressive Mobility start on your patient?
    a. On admission with a baseline mobility assessment
    b. When the patient is hemodynamically stable.
    c. When the patient agrees to participate
    d. When the physician writes orders.

Appendix J

Mobility tool used by this CNL to track mobility barriers and mobility documentation

Room #	Baseline Mobility level	Current Mobility Level	Barriers to Mobility	Staff Concerns
1	No documentation	1	RN will speak to CC physician to see if its ok to mobilize patient	Need orders
2	No documentation	None	Patient O2 stats drop with activity	Patient O2 stats drop with activity
4	Ambulatory	None	Need to change trach first. Need to coordinate care with the trach change.	Will need to coordinate care with getting trach changed
9	Independent at home	1	Patient refusing care. Will not let staff turn him	Patient refusing
11	No documentation	1	NO purposeful movement	ROM at most
16	Ambulating at home PTA on 5/25	1	No purposeful movement	ROM at most
14	Dependent does less than 25% of care	No documentation	No documentation	No documentation
2	No documentation	No documentation	No documentation	Patient refusing care
3	No Documentation	1	Not now in a few days	Not stable
1	No Documentation	1	No documentation	Not stable

Notes. Additional barriers in mobility include patients not being seen by PT. Staff states PT evaluates and assesses the patients in the order according to when the orders are placed in EPIC. When PT comes to assess the patient and they are still sedated, they will return in one hour after the sedation is turned off but they usually set side tracked and do not return. Another barrier is lack of available resources to mobilize patients. One staff nurse stated If I don't have the help and I can't mobilize the patient by myself, the mobility is delayed if it happens at all.