PREVENT HAIs Healthcare-Associated Infections

Early Mobility Guide for Reducing Ventilator-Associated Events in Mechanically Ventilated Patients

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Introduction

The Importance of Early Mobility in the Intensive Care Unit (ICU)

A high proportion of survivors of critical illness suffer from significant physical, cognitive, and psychological disabilities.[1] Profound neuromuscular weakness secondary to critical illness, prolonged bedrest, and immobility leads to impaired physical function. Physical impairment affects approximately 50 percent of ICU patients, with at least half of discharged patients unable to return to premorbid levels of activity.[1] Cognitive impairment, including impaired executive function, memory, language, and attention, is widespread; almost 80 percent of ICU survivors suffer from cognitive impairment early after discharge, with deficits often lasting from months to years.[2,3] The prevalence of psychiatric morbidity, including clinically significant depression, anxiety, and post-traumatic stress disorder, remains high among ICU survivors.[4]

Evidence suggests that mobilization mitigates the physical, cognitive, and psychological complications of critical illness. Mobilization has also been linked to decreased time on the ventilator,[5,6] decreased hospital length of stay,[7,8] and improved functional outcomes.[9] The mobilization of ICU patients is safe and feasible.[10] However, ICU patients are typically perceived as being too sick to tolerate activity. As a result, they have limited exposure to physical rehabilitation.[9,11,12] In addition to this culture of immobility, variability in research and published protocols make translating evidence into practice challenging.[13]

The implementation of an early mobilization program requires a multidisciplinary approach, including collaboration between nurses, rehabilitation therapists, respiratory therapists, physicians, and administrators. This guide integrates available resources to help you educate and engage all stakeholders, proposes protocols to standardize the screening and mobilization of your patients, and provides tools to collect data and evaluate your progress.

Early Mobility as a Preventative Intervention

Surveillance for ventilator-associated complications in the National Healthcare Safety Network before 2013 was limited to ventilator-associated pneumonia (VAP). VAP is a heterogeneous disease and is difficult to diagnose.[14] A major barrier to standardizing prevention and treatment of VAP is that the radiological and microbiological methods of diagnosing VAP are notoriously subjective and difficult to carry out in critically ill patients. This often results in interobserver variability and inconsistent treatment paradigms. In the United States in particular, problems in diagnosing and treating VAP stem from subjectivity in classification that leads to misdiagnosis.[15,16]

In January 2013, the Centers for Disease Control and Prevention (CDC) released new surveillance definitions for ventilator-associated events and ventilator-associated conditions (VAC). This new, tiered definition is based on objective, streamlined, and automatable criteria, and is more broadly focused on preventable complications of mechanical ventilation, including VAP.[17,18] The change in the CDC surveillance definition marks a strong first step toward recognizing the short-term preventable complications associated with mechanical ventilation

beyond VAP, and improving outcomes for all mechanically ventilated patients. In addition to pneumonia, VAC is most commonly attributable to atelectasis, pulmonary edema, and acute respiratory distress syndrome, or a combination of these conditions. Recently published data suggest that VAC is associated with increased duration of mechanical ventilation, prolonged hospitalization, and increased hospital mortality.[17,19] Thus, preventative interventions must address both VAP and VAC. We are targeting early mobility as a key preventative intervention given the strong emerging evidence linking early mobility to decreased time on the ventilator.

What's in the Guide?

By implementing this guide in your care for ICU patients, your team leads the national effort to reduce complications related to mechanical ventilation and to improve physical, cognitive, and psychological patient outcomes. However, this guide alone is not a prescription for success. While we have developed a model to support your efforts to implement evidence-based practices and improve care for all ICU patients, the authors of this manual do not work in your unit. Only your team understands your obstacles and opportunities for improvement. The materials presented here provide a structure to implement evidence-based practices and improve your patients' outcomes. Ultimately, success requires creative energy, profound persistence, strong leadership, and deliberate teamwork.

Using the TRIP Model as a Framework

The structure of this guide is based on the Translating Research Into Practice (TRIP) model, designed to close the gap between evidence-based guidelines and clinical bedside practice.[20]

The TRIP model is composed of four phases:

1. Develop an evidence-based intervention,
    - Identify interventions associated with improved outcomes
    - Select interventions with the largest benefit and lowest burden
2. Identify barriers to implementation,
3. Measure baseline performance, and
4. Ensure all patients receive the intervention.

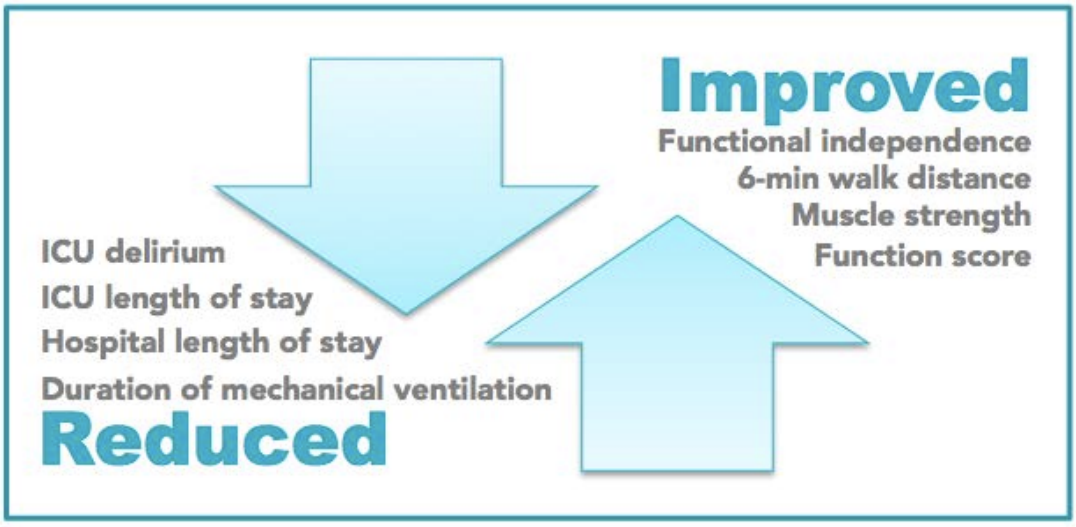
Implementation of the TRIP model in combination with the Comprehensive Unit-based Safety Program (CUSP) has been associated with significant reductions in central line-associated bloodstream infections (CLABSI) and VAP in more than 100 Michigan ICUs.[21-23] The Michigan results were sustained for more than 3 years and were associated with a reduction in mortality among Medicare ICUs with significant cost savings.[24-25] Implementation of the same program in Rhode Island ICUs demonstrated similar results.[26] Most recently, implementation of the TRIP model in combination with CUSP has been associated with significant reductions in CLABSI in hospitals in 45 States, from Hawaii to Connecticut.[27]

The TRIP framework will help you incorporate evidence-based interventions into your patient care practices. Below, we describe each step in the TRIP model applied to improving care for mechanically ventilated patients.

Phase 1. Develop an Evidence-Based Intervention

In Phase 1, you will develop an evidence-based intervention plan for your work area. The benefits of early mobilization based on available literature are listed in Figure 1.[28] Your plan will encompass two distinct processes. First, identify the interventions associated with your desired outcome improvements. Next, select those interventions with the largest benefit and lowest burden.

Figure 1. Benefits of Early Mobilization



Identify Interventions Associated With Improved Outcomes

But what are the key interventions to achieve early mobilization and the listed benefits for your patients? Below is a list of interventions based on an extensive review of available literature and guidelines. Note that recommendations vary in the published protocols, and the evidence regarding the most effective exercises and dosing is still in its infancy. Therefore, these interventions were selected based on input from national experts in sedation and delirium, mechanical ventilation, and rehabilitation in addition to current literature.

Below is a brief overview of the interventions elaborated on within the toolkit:

- ***Multidisciplinary and coordinated approach***. The joint participation of nurses, physicians, respiratory therapists, rehabilitation therapists, and local hospital administrators as described in CUSP is vital throughout the TRIP model continuum to create a culture of mobility and consistently achieve mobilization for patients. These staff members will form an early mobility team and may be independent of the CUSP team.
- ***Structured assessments of sedation level and delirium using sedation and delirium scales.*** Routinely assessing the patient's cognitive function with these scales will help you target lighter sedation levels and treat delirium, and to achieve the requisite level of cognitive function to mobilize your patients.

- ***Daily sedation interruption and minimizing sedative use***. Heavily sedated patients cannot participate in a rehabilitation program. Protocols incorporating daily sedative interruptions and targeting light sedation will help your patients remain alert and cooperative to the extent that they may participate in a rehabilitation program and achieve their maximal mobility.
- ***Screening for eligibility for mobilization***. An important first step is routinely screening all of your patients using a standard screening algorithm to determine which patients may safely participate in a mobilization program.
- ***Employing a nurse-driven protocol to achieve highest level of mobility***. Not all ICUs have dedicated rehabilitation resources. Traditionally, nurses mobilize critically ill patients only once the patients have recovered from critical illness. It is possible to shift the focus of nurse-driven mobilization to the time of acute illness. Earlier nurse-driven mobility promotes recovery by integrating a systematic protocol into routine nursing care, with the appropriate input and/or use of rehabilitation specialists for select patients. Utilizing a multidisciplinary approach as outlined in CUSP helps create a culture where nurses can feel empowered to drive improvement efforts.

Select Interventions With the Largest Benefit and Lowest Burden

Your team can consider several factors when selecting interventions:

- How much effort is required to build buy-in for the early mobility intervention?
- Who will champion this effort?
- How is it best to share the evidence supporting the intervention to the different stakeholders?
- Which resources are required to change current local practice?
- What is required to garner the necessary resources?

Consider choosing "low-hanging fruit" to gain positive momentum before focusing on the more challenging interventions. Low-hanging fruit refers to an intervention that is easy to implement while yielding strong rewards. For instance, to reduce patient falls, it would be easier to add a nightlight to bathrooms than to redesign floor plans.

The Early Mobility Toolkit in Practice

It was clear that the majority of our mechanically ventilated patients were too sedated to participate in an early mobility program. We also found a significant discrepancy between the sedation level agreed upon between providers on rounds and the actual sedation level of patients. In order to demonstrate this, we tracked the agreed-upon sedation level and the actual sedation level for all patients in the ICU for 3 days. Staff members were stunned by the results and were motivated to collaboratively monitor sedation level more closely. Now, the target sedation level is explicitly noted on the Daily Goals rounding sheet each morning, and re-evaluated on evening rounds to determine if the target is met or needs to be adjusted.

— Safety Team Member

Phase 2. Identify Barriers to Implementation

Clinicians want to achieve the best possible outcomes for their patients. If patients are not receiving the evidence-based intervention your team identified, you will need to understand the barriers to compliance.[29] Common barriers to implementation of evidence-based interventions include the three As:

- **Awareness**: Are clinicians aware of the evidence-based intervention?
- **Agreement**: Do clinicians agree with the intervention?
- **Access**: Do clinicians have convenient access to the equipment or supplies required to implement the intervention?

Barriers for implementing mobility vary among ICUs. The most commonly encountered barriers to early mobility in the ICU include the following:[1,30]

- **Lack of leadership**. Strong leadership is necessary both at the institutional level, and at the local level, including the recruitment of a multidisciplinary project team.
- **Lack of resources**. Adequate professional staffing and equipment are necessary for successful implementation and institutional leadership must understand the value of an early mobility program to support it.
- **Lack of clinical training to mobilize critically ill patients**. Comprehensive education and training across disciplines is required, especially in ICUs without dedicated rehabilitation therapists.
- **Excessive sedation**. Patients need to be alert and cooperative to participate in rehabilitation therapy.
- **Lack of consistent screening for safety concerns.** Education followed by careful and consistent screening for physical and medical safety must be performed for all patients to optimize the timing and progression of therapy.

Through education, engagement, and collaboration of multidisciplinary teams of clinicians, these barriers can be surmounted to create a culture of mobility and make mobilization a part of routine care.

The Early Mobility Toolkit in Practice

We did not have resources to have a dedicated physical therapist in our ICU. ICU patients were usually regarded as a "last priority" by the inpatient physical therapists due to the critical nature of their illness and the high proportion of patients who did not meet their medical screening criteria. Also, when orders for physical therapy were placed in the middle of the day, patients' rehabilitation sessions were usually put off until the next day.

To remedy this, a standing appointment was scheduled between the charge nurse and lead physical therapist at 7:30 a.m. every morning. The charge nurse determined which patients were eligible for rehabilitation based on a standard medical screening algorithm applied to all patients in the ICU. She shared the names of the patients who passed the algorithm with the lead therapist, who then scheduled these patients for physical therapy that day. The rehabilitation plan for patients was finalized on rounds with the other staff, and if there were any changes to the plan, the charge nurse called the lead physical therapist after rounds.

— Safety Team Lead

Phase 3. Measure Performance

Baseline Performance

Collect baseline performance data to highlight at-risk areas, or your team's improvement opportunities. By sharing your results with both clinicians and hospital leadership, you will provide a catalyst for those improvement efforts. There are several potential strategies to assess baseline performance for early mobility: sedation practices, delirium rates, frequent barriers to mobilization, adverse events, and mobility outcome measures.

Monitor Compliance With Evidence-Based Guidelines

It is important to monitor compliance with evidence-based interventions through frequent formal and informal audits. Share the audit results with all involved staff to maintain engagement and spur improvement. Through this monitoring process, you will be able to maintain awareness, establish expectations, create urgency, generate accountability, and reward changes in behavior.[31-33] Evaluating performance provides an ongoing, real time "ground truth" image of performance and outcomes.[34] Areas of poor compliance can be identified and rectified.[35] Any lingering compliance concerns are immediately recognized, allowing the improvement team to revisit. Walk the process with staff to gain additional insights into barriers to implementation and weak compliance rates.[23]

To collect data and audit compliance, the Daily Early Mobility and Daily Care Processes data Collection tools include patient care activities on a daily basis to maximize mobilization, including—

- Screen for medical appropriateness for rehabilitation
- Target a sedation level and perform structured assessment of sedation level using a sedation scale
- Perform a structured assessment of sedation level and delirium
- Assist patients to achieve their highest level of mobility
- Minimize sedative use and implement daily sedation interruption or spontaneous awakening trial (SAT)
- Evaluate readiness for discontinuation of mechanical ventilation with daily spontaneous breathing trial (SBT)
- Link SAT and SBT to facilitate the discontinuation of mechanical ventilation

Daily Data Collection Tools

Local data should drive all quality improvement efforts. The Daily Early Mobility and Daily Care Processes data collection tools can be used for collecting data on daily patient care activities.

Tools	*How To Use Them*
Daily Early Mobility Data Collection Tool	This tool helps track compliance with each of the evidence-based recommendations for promoting early mobility as well as capturing perceived barriers to early mobilization, events that may occur during the mobilization process, and the level of PT and OT involvement.
Daily Care Processes Data Collection Tool	This tool helps track the compliance with each of the recommended daily care measures shown to reduce the harms associated with mechanical ventilation.

Outcomes Reported in the Daily Data Collection Tools

The following reported outcomes help you maximize the mobility of your patients:

- Distribution of activity levels
- Percentage of Richmond Agitation Sedation Scale (RASS) or Riker Sedation-Agitation Scale (SAS) actual being {-1, 0, 1} or {4, 5}
- Percentage achieving RASS/SAS target

- Delirium assessment compliance rate
- Percentage of Intensive Care Unit Delirium Screening Scale (ICDSC) negative, Confusion Assessment Method for the ICU (CAM-ICU) negative, or Attention Screening Exam (ASE) ≤ 2 (no delirium)
- Percentage of patient days mobilized out of bed
- Distribution of perceived barriers
- Adverse event incidence rate
- Adverse event rate (patient day level)

Phase 4. Ensure All Patients Receive the Intervention

Finally, deliver reliable evidence-based care to 100 percent of your patients. You want to ensure that your interventions become "the way things are done around here." This phase poses the biggest challenge for unit improvement teams. While your team implements phases 1 through 3 of the TRIP model, phase 4 requires buy-in and engagement from the your unit's entire care team and stakeholders. Without their complete awareness of, agreement to, and access to materials, the interventions will not become the norm nor be sustained.

The Early Mobility Toolkit in Practice

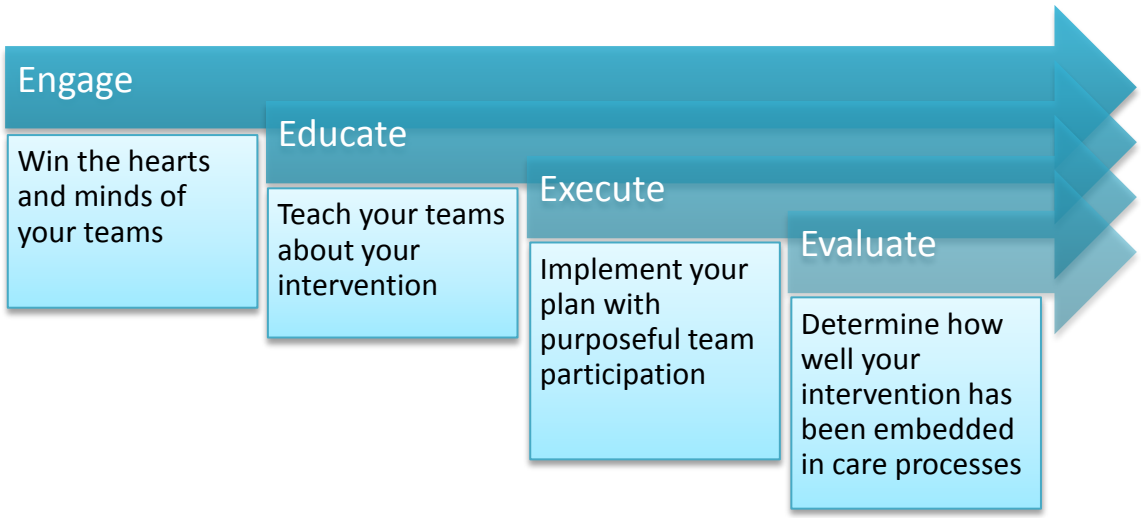
Our ICU patients were not being mobilized in a consistent way—mobilization was not discussed at rounds for every patient, orders were not always placed, and patients were not consistently screened for medical stability. In our ICU, we use a Daily Goals rounding tool for every patient during rounds to standardize the care that we provide for our patients, including interventions such as providing deep vein thrombosis prophylaxis, and monitoring whether catheters may be removed. We added fields related to mobility to our Daily Goals tool, including if the patient passed the medical screening level, a target activity level, and whether this could be achieved by nursing alone or if a rehabilitation specialist needed to be consulted. Now, we consistently address mobility for every patient at daily rounds.

— Physician Champion

The Four Es

Drawing from the published literature and experience, clinicians at the Johns Hopkins Hospital developed the Four Es implementation model. The model prompts your team to consider staff engagement, local culture, and contextual factors in a phased plan to embed your intervention in existing care processes. The Four Es represent the four phases of this expansion model, as shown in Figure 2:

Figure 2. Four Es Model



Operationalize the Four Es

Safety efforts succeed through the investment of key stakeholders, including senior leaders, improvement team leaders, and frontline staff. Though stakeholders have different perspectives, hopes, and fears, they often have the same questions about their involvement in the quality improvement process.[20,23]

Put the Four Es model to work by explicitly addressing the questions that your key stakeholders are sure to have:

1. **Engage:** How will early mobility improve patient outcomes?
2. **Educate:** What do we need to mobilize critically ill patients?
3. **Execute:** How will we implement early mobility given local culture and resources?
4. **Evaluate:** How will we know that mobilizing our patients made a difference?

Engage: How Will Early Mobility of Critically Ill Patients Improve Patient Outcomes?

Your staff members are likely overwhelmed by the amount of quality improvement initiatives going on at your hospital. You may need to convince them that early mobilization is not just a "flavor of the month" and illustrate the value of early mobility in patient outcomes. Early mobility is essential to incorporate into routine ICU care to prevent VAC as well as short- and long-term cognitive, physical, and psychological disabilities.

Successful implementation of an early mobility program is predicated on a change in both ICU culture and practice. Methods that have proved useful include recruiting early mobility champions to meet with and educate stakeholders from various ICU disciplines, thereby building support and addressing anticipated barriers. Sharing patient anecdotes, both of success stories and of difficulties of recovering from critical illness, is an especially powerful way to engage clinicians. Also, inviting guest speakers with expertise in the field, visiting a hospital with an experienced early rehabilitation program, or attending lectures and related conferences can help close the knowledge and training gap.[1,8] Additional resources for learning about ICU mobility are provided in the list of resources below.

Engaging Senior Executives

As part of your CUSP activities, designate a senior executive to partner with the early mobility team to advocate for resources and address barriers, whether global, discipline-based, or patient-centric. This executive will attend regular interdisciplinary meetings, help prioritize that all eligible patients receive rehabilitation in timely manner, and employ organizational support and resources on behalf of early mobility efforts. You can garner executive support by stressing the positive impacts of early mobilization:

- Decreased duration of ventilation
- Decreased ICU length of stay
- Decreased hospital length of stay

To support executive buy-in, share research that supports hospital-level decision making. A recently published financial model illustrates the significant cost savings with the implementation of an early mobilization program.[36] Based on an analysis of data from prior publications and the early rehabilitation program in the Johns Hopkins Medical ICU, the report authors developed a conservative model for net financial savings and costs. This analysis demonstrated that most ICUs with between 200 and 2,000 annual admissions would generate a net savings of up to $3.76 million by reducing patient ICU length of stays.

Engagement Resources

For engaging your staff, use the following tools:

- For patient videos and news about ICU mobility and improving patient outcomes after critical illness or surgery, visit the Johns Hopkins Web site at www.hopkinsmedicine.org/OACIS and select "OACIC Videos and News"
- For additional patient videos about ICU mobility and patient-centered rounds using the ABCDEF bundle, visit the Society of Critical Care Medicine (SCCM) ICU Liberation Web site at http://www.iculiberation.org/news/Pages/New-Video-Series-Centers-on-Patient-Centered-Rounds-Using-ABCDEF-Bundle.aspx
- For patient testimonials regarding the impact of cognitive impairment, depression and post-traumatic stress disorder, visit http://www.icudelirium.org/testimonials.html
- To view an international network of ICU mobilization centers and access relevant resources, visit http://www.mobilization-network.org
- For videos focused on the ICU experience of patients, visit the SCCM Web site on post-intensive care syndrome at http://www.myicucare.org/Thrive/Pages/Post-intensive-Care-Syndrome.aspx and find "Helpful Video Links" at the bottom of the page. The videos also are available at https://www.youtube.com/playlist?list=PLsb8sp1zaJWpYFl3CD_nLYoPbGxYkOM3r.
- On Twitter, follow @icurehab for updates on ICU rehabilitation or contribute to the conversation using #icurehab

Make Performance More Visible

Quality improvement teams often share process and outcome performance measures with select individuals or improvement groups within their organization. Key stakeholders, including frontline staff and senior leadership, are often unaware of local performance. If you were to ask frontline staff and leadership what your ventilator-associated event rates are, or the extent to which you are maximally mobilizing your ICU patients, would they know the answer? In most cases, they would not.

Give your invested stakeholders feedback by sharing your performance in the following ways:

- Post a trend line of percentage of patient days mobilized in your intensive care units to show how this changes over time
- Post the percentage of achieving RASS/SAS targets
- Post the percentage of ICDSC negative, CAM-ICU negative, or ASE ≤ 2 (no delirium)
- Benchmark your performance against similar hospitals
- Share your adverse incidence rate and update this regularly
- Review your unit's early mobility outcome reports

Most importantly, performance feedback will only be meaningful if your providers believe that the data are valid. Be transparent about your data collection techniques, analyses, and any efforts your team has made to address possible biases.

Recognize Staff Efforts

Financial incentives to engage staff and leaders, while attractive, are often not feasible or sustainable. Staff recognition using nonfinancial strategies can go a long way toward engaging your colleagues. Some examples include—

- Assigning a title for key team participants, such as the physician or nurse project leader. Make new designations visible by posting around the unit and by publishing in a hospitalwide newsletter or Web site.
- Encouraging team members to present their efforts on a recurring basis at important committee or board meetings within your organization.
- Highlighting staff efforts in local newsletters, bulletins, or publications.

The Early Mobility Toolkit in Practice

We wanted to elicit patient and family stories regarding their experiences in our ICU. We rarely get feedback about these, and as a result, do not have any direct information about the cognitive and physical deficits experienced by our patients who survive critical illness. We surmised that our staff would be more engaged in interventions to minimize sedative use and more aggressively mobilize patients if they were more aware of the outcomes of patients whom they cared for. So our ICU nurse manager called a sample of patients who stayed in our ICU longer than a week about 3 weeks post-discharge from the hospital. She inquired about their memories regarding their experience in their ICU, and their current physical and cognitive state. She posted short testimonials from these patients in our staff room for all staff to read on breaks. These testimonials created a lot of fruitful discussions among staff and motivated them to be more engaged in our early mobility program.

— Safety Team Member

Educate: What Do We Need To Mobilize Critically Ill Patients?

Prolonged periods of immobility place critically ill patients at a higher risk for many complications, ranging from short-term impairments (e.g., neuromuscular weakness, increased time on mechanical ventilation, and longer ICU stays) to long-term impairments in physical functioning. Such long-term physical impairments, along with impairments in cognition and mental health, are collectively termed post-intensive care syndrome. Early rehabilitative interventions begun as soon as critically ill patients are deemed physiologically stable (i.e., their clinical status is no longer declining) are beneficial to reducing patient complications. Such interventions frequently occur while patients are on mechanical ventilation and/or vasopressor infusions. Traditionally, patients are mobilized following, as opposed to during, their critical illness. For example, it is a common misconception that it is contraindicated to mobilize patients on vasopressors. With careful screening, such patients may be safely mobilized.

Evidence To Support Early Mobility

Evidence shows early rehabilitation of ICU patients is both safe and feasible. In 3 independent systematic reviews of 15 studies reporting on early rehabilitation programs for critically ill patients, no serious adverse events resulted in death or near-death events. The removal of lines or tubes was rare, and in fact, the most common physiological change was a transient oxygen desaturation.[33] A prospective observational study of routine clinical care of approximately 1,100 patients and more than 5,000 physical therapy treatments reported a 0.6 percent rate of potential safety events, most of which were transient physiologic changes, and none resulted in additional costs or lengthened ICU stays.[37]

In addition to no severe negative effects, many benefits have been correlated with early mobility. Studies have demonstrated that ICU patients who participate in early rehabilitation have improved muscle strength.[9] Furthermore, early rehabilitation interventions have also been associated with a significant reduction in the duration of mechanical ventilation.[6] ICUs with an early rehabilitation program had a demonstrable decrease in their patients' ICU and hospital lengths of stay, a decrease in delirium, as well as a decrease in total health care costs.[6,8,38] Patients who underwent early rehabilitation in the ICU were more likely to meet mobility milestones and achieve independent functional outcomes.[33] The benefits of early mobility in the ICU are summarized below in the resources provided below.

Education Resources

For educating your staff, we suggest the following background evidence and education tools:

- A list of relevant studies and articles is available in Appendix A.
- For the SCCM 2013 Guidelines for the Management of Pain, Agitation, and Delirium (PAD), visit the SCCM ICU Liberation Web site at http://www.iculiberation.org/Guidelines/Pages/default.aspx.
- For prevention, implementation, and measurement Webcasts to support the SCCM PAD guidelines, visit http://sccmmedia.sccm.org/video/Webcast/Symposium2013/Delirium/.

- For the comprehensive American Association of Critical-care Nurses (AACN) ABCDEF bundle, a collection of evidence-based recommendations to reduce time on the ventilator and delirium and reduce long-term consequences for adult intensive care patients, visit http://www.aacn.org/dm/practice/actionpakdetail.aspx?itemid=28328.
- For education tools for sedation and delirium, visit the Vanderbilt Delirium and Cognitive Dysfunction Web site at http://www.icudelirium.org/resources.html.
- For lessons learned from the implementation of an ICU early mobility program at University of California at San Francisco, visit http://www.ucsfcme.com/2013/MAN13002/slides/14.%20Engel-%20Early%20Moblization.pdf.

Getting Your Message to Frontline Staff

Your team will need to educate staff and leadership about the evidence, explain new processes, answer questions and set performance goals. Workshops, hands-on trainings, conferences, slide presentations, and interactive discussions are all effective tools to use for staff education. In fact, multiple teaching modalities can more effectively meet diverse learning styles.[39,40] Local champions and topic experts should be responsible for staff education,[41-43] which should include both multidisciplinary and specialty-targeted educational programs.[31-2,42-45] Sessions must be informative and relevant for the learner, providing clear explanations of desired procedures. These sessions provide an explanation of why staff members need to adopt the new practices. Done well, the session should engage and encourage adoption of new practices.[32,40]

Physician Education Efforts

While educational sessions should be interdisciplinary, some groups, such as physicians, are likely more receptive to other physicians. The physician champion on your CUSP team should lead breakout physician education efforts. Several education strategies described in the literature focus on changing physician behavior:

- Provide physicians with educational information packets consisting of research literature, evidence-based reviews, hospital specific data, and national guidelines. Educational information resources from national physician professional societies is particularly useful.
- Introduce educational information at staff meetings or Grand Rounds.
- Utilize informal educational meetings and networks to disseminate information.
- Conduct educational outreach visits involving content experts, such as respiratory therapists, pharmacists, pulmonologists, or infection preventionists.

Execute: How Will We Implement Early Mobility Given Local Culture and Resources?

Frame Your Intervention in the "Science of Safety"

Without a doubt, clinicians care deeply about their patients. Yet we are all fallible. No matter how hard we try, we will forget to order an important medication, and we will make mistakes. Patient safety research has demonstrated consistently that blaming individual doctors or nurses will not prevent patient harm. Organization-level factors, functional work area–related factors, team-related factors, task-related factors, and patient-related factors all have a role in patient outcomes. We need to ensure our system is designed to deliver these evidence-based interventions for every patient, every time. To achieve this, make sure to follow the CUSP principle of educating your staff on the Science of Safety. Further information can be found in the CUSP Guide for Reducing Ventilator-Associated Events in Mechanically Ventilated Patients and the Science of Safety video presentation.

Apply Principles of Safe System Design

Every system is designed to produce the results it delivers. If we want to achieve substantive and sustainable improvements in patient outcomes, we have to change the flawed components of the systems in which clinicians work. We must redesign systems to consistently produce wellness instead of harm. Other critical industries, like airlines and nuclear energy, teach us clear principles of safe system design:

- Standardize care
- Create independent checks
- Learn from defects

Standardize Care

Standardizing care and reducing complexity helps to establish new care processes as "normal behavior" for staff.[45] A way to incorporate standardization into patient care is to use daily multidisciplinary rounds. Daily rounds should follow a structured format: discuss the patient's goals for that day, determine what resources and actions are necessary to achieve those goals, and close any communication gaps regarding care. Any potential barriers and/or any safety issues should be identified.[23,33,35,46] Providers want to do the right thing for their patients. However, the care of a patient on mechanical ventilation is complex. It can be difficult to remember and execute everything we should do in real time without clear communication and standardized care procedures.

Create Independent Checks

Creating independent checks or redundancy along the continuum of care involves developing unique and separate system checks for critical procedures. High-reliability industries use independent redundancies to monitor the high-risk procedures that, if not done correctly or not completed at all, are most likely to cause harm. The health care industry is just beginning to develop independent redundancies. By combining both education and redundancy, we can

significantly improve the processes of care.[47] Engaging all caregivers in care choices, including respiratory, physical, and occupational therapists, provides a powerful independent redundancy.

Data should drive all quality improvement efforts. One powerful strategy to standardize care, reduce complexity, and create independent checks to ensure all patients receive evidence-based interventions is to employ daily data collection tools. Data collection tools are used every day on every patient receiving mechanical ventilation. Monitoring SAT and SBT compliance, as well as mobility targets provides real time feedback and focus on interventions.

The following sections provide several strategies for standardizing care, reducing complexity, and creating independent checks. Talk to your frontline providers! They likely have many other suggestions for creating a safer system design to ensure patients receive the interventions they should.

Execution Resources

To learn more about how to implement your plan with purposeful team participation, use these early mobility implementation tools:

- A medical screening algorithm to evaluate patient appropriateness for rehabilitation is available in Appendix B.
- For the AACN Early Progressive Mobility Protocol, visit http://www.aacn.org/wd/practice/docs/tool%20kits/early-progressive-mobility-protocol.pdf.
- For early mobility assessment and treatment steps, visit the SCCM ICU Liberation Web site at http://www.iculiberation.org/Mobility/Pages/default.aspx.

Strategies for Safe System Design Principles

Standardize care and create independent checks with these strategies for implementing an early mobility program:

- Incorporate Daily Goals to address sedation and activity targets for every patient on rounds
- Change nursing reporting by—
    - Listing each patient's level of mobility on the charge nurse report to prioritize physical therapy resources
    - Adding mobility, sedation, and delirium reporting to the electronic medical record
- Hold daily brief mobility huddles midday with the ICU physician, charge nurse, and rehabilitation specialist to ensure patient mobility targets are achieved
- Link SAT and SBT in nurse and respiratory therapist-driven protocols; nonphysician protocols facilitate the discontinuation of mechanical ventilation[46]

- Provide pocket cards to facilitate sedation, delirium, mobility readiness screening, and mobility activities
- Inform family members of the daily mobility plan and engage active caregivers in implementing a prescribed exercise plan
- Schedule mobility sessions in the morning to reduce interference with other clinical activities
- Incorporate sedation and mobility outcomes into ICU dashboards

Check Current Policies

Policies can be an effective strategy to improve compliance with evidence-based practice. Historically, unit and hospital policies tend to restrict the mobilization of critically ill patients. Check your hospital or unit policies, protocols, or standard order sets which inhibit mobilization: automatic bed rest, no mobilization in the presence of a femoral catheter, etc. Review and update existing policies to promote early mobilization in your ICU.

The Early Mobility Toolkit in Practice

By using the Daily Goals tool on rounds, we were prompted to discuss a patient's level of activity during the previous day, as well as the goal for the coming day. The patient's bedside nurse revealed that the patient had not moved out of bed for 2 days. Review of the electronic health record revealed that a "strict bed rest" order had been entered on admission as part of a postsurgical order set. This appeared to be the default order entry setting. It was unclear from the available documentation as to why strict bed rest was necessary. This prompted a call to the attending surgeon who said that there was no contraindication to mobilizing the patient. Following this incident, postsurgical order sets were modified such that "strict bed rest" was not the default setting.

— Physical Therapist, Safety Team

Evaluate: How Will We Know That Our Efforts Make a Difference?

The final step in the Four Es model is to evaluate the impact of your interventions. You need to assess whether your efforts are adding value for your staff, your patients, and their families.

Conducting frequent formal and informal audits with continuous timely feedback of outcome measures to all staff involved in this quality improvement process is essential. To accomplish this, monitor and report back to your staff each month. Routinely reporting local results allows staff to track improvements in performance, serves to remind staff about the new processes and even motivates improvement.[33] Be sure to celebrate your successes.

The Early Mobility Toolkit in Practice

About a year ago, our facility hired a nurse trained in quality and patient safety. This patient safety nurse audits the daily charts to verify specific care requirements or interventions were completed; she also notes when they were not missed. Over time, it has become clear that she could do more to improve care than audit charts. Now, any issue involving compliance with care procedures or evidence-based interventions raises a flag. She sets up hands-on education with the involved staff members. In addition, she adjusts her schedule to be available the next time the particular staff members are working in order to re-educate and address lingering questions. We have added the early mobility measures to her audit and education activities.

— Physician Champion

Data Collection

You should collect early mobility intervention data using the Daily Early Mobility Data Collection Tool. Local data should drive your improvement efforts. While data collection can be difficult in the beginning, hospitals teams that audit practices advance their care systems. Teams report heightened awareness of a multitude of care practices and enjoy significant and quantifiable progress. Sharing your progress with your frontline staff will help your team focus on your work towards mobilizing the patients in your unit.

Getting Help

You can access more learning materials on the Web site for the Toolkit To Improve Safety for Mechanically Ventilated Patients.

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Appendixes

Appendix A Literature List

Appendix B Medical Screening Algorithm

Appendix A. Literature List

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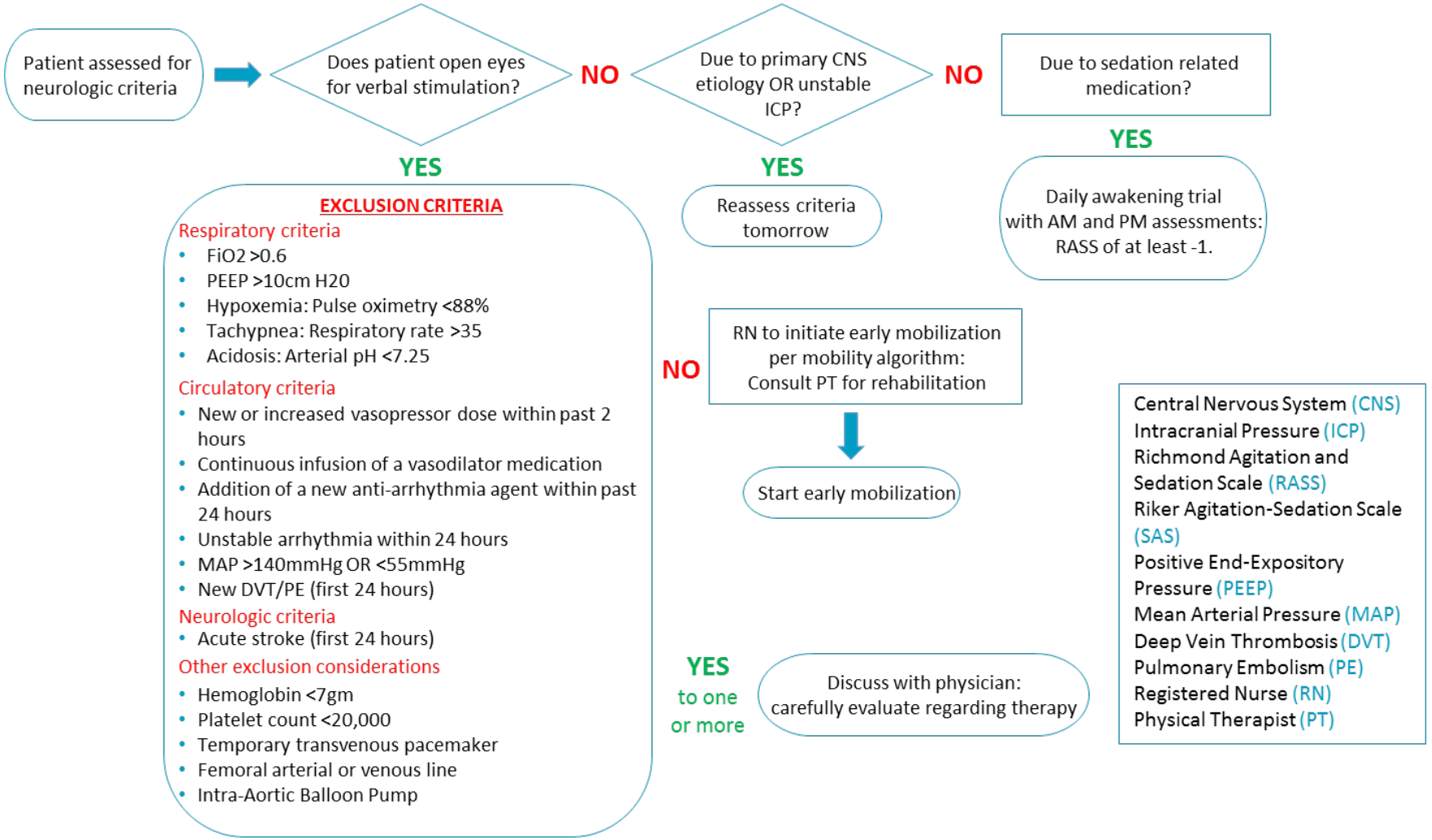
Appendix B. Medical Screening Algorithm

Medical screening algorithm to evaluate patient appropriateness for rehabilitation.



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