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Evaluation of MOVE Early Mobility Screening Protocol in Non-Surgical Mechanically Ventilated Patients in the Intensive Care Unit

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DNP Final Project Report

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Dedication

This work and my DNP Project is dedicated to my amazing parents, Kristan and David Swindler, who have always believed in me and supported my dreams. Every sacrifice you have made to get me to this point was not in vain. Thank you for giving me the opportunity to make you proud.

This is for my Nana Jan and soul sister Hillary Wile, who have reminded me (countless times) that when the going gets tough, the tough get going. Your constant words of encouragement have been and will always be driving forces in my life. I could not have asked for better cheerleaders, especially during this program.

This is for my beautiful partner Stephanie Mosier, who reminded me to stay positive and focus on the light at the end of the tunnel. Thank you for being my steady rock during the home stretch of this important chapter of my life. Your patience and selflessness during this time will never be forgotten.

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Abstract

Objective: To evaluate the effectiveness of a previously implemented, nurse driven early mobility screening protocol, called "MOVE", during its first 6 months of use.

Methods: A retrospective electronic medical record review was conducted (*n=100*) at Norton Audubon Hospital in Louisville, KY. Eligible electronic medical records were randomly selected and audited for the following variables: age, sex, ethnicity, admission diagnosis, comorbidities, ventilator days, invasive catheters, utilization of vasoactive or inotropic medications, restraint use, continuous sedation medications, Richmond Agitation Sedation Score (RASS), Confusion Assessment Method for the ICU (CAM-ICU), nurse adherence to charting of MOVE enrollment eligibility, physical therapy (PT) intervention, occupational therapy (OT) intervention, range of motion (ROM), sitting on the side of the bed, standing on the side of the bed, ambulation, intensive care unit (ICU) length of stay (LOS), hospital LOS, initial consult and discharge Activity Measure for Post-Acute Care (AM-PAC) mobility scores, and discharge disposition. Data were analyzed using descriptive statistics.

Results: No statistically significant relationships between the MOVE program mobility practices and characteristics specific to the patient population were found. Crosstabulation of data revealed: 7% of the sample (*n=100*) met criteria for the MOVE program and received early mobility via PT/OT intervention; 64% did not meet criteria; and 29% were never screened for eligibility. Of the 7 patients who met criteria and received early mobility, 100% *(n=7)* received active/passive ROM, 57.1% *(n=4)* sat edge of bed, 28.6% *(n=2)* stood edge of bed, and 14.3% *(n=1)* ambulated while on the ventilator.

Conclusion: This study resulted in recommendation for evaluation of nurse knowledge of MOVE early mobility screening protocol importance and procedure. Evaluation of perceived barriers to adherence of screening protocol should also be investigated to increase stakeholder buy in and ensure future program success.

Background

Over the past decade, there has been an increased focus on providing evidence-based care to patients across the continuum. As more patients survive the acute phase of illness within the critical care arena, unintended secondary complications and consequences of critical care have surfaced. Heightened attention to quality and patient-centered outcomes has underscored the importance of obtaining evidence that supports the interventions designed to treat critically ill patients. A topic that has piqued the interest of many researchers and clinicians is immobility and its negative effects in the critically ill, mechanically ventilated patient population.

Patients in intensive care settings are at extremely high risk for immobility and its secondary complications, such as pressure ulcers, ventilator-associated pneumonia (VAP), deep vein thromboses (DVTs), and falls. High levels of acuity and perceived barriers toward mobility predispose patients in the intensive care unit (ICU) to extended periods of bedrest. Skeletal muscle wasting and weakness are significant complications associated with critical illness and reduced mobility during temporary and long term mechanical ventilation. After one week of bed rest, muscle strength can decrease as much as 20%, with an additional 20% loss of remaining strength each subsequent week (Sciaky, 1994; Mendez-Tellez & Needham, 2012). Persistent weakness impairs tissue oxygenation and can ultimately delay ventilator weaning (DeJonghe et al., 2007). Prolonged mechanical ventilation has been statistically linked to decreased quality of life, functional decline, protracted recovery, and long term physical and cognitive deficits along with increased delirium, morbidity, mortality, length of hospital stay, hospital readmissions, and overall cost of care (Hopkins et al., 2016; Hermans, 2014; Kayambu,

Boots, & Paratz, 2013; Parry & Puthucheary, 2015). Ventilator-associated pneumonia (VAP), for example, is a healthcare acquired complication linked to prolonged mechanical ventilation that negatively impacts patient outcomes and total cost of care.

According to AACN Practice Alert issued in 2008, "critically ill patients who are intubated for >24 hours are at 6 to 21 times the risk of developing VAP and those intubated for <24 hours are at 3 times the risk of VAP" (p. 83). VAP is also associated with a substantial increase in hospital LOS by an average of 7-9 days per patient and an increase of approximately $40,000 in mean hospital charges per patient (Galal, Youssef, & Ibrahiem, 2016; Rello et al., 2002). More importantly, morbidity and mortality associated with the development of VAP is high, with mortality rates ranging from 4.4 to 13% (AACN, 2017). Preventative interventions, like early mobility, can drastically decrease the incidence of VAP and other secondary complications of immobility.

Early mobility protocols (EMPs) have been shown to be effective in decreasing total ventilator days, healthcare acquired complications, hospital length of stay (LOS), and overall cost of care; these protocols also increase functionality, quality of life, and patient outcomes (Adler & Malone, 2012; Morris et al., 2008; Olkowski et al., 2015; Schweickert et al., 2009). Research and expert consensus have established that mobility screening protocols are feasible, safe, and easily replicable (Bailey, et al., 2007; Hashem, Parker, & Needham, 2016; Moyer et al., 2017; Sottile et al., 2015). In 2015, Bognar et al. used literature based clinical outcome estimates of EMPs for ICU patients to develop a financial impact model and simulate the impact of introducing an EMP in an ICU on costs to hospitals, third-party payers, and capitated healthcare delivery systems. Results from this study concluded that "the total net present value over a seven-year time horizon

of an EMP for a US hospital with 1000 yearly ICU admissions exceeds $2.3m" (p. 1). In addition, the yearly cost of care savings generated by reducing ICU LOS and numbers of days on the ventilator was approximately $927,000. Finally, the impact of EMPs on hospital readmission rates saves an additional $93,000 annually by reducing hospital readmission penalties.

A needs assessment study conducted by University of Kentucky DNP graduate Dr. Catharine Morgan (2016) established the need for an early mobility protocol in the Open Heart Unit (OHU) and ICU at Norton Healthcare (NHC) Audubon Hospital. A nurse driven mobility screening tool and program, called MOVE, was developed and implemented throughout the NHC system on January 9, 2017 in response to the needs assessment data obtained by Dr. Morgan, DNP. Nursing and rehabilitation staff were trained via a one time, mandatory online education module prior to the launch date.

Description of MOVE Early Mobility Protocol

The NHC MOVE early mobility screening protocol consists of a mandatory shift assessment of each ICU patient's early mobility eligibility and mobility level once every 12 hours. Nursing staff are required to document if the patient does or does not meet criteria for enrollment into the MOVE program based on the following criteria: Myocardial Stability, Oxygenation Adequate, Vasopressor(s) Minimal, and Engages to Voice (see Figure 4). If the patient meets the aforementioned criteria, proper documentation of "Criteria Met" will trigger a best practice advisory (BPA) alert, which will in turn order PT/OT services. This BPA triggered order must be signed as a standing order by the nurse before it will enroll the patient into the MOVE program. Patient activity level should also be documented by nursing staff to trend mobility level over the

course of the patient's hospitalization. Nursing adherence to documentation of eligibility and mobility level is crucial for the success of the MOVE Program.

Purpose

The purpose of this retrospective study was to evaluate the effectiveness of a previously implemented, nurse driven early mobility screening protocol, called MOVE, during its first 6 months of implementation and to determine if there is a connection between the MOVE Program and improved patient clinical outcomes. Objectives included the following:

a. Conduct a retrospective electronic medical record review to evaluate nursing adherence to documentation of MOVE Criteria (defined by documentation of criteria met vs. criteria not met) and performance of appropriate level of activity (defined by range of motion, sitting on side of bed, standing at side of bed, ambulation, activity measure for post-acute care [AM-PAC] scores, physical therapy and occupational therapy order).
b. Determine the association between MOVE Program and characteristics specific to the patient population including admission diagnosis, comorbidities, ventilator days, invasive catheters, utilization of vasoactive or inotropic medications, restraint use, continuous sedation medications, Richmond Agitation Sedation Score (RASS), Confusion Assessment Method for the ICU (CAM-ICU), ICU LOS, hospital LOS, initial consult and discharge AM-PAC scores, and discharge disposition.
c. Compare post-implementation outcomes of MOVE Program patients to those of pre-implementation group from Dr. Morgan's need assessment. Pre- and post-

implementation outcome data to be analyzed include PT and OT intervention, ICU LOS, hospital LOS, and discharge disposition.

Methods

Design

This study was a single-center, post-implementation retrospective report of the impact of nurse driven early mobility program MOVE. Data were collected via retrospective electronic medical record review for eligible patients admitted between January 9, 2017 and July 9, 2017.

Setting

With a network of five hospitals, 13 immediate care centers, and 190 physician practices, NHC is the largest health care system in Louisville, KY and the surrounding region. NHC's Audubon Hospital, a 432-licensed bed acute care hospital, was the focus of this study. Data points were collected on eligible patients who were admitted to Audubon ICU or OHU during the aforementioned study period. The ICU is an 18-bed unit and the OHU is a 16-bed unit. The typical nurse to patient ration is 1:2, occasionally 1:1 or 1:3 based on patient acuity. There are two patient care associates (PCAs) and one respiratory therapist (RT) assigned to each unit each 12 hour shift.

Sample

The patient population of interest was non-surgical, mechanically ventilated patients admitted to Audubon ICU or OHU. A total of 284 patients met inclusion criteria during the study interval. A sample of 100 patients were chosen using a random number generator. Inclusion criteria were mechanically ventilated patients at least 18 years old that had been mechanically ventilated for at least 48 hours, had a RASS score of -1 to +1

(see Figure 2), and did not have major surgery lasting more than one hour at any point during their hospital stay. Exclusion criteria were any surgery lasting more than one hour, palliative care order, hemodynamic instability (defined by MAP <55, pulmonary instability defined by FiO_2 >60%, PEEP > 10 cmH_2O), presence of femoral central venous catheter, femoral arterial sheath, or open abdominal wounds.

Data Collection

Approvals from the Norton Healthcare Office of Research and Administration (NHORA) and the University of Kentucky Institutional Review Board (IRB) were obtained prior to data collection. This study was based on a retrospective chart review. Patient charts were obtained from Norton Healthcare's electronic patient database. During data collection, patient records were accessed using the patient medical record number (MRN). Each chart was screened to determine if the inclusion criteria were met. All patients that met the inclusion criteria were assigned a unique study number and had data transferred to a separate electronic data collection spreadsheet. For privacy purposes, no patient identifying information was included on the electronic data collection spreadsheet. The primary investigator was the only individual with access to the master list of patients' MRNs and unique study numbers. The master list and electronic data collection spreadsheet were kept on Norton Healthcare's H: drive, which is both password and firewall protected.

Data were collected related to the following study variables: age, gender, ethnicity, comorbidities, ICU and hospital LOS, ventilator days, invasive catheters, utilization of vasoactive medications, continuous sedation drips, level of sedation using the RASS, presence of delirium using the CAM-ICU, restraint use, nurse adherence to

documentation of MOVE eligibility (Figure 4), PT consults, OT consults, ROM, sitting on the side of the bed, standing at the side of the bed, ambulation, initial consult and discharge AM-PAC scores, and disposition at discharge from the hospital. Please refer to Appendix A for complete data collection form.

RASS is a 10-point scale used to assess a patient's level of sedation. RASS has four levels of anxiety or agitation (+1 to +4 [combative]), one level to denote a calm and alert state (0), and five levels of sedation (-1 to -5 [unarousable]). A RASS of -2 is typically considered the target goal for continual sedation, which is considered light sedation (Figure 2). The CAM-ICU monitors the patient for the development or resolution of delirium in intensive care. This tool assesses four features: 1) acute change or fluctuation in mental status from baseline, 2) inattention, 3) altered level of consciousness, and 4) disorganized thinking (Figure 3). The CAM-ICU is positive, and the patient is considered to have delirium, if features 1 and 2 and *either* feature 3 or 4 are present. A positive result indicates that delirium is present and a negative result indicates that there is no delirium. Finally, PT/OT at NHC use the Boston University AM-PAC basic mobility short form to assess a patient's level of mobility. A score of 6 indicates that the patient is completely dependent and a score of 24 means that the patient is completely independent (Figure 5).

Data Analysis

Data analysis from the retrospective electronic medical record review was performed using IBM SPSS version 23.0. Data were analyzed using descriptive statistics, including frequency distributions, means, and percentages. These results were used to evaluate study objectives.

Results

Sample Characteristics

A total of 284 electronic medical records were reviewed during the data collection time period and 100 met the inclusion criteria for this study. The mean age was 61 years old, with the majority of patients being male and Caucasian. Top two admission diagnoses included acute respiratory failure and COPD exacerbation. Complete sample demographics can be found in Table 1.

Study Results

No statistically significant relationships between the MOVE program mobility program and characteristics specific to the patient population were found. Majority of patients had a high comorbidity burden, with seven to nine individual comorbidities (Table 2). Mean ventilator days, ICU LOS, and hospital LOS were similar in both groups (Table 3). Despite the frequent use of sedation within the sample population (83.7%), all patients included in the study maintained a RASS of -1 to +1 (Figure 2), indicating appropriate wakefulness to participate in early mobility exercises. Very little data on CAM-ICU was collected related to lack of documentation; therefore, conclusions regarding delirium could not be made.

Crosstabulation of data revealed: 7% of the sample (*n=100*) met criteria for enrollment in the MOVE program and received early mobility via PT/OT intervention; 64% did not meet criteria for enrollment; and 29% were never screened for eligibility. No statistically significant bias of age, gender, race, or comorbidity burden for patients that were never screened for eligibility was identified. Of the 93 patients who were not enrolled in MOVE, 91.1% *(n=92)* had bedrest orders and 96.7% *(n= 89)* received

standard practice of active/passive ROM. Only 1.1% *(n=1)* received PT and OT intervention while intubated. No patients from this group sat on the edge of the bed, stood at the edge of the bed, or ambulated while intubated. Many of these patients had PT/OT orders; however, intervention was deferred until the patient was taken off the ventilator.

Of the 7 patients who met criteria and received MOVE early mobility, 100% *(n=7)* received active/passive ROM, 57.1% *(n=4)* sat on the edge of the bed, 28.6% *(n=2)* stood at the edge of the bed, and 14.3% *(n=1)* ambulated while on the ventilator. No adverse events or injuries during PT/OT intervention were documented. In this group, 85.7% *(n=6)* had an oral endotracheal tube, 85.7% *(n=6)* had restraints, 71.4% *(n=5)* had continuous sedation drips, and the average number of invasive catheters was three. Average time from MOVE protocol triggered PT/OT order to consultation was 55 minutes. Average increase in AM-PAC score (please refer to Figure 5 for scoring details) from initial consult to discharge was 2.8 points. Discharge disposition for this group included: 28.6% *(n=2)* home; 14.3% *(n=1)* home health; 28.6% *(n=2)* rehab; 14% *(n=1)* skilled nursing facility (SNF); and 14.3% *(n=1)* long term acute care center (LTAC). A bar graph comparing discharge dispositions between patients enrolled in MOVE mobility program and those not enrolled can be found in Figure 1.

Discussion

Pre Implementation Needs Assessment Data

A needs assessment study conducted by University of Kentucky DNP graduate Dr. Catharine Morgan (2016) established the need for an early mobility protocol in the ICU and OHU at Audubon Hospital. A retrospective electronic medical record chart review of 100 non-surgical mechanically ventilated patients admitted to Audubon's ICU

or OHU between January 1, 2015 and December 31, 2015 revealed a low incidence of sitting on the side of the bed (*n=2*), standing at side of the bed (*n=1*), and patients ambulated (*n=0*) during the study period. An additional unintended finding was the lack of charting on sedation using RASS and delirium using CAM-ICU tool. Dr. Morgan's study suggested that "a nurse driven mobility protocol would aid in getting mobility initiated earlier, and more consistent initiatives throughout the day" (2016, p.10).

Post Implementation Evaluation of MOVE

Inability to make statistically significant associations between demographic data and MOVE mobility outcomes was related to small sample size of patients enrolled in MOVE program during the six month study period. Although not statistically significant, the 7 patients who did receive MOVE early mobility showed promising results. Once the nurse documented "criteria met" and patient was enrolled in MOVE, time between PT/OT order and consult ranged from 23 to 92 minutes, with a cumulative average of 55 minutes. In addition to timely intervention, no adverse events or injuries during MOVE PT/OT intervention were documented during the study period. The patients enrolled in MOVE were able to safely participate in physical activity despite 85.7% having an oral endotracheal tube, 85.7% having restraints, and 71.4% having continuous sedation drips. Patients enrolled in MOVE demonstrated a 2.8 point increase in AM-PAC score from initial PT/OT consult to discharge. Return to functionality plays a major role in discharge disposition. The majority of the patients who received early mobility were able to discharge home, home with home health, or with outpatient rehab; whereas, the majority of patients who did not receive early mobility discharged to a skilled nursing facility. In terms of cost savings, the average cost of inpatient stays discharged to skilled nursing

facility in 2013 was around $17,000, which was more than twice the average cost of inpatient stays with a routine home discharge of $8,000 (AHRQ, 2016). Discharge to a long term acute care facility is four and a half times the cost of routine discharge at $36,000.

Comparison to pre-implementation data collected by Dr. Morgan, DNP (2016) indicates that the nurse driven early mobility screening protocol currently in place, MOVE, is not reaching its full potential. During the duration of this post-implementation study, only seven patients *(n=100)* were enrolled in MOVE. Of these seven patients, four patients sat on the edge of the bed, three stood at the edge of the bed, and only one ambulated. Results from this study also revealed that 29% of ventilated patients in the ICU or OHU were never screened for eligibility, further indicating that MOVE is underutilized. Including Dr. Morgan's needs assessment, this is the second study demonstrating need for increased mobility in ICU and OHU at Audubon Hospital.

Implications for Practice

Data surrounding the positive impact of early mobility in the mechanically ventilated patient population is growing at a rapid rate. Randomized control trials, meta-analyses, and systematic reviews have been conducted to support the use of an early mobility protocol in the ICU. For example, in a pre/post cohort study of 104 patients with respiratory failure, transfer from a traditional ICU to a respiratory ICU, where active mobilization was a priority, resulted in a 2.5-fold increase in the odds of ambulation despite identical staffing in the two ICUs (Thomsen, Snow, Rodriguez, & Hopkins, 2008). This finding suggests the respiratory ICU's focus on rehabilitation played a crucial role in the observed increase in ambulation. Despite the compelling evidence, successful

implementation of a nurse driven mobility protocol (i.e. MOVE) requires adequate stakeholder buy in and proper utilization. If barriers exist, they must be addressed.

Research has identified several commonly perceived barriers to early mobility, including cultural barriers (competing patient priorities, insufficient coordination, timing conflicts, etc.), use of sedation, fear of adverse events, workload burden, staffing concerns, and cost (Hasham, Parker, & Needham, 2016). A study by Boehm et al. (2017) showed a statistically significant relationship between the perceptions of workload burden and adherence to an early mobility protocol among ICU providers. The study concluded that "for every unit increase in workload burden, adherence to [early mobility] bundle decreased by 53%" and "for every unit increase in perceived difficulty carrying out [early mobility] bundle, adherence with early mobility was reduced 59%" (p. 38). The culture of a unit can have a major impact (positive or negative) on unit priorities, practices, and outcomes (Hopkins et al., 2016). One barrier identified in this study is the high number of patients with active bedrest orders. When a patient is admitted to the ICU, a bedrest order is entered as part of the ICU standing order set. This bedrest order could deter stakeholders from initiating early mobility. An order for the MOVE criteria must be added to the ICU standing order set to ensure that patients are being properly screened and given the opportunity receive early mobility as soon as possible. If a patient meets criteria for MOVE early mobility, the standing MOVE order could supersede the existing standing bedrest order.

Sustaining any clinical improvement initiative requires an organizational culture change. Results from Dr. Morgan's study and this study indicate that Audubon may not have a strong culture of early mobility. In order to create and sustain a culture of change

surrounding early mobility in the ICU and OHU at Audubon, all stakeholders (physicians, advanced practice providers, staff nurses, RTs, PTs, OTs, and PCAs) must feel empowered, motivated, and supported. Focus groups, interviews, and anonymous surveys could be conducted to assess unit culture and identify any perceived barriers to MOVE adherence. Presenting evidence to support early mobility practices, mentoring late adopters, and leading by example could help increase stakeholder buy in. In addition, a process of continuous training and evaluation needs to be established and implemented to maintain best practice. Multimodal education tools on MOVE should be developed and used during on-boarding and yearly skills assessments to increase nursing knowledge and establish early mobility as a unit priority. Physicians and advanced practice providers writing sedation orders should also be educated on their unique role in early mobility. Continual recognition of ongoing positive outcomes through emails, patient stories, unit posters, and staff meetings could increase awareness and provide nurses with a sense of ownership. Discussion of patient's early mobility progress and MOVE eligibility during interdisciplinary rounds could also increase ownership and adherence.

Recommendations for Future Studies

Future studies should include a larger sample size and more than one hospital site. This will aid in a more complete clinical picture and contain a more inclusive population. Studies examining the use of sedation and frequency of delirium in this patient population would be beneficial. This study did not examine the type of sedation used while on the vent. Early mobility sedation protocols could be investigated and implemented to increase provider adherence. Piloting a protocol that requires daily evaluation and reordering of sedation could decrease over sedation and, in turn, increase

early mobility within this population. Additional considerations would be to examine nurse knowledge and perception of early mobility in the ICU and OHU at Audubon Hospital. Studies evaluating perceived barriers to adherence to MOVE protocol should also be investigated to increase stakeholder buy in and ensure future program success. MOVE mobility practices at other NHC facilities could be evaluated to identify similarities and differences in culture, adherence rates, and associated mobility outcomes. Outcome variables may be trended as more patients are enrolled in MOVE.

Conclusion

Critically ill patients are subjected to long periods of immobility, which often leads to secondary complications, prolonged intubation, and increased ICU and hospital length of stay. This retrospective chart review was designed to evaluate the effectiveness of Norton Healthcare's MOVE program, a nurse driven early mobility screening tool and protocol. Findings of this study revealed an inability to make a statistical significance between the MOVE program and characteristics specific to the patient population. Comparison to pre-implementation needs assessment revealed a consistently low use of early mobility, despite MOVE intervention. Based on the results of this study, nurse knowledge of the importance of the MOVE protocol and its procedures should be evaluated. Evaluation of perceived barriers to adherence of screening protocol should also be investigated.

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Table 1. *Demographic Variables*

Demographic Characteristics by Group		
Characteristic	***Received MOVE Early Mobility***	
	No (n = 93)	***Yes (n = 7)***
	n (%)	***n (%)***
Age, years Mean (SD)	*61.8 (12.5)*	*61.4 (12)*
Sex		
Male	*51 (55.4%)*	*4 (57.1%)*
Female	*42 (44.6%)*	*3 (42.9%)*
Race		
African American	*22 (23.9%)*	*2 (28.6%)*
Caucasian	*68 (73.9%)*	*5 (71.4%)*
Hispanic	*1 (1.1%)*	-
Native Hawaiian/Pacific Islander	*1 (1.1%)*	-
Admission Diagnosis		
Cardiac arrest	*6 (6.5%)*	-
Acute respiratory failure	*20 (21.7%)*	*2 (28.6%)*
Shortness of air	*3 (3.3%)*	*1 (14.3%)*
Pneumonia	*6 (6.5%)*	*1 (14.3%)*
Altered mental status/Seizures	*12 (13%)*	-
Sepsis	*13 (14.1%)*	-
Chest pain/Congestive Heart Failure	*9 (9.8%)*	-
Chronic Obstructive Pulmonary Disease	*14 (15.2%)*	*3 (42.9%)*
Renal Failure	*3 (3.3%)*	-
Other	*6 (6.5%)*	-
Notes: Standard deviation (SD)		

Table 2. *Comorbidities*

Individual Comorbidities and Comorbidity Burden by Group		
	Received MOVE Early Mobility	
	No (n = 93)	***Yes (n = 7)***
Individual Comorbidity	***n (%)***	***n (%)***
DM		
Yes	*30 (32.6%)*	*4 (57.1 %)*
No	*63 (67.4%)*	*3 (42.9%)*
HTN		
Yes	*71 (77.2%)*	*5 (71.4%)*
No	*22 (22.8%)*	*2 (28.6%)*
COPD		
Yes	*51 (54.3%)*	*4 (57.1%)*
No	*42 (45.7%)*	*3 (42.9%)*
OSA		
Yes	*28 (30.4%)*	*2 (28.6%)*
No	*65 (69.6%)*	*5 (71.4%)*
HLD		
Yes	*58 (63%)*	*3 (42.9%)*
No	*35 (37%)*	*4 (57.1%)*
CHF		
Yes	*38 (41.3%)*	*3 (42.9%)*
No	*54 (58.7%)*	*4 (57.1%)*
Comorbidity Burden (sum of individual comorbidities)	***n (%)***	***n (%)***
0	-	-
1-3	*11 (12%)*	-
4-6	*11 (12%)*	*2 (28.6%)*
7-9	*56 (60.9%)*	*4 (57.1%)*
>10	*14 (15.2%)*	*1 (14.3%)*

Notes: Diabetes Mellitus (DM); Hypertension (HTN), Chronic Obstructive Pulmonary Disease (COPD); Obstructive Sleep Apnea (OSA); Hyperlipidemia (HLD); Congestive Heart Failure (CHF).

Table 3. *Clinical Variables*

Clinical Variables by Group		
Clinical Variable	***Enrolled in MOVE Program***	
	No (n = 93)	***Yes (n = 7)***
Ventilator days, Mean	*6.3 (2-28)*	*6.0 (3-17)*
ICU LOS, Mean	*8.7 (2-28)*	*8.1 (2-27)*
Hospital LOS, Mean	*14 (4-37)*	*14 (5-30)*
Restraints	*87 (93.5%)*	*6 (85.7%)*
Continuous Sedation	*77 (82.8%)*	*5 (71.4%)*
Vasopressor(s)	*36 (38.7%)*	*3 (42.9%)*
Notes: Length of Stay (LOS) in days		

Table 4. *Mobility Variables*

Mobility Variables by Group		
Mobility Variable	***Enrolled in MOVE Program***	
	No (n = 93)	***Yes (n = 7)***
	n (%)	***n (%)***
Activity ordered: bedrest	*92 (91.1%)*	*-*
PT intervention	*1 (1.1%)*	*7 (100%)*
OT intervention	*1 (1.1%)*	*7 (100%)*
Active or passive ROM	*89 (96.7%)*	*7 (100%)*
Sat edge of bed	*-*	*4 (57.1%)*
Stood edge of bed	*-*	*2 (28.6%)*
Ambulated	*-*	*1 (14.3%)*
Notes: Physical therapy (PT); Occupational therapy (OT); Range of motion (ROM)		

Figure 1. *Discharge Disposition*

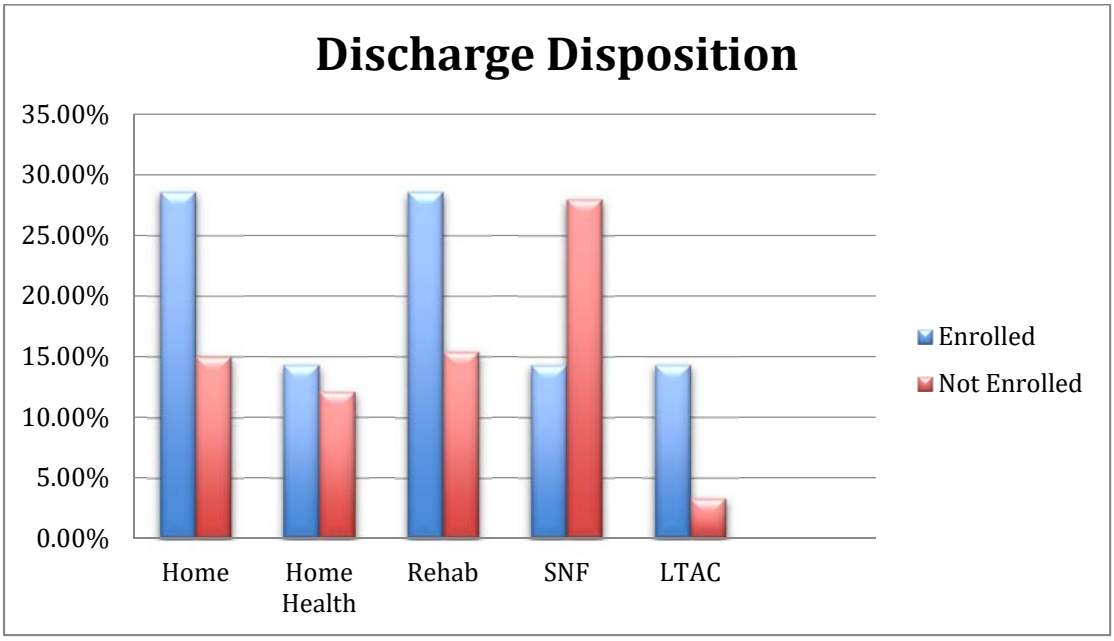

Figure 2. *Richmond Agitation & Sedation Scale (RASS).*

RASS score

Richmond Agitation & Sedation Scale				CAM-ICU
Score	Description			
+4	Combative	Violent, immediate danger to staff		RASS ≥ -2 Proceed to CAM-ICU assessment
+3	Very agitated	Pulls at or removes tubes, aggressive		
+2	Agitated	Frequent non-purposeful movements, fights ventilator		
+1	Restless	Anxious, apprehensive but movements not aggressive or vigorous		
0	Alert & calm			
-1	Drowsy	Not fully alert, sustained awakening to voice (eye opening & contact >10 secs)	Voice	
-2	Light sedation	Briefly awakens to voice (eye opening & contact < 10 secs)		
-3	Moderate sedation	Movement or eye-opening to voice (no eye contact)		RASS < -2 STOP Recheck later
-4	Deep sedation	No response to voice, but movement or eye opening to physical stimulation	Touch	
-5	Un-rousable	No response to voice or physical stimulation		

(Kerson et al., 2016)

Figure 3. *CAM-ICU Assessment Methods*

Table 1. The Confusion Assessment Method for the Intensive Care Unit (CAM-ICU)

Features and Descriptions	Absent	Present
I. Acute onset or fluctuating course*		
A. Is there evidence of an acute change in mental status from the baseline? B. Or, did the (abnormal) behavior fluctuate during the past 24 hours, that is, tend to come and go or increase and decrease in severity as evidenced by fluctuations on the Richmond Agitation Sedation Scale (RASS) or the Glasgow Coma Scale?		
II. Inattention†		
Did the patient have difficulty focusing attention as evidenced by a score of less than 8 correct answers on either the visual or auditory components of the Attention Screening Examination (ASE)?		
III. Disorganized thinking		
Is there evidence of disorganized or incoherent thinking as evidenced by incorrect answers to 3 or more of the 4 questions and inability to follow the commands? Questions 1. Will a stone float on water? 2. Are there fish in the sea? 3. Does 1 pound weigh more than 2 pounds? 4. Can you use a hammer to pound a nail? Commands 1. Are you having unclear thinking? 2. Hold up this many fingers. (Examiner holds 2 fingers in front of the patient.) 3. Now do the same thing with the other hand (without holding the 2 fingers in front of the patient). (If the patient is already extubated from the ventilator, determine whether the patient's thinking is disorganized or incoherent, such as rambling or irrelevant conversation, unclear or illogical flow of ideas, or unpredictable switching from subject to subject.)		
IV. Altered level of consciousness		
Is the patient's level of consciousness anything other than alert, such as being vigilant or lethargic or in a stupor, or coma? Alert: spontaneously fully aware of environment and interacts appropriately Vigilant: hyperalert Lethargic: drowsy but easily aroused, unaware of some elements in the environment or not spontaneously interacting with the interviewer; becomes fully aware and appropriately interactive when prodded minimally Stupor: difficult to arouse, unaware of some or all elements in the environment or not spontaneously interacting with the interviewer; becomes incompletely aware when prodded strongly; can be aroused only by vigorous and repeated stimuli and as soon as the stimulus ceases, stuporous subject lapses back into unresponsive state Coma: unarousable, unaware of all elements in the environment with no spontaneous interaction or awareness of the interviewer so that the interview is impossible even with maximal prodding		
Overall CAM-ICU Assessment (Features 1 and 2 and either Feature 3 or 4): Yes___ No___		

*The scores included in the 10-point RASS range from a high of 4 (combative) to a low of −5 (deeply comatose and unresponsive). Under the RASS system, patients who were spontaneously alert, calm, and not agitated were scored at 0 (neutral zone). Anxious or agitated patients received a range of scores depending on their level of anxiety: 1 for anxious, 2 for agitated (fighting ventilator), 3 for very agitated (pulling on or removing catheters), or 4 for combative (violent and a danger to staff). The scores −1 to −5 were assigned for patients with varying degrees of sedation based on their ability to maintain eye contact: −1 for more than 10 seconds, −2 for less than 10 seconds, and −3 for eye opening but no eye contact. If physical stimulation was required, then the patients were scored as either −4 for eye opening or movement with physical or painful stimulation or −5 for no response to physical or painful stimulation. The RASS has excellent interrater reliability and intraclass correlation coefficients of 0.95 and 0.97, respectively, and has been validated against visual analog scale and geropsychiatric diagnoses in 2 ICU studies.[37,38]

†In completing the visual ASE, the patients were shown 5 simple pictures (previously published[34]) at 3-second intervals and asked to remember them. They were then immediately shown 10 subsequent pictures and asked to nod "yes" or "no" to indicate whether they had or had not just seen each of the pictures. Since 5 pictures had been shown to them already, for which the correct response was to nod "yes," and 5 others were new, for which the correct response was to shake their heads "no," patients scored perfectly if they achieved 10 correct responses. Scoring accounted for either errors of omission (indicating "no" for a previously shown picture) or for errors of commission (indicating "yes" for a picture not previously shown). In completing the auditory ASE, patients were asked to squeeze the rater's hand whenever they heard the letter *A* during the recitation of a series of 10 letters. The rater then read 10 letters from the following list in a normal tone at a rate of 1 letter per second: *S, A, H, E, V, A, A, R, A, T*. A scoring method similar to that of the visual ASE was used for the auditory ASE testing.

(Ely et al., 2001).

Figure 4. *Shift Assessment of MOVE Criteria*

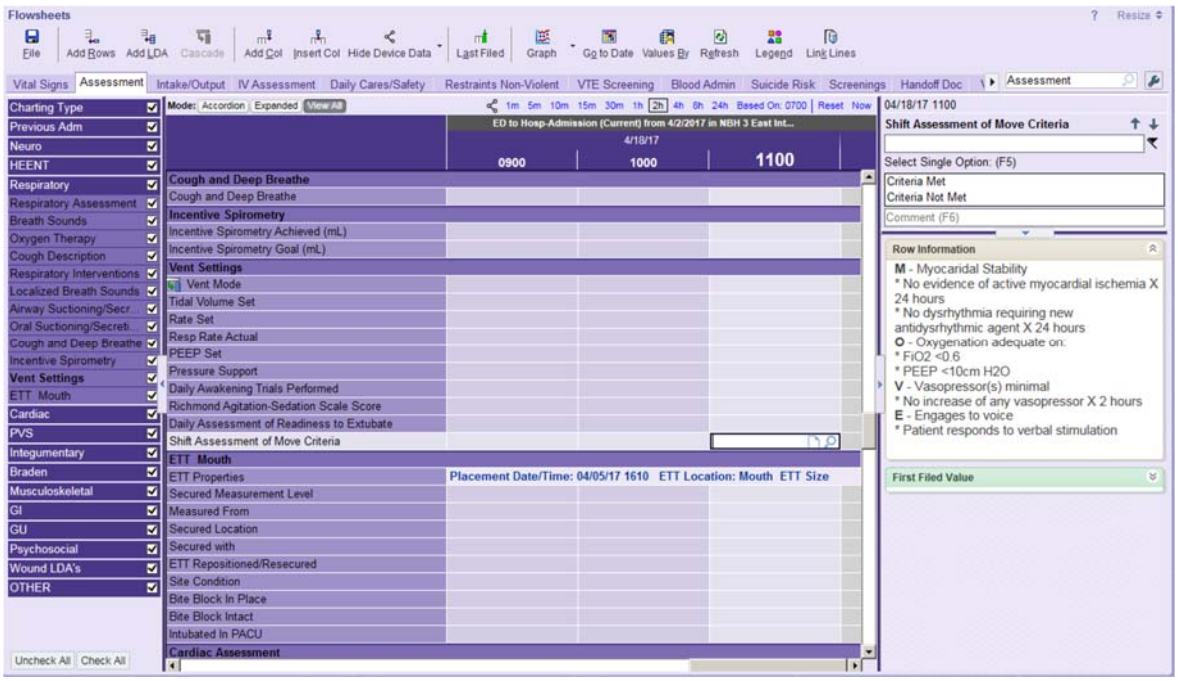

Figure 5. *Boston University AM-PAC Basic Mobility Form*

Boston University AM-PAC™ "6 Clicks"
Basic Mobility Inpatient Short Form

Please check the box that reflects your (the patient's) best answer to each question.

How much difficulty does the patient currently have…	Unable	A Lot	A Little	None
1. Turning over in bed (including adjusting bedclothes, sheets and blankets)?	☐1	☐2	☐3	☐4
2. Sitting down on and standing up from a chair with arms (e.g., wheelchair, bedside commode, etc.)	☐1	☐2	☐3	☐4
3. Moving from lying on back to sitting on the side of the bed?	☐1	☐2	☐3	☐4

How much help from another person does the patient currently need…	Total	A Lot	A Little	None
4. Moving to and from a bed to a chair (including a wheelchair)?	☐1	☐2	☐3	☐4
5. Need to walk in hospital room?	☐1	☐2	☐3	☐4
6. Climbing 3-5 steps with a railing?	☐1	☐2	☐3	☐4

Raw Score: _____ CMS 0-100% Score: _____

Standardized Score: _____ CMS Modifier: _____

(Jette, Haley, Coster, & Ni, 2014).

Appendix A: *Data Collection Form*

MOVE Chart Audit Data Collection Form	
Patient Identification Code	Numeric
Gender	Male- 0, Female- 1
Age	Numeric
Ethnicity	See Key
Admission Diagnosis*	See Key
Comorbidities (number)	See Key
History of Diabetes	Yes-0, No-1
History of Hypertension	Yes-0, No-1
History of COPD	Yes-0, No-1
History of Obstructive Sleep Apnea	Yes-0, No-1
History of Hyperlipidemia	Yes-0, No-1
History of Congestive Heart Failure	Yes-0, No-1
Type of Airway	ETT-0, Trach-1
Ventilator days	Numeric
Invasive Catheters (number)	Numeric
Type of Invasive Catheters*	
Vasopressor (number)	Yes-0, No-1
Restraints	Yes-0, No-1
Continuous Sedation Drip	Yes-0, No-1
MOVE Criteria Charted "Met or Not Met" q12h	Yes-0, No-1, Never-2
ICU Mobility Level Charted q12h	Yes-0, No-1

BPA Generated	Yes-0, No-1
PT order	Yes-0, No-1
OT order	Yes-0, No-1
Time between rehab order and consultation (numeric in minutes)	Numeric
Activity Level Ordered	See Key
ROM	Yes-0, No-1
Sat on side of bed	Yes-0, No-1
Stood on side of bed	Yes-0, No-1
Ambulate	Yes-0, No-1
RASS	Numeric
CAM-ICU	Negative- 0, Positive- 1
ICU LOS	Numeric
Hospital LOS	Numeric
Initial Consult AM-PAC Score	Numeric
Discharge AM-PAC Score	Numeric
Discharge Disposition	See Key

Key:

Ethnicity
White/Caucasian: 0
African American/Black: 1
Hispanic: 2
Asian American: 3
Native Hawaiian/Pacific Islander: 4
Native American: 5
Other: 6

Comorbities
None: 0

1-3: 1
4-6: 2
7-9: 3
>10: 4

MOVE Level
1: 0
2: 1
3: 2
4: 3

Activity
MD order bedrest/turned: 0
Dangled: 1
Stood at bedside: 2
Chair: 3
Ambulated: 4

Discharge Disposition
Home/self-care: 0
Home health: 1
Transferred to Rehab Facility: 2
SNF: 3
LTAC: 4
Hospice: 5
Expired: 6
AMA: 7
Other: 8

Admission Diagnosis
Overdose/Other: 0
Cardiac Arrest: 1
Acute Respiratory Failure: 2
Shortness of Air: 3
Pneumonia: 4
Altered Mental Status/Seizures: 5
Sepsis: 6
Chest Pain/Cardiac Arrhythmia/Congestive Heart Failure: 7
Chronic Obstructive Pulmonary Disease: 8
Acute Renal Failure: 9

*Will assign numeric code for SPSPP based on population data