Early Mobility in Critical Care: A Quality Improvement Project

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Introduction

Problem Description

Survivors of critical illness suffer long-term consequences in relation to the severity of their illness and time spent in an intensive care unit (ICU). These long-term side effects include cognitive impairment, post-traumatic stress disorder, depression, anxiety, and significant physical disability [1, 2]. In 2013, the Society of Critical Care Medicine (SCCM) developed the ICU Liberation Bundle, which included early mobility as a crucial intervention aimed at reducing adverse outcomes associated with critical illness and subsequent long-term survivorship issues [3]. Delirium and physical deconditioning are two extraordinary burdens that afflict critically ill patients. Studies have shown that early mobility can decrease the incidence of delirium, reduce the number of days a patient requires mechanical ventilation, reduce hospital length of stay, and improve functional status [1]. Importantly, numerous studies have demonstrated that the prevalence of adverse events related to early mobility is incredibly low [4]. Prior qualitative analyses thematically classified barriers to implementing the ICU Liberation Bundle as patient-related, clinician-related, protocol-related, and ICU contextual barriers [5]. This project will examine the issues surrounding actual and perceived barriers to implementation of the early mobility aspect of the ICU Liberation Bundle in the ICU at Providence Portland Medical Center (PPMC).

Available Knowledge

Medical advances have led to improved patient survival after critical illnesses; however, as survivorship has increased, there has been a subsequent rise in negative long-term effects of enduring such illnesses [6]. Providing complex care to critically ill patients is often focused on the acute problems and not the potential long-term consequences of these critical illnesses. Researchers estimate that cognitive impairment affects 60% to 80% of mechanically ventilated patients, and physical impairment has been reported to affect approximately 25%-75% of ICU survivors [7]. Prospective cohort studies have demonstrated that these cognitive and physical impairments yield higher mortality after hospital discharge (from anywhere between 90-day to 5-year mortality) [21-22]. Electrophysiologic and histologic abnormalities confirming ICU acquired weakness (ICU-AW) have been identified in studies that demonstrated considerable prevalence of ICU acquired myopathies and neuropathies among mechanically ventilated patients [8]. Bedrest can decrease skeletal muscle strength by 1%-1.5% per day and cause myocardial dysfunction, even in the absence of primary heart disease [9]. Furthermore, a study that followed acute

respiratory distress syndrome (ARDS) survivors for five years found that patients who survived ARDS had persistent exercise limitations and a reduced quality of life many years after their critical illness and that ICU-AW is a major contributor to impaired long-term function and quality-of-life [10]. It is important to note that patients in this study were young, ages 16-57. A similar study that followed ARDS survivors for 5 years also identified increased 5-year mortality among those discharged with measurable weakness. These patients were 38-64 years of age [22].

Over the last 20 years, there have been numerous studies aimed at evaluating the short- and long-term impacts of early mobility in critical care. The data is variable as patients in critical care present with incredibly diverse diagnoses and comorbidities. Despite recommendations from the SCCM, there is no standardization in critical care for many aspects of treatment, such as sedation practices, protocols regarding spontaneous breathing and awakening trials, and use of physical or occupational therapists in the ICU. These decisions are often clinician or system-specific, which contributes to the variability of patient outcomes. Many clinicians and researchers hypothesize that early mobility can impact numerous factors such as enhanced clearance of respiratory secretions, reduction of atelectasis and the risk of ventilator-associated pneumonias, improved lung compliance, and facilitation of euglycemia [11,12]. These outcomes can be difficult to measure and generalize among a broad spectrum of critically ill patients.

Numerous studies have sought to identify the impacts of early mobility in the ICU. One evaluated mechanically ventilated patients and randomized them to an exercise and mobilization program with dedicated physical and occupational therapists [6]. Patients in the intervention group started mobilizing nearly six days earlier than those receiving "usual care" which was therapy ordered at a clinician's discretion. This study demonstrated both short- and long-term positive impacts of early mobilization, such as fewer days with delirium, fewer mechanical ventilator days, and greater return to independent functional status at hospital discharge, which ultimately led to more discharges directly to home. ICU and hospital length of stay did not differ [6]. Two additional randomized control trials (RCT) echoed these results and identified statistically significant long-term positive impacts several months after hospital discharge [13, 14]. One RCT evaluated the impacts of early mobility among patients with sepsis and found that while muscle strength and exercise capacity were not statistically different between groups during their hospitalization, at six months, there was a statistically significant increase in patient self-reported physical function [13]. These findings were reiterated in a study that evaluated patients who were mechanically ventilated for acute respiratory failure and participated in early mobility. Authors described that six

months after discharge, there was a statistically significant increase in self-reported, as well as measurable, physical strength and function in addition to self-reported improvement in quality of life [14]. Similarly, an RCT that evaluated early mobility among patients receiving mechanical ventilation for any reason found that hospital length of stay and overall mortality did not seem to be impacted by early mobility in a statistically significant way, but the long-term positive physical and mental impacts were substantial [15].

Early mobility is an effort to improve quality of life for survivors of critical illness. Much of the research demonstrates substantial long-term benefits of early mobility, but short-term benefits have been more difficult to consistently prove due to considerable variability in the ICU. Critical care providers are often more focused on acute issues that endanger patients. Consequently, the long-term impacts of critical illness are overlooked. As the COVID19 pandemic has exponentially increased morbidity and mortality among critically ill patients, it is likely that long-term survivorship will be accompanied by more suffering and impairments in quality of life. Early mobility has never been more important, yet there have also been more barriers than ever.

Qualitative research has identified four themes of barriers, including patient-related (such as instability or lack of cooperation); clinician-related (i.e., lack of knowledge, safety concerns, perceived workload); protocol-related (such as unclear or absent protocols and/or discomfort with guidelines); and ICU contextual barriers, which are related to unit culture, interprofessional coordination (or lack thereof), staffing, scheduling, equipment, and leadership [5]. Additional barriers such as costs associated with early mobility, the challenges of mobilizing obese patients, and the time restraints that exist in each ICU "shift," including the increasing amount of documentation required by insurers, lawyers, and hospital administrators also impact the implementation of early mobility [9]. Assessing and addressing the numerous barriers to engaging critically ill patients in early mobility is essential for the wellness of this incredibly vulnerable patient population.

Rationale

When considering the ICU at PPMC, many of the previously discussed themes of barriers could explain why early mobility is not prioritized. Providing proper training and education and initiating an early mobility program in the ICU are effective methods of overcoming many barriers and creating a new standard of care. Hospital units that have implemented successful early mobility programs developed robust protocols and guidelines and facilitated continuous engagement of all disciplines. For example, one hospital implemented an early mobility protocol for their ICU that consisted of an initial physical and occupational therapy (PT/OT) guided mobilization

protocol, then transitioned to a nurse-driven protocol [16]. Their multi-year study demonstrated that patients who were engaged in a nurse-driven mobilization protocol not only mobilized earlier and more frequently but did not require discharge to a skilled nursing or long-term acute care hospital, whereas 12.5% of patients who only engaged in mobility with PT or OT (often once per day, or less) required skilled nursing or long-term acute care admission. Authors reported no adverse events related to early mobilization [16]. Another facility developed a multidisciplinary "work group" to spearhead an early mobility program at their facility [17]. This team collaborated to determine patient eligibility criteria, establish the need for safe patient handling equipment, facilitate staff education, and ensure continuous engagement and implementation by facilitating early mobility education and training [17]. These two examples highlight that with the right education, training, and engagement, an early mobility program can be safely established as a standard of care.

This quality improvement project was designed using the Model for Improvement from the Institute for Healthcare Improvement (IHI). The IHI model was selected as a framework as it is an integrated approach that can quickly deliver meaningful results in diverse settings [18]. This method centers on goal setting and teamwork to achieve positive change [23]. Changes can be evaluated in Plan-Do-Study-Act (PDSA) cycles which allow for trial periods and editing of plans.

Specific Aims

The specific aims of this quality improvement project were to evaluate current perceived and actual barriers to early mobility implementation in the ICU at PPMC and develop an education program to dismantle those barriers.

Methods

Context

The ICU at PPMC is 36-bed unit that provides care to a variety of critically ill patients. For historical background, from 2015-2019, the ICU at PPMC experienced a unit merger, high staff turnover, a revolving door of unit leadership in the setting of a toxic environment (particularly in administration), and a lack of a critical care educator. Amid this structural upheaval, PPMC became an ARDS center and developed an extracorporeal membrane oxygenation (ECMO) program. The numerous changes that occurred during a time of tribulation allowed for knowledge gaps that have persisted. Now that the unit has stabilized from a leadership perspective, it has been identified that the ICU Liberation Bundle in its entirety is not being consistently employed. This became most evident over the last three years while the ECMO program implemented "awake ECMO," in which patients on

ECMO were taken off sedation and extubated as soon as possible (some patients received an early tracheostomy) and encouraged to engage in physical activity by day five on ECMO. This was a team effort of the ECMO program, based on evidence demonstrating that awake ECMO to facilitate early mobility was safe and effective at improving short and long-term outcomes [11,19]. ECMO specialist nurses were provided education and training, and the interdisciplinary team agreed to make early mobility among these patients a priority. One major difference seen within the ECMO program is that nurses are the primary drivers of initiating mobility. Because of this, anecdotally, patients on ECMO mobilize earlier and more frequently. Care for patients on ECMO is provided in teams, where multiple nurses care for these patients to ensure safety, assist in emergencies, and help mobilize these complex patients. For these reasons, patients on ECMO walk the halls and sit in a chair, while other patients in the ICU languish in bed.

Enthusiasm for early mobility primarily exists within the ECMO program. Outside of the program, there are typically fewer nurses available to care for patients (contributing to increased workload as a significant barrier), a lack of clarity as to who is responsible for implementing early mobility, knowledge gaps regarding the ICU Liberation Bundle as a whole (particularly pain, agitation, and delirium management which directly impacts early mobility), lack of clear unit protocols or guidelines, and perceived patient status issues. The ECMO team has an informal framework for early mobility that is essentially nurse-led decision-making on when and how to mobilize patients on ECMO. There is no explicit protocol.

Interestingly, in 2015, a retrospective cohort study was done as part of a quality improvement initiative at PPMC. The authors, including the PPMC ICU medical director, evaluated the impacts of having dedicated physical and occupational therapists in the ICU five days per week. They found a decrease in ICU and hospital LOS, improved functional class at discharge (meaning fewer discharges to skilled nursing facilities), and a potential cost savings benefit (despite the additional costs of having dedicated therapists on the unit). Annual cost savings were projected at $677,216 per year [20]. The result of this data was that PT and OT staff were allocated to spend a portion of their day in the ICU, but they still had to split time with a neighboring unit. As the COVID19 pandemic began, a mixture of rehabilitation department shortages and hospital surges took therapists out of the ICU, and their priority became assisting with expediting discharges to facilitate throughput. To date, there has not been a robust return of therapy staff into the ICU.

COVID19 Context

It is critical to acknowledge the impacts of the COVID19 pandemic in this ICU. Much like hospitals around the nation, PPMC suffered the fate of significant staff turnover from all disciplines. While some staff took on more lucrative travel jobs, many chose to leave the ICU for a healthcare job with less suffering and fatigue. Some left healthcare altogether. In 2020, ICU RN turnover was 8.53%. Turnover rate nearly doubled in 2021, with 16.9% ICU RN turnover. To correct staffing shortages in the ICU, PPMC hired 19 travel nurses between 2021-2022, in addition to 20 "new to ICU" nurses. It is important to acknowledge that nurses new to ICU were trained during the pandemic. These nurses only know pandemic critical care, which is rife with barriers to implementing the ICU Liberation Bundle. Given significant turnover and the loss of many experienced nurses, the culture of the PPMC ICU changed. The strain of the COVID19 pandemic has subsequently caused a significant decline in early mobility among all ICU patients at PPMC. Infectious isolation also become a barrier to mobility as patients cannot exit their rooms until at least 20 days of isolation. More significantly, due to nursing shortages in early 2022, the awake ECMO model was mandated to be held by leadership. ECMO specialists were asked to keep their patients sedated in an effort to minimize the burden of their care, and the team nursing model was dissolved so that more nurses could be available to care for the onslaught of critically ill patients. The response to this was divided. Many nurses, in the wake of significant burnout and moral distress [24], expressed relief in having the burden of early mobility removed. In contrast, several nurses were vehemently against keeping their patients sedated and did not comply. It was observed that this division in compliance with new protocols created tension among staff within the ECMO program and further altered unit culture. Ultimately, the ICU has been in damage control since the start of the pandemic in 2020. As the pandemic begins to retract, it has become more essential than ever to rebuild the unit culture and embed the principles of the SCCM ICU Liberation Bundle.

Interventions, Measures, and Analysis

Measures included a survey, staff input via informal interviews, and unit observations. The critical care nurse manager provided census and acuity data to help supplement this information. Chart review was not available per PPMC policy prohibiting students from doing such.

Focus group and individual interviews were inclusive of the interdisciplinary team. The intent was to attend several unit-based council and ICU staff meetings; however, all but one of them were cancelled due to the COVID19 surge of patients and staffing shortages. Communication with staff occurred during unit rounding, via

email, or video chat on Microsoft Teams. Interview questions were informal and intended to supplement data to personalize education needs for this unit.

A short survey (Figure 1) was developed to evaluate nurses' knowledge and comfort with early mobility. In October 2021, 50 surveys were distributed and 37 were submitted with response rate of 74%. The survey contained questions aimed at identifying knowledge gaps pertaining to early mobility, mobilizing patients on mechanical ventilation, the SCCM ICU Liberation Bundle, and familiarity with mobility protocols available at PPMC. Survey results are displayed in Figures 2 and 3.

Observations from unit rounding during a two-week period (11 out of 14 days) were documented along with contextual background of the patient's illness per the bedside RN or MD (Table 1). Patients were assigned a level of mobility (Figure 5) to demonstrate current mobility practices.

Identified barriers were categorized per the modified CFIR framework (Table 2) published by Costa et al. (2017) and utilized to develop an education program to address the unit-specific barriers. This education addressed knowledge gaps with literature review, review of the SCCM ICU Liberation Bundle, robust discussion about sedation practices and harms associated with prolonged sedation and immobility, creative patient management strategies, resources and guidelines available to determine patient appropriateness for early mobility, and emphasized the importance of multidisciplinary teamwork. Education was provided online via live stream on Microsoft Teams for staff to attend and receive one continuing education credit as per PPMC policy. The lecture was recorded and uploaded to the PPMC education website. The unit educator has made this lecture part of the required education for all new hires to the ICU at PPMC.

Ethical Considerations

This quality improvement project was approved by the OHSU and PPMC Investigational Review Boards prior to implementation. All staff working in critical care at PPMC were informed of the project via email, virtual meetings, or in-person discussion. Participation in this quality improvement project was voluntary and emphasized as such. Data obtained from interviews, surveys, and observations were published in a way that protected patient and staff privacy.

Results/Outcomes

Patient related barriers

As data was obtained during the COVID19 pandemic, acuity was a ubiquitous barrier. As an ARDS center, PPMC takes on the burden of caring for some of the most critically ill patients in the region. Many patients were mechanically ventilated, in the prone position, chemically sedated, on neuromuscular blockade, continuous renal replacement therapy, inhaled nitric oxide, in florid shock, and ultimately too critical to engage in mobility. In 2020, the ICU cared for 136 patients with COVID19 and 70 of them required mechanical ventilation. The amount of critically ill patients with COVID19 more than doubled from 2020 to 2021, as 2020 data revealed 315 critically ill patients with COVID19, 211 requiring mechanical ventilation. ECMO days also increased substantially from 2020 to 2021. In 2020, 15 patients were placed on ECMO for COVD19, generating 564 ECMO days. In 2021, 26 patients were placed on ECMO for COVID19, which generated 886 ECMO days. Patients often remained on ECMO for extended periods as we patiently waited for lung recovery. The longest ECMO run during this time was 109 days for a single patient.

As many patients were direly ill, on heavy sedation for many days, delirium was ever prevalent and made patient participation challenging as the team attempted to manage confusion, agitation, insomnia, and impulsivity. It is also important to note that morbidly obese patients posed a particular challenge as these patients required more staff and more specialized equipment to mobilize, generating additional strain.

Clinician related barriers

The survey results demonstrated that some staff had never heard of the SCCM ICU Liberation Bundle (19%), nor had they ever mobilized a patient on mechanical ventilation (21%). This, potentially, speaks to the number of "new to ICU" nurses hired during the pandemic. These nurses were ultimately hired during a time of damage control as COVID19 overwhelmed the ICU. Eighty-six percent of survey respondents cited a lack of clear protocols or guidelines to help decipher which patients were eligible for early mobility. Many reported that a lack of staff availability, as well as competency, precluded them from regularly engaging patients in early mobility. Eleven percent of respondents directly reported a belief that mobilizing patients on invasive mechanical ventilation was not safe, expressing concern for dislodging important tubes or lines. While observations demonstrated that nurses were often getting their patients up to a chair (25% of patients observed during the rounding period) and advocating for PT sessions, interviews cited concern for lack of complete buy-in from the unit as a whole, and that there was a

pervasive unit subculture that still operated under the perception that rest equaled healing, and that rest was obtained via sedation. During the rounding period, 43% of patients observed were bedridden (mobility level 0, Figure 4).

Protocol related barriers

PPMC does not have its own protocol, policy, or guideline to aid and facilitate early mobility. PPMC utilizes an outside company, Lippincott, for mobility protocols. Many nurses (38% of respondents) were not aware of this. The Lippincott guideline is vague, offering suggestions but ultimately unable to give definitive guidance and recommended collaborating with a provider to determine patient appropriateness. Staff across the various disciplines reported a desire for clear guidelines or parameters in which they could feel reassured that mobilizing their patients was appropriate and minimized subjectivity in this assessment.

ICU contextual barriers

Staffing shortages were a substantial barrier and inclusive of all disciplines. For months the rehabilitation department was reallocated to facilitate discharges and was largely absent from the ICU. PT and OT have not been present during multidisciplinary rounds since the pandemic started. As shortages persisted during a time of perpetually high acuity, competing priorities put mobility on the backburner. Staff turnover and utilization of travel staff and "new to ICU" nurses certainly contributed to a culture shift towards damage control. Other ICU contextual barriers cited by ICU staff were equipment shortages, inadequate equipment (i.e., not enough bariatric specific equipment), and schedule conflicts such as patients receiving hemodialysis or in surgery.

Discussion

Summary and Interpretation

Many actual and perceived barriers to early mobility exist on this unit, and education was able to address many of them. Education also provided inspiration and motivation to provide evidenced-based care in an effort to improve patient outcomes. Despite the numerous barriers to obtaining data on this unit, a robust amount of information was gathered to supplement what is already known about early mobility barriers in critical care.

As the pandemic retracts, we have fewer critically ill patients with COVID19; however, the effects of the pandemic on healthcare have been far-reaching. Critical care units remain in the wake of healthcare worker shortages which continue to put hospitals under strain. While we attempt to recover and restructure, it is now an essential time to get back to evidence-based care and focus on the ICU Liberation Bundle. The ICU at PPMC has experienced a skill and culture shift that needs to be addressed by getting back to the basics, most importantly

increasing ICU Liberation Bundle compliance. It has been suggested that much of the stress healthcare workers face is related to patient suffering, feelings of helplessness, moral uncertainty, and moral distress exacerbated during the pandemic [25]. Increasing ICU Liberation Bundle compliance will improve patient care, patient outcomes, and thereby can improve hospital morale. Nurses and other healthcare workers want to see their patients do well. Nurses do not choose critical care because they want to facilitate suffering. Unfortunately, much suffering is experienced by the nurses themselves as they aspire to help people under the weight of crushing circumstances out of their control. Many nurses, when presented data on patient outcomes and how evidenced-based care can facilitate positive change, feel inspired to enact such change in their own practice. The education provided to this unit sought to appeal to this desire to perform at the highest level and help patients in a tangible way.

Limitations

Data collected for this quality improvement project was observational and qualitative, and was a single unit analysis, which can lead to bias and reduce generalizability of information. Many barriers, such as restrictive hospital policies and COVID19 pandemic constraints made data gathering challenging, and perhaps not as robust as intended.

Conclusion and Next Steps

The education provided as part of this quality improvement initiative was timely and has the potential to ignite positive change in the ICU at PPMC**.** Based on data gathered, there were certainly barriers to early mobility that education alone could not address. Creating an ICU Liberation Bundle council that can develop unit-based guidelines for early mobility could benefit this unit. Ultimately, a nurse-driven protocol would be best for this unit, as rehab staff resources are limited. The critical care unit-based council at PPMC is well equipped to spearhead such initiatives and will be essential in leading culture change as well as generating unit-specific guidelines or policies. Obtaining more advanced mobility equipment, including bariatric equipment, would aid in mobilizing complex patients. Correcting staffing shortages in all disciplines is essential as well. Hospital systems must invest in staff and the resources required to provide evidenced-based care. It will be critical that nurses from this ICU champion early mobility and ICU Liberation Bundle compliance and advocate for continuous positive growth and change.

References

1 Linke, C. A., Chapman, L. B., Berger, L. J., Kelly, T. L., Korpela, C. A., & Petty, M. G. (2020). Early mobilization in the ICU: A collaborative, integrated approach. *Critical Care Explorations, 2*(4), e0090. https://doi-org.liboff.ohsu.edu/10.1097/CCE.0000000000000090

2 Marra, A., Ely, E. W., Pandharipande, P. P., & Patel, M. B. (2017). The ABCDEF bundle in critical care. *Critical Care Clinics, 33(2)*, 225–243. https://doi-org.liboff.ohsu.edu/10.1016/j.ccc.2016.12.005

3 Society of Critical Care Medicine: *About ICU Liberation.* (n.d.). Retrieved April 6, 2021, from https://sccm.org/ICULiberation/About

4 Doiron, K. A., Hoffmann, T. C., & Beller, E. M. (2018). Early intervention (mobilization or active exercise) for critically ill adults in the intensive care unit. *The Cochrane Database of Systematic Reviews, 3(3)*, CD010754. https://doi-org.liboff.ohsu.edu/10.1002/14651858.CD010754.pub2

5 Costa, D. K., White, M. R., Ginier, E., Manojlovich, M., Govindan, S., Iwashyna, T. J., & Sales, A. E. (2017). Identifying barriers to delivering the awakening and breathing coordination, delirium, and early exercise/mobility bundle to minimize adverse outcomes for mechanically ventilated patients: A systematic review. *Chest, 152(2)*, 304–311. https://doi-org.liboff.ohsu.edu/10.1016/j.chest.2017.03.054

6 Schweickert, W. D., Pohlman, M. C., Pohlman, A. S., Nigos, C., Pawlik, A. J., Esbrook, C. L., Spears, L., Miller, M., Franczyk, M., Deprizio, D., Schmidt, G. A., Bowman, A., Barr, R., McCallister, K. E., Hall, J. B., & Kress, J. P. (2009). Early physical and occupational therapy in mechanically ventilated, critically ill patients: A randomised controlled trial. *Lancet (London, England), 373*(9678), 1874–1882. https://doi-org.liboff.ohsu.edu/10.1016/S0140-6736(09)60658-9

7 Brummel, N. E., Jackson, J. C., Girard, T. D., Pandharipande, P. P., Schiro, E., Work, B., Pun, B. T., Boehm, L., Gill, T. M., & Ely, E. W. (2012). A combined early cognitive and physical rehabilitation program for people who are critically ill: The activity and cognitive therapy in the intensive care unit (ACT-ICU) trial. *Physical therapy, 92*(12), 1580–1592. https://doi-org.liboff.ohsu.edu/10.2522/ptj.20110414

8 De Jonghe, B., Sharshar, T., Lefaucheur, J. P., Authier, F. J., Durand-Zaleski, I., Boussarsar, M., Cerf, C., Renaud, E., Mesrati, F., Carlet, J., Raphaël, J. C., Outin, H., Bastuji-Garin, S., & Groupe de Réflexion et d'Etude des

Neuromyopathies en Réanimation (2002). Paresis acquired in the intensive care unit: a prospective multicenter study. *JAMA, 288(22)*, 2859–2867. https://doi-org.liboff.ohsu.edu/10.1001/jama.288.22.2859

9 Morris P. E. (2007). Moving our critically ill patients: Mobility barriers and benefits. *Critical Care Clinics, 23*(1), 1–20. https://doi-org.liboff.ohsu.edu/10.1016/j.ccc.2006.11.003

10 Herridge, M. S., Tansey, C. M., Matté, A., Tomlinson, G., Diaz-Granados, N., Cooper, A., Guest, C. B., Mazer, C. D., Mehta, S., Stewart, T. E., Kudlow, P., Cook, D., Slutsky, A. S., Cheung, A. M., & Canadian Critical Care Trials Group (2011). Functional disability 5 years after acute respiratory distress syndrome. *The New England Journal of Medicine, 364(14)*, 1293–1304. https://doi-org.liboff.ohsu.edu/10.1056/NEJMoa1011802

11 Haji, J. Y., Mehra, S., & Doraiswamy, P. (2021). Awake ECMO and mobilizing patients on ECMO. *Indian Journal of Thoracic and Cardiovascular Surgery*, 1–10. Advance online publication. https://doi-org.liboff.ohsu.edu/10.1007/s12055-020-01075-z

12 Patel, B. K., Pohlman, A. S., Hall, J. B., & Kress, J. P. (2014). Impact of early mobilization on glycemic control and ICU-acquired weakness in critically ill patients who are mechanically ventilated. *Chest, 146(3)*, 583–589. https://doi-org.liboff.ohsu.edu/10.1378/chest.13-2046

13 Kayambu, G., Boots, R., & Paratz, J. (2015). Early physical rehabilitation in intensive care patients with sepsis syndromes: A pilot randomised controlled trial. *Intensive Care Medicine, 41*(5), 865–874. https://doi-org.liboff.ohsu.edu/10.1007/s00134-015-3763-8

14 Morris, P. E., Berry, M. J., Files, D. C., Thompson, J. C., Hauser, J., Flores, L., Dhar, S., Chmelo, E., Lovato, J., Case, L. D., Bakhru, R. N., Sarwal, A., Parry, S. M., Campbell, P., Mote, A., Winkelman, C., Hite, R. D., Nicklas, B., Chatterjee, A., & Young, M. P. (2016). Standardized rehabilitation and hospital length of stay among patients with acute respiratory failure: A randomized clinical trial. *JAMA, 315*(24), 2694–2702. https://doi-org.liboff.ohsu.edu/10.1001/jama.2016.7201

15 McWilliams, D., Jones, C., Atkins, G., Hodson, J., Whitehouse, T., Veenith, T., Reeves, E., Cooper, L., & Snelson, C. (2018). Earlier and enhanced rehabilitation of mechanically ventilated patients in critical care:

A feasibility randomised controlled trial. *Journal of Critical Care, 44*, 407–412. https://doi-org.liboff.ohsu.edu/10.1016/j.jcrc.2018.01.001

16 Young, B., Moyer, M., Pino, W., Kung, D., Zager, E., & Kumar, M. A. (2019). Safety and feasibility of early mobilization in patients with subarachnoid hemorrhage and external ventricular drain. *Neurocritical Care, 31*(1), 88–96. https://doi-org.liboff.ohsu.edu/10.1007/s12028-019-00670-2

17 Wyatt, S., Meacci, K., & Arnold, M. (2020). Integrating safe patient handling and early mobility: Combining quality initiatives. *Journal of Nursing Care Quality, 35*(2), 130–134. https://doi-org.liboff.ohsu.edu/10.1097/NCQ.0000000000000425

18 Langley, G. J., Moen, R. D., Nolan, K. M., Nolan, T. W., Norman, C. L., & Provost, L. P. (2009). *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance* (Second ed.). Jossey-Bass.

19 Abrams, D., Javidfar, J., Farrand, E., Mongero, L. B., Agerstrand, C. L., Ryan, P., Zemmel, D., Galuskin, K., Morrone, T. M., Boerem, P., Bacchetta, M., & Brodie, D. (2014). Early mobilization of patients receiving extracorporeal membrane oxygenation: A retrospective cohort study. *Critical Care (London, England), 18*(1), R38. https://doi-org.liboff.ohsu.edu/10.1186/cc13746

20 Hotchkin, D., Riddick, C. A., Gaston, L., & Jacobs, M. (2015). *Cost Savings via Integration of a Dedicated Physical and Occupational Therapist in the ICU.*

21 Ely, E. W., Shintani, A., Truman, B., Speroff, T., Gordon, S. M., Harrell, F. E., Jr, Inouye, S. K., Bernard, G. R., & Dittus, R. S. (2004). Delirium as a predictor of mortality in mechanically ventilated patients in the intensive care unit. *JAMA*, *291*(14), 1753–1762. https://doi.org/10.1001/jama.291.14.1753

22 Dinglas, V. D., Aronson Friedman, L., Colantuoni, E., Mendez-Tellez, P. A., Shanholtz, C. B., Ciesla, N. D., Pronovost, P. J., & Needham, D. M. (2017). Muscle Weakness and 5-Year Survival in Acute Respiratory Distress Syndrome Survivors. *Critical care medicine*, *45*(3), 446–453. https://doi.org/10.1097/CCM.0000000000002208

23 Millard, M. (2021, February 21). *The Institute for Healthcare Improvement Model for Improvement*. KaiNexus. https://blog.kainexus.com/continuous-improvement/continuous-improvement-software/healthcare/the-institute-for-healthcare-improvement-model-for-improvement

24 Čartolovni, A., Stolt, M., Scott, P. A., & Suhonen, R. (2021). Moral injury in healthcare professionals: A scoping review and discussion. *Nursing ethics*, *28*(5), 590–602. https://doi.org/10.1177/0969733020966776

25 Silverman, H. J., Kheirbek, R. E., Moscou-Jackson, G., & Day, J. (2021). Moral distress in nurses caring for patients with Covid-19. *Nursing ethics*, *28*(7-8), 1137–1164. https://doi.org/10.1177/09697330211003217

Figure 1

Survey

By completing this survey, I am consenting to providing input that will be utilized as part of a quality improvement project conducted by Lauren Melnik, AGACNP DNP Candidate.

Early Mobilization Survey

1. Have you ever mobilized a mechanically vented patient?
    a. Yes
    b. No

2. Do you feel comfortable mobilizing a mechanically vented patient?
    a. Yes
    b. No

3. Do you think that mobilization of a mechanically vented patient is safe? If no, why not?
    a. Yes
    b. No:

4. Do you believe that early mobility in the ICU is beneficial to patients? If no, why not?
    a. Yes
    b. No:

5. Do you know how/when to initiate the process of mobilization of a vented patient?
    a. Yes
    b. No

6. Are you familiar with the progressive mobility protocol at Providence?
    a. Yes
    b. No

7. Are you familiar with the SCCM's ICU Liberation Bundle (the ABCDEF bundle)?
    a. Yes
    b. No

8. How important is early mobility in the ICU to you?
    a. Extremely important
    b. Important
    c. Not as important
    d. Not important at all

9. Are you satisfied with the equipment available for mobilizing patients in the ICU? If no, please elaborate.
    a. Yes
    b. No:

10. Does CCS have a clear set of guidelines to help determine which patients are eligible for mobilization in the ICU? (Meaning, things like hemodynamic parameters, meds, ventilator settings that would make mobilization acceptable or not)
    a. Yes
    b. No

11. Comments?

Figure 2

CCS Early Mobility Survey Results

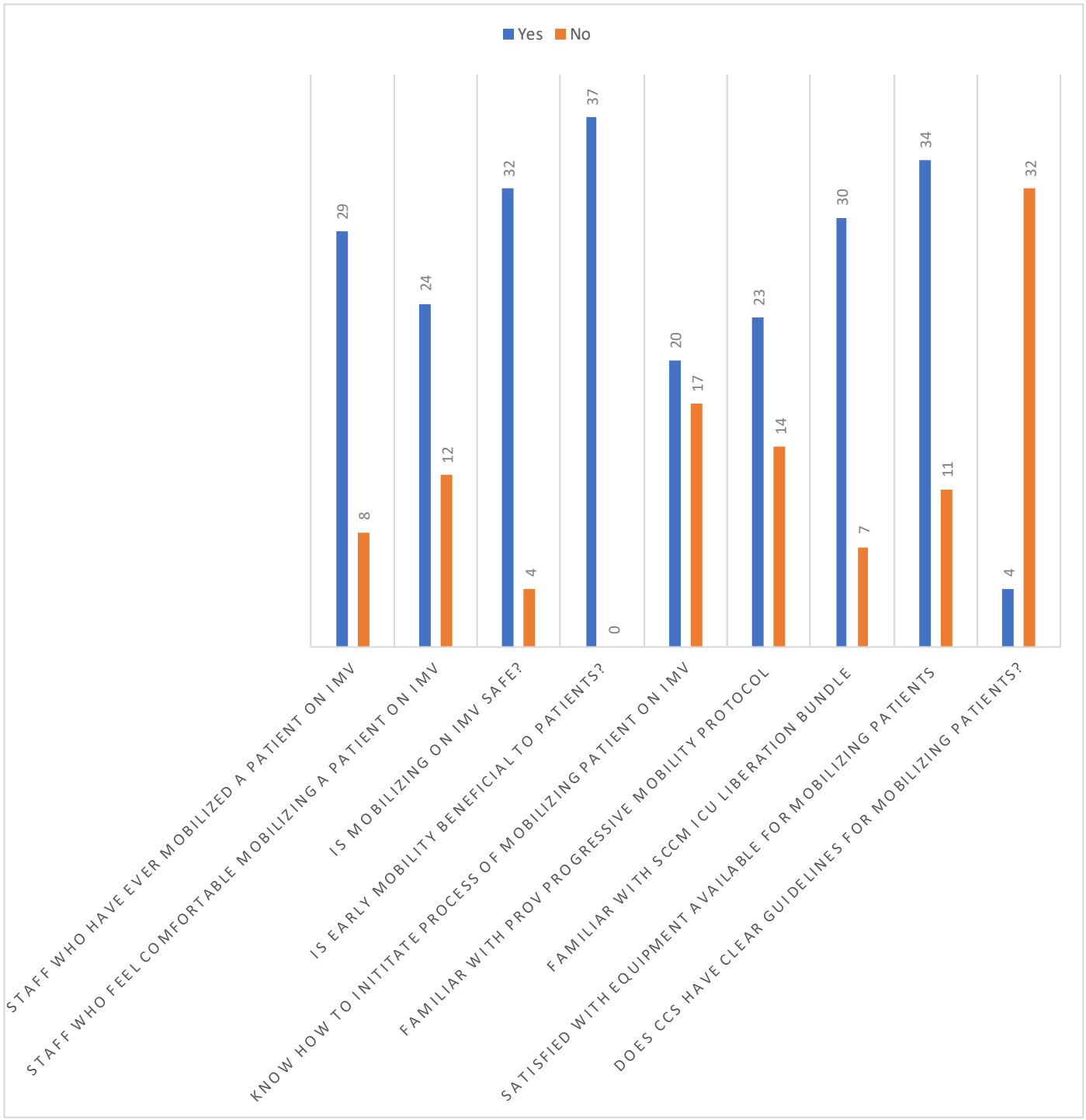


Figure 3

CCS Survey Question on Perceived importance of early mobility (Question #8)

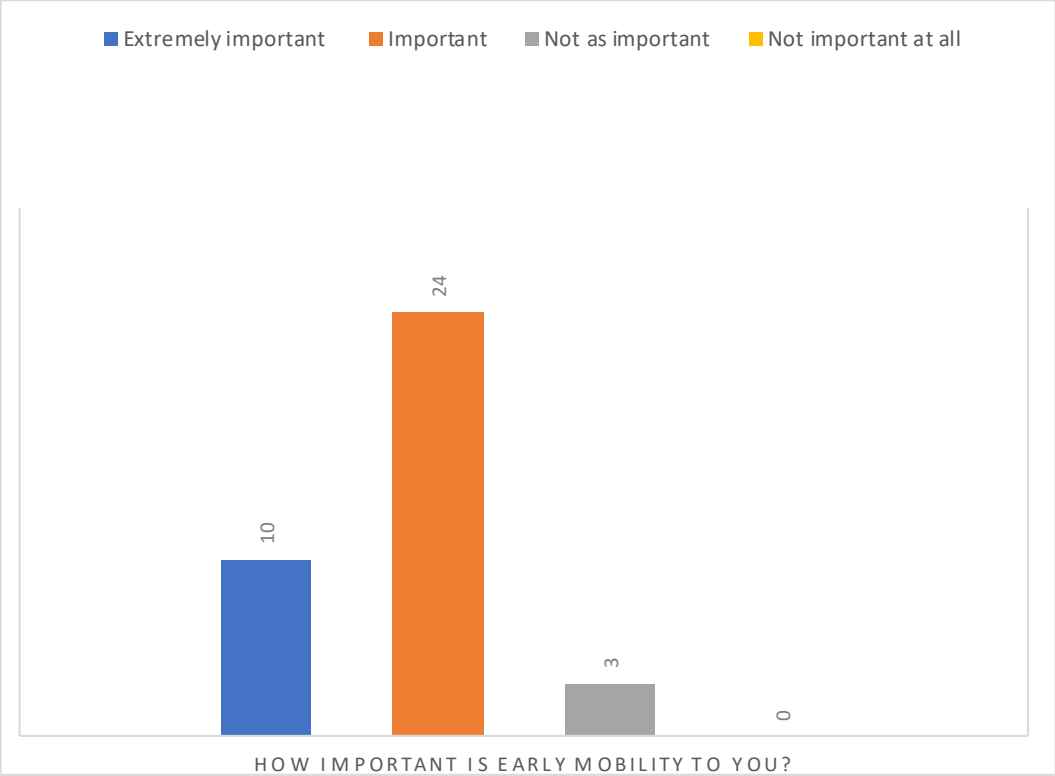


Table 1

Unit Observations

Date: 11/9			
Patient #	**ETT/Trach/vent/CCRT/ECMO?**	**Level of mobility (per SCCM definition)**	**Barrier to mobility/Clinical context**
1	no	9	DKA, better
2	no	2	ICH + IVH on scheduled mannitol for cerebral edema
3	Yes; ETT/vent	0	Sedated while on vent. No plan to awaken until SBT.
4	No	10	X STEMI, better
5	Yes; trach/vent	2	Had 1st PT eval today after 30D hospital stay –covid, rough course
6	no	0	Hemorrhagic shock. ICU day 1
7	Yes; trach/vent	2	AMS, unable to participate w PT
8	Yes EET/vent	0	Seizures. Heavy sedation.
9	No	0	Paraplegic here w/ septic shock on pressors
10	Yes ETT/vent	0	Seizures. Heavy sedation.
11	Yes ETT/vent	0	Craniotomy overnight. Keeping sedated for MRI.
12	Yes ETT/vent	0	PEA arrest today on 4 pressors
13	Yes ETT/Vent	0	Going comfort
14	No	0	EKOS for PE w/ bedrest/limb restrictions
15	Yes ETT/vent	0	Prone/NMB Covid
16	No	0	Covid BiPAP dependent w/ recurrent hypoxia. AMS.
17	Yes Trach/vent	0	Long covid. Rough course. AMS.
18	Yes ETT/Vent	0	s/p PEA arrest and not waking up
19	No	0	Covid BiPAP dependent. Unstable. Heading towards intubation.
20	Yes ETT/Vent	0	Covid, bleeding, unstable
21	Yes ETT/Vent	0	Covid. Not sedated but won't wake up.
22	No	0	Covid BiPAP dependent. Tenuous.
23	Yes; ETT/Vent + VVECMO	0	Covid, ECMO, NMB for severe refractory hypoxemia.
24	Yes VVECMO, no vent	4	Covid ECMO, Syncope when standing
25	Yes VV ECMO no vent	7	Covid ECMO, ambulated in hallway w/ RNs/PT

26	No	5	OOB to chair w/ assist. Temp pacer wires still in.
11/11			
1	Yes ETT/Vent	0	Botulism paralysis
2	No	0	Cardiogenic shock
3	No	5	POD 1: Bed to chair w/ CTO brace
4	No	8	Ambulating w/ PT
5	No	1	POD 0 thoracotomy w/ pain mgmt. issues
6	Yes trach/vent	2	Covid long rough course. AMS.
7	Yes Trach/vent	0	Covid. Long rough course. AMS.
8	Yes ETT/Vent + CRRT	0	Septic shock/meningitis + seizures
9	no	0	Paraplegic going to OR today for LE amputation 2/2 wound
10	Yes ETT/Vent	0	Seizures. LP today.
11	Yes ETT/Vent	0	SDH w/ shift s/p crani. Transitioning to precede for eventual SBT. Agitated off propofol.
12	Yes ETT/Vent	0	s/p PEA arrest and won't wake up
13	No	1	Rip roaring ETOH withdrawal getting phenobarbital
14	Yes ETT/vent	0	Covid NMB/prone, dying
15	Yes ETT/vent	0	Covid ARDS, sedated, tenuous
16	Yes ETT/Vent	0	Covid, bleeding, shock
17	Yes trach/vent	0	Covid. AMS. Recurrent hypoxia.
18	Yes trach/vent	0	s/p PEA arrest. Obtunded.
19	Yes ETT/Vent	0	s/p PEA arrest. comatose
20	No	1	Covid bipap dependent. Tenuous.
21	No	1	To be seen for 1st time by PT/OT today→~2 wk admit w/ covid
22	Yes trach/Vent	0	Covid. Comatose.
23	Yes ETT/Vent	0	Covid ARDS unstable. PTX
24	Yes ETT/Vent + VVECMO w/ protek	0	Covid ARDS unstable on NMB
25	Yes trach—no vent	1	Strict bedrest for 24H per OMFS
26	Yes VV ECMO	1	Covid ARDS unstable. Pre-syncopal when HOB too high. Acute RV failure.
27	Yes VV ECMO	5	Covid ARDS. OOB to chair. No walk 2/2 new

			septic shock and feeling bad.
28	No	1	Pregnant, pneumonia, on HHFNC with recurrent hypoxia, septic shock on pressors
11/12			
1	Yes ETT/Vent	0	Paralyzed r/t botulism
2	No	5	Decomp HF on low dose pressor
3	No	7	Post-op complicated esophagectomy requiring bronchial patch. On HHFNC.
4	Yes Trach/vent	0	Sepsis, PNA, on pressor
5	Yes trach/vent	2	Complicated covid course. Here > 1mo. AMS.
6	Yes trach (new), no vent	1	Bedrest per OMFS 1st 24H
7	No. Has EVD.	2	Head bleed with EVD. AMS + focal neuro deficits.
8	Yes trach/vent	2	Long covid. AMS and severely deconditioned.
9	No	9	Elective aneurysm coil. No deficits.
10	Yes. ETT/Vent + CRRT	0	Seizure. Meningitis. Sedated. No pressors.
11	No	2	paraplegic
12	Yes ETT/Vent	0	Sedated while on vent 2/2 trigger of severe mvmt disorder with ETT but unable to trach or extubate 2/2 anatomy/swelling.
13	No	4	AMS but mobile. OR today for crani.
14	No	3	Covid, PE, PEA arrest, CVA. Just extubated to HHFNC and PT/OT order newly placed (ICU day 5)
15	No	4	AMS. ETOH withdrawal.
16	Yes ETT/Vent	0	Covid ARDS NMB/Prone. Highly unstable.
17	Yes ETT/Vent	0	Covid ARDS, sedated on vent.
18	No	2	AMS/agitation. Uncooperative. Metastatic colon CA s/p complicated surgery.
19	Yes trach/vent	0	Long covid. AMS. Horribly deconditioned. Impulsive/uncooperative.
20	Yes ETT/vent	1	Intubated. On max Dex for anxiety/agitation.
21	Yes ETT/Vent + CRRT	0	In shock. Unstable. Severe brain injury after long code

			for asystolic arrest r/t acidemia.
22	No	3	Covid. BiPAP dependent. Only able to tolerate edge of bed without severe hypoxia + SOB.
23	No	3	Covid. Long course. Deconditioned with residual encephalopathy.
24	No	10	S/p EKOS for DVT/PE doing well.
25	Yes. Trach + reach mist + VVpA ECMO	0	On low dose NMB. septic shock. Unstable.
26	Yes ETT/Vent	0	Covid ARDS NMB/prone
27	Yes trach + trach mist	7	Post op OMFS walking with PT or RN
28	Yes ETT/vent + VV ECMO +CRRT	0	Intubated, sedated, unstable, GI bleeding, RV failing
29	Yes VV ECMO	7	Hall walks w/ 3+staff
30	No	5	Pregnant on HHFNC for CAP
11/14			
1	No	1	POD 1 s/p crani for SDH. Confused.
2	Yes ETT/Vent	0	Botulism paralysis
3	Yes ETT/Vent	0	Comfort care. Dying.
4	Yes trach/vent	2	Long terrible covid > 1 mo. AMS + deconditioned. High fio2 needs.
5	Yes trach, no vent	1	Post op OMFS walking with PT or RN
6	No. Has EVD	1	EVD for head bleed. AMS + focal deficits.
7	Yes trach/vent	2	Long covid. Deconditioned. AMS. Large sacral wound so can't sit for long.
8	No	5	Complicated infectious admit. Just got transfer orders.
9	No	2	Severely mentally disable. Unable to cooperate.
10	Yes ETT/Vent + TTM	0	s/p asystolic arrest after cocaine use. now w/ ARDS.
11	No	0	Comfort care. Complicated covid. Severe AMS s/p new CVA
12	No	0	Too hypoxic w/ activity. Bad metastatic CA w/ severe sepsis.
13	No	5	STEMI today s/p PCI
14	Yes ETT/Vent	0	Covid ARDS NMB/prone unable to tolerate supine

15	No	2	Covid. Just extubated to HHFNC. AMS. Hypoxia w/ activity.
16	No	2	Agitated/AMS uncooperative
17	Yes ETT/vent	0	Covid ARDS NMB/prone
18	No	2	AMS, hypoxic w/ activity. ICU day 8 s/p PEA arrest.
19	No	1	ICU < 24H. CAP/septic shock. pressors. Getting a line.
20	No	1	ICU < 24H. Covid + urosepsis w/ shock.
21	Yes ETT/Vent	0	Covid ARDS prone/NMB
22	No	5	s/p complicated foregut surg.
23	Yes ETT/Vent + VVpa ECMO	0	Unstable. Shock + hypoxia
24	No	5	s/p OMFS surg
25	Yes ETT/vent + VV ECMO	0	GI bleeding, shock, unstable
26	Yes VV ECMO	7	Walking halls with 2+ staff
27	No	1	AMS, uncooperative, agitated
11/15			
1	Yes ETT/vent	0	Paralyzed, botulism
2	No	10	Sm. ICH. Medically managed. Only sx= slight confusion.
3	Yes trach/vent	2	Long terrible covid ards + numerous infections. AMS + deconditioned.
4	Yes trach, no vent	5	Post op OMFS
5	No, EVD	0	ICH w/ IVH. EVD. AMS major focal deficits.
6	Yes trach/vent	1	Long covid. AMS. Deconditioned. Sacral wound limiting OOB.
7	No	5	Covid. NSTEMI.
8	No	5	Recovering from crani
9	No	2	Down's, nonverbal, dependent, recurrent seizures. Terrible mvmt disorder.
10	Yes ETT/Vent	0	Coma. s/p PEA arrest
11	No	1	OR today for vascular surgery. Card shock.
12	Yes ETT/vent	0	Covid ARDS prone/NMB super sick
13	No	1	Covid ARDS, AMS, hypoxic w/ activity, getting HD
14	No	1	AMS, uncooperative
15	Yes ETT/Vent	0	Covid ARDS prone/NMB
16	No	1	Bipap for aspiration PNA, acute encephalopathy

17	No	10	Recovering DKA + UTI + incidental covid
18	Yes ETT/Vent	0	Covid ARDS, prone
19	No	10	STEMI, recovering
20	No	5	Foregut post op recovering
21	Yes ETT/Vent/VVpa ECMO	0	Covid ARDS highly unstable w/ refractory hypoxemia/multifactorial shock
22	Yes trac/no vent	9	Post op OMFS recovering
23	Yes ETT/Vent + VV ECMO	0	Covid ARDS, multifactorial shock
24	Yes VV ECMO	7	Covid ARDS OOB ambulating with multiple staff
25	No	5	AMS. Recovering from meningitis.
11/16			
1	Yes ETT/vent	0	Botulism, paralyzed
2	No	1	EKOS w/ bedrest orders
3	No	0	SAH, unwell. Being transferred to PSV for further surgical intervention
4	Yes Trach/no vent	1	OMFS post op w/ bedrest orders until tomorrow.
5	No	5	Complicated esophagectomy w/ respiratory issues
6	Yes Trach/vent	2	Long horrible covid course. AMS, deconditioned, unstable
7	Yes trach/no vent	9	OMFS post op w/ floor orders
8	No	2	EVD. AMS. Significant focal deficits
9	No	5	Covid iso. AMS.
10	No	5	Recovering head bleed. AMS.
11	Yes trach/no vent	9	OMFS post op w/ floor orders
12	Yes ETT/vent	0	Just intubated. In shock. unstable.
13	Yes ETT/vent	0	Coma s/p PEA arrest. Seizing.
14	Yes ETT/vent	0	Covid ARDS prone/NMB
15	Yes ETT/Vent	0	Covid/ARDS prone/NMB
16	No	1	Covid ARDS. Hypoxic w/ activity. AMS.
17	No	5	Complicated liver surgery. Now has floor orders. AMS.
18	Yes	0	Covid ARDS prone/sed
19	No	5	Covid iso. Floor orders.
20	Yes ETT/vent	0	Covid ARDS prone/sed

21	No	10	STEMI. Better. Leaving ICU.
22	No	5	Foregut post-op w/ epidural & some resp issues.
23	Yes VVpa ECMO	3	Coivd ARDS very sick. Poor activity tolerance. Short dangle.
24	Yes VV ECMO	3	Covid ARDS able to dangle but syncopal w/ standing. Lift to chair.
25	Yes VV ECMO	7	Covid ARDS ambulating w/ multiple staff
26	No	5	AMS. Floor orders.
11/17			
1	Yes trach/vent	0	Botulism, paralyzed
2	No	5	EKOS pulled today. Just starting to mobilize.
3	Yes, trach (on/off vent)	2	Paraplegic. Worsening resp failure.
4	Yes trach/no vent	5	OMFS post op
5	No	9	Post-op esophagectomy doing better.
6	Yes tach/vent	2	Covid ARDS long course still unstable.
7	Yes trach/no vent	9	OMFS post op w/ floor orders.
8	No	2	EVD. AMS. Focal deficits.
9	No	5	STEMI. Doing better. Floor orders.
10	No	5	Covid iso. Floor orders.
11	No	9	Post op crani boing better w/ floor orders
12	Yes trach/no vent	9	Post-op OMFS w/ floor orders.
13	Yes ETT/vent	0	Needs low stim2/2 recurrent myoclonus/severe mvmt disorder w/ resp failure + hypoxia.
14	Yes ETT/vent	0	Coma s/p PEA arrest. Myoclonus.
15	Yes trach/vent	0	Covid ARDS. Long course. Vibra bounce back. Resp failure/acidosis worsening now.
16	No	5	Foregut post op
17	Yes ETT/vent	0	Covid ARDS prone/NMB
18	Yes ETT/Vent	0	Covid ARDS prone/NMB
19	No	5	Complicated liver post op. floor orders.
20	Yes ETT/vent	0	Covid ARDS prone/NMB
21	Yes ETT/vent	0	Covid ARDS prone/NMB
22	No	5	Covid iso. Floor orders.
23	Yes ETT/vent	0	Covid ARDS prone/sed

24	No	0	Hosp day 1. Covid PNA, ESRD, variceal bleeding, unstable.
25	No	10	STEMI. Better. Floor orders.
26	No	5	Post-op foregut. Improving.
27	Yes VVpa ECMO	0	Covid ARDS. Unstable. Bleeding.
28	Yes ETT/vent	0	Cardiac arrest, coma, TTM, shock
29	Yes VV ECMO	1	Covid ARDS. Unstable.
30	Yes VV ECMO	7	Covid ARDS. Ambulates w/ multiple staff,
31	No	5	Floor orders. AMS.
11/19			
1	No	1	AMS, clinically a mess (severe hyponatremia, uro bleed, CIWA)
2	Yes ETT/Vent	0	Septic shock intubated/sedated/CRRT
3	No	10	STEMI. PCI. Better.
4	Yes trach/no vent	9	OMFS post op
5	No	9	Esophagectomy w/ floor orders
6	Yes trach/vent	0	Long terrible covid ards. Declining. Planning for withdrawal of support in 24-48H .
7	No	0	Unstable head bleed s/p crani POD2
8	No	2	EVD. AMS. Sig focal deficits.
9	No	5	Sepsis, improving. Floor orders.
10	No	5	Floor orders. AMS.
11	Yes ETT/vent + CRRT	0	Card shock, AKI. Jet fuel pressors.
12	No	5	Improved hypercapnic resp failure post procedure. Will transfer out.
13	Yes ETT/Vent	0	Unstable w/ stim. Severe mvmt disorder + resp failure w/ massive secretions
14	Yes ETT/Vent	0	Coma s/p PEA arrest. Brain death testing today.
15	No	1	ICU day 1 ischemic CVA s/p thrombectomy w/ focal deficits & AMS.
16	No	9	Esophagectomy post op w/ floor orders.
17	Yes ETT/Vent	0	Covid ARDS intubated/sed. Still not stable.
18	Yes ETT/vent	0	Covid ARDS prone/NMB, shock

19	Yes ETT/vent	0	Covid ARDS prone/sed
20	No	9	Post op OMFS w/ floor orders
21	No	5	Sepsis, improving. Will transfer out.
22	Yes ETT/vent	0	Covid ARDS prone/sed
23	Yes ETT/vent	0	Covid ARDS. Intubated/sed. New PTX. Unstable.
24	No	5	Complicated liver post op with floor orders
25	No	5	DKA, improving
26	No	9	Foregut post op improving
27	Yes VVpa ECMO	0	Covid ARDS. Unstable. massive hemolysis. Shock, hypoxia.
28	No	2	Post cardiac arrest. AMS, uncooperative. To leave ICU.
29	Yes VV ECMO	0	Covid ARDS. Shock. refractory hypoxia.
30	Yes VV ECMO	7	Covid ARDS ambulates w/ multiple staff
31	No	5	GIB. Floor status. Getting iHD for multiple hours.
11/20			
1	No	9	Post op pt admitted after elective surg but had AF RV. Better w/ floor orders.
2	No	0	Bleeding. OR today.
3	Yes ETT/Vent + CRRT	0	Jet fuel pressors. Septic shock.
4	No	0	New admit. Septic shock on pressor + $NaHCO_3$ gtt. AMS. Unstable.
5	Yes Trach/Vent	0	Long covid. Comfort care.
6	No	0	Head bleed w/ seizure s/p crani. AMS. Cerebral edema. Low stim.
7	No	2	EVD. AMS + focal deficits.
8	Yes ETT/Vent	0	Covid. Stroke. Seizures. Deeply sedated.
9	No	1	Leukemia, sepsis, bleeding. Tenuous.
10	Yes ETT/Vent + CRRT	0	Card shock on jet fuel pressors. Unstable.
11	No	8	Admitted for anesthesia complication & doing better. Floor orders. Has Parkinson's & HF. Baseline limitations. Working w/ PT
12	No	1	Severe alcohol withdrawal. AMS. Unsafe.

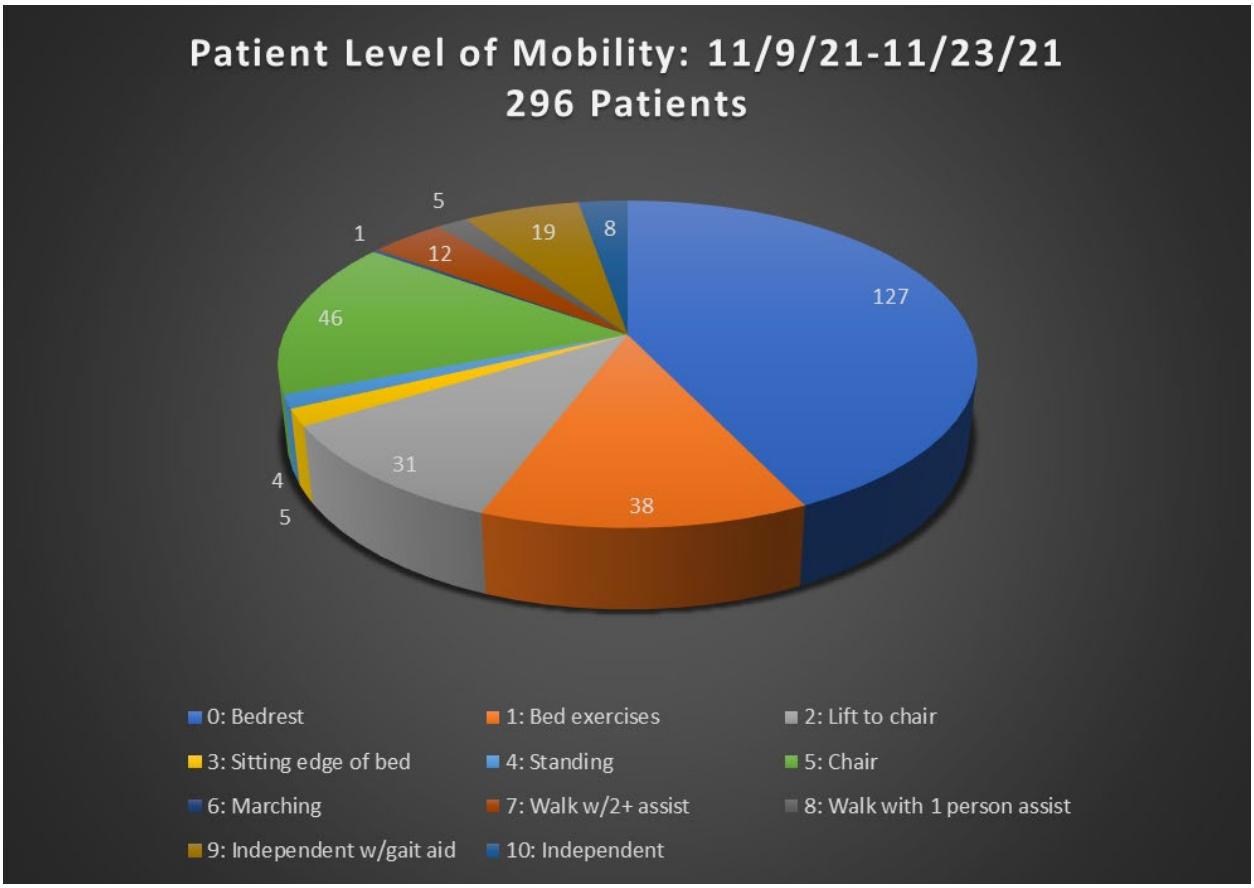
13	No	5	Stroke w/ severe motor deficits. Working w/ PT.
14	No	8	Esophagectomy post op doing better.
15	Yes ETT/Vent	0	Covid ARDS. Sedated. Morbidly obese.
16	Yes ETT/Vent	0	Covid ARDS prone/sed
17	No	0	Covid PNA. 100% fio2 Bipap/HHFNC dependent. Very tenuous (hypoxia) w/ sig anxiety
18	Yes ETT/Vent	0	Covid ARDS. Prone/sed.
19	Yes ETT/Vent	0	Covid ARDS. Prone/sed.
20	No	8	Complicated foregut post-op doing better. Working w/ RNs/PT.
21	Yes VVpa ECMO	1	Covid ARDS. Chair position in bed only. Too unstable (shock, refractory hypoxemia)
22	No	5	Post-op VATS. Just extubated. OOB to chair.
23	Yes VV ECMO	2	Covid ARDS. Be in chair position only. Unstable (hemodynamics + hypoxemia). Syncopal when too far upright.
24	Yes VV ECMO	7	Covid ARDS walking in hall w/ multiple staff.
11/21			
1	No	9	Floor orders. Post op, better.
2	Yes ETT/Vent + CRRT	0	Septic shock
3	Yes ETT/Vent	0	Comfort care
4	Yes Trach/vent	0	Long terrible covid. Comfort care.
5	No	1	Head bleed s/p crani + seizures. AMS.
6	No	2	EVD. Focal deficits. AMS.
7	Yes ETT/Vent	0	Covid, CVA, seizing
8	No	5	Floor status. Better after emergent HD.
9	No	1	BiPAP, shock, AMS.
10	No	2	Parkinson's, Heart failure, had allergic rxn to anesthesia. Improving. Floor orders. Baseline mobility deficits.
11	No	1	Severe ETOH withdrawal. Unsafe.
12	No	2	Recent CVA. Significant mobility deficits.
13	No	9	Esophagectomy post op improving

14	Yes ETT/Vent	0	Covid ARDS intubated/sedated. Morbidly obese.
15	No	0	Septic shock. Biventricular heart failure. Bipap dependent. AMS.
16	Yes ETT/vent	0	Covid ARDS on NMB
17	Yes ETT/Vent	0	Intubated w/ light sedation for pt comfort. S/p massive aspiration and no immediate plan to extubate yet.
18	No	1	Covid PNA. Bipap/HHFNC dependent. Significant hypoxia w/ any exertion.
19	Yes ETT/Vent	0	Covid ARDS. Prone/sed.
20	Yes ETT/Vent.	0	Covid ARDS. Prone/light sed.
21	No	8	Complicated foregut post op. improving.
22	Yes VVpa ECMO + CRRT	0	In shock. Unstable.
23	Yes VV ECMO	4	Near syncope when upright. Tolerated a quick stand. Needs sling to chair.
24	Yes VV ECMO	7	Ambulated in halls w/ multiple staff
11/23			
1	Yes CRRT	1	CRRT stopped in afternoon and PT to eval.
2	No	1	Bipap w/ recurrent hypoxia. AMS from severe ETOH withdrawal.
3	Yes ETT/Vent	0	Very sick (CO poisoning, burns, heart failure, stroke, shock).
4	No	9	Floor orders. Post STEMI/PCI. Better.
5	No	2	Head bleed w/ lots of complications & significant AMS.
6	No	2	EVD. Focal motor deficits + AMS.
7	Yes ETT/vent	0	Status epilepticus.
8	Yes ETT/Vent	0	Strict bedrest per OMFS
9	No	5	Sepsis improved. No pressor. Working w/ PT/OT.
10	No	5	Anesthesia complication. Better. Floor orders.
11	No	5	ETOH withdrawal. AMS.
12	No	1	Covid PNA. Morbidly obese. In isolation. Extubated today. AMS. PT/OT just ordered.

13	No	1	RSV w/ resp failure + HTN emerg. Stuck on Bipap. Not stable.
14	Yes ETT/vent	0	Covid ARDS prone/NMB
15	No	5	Extubated today. Better.
16	No	1	Covid PNA. Bipap/HHFNC dependent. Hypoxic w/ any activity.
17	Yes ETT/Vent	0	Covid ARDS. Intubated/sed.
18	Yes trach/vent	0	Covid ARDS. Prone/sed.
19	No	5	STEMI s/p PCI. OK.
20	No	5	Esophagectomy yesterday.
21	No	9	Complicated foregut post-op. better.
22	Yes VVpa ECMO + ETT/Vent + CRRT	0	Covid ARDS very unstable. Shock.
23	Yes VV ECMO	6	Covid ARDS. Significant activity intolerance (syncope)
24	Yes VV ECMO	7	Covid ARDS walking in halls w/ multiple staff

Figure 4

Level of Mobility of CCS Patients November 9, 2021, through November 23, 2021



Level of mobility (based on mobility scale attached below in figure 5)
0: 127 = 42.9%
1: 38 = 12.8%
2: 31 =10.47%
3: 5 = 1.7%
4: 4 = 1.3%
5: 46 = 15.5%
6: 1 = 0.34%
7: 12 = 4.05%
8: 5 = 1.7%
9: 19 = 6.42%
10: 8 = 2.7%
Notes for acuity
Vents:115
CRRT:11
ECMO: 33
EVD: 9

Figure 5

ICU Mobility Scale

ICU Mobility Scale

	Classification	Definition
0	Nothing (lying in bed)	Passively rolled or passively exercised by staff, but not actively moving.
1	Sitting in bed, exercises in bed	Any activity in bed, including rolling, bridging, active exercises, cycle ergometry and active assisted exercises; not moving out of bed or over the edge of the bed.
2	Passively moved to chair (no standing)	Hoist, passive lift or slide transfer to the chair, with no standing or sitting on the edge of the bed.
3	Sitting over edge of bed	May be assisted by staff, but involves actively sitting over the side of the bed with some trunk control
4	Standing	Weight bearing through the feet in the standing position, with or without assistance. This may include use of a standing lifter device or tilt table.
5	Transferring bed to chair	Able to step or shuffle through standing to the chair. This involves actively transferring weight from one leg to another to move to the chair. If the patient has been stood with the assistance of a medical device, they must step to the chair (not included if the patient is wheeled in a standing lifter device).
6	Marching on spot (at bedside)	Able to walk on the spot by lifting alternate feet (must be able to step at least 4 times, twice on each foot), with or without assistance.
7	Walking with assistance of 2 or more people	Walking away from the bed/chair by at least 5 metres (5 yards) assisted by 2 or more people.
8	Walking with assistance of 1 person	Walking away from the bed/chair by at least 5 metres (5 yards) assisted by 1 person.
9	Walking independently with a gait aid	Walking away from the bed/chair by at least 5 metres (5 yards) with a gait aid, but no assistance from another person. In a wheelchair bound person, this activity level includes wheeling the chair independently 5 metres (5 yards) away from the bed/chair.
10	Walking independently without a gait aid	Walking away from the bed/chair by at least 5 metres (5 yards) without a gait aid or assistance from another person.

Table 2

Four Classes of Barriers According to CFIR Domains by Costa et al. 2017

1. Patient-related barriers (CFIR outer setting)
• Lack of patient cooperation
• Patient instability and patient safety concerns (hemodynamics, treatment-related adverse events, physiologic patient issues)
• Patient status issues (ie, diarrhea, fatigue, leaking wound, patient weight or size, confusion/agitation, imminent death)
2. Clinician-related barriers (CFIR characteristics of individuals)
• Lack of knowledge and awareness about protocol
• Lack of conceptual agreement with guidelines
• Lack of self-efficacy and confidence in implementing protocol
• Clinician preference for autonomy (resistance to change, expectation of nurse)
• Staff and patient safety concerns
• Perception that rest equals healing
• Reluctance to follow protocol (previous execution associated with negative outcomes)
• Lack of confidence that protocol will improve workflow or improve patient outcomes
• Perceived workload (hard work)
• Staff attitude and lack of buy-in
• Safety of tubes, catheters, and wires
3. Protocol-related barriers (CFIR intervention characteristics)
• Unavailable or cumbersome to use protocols
• Unclear protocol criteria and agreement or discomfort with guidelines
• Protocol development cost (time and money to develop)
• Learning curve (possibility for clinician to test guideline and observe other clinicians using the guideline easily)
• Lack of clarity as to who is responsible, steps needed to take, and expected standards for protocol implementation
• Lack of confidence in evidence supporting protocol and guideline developer
• Lack of confidence in reliability of screening tools
4. ICU contextual barriers (CFIR inner setting)
• Culture (safety culture)
• Interprofessional team care coordination, communication, and collaboration barriers
• Lack of leadership/management
• Interprofessional clinician staffing, workload, and time
• Lack of interprofessional team support and training/expertise
• Physical environment, equipment, and resources
• Staff turnover
• Low prioritization and perceived importance
• Competing priorities and need for further planning
• Scheduling conflicts (ie, patient off unit, at dialysis, procedure)

ABCDE = Awakening and Breathing Coordination, Delirium, and Early exercise/mobility bundle; CFIR = Consolidated Framework for Implementation Research.