

USING TECHNOLOGY TO ENHANCE MOBILITY OF PATIENTS IN THE ICU

OVERVIEW

Early mobilization is a key component for optimizing patient outcomes in the intensive care unit (ICU). The **Mobility STEP** Protocol provides an outline to safely and effectively develop and implement evidence-based interventions that will improve patient mobilization.

INTRODUCTION

The **Mobility STEP (Safely Transitioning Every Patient)** Protocol is an early mobility protocol that incorporates evidence-based data from the ICU liberation bundle framework and the validated Bedside Mobility Assessment Tool 2.0 (BMAT 2.0) to bring early mobility to the next level. The **Mobility STEP** Protocol should be utilized starting the first day of ICU admission to decrease the incidence of ICU-acquired complications related to immobility.

THE DANGERS OF IMMOBILITY

Improvements in modern critical care medicine and advancements in technology over the past 50 years are resulting in more patients surviving ICU hospital stays.¹ An estimated 13 million to 20 million people are patients in ICUs around the world each year.² The current survival rate for patients who are mechanically ventilated in the ICU is 70%.³

Although the survival rate is high, an estimated 10% of former patients in the ICU have PTSD, 30% have depression, 30% have anxiety, and 40% have cognitive impairment that resembles moderate brain injury.⁴ While survival used to be the largest goal, the focus has broadened to include factors that affect patients' long-term outcomes after they leave the ICU.

Immobility and sedation used to be the norm in ICUs as a method to keep patients comfortable.¹ However, research has uncovered the dangers of prolonged immobility on outcomes of individuals who survive their ICU stay. Since the introduction of the ICU Liberation bundle in 2007, critical care medicine has broadened its

focus from solely short-term survival to also improving long-term outcomes for survivors of the ICU.⁵

For hospitalized patients, immobility quickly leads to negative outcomes. Adults who are hospitalized and who were ambulatory prior to admission have been estimated to be lying down for approximately 83% of their hospitalization.⁶

Studies show that prolonged immobility results in:⁷⁻¹¹

- pressure injuries,
- longer hospital stays,
- longer dependence on mechanical ventilation,
- reduced ability to do activities of daily living,
- frequent hospital readmissions,
- deep vein thrombosis,
- constipation,
- limited movement of joints,
- depression,
- insulin resistance,
- functional decline,
- postoperative respiratory complications, and
- sleep issues.



After just one week of bed rest, a patient can lose:^{8,12}

20%	40%	1%
OF THEIR MUSCULAR STRENGTH	OF THEIR MUSCLE MASS	OF THEIR BONE DENSITY

ICU-ACQUIRED WEAKNESS

Unfortunately, about half of ICU patients develop a condition of rapid neuromuscular decline called ICU-acquired weakness.¹² Prolonged bed rest and the breakdown of muscle leads to this debilitating condition.¹³

The condition can start to develop when the patient is in the ICU but continues after they leave the hospital.¹⁴ One year after discharge, only half of patients with ICU-acquired weakness have made a complete recovery.¹²

The long-term effects of ICU-acquired weakness include:¹

- Mortality
- Disability
- Poor physical function

THE BENEFITS OF IMPLEMENTING AN EARLY MOBILITY PROTOCOL

For decades, research has shown that getting patients up and moving as quickly and as safely as possible can combat the negative effects of immobility by:^{7,15-18}

- lowering the patient’s need to be mechanically ventilated,
- strengthening their respiratory system,
- reducing delirium, and
- allowing them to get back to their activities of daily living more quickly.

Since 2006, early mobilization has been considered the solution for preventing ICU-acquired weakness.¹³

Early mobility protocols encourage and support nurses and other caregivers who are taking care of the patient to mobilize the patient safely and get them out of bed sooner.

Getting the patient up and moving as soon as possible has many positive short-term effects. Results from studies on early mobility show that patients have¹⁵⁻¹⁸

- more muscle strength,
- better functional mobility,
- improved oxygenation,
- reduced risk for venous thromboembolism,
- shorter hospital stays, and
- the ability to walk further and longer.

In addition to the benefits the patient experiences from early mobilization, it also reduces the days spent in the hospital. Each day saved can potentially save a hospital approximately \$2,300.¹⁷

Although research confirms that early mobility protocols improve patient outcomes, only 45% of ICUs in the United States are using early mobility practices.¹⁹

HOW THE ICU LIBERATION BUNDLE REVOLUTIONIZED CRITICAL CARE

Prior to 2007, many ICUs around the world did not allow visitors and kept their patients heavily sedated and immobilized.⁵ The introduction of the ICU liberation bundle revolutionized the care that ICU patients receive by shifting the focus of care towards a patient and family-centered approach that emphasized early mobility.⁵

The ICU liberation bundle, also called the ABCDEF bundle, is a multidisciplinary protocol endorsed by the Society of Critical Care Medicine that encourages a holistic, evidence-based method to care for patients.^{15,20}

The ICU liberation bundle improves quality of care through its emphasis on:¹⁵

- pain management,
- breathing trials,
- sedation management,
- delirium prevention,
- early mobility, and
- family engagement recommendations.

Various studies that analyzed the outcomes of 20,000 patients cared for with the ICU liberation bundle show that the bundle improves patient outcomes, as evidenced by:²⁰

- hospital deaths within 7 days dropped by 68%,
- the days a patient was not conscious or had altered consciousness dropped 25% to 50%,
- the need for physical restraints was lowered,
- ICU readmissions dropped 50%, and
- discharges to nursing and rehabilitation facilities were lowered.

THE **MOBILITY STEP** PROTOCOL

The **Mobility STEP (Safely Transitioning Every Patient)** Protocol incorporates evidence-based data from the Society of Critical Care Medicine’s ICU liberation bundle framework and the validated Bedside Mobility Assessment Tool 2.0 (BMAT 2.0) to provide a framework for assessments and interventions aimed at promoting safe and effective mobilization throughout all the phases of a patient’s care.

WHAT IS THE BEDSIDE MOBILITY ASSESSMENT TOOL 2.0?

The Bedside Mobility Assessment Tool 2.0 (BMAT 2.0) is endorsed by the American Nurses Association as an aid to keep workers safe as well as encourage early and frequent mobilization of the patient.⁶

Nurses involved in a pilot study of the original BMAT conveyed that the assessment tool helped them clearly determine a patient’s mobility status as well as select the appropriate equipment needed for safe mobilization.⁶ The pilot study results showed fewer nurse injuries after implementation of the tool as well as a decrease in patient falls.⁶

Nurses should conduct the BMAT 2.0 test when the patient is admitted, every shift, and if there are any

changes to the patient’s condition.⁶ The BMAT 2.0 can usually be completed in 2 minutes.⁶

The BMAT 2.0 assesses a patient’s mobility according to their previous level. Examples of tests used during the assessment include the patient sitting unsupported and completing various tasks, standing for 1 minute, or marching in place.²¹

The tests are described thoroughly in the tool and criteria for a passing response are described in detail.²¹ Next steps are also clearly defined whether a patient passes or fails the particular level they are being tested on.²¹

WHAT IS IN EACH LEVEL OF THE MOBILITY STEP PROTOCOL

The **Mobility STEP** Protocol has 5 progressive levels that are based on the patient’s current level of function. The protocol outlines specific goals for each of the 5 levels of mobility.

Each level of the protocol always begins and ends with an assessment by the nurse. Assessing and mobilizing the patient is in the scope of nursing practice.⁶ (Note: the nurse should collaborate with physical therapy throughout the **Mobility STEP** Protocol levels, but understand that mobility is a shared responsibility of nursing and physical therapy.)

There are various activities in each level of the protocol that should be completed regularly in order for the patient to progress and be able to advance to the next level. These activities are based on the most up-to-date evidence-based research, including interventions from the ICU liberation bundle, the American Association of Critical-Care Nurses (AACN), and the American Nurses Association-endorsed BMAT 2.0. For example, the AACN recommends turning every 2 hours for patients at all levels of mobility and range of motion exercises for patients who are not yet able to actively mobilize out of bed.¹⁵ These interventions are included in the **Mobility STEP** Protocol activities.

The protocol contains BMAT 2.0 tests incorporated throughout its 5 levels to help the nurse assess more easily where the patient is at and whether the patient is ready to advance to the next level. The patient’s mobility should be assessed by the nurse at least once per shift.

Each level of the protocol ends with criteria the patient must meet in order to advance to the next level. Criteria include the BMAT 2.0 tests.



GOALS FOR PATIENT MOBILITY

Nursing goals for all patients’ mobility, regardless of their level on the **Mobility STEP** Protocol, should focus on:²²

- improving the patient’s oxygenation,
- reducing respiratory secretions,
- reducing joint contractures,
- preventing pressure injury,²³ and
- including the family in the plan of care.

The ICU Liberation Bundle recommends setting a daily activity goal for every patient.²⁰

Goals for the patient can also be individualized according to the patient’s current and previous levels of function. These goals could be set in a way that is motivating to the patient. An example of a personalized goal for the patient could be that the patient wants to be able to take a lap around the unit with their loved one.

LEVEL 1: STABILIZE

THE GOAL: INITIATE MOBILITY

The American Journal of Critical Care recommends beginning an early mobility program as soon as the patient is physically stable.¹⁹ However, some patients are not medically stable enough to tolerate turning or passive range of motion. These patients should still be assessed every shift or more frequently, but should not begin the **Mobility STEP** Protocol until they are medically stable.

YES, PATIENTS WHO ARE ON MECHANICAL VENTILATION AND/OR ON VASOACTIVE MEDICATIONS CAN BE MOBILIZED

Clinical practice guidelines published in 2018 by the Critical Care Medicine Journal state that as long as a patient is medically stable, being mechanically ventilated or on vasoactive medications does not automatically exclude them from early mobilization.²⁴

Once the nurse assesses the patient to be medically stable, passive mobility can be initiated through the Level 1 activities of the **Mobility STEP** Protocol. By the end of Level 1, the patient should be able to sit upright and lift their leg without applied resistance.¹⁵

COMBINING THE MOBILITY STEP PROTOCOL WITH SMART BED TECHNOLOGY

The **Hillrom Progressa+** ICU bed has features that make the mobility goals and activities in the **Mobility Step** Protocol easier to achieve than with regular ICU beds.²⁵ The **Hillrom Progressa+** ICU bed enhances safety and promotes mobility by:

- Encouraging early mobility with **FullChair** and sit-to-stand option at foot-end - helping patients get up and moving earlier.
- Protecting patients’ skin through features like Advanced Microclimate Technology and Turn Assist
- Helps patients breathe better with chest physiotherapy from features like Percussion & Vibration and Continuous Lateral Rotation Therapy (CLRT).



Scan the QR code for more information on the Hillrom Progressa+ ICU bed.



ACTIVITIES

- Maintain HOB at 30° or more
- Turn every 2 hours using Safe Patient Handling (SPH) equipment (such as the **Hillrom Progressa+** ICU Bed Turn Assist feature)
- Continuous lateral rotation therapy (CLRT) for 18 hours each day
- Passive or Active Range of Motion (PROM/ AROM) 3 times/day; use Safe Patient Handling (SPH) equipment; encourage family involvement
- Reverse Trendelenburg/Tilt table 3 times/day. Minimum 15 minutes at least once per day
 - + Perform lower extremity exercises with retracting footboard
 - + Perform in-bed squats
- Calf/Ankle pumps
- Place patients in prone position to improve oxygenation. Utilize SPH equipment

THE IMPORTANCE OF SAFE PATIENT HANDLING EQUIPMENT

In order to effectively use the **Mobility STEP** Protocol to enhance patient outcomes, Safe Patient Handling (SPH) equipment needs to be utilized.

Without SPH equipment, the risk for employee injury while mobilizing patients is high.⁸ While simple equipment like front-wheel walkers and gait belts are integral for mobilizing patients after they are out of bed, investing in technologically advanced equipment to safely and efficiently help patients get out of bed can reduce the risk for both hospital staff and patient injury. Examples of technologically advanced equipment include tilt tables and smart beds.

The **Hillrom Progressa+ ICU bed** has advanced technological SPH features that include Side Exit Assist and Chair Egress that can safely assist the caregiver to get the patient out of bed.²⁵



Scan the QR code for more information on other SPH equipment available from Baxter including lift aids and lift accessories.

WHEN TO PROGRESS TO LEVEL 2

The patient is ready to progress to Level 2 when they:

- Have acceptable oxygenation/hemodynamics
- Tolerate q2h turning
- Tolerate HOB >30° or Reverse Trendelenburg
- Pass BMAT 2.0 “Sit & Shake” test

In the “Sit & Shake” test, the patient is placed in a slightly reclined position and instructed to sit upright.²¹ The patient is then instructed to shake the caregiver’s hand on the side opposite to the hand they are using.²¹ A passing response would be that the patient can sit up without support for a minute and can follow instructions.²¹

CONTINUOUS LATERAL ROTATION THERAPY (CLRT)

A HILLROM PROGRESSA+ ICU BED FEATURE

CLRT is another important feature of the **Hillrom Progressa+ ICU Bed**.²⁵ CLRT is an evidence-based recommendation for patients in Level 1 of the **Mobility STEP** Protocol. CLRT has been shown in studies to be more effective than manual positioning at reducing rates of pneumonia, decreasing time spent in the hospital, and reducing costs.²⁶

Many studies recommend using CLRT for 18 hours each day.²⁶ The **Hillrom Progressa+ ICU Bed** loosens secretions in the lungs by mechanically rotating the patient in a slow side-to-side movement.²⁶ The bed also maintains body alignment for optimal pressure distribution to improve comfort and loosen lung secretions.²⁵

PRONE POSITIONING

A HILLROM PROGRESSA+ ICU BED ACCESSORY FEATURE

The **Hillrom Progressa+ ICU Bed**, combined with its exclusive ICU proning accessory, can help caregivers safely position the patient in the prone position.²⁵ The prone position is a recommended activity for patients at Level 1 of the **Mobility STEP** Protocol. When the patient is placed in the prone position, their oxygenation improves because their lungs expand.²⁷ Patients with severe acute respiratory distress syndrome (ARDS) benefit from being in the prone position at least 16 hours per day.²⁷ Placing patients in the prone position could also lower the risk of ventilator-associated pneumonia because gravity helps secretions drain better when the patient is in this position.²⁷

LEVEL 2: SIT

Positioning a patient upright, whether in bed or in a chair, improves oxygenation in patients with acute respiratory distress syndrome and can decrease the risk of developing ventilator-associated pneumonia.²⁸

THE GOAL: SIT UPRIGHT

The goal for level 2 is that the patient tolerates being in an upright position. By the end of Level 2, the patient will be able to engage their quadriceps by extending their leg with a straight knee to point their toes and pump their ankle.

ACTIVITIES

- Continue patient-appropriate activities from Level 1, including q2h turns and ROM exercises
- Assess patient mobility using BMAT 2.0 “Stretch and Point” test
- **FullChair** position (footboard on) or up to bedside chair with SPH equipment for at least 20 minutes 3 times/day¹⁵
- Sit at the edge of the bed as tolerated
- Physical therapist (PT) consultation

TURN ASSIST

A HILLROM PROGRESSA+ ICU BED FEATURE

WITHOUT ALP



WITH ALP



Turning is an important aspect of the **Mobility Step** Protocol throughout all 5 levels. Even after patients have progressed past Level 1 of the protocol, they should continue to be turned to prevent pressure injury formation.

The **Hillrom Progressa+ ICU bed** has a Turn Assist feature that helps caregivers reach the goal of turning the patient every 2 hours when they are in bed. By selecting “Right Turn Assist” or “Left Turn Assist” on the touch screen of the bed, caregivers can turn patients without injuring themselves.²⁵

FULLCHAIR POSITION

A HILLROM PROGRESSA+ ICU BED FEATURE

The **FullChair** position is a feature of the **Hillrom Progressa+** ICU bed.²⁵ With push of a button, the **FullChair** Position turns the bed into a chair.

For patients who are at Level 2 of the **Mobility STEP Protocol** but are not yet able to stand, the **FullChair** Position is a unique feature of the **Hillrom Progressa+** ICU bed that can be used to sit them up without getting them out of bed.

By pushing and holding one button, the bed will safely and comfortably position patients in a seated position while reducing the physical strain on the caregiver.²⁵ This feature places the patient in a fully seated position without having to take them out of bed – since the bed becomes a chair with the patient in it.



LEVEL 3: STAND

The patient in level 3 is working towards being able to stand. By bearing weight and actively moving their bodies, patients who can stand are considered to be actively transferring. Safe patient handling equipment should continue to be utilized to prevent staff injury and/or injury to the patient while transferring.

THE GOAL: STAND UPRIGHT

The goal for the patient in level 3 is to progress to standing. By the end of level 3, the patient’s strength will improve and they will develop the ability to stand with minimal assistance.¹⁵



ACTIVITIES

- Continue patient appropriate activities from previous level(s)
- Assess patient mobility using BMAT 2.0 “Stand” test
- Stand attempts 3 times/day, use a sit-to-stand if patient is unable to support self for 1 minute
- Pivot to chair if patient tolerates partial weight-bearing
- PT/Occupational Therapy (OT) actively involved.



WHEN TO PROGRESS TO LEVEL 3

- The patient is ready to progress to Level 3 when they:
- Tolerate active-assistive exercises 2 times/day
 - Tolerate lower extremity exercises against footboard/Reverse Trendelenburg
 - Tolerate **FullChair** position or up in bedside chair 3 times/day
 - Pass BMAT “Stretch and Point” test

In the “Stretch and Point” test, the patient sits without support, extends a leg, and straightens the knee.²¹ The patient then points their toes and pumps their ankle three times.²¹ If they can do this, it means their quadriceps are engaged and they are ready to start standing for longer periods of time.²¹

CONTINUING THE STEP MOBILITY PROTOCOL WHEN THE PATIENT IS DISCHARGED TO A LOWER LEVEL OF CARE

Once the patient is able to sit up in a chair, they could potentially be discharged from the ICU to a step-down or medical-surgical unit. Nurses who work on these units should be familiar with the **Mobility STEP Protocol** in order to continue progressing the patient through the levels and towards their baseline.

When completing the handoff, the ICU nurse should relay to the nurse taking over care of the patient what level the patient is in, how the family has been involved, and which activity’s need to be completed prior to the next assessment.



CHAIR EGRESS POSITION

A PROGRESSA + ICU BED FEATURE

The Chair Egress position is a sit-to-stand option for the patient to exit the bed at the foot-end; this is another innovative feature of the **Hillrom Progressa+** ICU bed.²⁵

For patients who are at Level 3 of the **Mobility STEP Protocol** and are ready to stand with assistance, the Chair Egress function of the **Hillrom Progressa+** ICU bed can be used to get them out of bed safely and efficiently.

This feature assists caregivers in helping the patient stand while the bed is in the **FullChair** position.²⁵ From the **FullChair** Position and with the footboard removed, the bed tilts while in the chair position to assist the patient to stand up with the caregiver right next to them.



WHEN TO PROGRESS TO LEVEL 4

The patient is ready to progress to Level 4 when they:

- Tolerate increasingly active exercises
- Tolerate standing for up to 1 minute
- Tolerate full weight bearing
- Pass BMAT 2.0 "Stand" test

In the "Stand" test, the patient stands with their feet on the floor, upright for 1 minute.²¹ If a patient has orthostatic hypotension, the signs and symptoms will most likely appear within one minute of the patient standing.²¹

WHAT TO CHART WITH THE MOBILITY STEP PROTOCOL

Charting the patient's current mobility level in the electronic health record (EHR) according to the nurse's assessment is important in order to facilitate multidisciplinary collaboration. Documenting mobility should include activities, positioning, and up-to-date assessments.²⁹ When documenting mobilization, include what the patient did, the distance walked, and how the patient responded.²⁹ Make sure to follow your facility's procedure for charting mobilization as well.

LEVEL 4: STEP

The patient who can stand is using their active muscles more and more while mobilizing.

THE GOAL: WALKING

The goal for the patient who is at level 4 is to continue strengthening and developing the ability to stand for longer periods of time in order to progress to walking.¹⁵ By the end of level 4, the patient will be able take small steps.



ACTIVITIES

The patient should still be turned every 2 hours while in bed to prevent complications, but may be able to help turn themselves with direction at this point.¹⁵ Mobilization at this stage might require the help of extra staff to manage the patient's airway.¹⁵

- Continue patient appropriate activities from previous level(s)
- Assess patient mobility with BMAT 2.0 "Step" test
- Step and march patient in place 3 times/day
- Patient transfers to chair with standby assist
- PT/OT actively involved

SIDE EXIT ASSIST

A PROGRESSA + ICU BED FEATURE

Another feature of the **Hillrom Progressa+ ICU bed**, the Side Exit Assist, assists patients from getting up from the side of the bed.²⁵

This feature is helpful for patients at Level 4 of the **Mobility STEP Protocol** who are able to actively assist themselves to a standing position. After the caregiver assists the patient to sit on the edge of the bed with their feet flat on the floor, the caregiver pushes the "Side Exit Assist" button to inflate the surface underneath where the patient is sitting. Once the surface is inflated to the ideal position, the caregiver helps the patient stand up.

This feature helps keep healthcare workers safe from back injuries that commonly occur from physically pulling the patient up from bed to the standing position.²⁵ With **Hillrom Progressa+ ICU bed**, caregivers can help get the patient out of bed more easily. Higher levels of mobilization, such as getting the patient out of bed instead of just sitting at the edge of the bed, lead to better long-term outcomes.¹³ With the Side Exist Assist feature, caregivers have the ability to help the patient reach a higher level of mobilization which will lead to better outcomes for the patient.



WHEN TO PROGRESS TO LEVEL 5

The patient is ready to progress to Level 5 when they:

- Can successfully perform all activities
- Stand and pivot to chair
- Pass BMAT 2.0 "Step" test

In the "Step" test, the patient is asked to march in place taking small steps 3 times.²¹ If they are able to do this, then they are instructed to step forward, shift their weight onto the foot they stepped forward with, then bring that foot back to standing position and do it again on the other side.²¹

INVOLVING THE FAMILY IN SETTING GOALS AND PERFORMING ACTIVITIES

Family has a very important role in encouraging positive outcomes in patients who are in the ICU. Evidence shows that having family present at the bedside can aid in communication, provide a comforting presence to the patient, and reduce the risk of delirium.³⁰

When possible, the patient's family members and loved ones should be:³⁰

- Invited to actively participate in **Mobility STEP** Protocol activities
- Shown that their presence is valued
- Educated about the importance of early mobility
- Shown how to complete passive or active range of motion exercises with their loved one
- Given a demonstration about how the patient will be instructed to mobilize
- Permitted to help mobilize the patient when safely possible for all involved

LEVEL 5: STRENGTHEN AND SUSTAIN

At this stage the patient is able to walk, but should continue to be mobilized. The patient should be given opportunities to safely ambulate throughout the day and increase the time spent ambulating each day as tolerated. Physical therapy and the nursing staff continue to share responsibility for the patient’s mobility at this stage.²² The nurse should prioritize mobilizing the patient as much as recommended according to the patient’s ability while collaborating with the physical therapist to help the patient continue to progress.

THE GOAL: STAND UPRIGHT

The goal for this patient is to continue gaining strength and to gradually increase how far they can walk.¹⁵ By the end of level 5, the patient has advanced their mobility and is ready to be discharged from the hospital.



ACTIVITIES

- Continue patient appropriate activities from previous level(s)
- Ambulate 3 times/day. Utilize SPH equipment for safety if necessary
- Continue to progress mobility through all transitions in care
- PT/OT – advance mobility goals
- Continue to strengthen and progress through discharge.

GETTING BUY-IN FROM STAFF WHEN IMPLEMENTING THE MOBILITY STEP PROTOCOL

Prior to going live with the **Mobility STEP** Protocol, it is important to identify barriers to implementation.¹⁹ Understanding how staff make decisions and prioritize can ensure that education is targeted specifically to alleviate these barriers, particularly through providing education about the hazards of immobility as well as how to properly use the **Mobility STEP** Protocol.¹⁹

Common organizational barriers to buy-in for the **Mobility STEP** Protocol might include:¹²

- | | |
|--|---------------------------|
| – Safety concerns (such as, “can the patient be mobilized safely?) | – Training and Experience |
| – Time restraints | – Work stress |
| – Staffing levels | – Limited Resources |

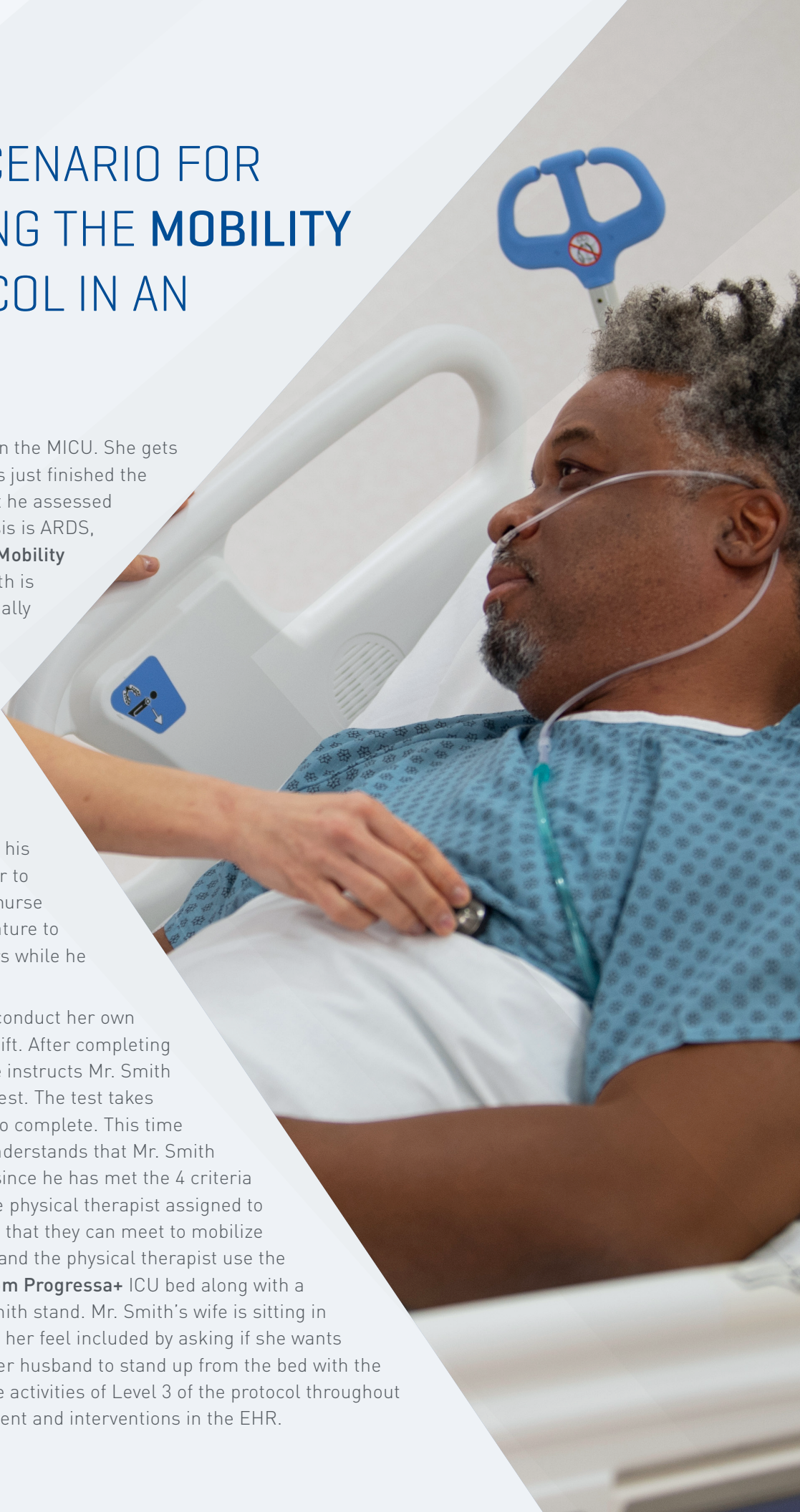
EXAMPLE OF EDUCATION REGARDING A COMMON BARRIER TO EARLY MOBILIZATION

Safety concerns are a common barrier to early mobilization of the patient. However, observational studies, randomized controlled trials, and systematic review and meta-analysis show that with proper assessment it is safe to increase the activity of patients to prevent the complications that come with immobility.^{13,15,23} The **Mobility STEP** Protocol outlines assessment activities in detail that give nurses more confidence to properly assess their patients.

REAL-LIFE SCENARIO FOR IMPLEMENTING THE MOBILITY STEP PROTOCOL IN AN ICU SHIFT

Nurse Holly arrives for her shift in the MICU. She gets a report from nurse Dan, who has just finished the night shift. Nurse Dan states that he assessed patient Mr. Smith, whose diagnosis is ARDS, at the start of his shift using the **Mobility STEP** Protocol. Although Mr. Smith is still on vasopressors, he is medically stable and has been tolerating mobility activities. Nurse Dan assessed that Mr. Smith should remain at Level 2 of the protocol because he did not pass the “Stretch and Point” BMAT 2.0 test. Nurse Dan states that Mr. Smith was able to sit up in the **FullChair** Position of his **Hillrom Progressa+** ICU bed prior to going to sleep for the night, and nurse Dan also used the Turn Assist feature to reposition Mr. Smith every 2 hours while he was sleeping.

It is now time for Nurse Holly to conduct her own assessment at the start of her shift. After completing her head-to-toe assessment, she instructs Mr. Smith through the “Stretch and Point” test. The test takes nurse Holly less than 2 minutes to complete. This time Mr. Smith passes. Nurse Holly understands that Mr. Smith is now at Level 3 of the protocol since he has met the 4 criteria to complete Level 2. She calls the physical therapist assigned to Mr. Smith and coordinates a time that they can meet to mobilize Mr. Smith. Together, nurse Holly and the physical therapist use the Chair Egress feature of the **Hillrom Progressa+** ICU bed along with a front wheel walker to help Mr. Smith stand. Mr. Smith’s wife is sitting in the room, and nurse Holly makes her feel included by asking if she wants to be shown the proper way for her husband to stand up from the bed with the walker. Nurse Holly continues the activities of Level 3 of the protocol throughout her shift and charts her assessment and interventions in the EHR.



EVIDENCE-BASED STUDIES SUPPORT EARLY PROGRESSIVE MOBILITY PROTOCOLS

- A cost-benefit analysis in a study showed that overall healthcare costs could be reduced by \$18,544.80 in one month if 8 patients in the early mobility protocol had reduced length of stays by 1.4 days in the ICU and 3.3 days in the hospital.⁸ This potential savings was presented to the key hospital stakeholders who agreed to move forward with investing in the proposed early mobility protocol.⁸ A cost-benefit analysis can provide financial data to reluctant hospital administrators who may not see the value in purchasing equipment or increasing staffing that are necessary components to implementing an early mobility protocol.⁸ Early mobilization can reduce a patient's hospitalization by more than 1 day, and a health care system could save up to \$2,300 for each hospital day saved.^{16,17}
- A systematic review and meta-analysis that included information on 69,492 patients hospitalized with pneumonia found that early mobilization reduced the patient's hospital stay by 1.1 days.^{16,17} A health care system could save up to \$2,300 for a single day a patient is not hospitalized, and the patient benefits from avoiding the increased risk of infection and adverse drug reactions that accompany hospital stays.¹⁷
- An early mobility protocol that was initiated in trauma ICU at a Level I Trauma Center reduced the incidence of venous thromboembolism (VTE) from 21% to 7.5% post-intervention over a 6-month period. For the protocol, all trauma patients were expected to be screened daily. Approximately 40% of patients were not medically stable enough to mobilize, including patients with myocardial instability, inadequate oxygenation, increase in vasopressor use, or elevated intracranial pressure. Trauma ICU patients tend to have complicated injuries and extra barriers to mobility. Despite this, the resulting patients that were able to mobilize had a dramatic reduction in VTE incidence. This study showed that an innovative early mobility protocol has the ability to improve conditioning and reduce the risk of VTE in a population of patients with medical complexity.¹⁸
- A study published in 2018 conducted in a 26-bed ICU showed significant improvements in patient outcomes after the implementation of an early mobility collaboration program. Staff were educated using an online module and an electronic health record communication tool was implemented to provide staff with up-to-date mobility levels of patients. The results showed an increase in staff satisfaction regarding communication about patients' mobility levels, a decrease in average ventilation time of 27 hours, patients were discharged home with greater overall function, and costs for intensive care dropped considerably.⁷
- A randomized controlled trial conducted in Sweden with 214 patients who underwent abdominal surgery found that patients who got out of bed to mobilize within 2 hours of abdominal surgery had improved oxygenation levels. The results from this trial demonstrate that getting the patient up and moving within 2 hours of surgery improves the patient's ability to oxygenate, a recognized concern after surgery.¹¹

Early mobilization can reduce a patient's hospitalization by more than 1 day, and a health care system could save up to \$2,300 for each hospital day saved.^{16,17}

CONCLUSION

The **Mobility STEP** Protocol, when used in conjunction with the **Hillrom Progressa+** ICU Bed, can improve early mobilization rates in the ICU while also reducing the risk of staff and patient injury. The protocol was developed using the most up-to-date evidence for early mobilization, including the ICU liberation bundle framework and the BMAT 2.0. The protocol is simple to follow and includes assessments, goals, and activities for each level.

Today, patients who are in the ICU have a 70% chance of survival. The research shows that early mobility enhances both short-term and long-term outcomes. With the implementation of the **Mobility STEP** Protocol, ICUs have the ability to change patients' long-term health trajectory by reducing the risk of complications from immobility.



ABOUT THE COMPANY

Baxter provides caregivers with tools that keep themselves and their patients safe. The **Hillrom Progressa+** ICU Bed, the Bedside Mobility Assessment Tool 2.0, and the **Mobility STEP** Protocol are some of the many products that Baxter provides that improve the health and safety of patients and their caregivers.

References

1. Mart MF, Pun BT, Pandharipande P, Jackson JC, Ely EW. ICU survivorship-the relationship of delirium, sedation, dementia, and acquired weakness. *Crit Care Med*. 2021;49(8):1227-1240. doi: 10.1097/CCM.00000000000005125
2. TEAM Study Investigators and the ANZICS Clinical Trials Group, Hodgson CL, Bailey M, et al. Early active mobilization during mechanical ventilation in the ICU. *N Engl J Med*. 2022;387(19):1747-1758. doi: 10.1056/NEJMoa2209083
3. Boehm LM, Vasilevskis EE, Mion LC. Interprofessional perspectives on ABCDE bundle implementation: a focus group study. *Dimens Crit Care Nurs*. 2016;35(6):339-347. doi: 10.1097/DCC.0000000000000208
4. Zhang S. What life is like after being taken off a ventilator. *The Atlantic*. April 22, 2020. <https://www.theatlantic.com/science/archive/2020/04/life-after-the-icu/610384/>
5. Morandi A, Piva S, Ely EW, et al. Worldwide survey of the "assessing pain, both spontaneous awakening and breathing trials, choice of drugs, delirium monitoring/management, early exercise/mobility, and family empowerment" (ABCDE) bundle. *Crit Care Med*. 2017;45(11):e1111-e1122. doi: 10.1097/CCM.0000000000002640
6. Boynton T, Kumpar D, VanGilder C. The bedside mobility assessment tool 2.0. *American Nurse Journal*. 2020;15(7):18-22.
7. Anderson R. Effects of an electronic health record tool on team communication and patient mobility: a 2-year follow-up study. *Critical Care Nurse*. 2022;42(2):23-31.
8. King L. Developing a progressive mobility activity protocol. *Orthopaedic Nursing*. 2012;31(5):253-262. doi: 10.1097/NOR.0B013E31826649F2
9. Alderden JG, Shibily F, Cowan L. Best practice in pressure injury prevention among critical care patients. *Crit Care Nurs Clin N Am*. 2020;32:489-500. doi: 10.1016/j.cnc.2020.08.001
10. Bergbower EA, Herbst C, Cheng N, et al. A novel early mobility bundle improves length of stay and rates of readmission among hospitalized general medicine patients. *Journal of Community Hospital Internal Medicine Perspectives*. 2020;10(5):419-425. doi: 10.1080/20009666.2020.1801373
11. Svensson-Raskh A, Schandl AR, Ståhle A, Nygren-Bonnier M, Fagevik Olsén M. Mobilization started within 2 hours after abdominal surgery improves peripheral and arterial oxygenation: a single-center randomized controlled trial. *Phys Ther*. 2021;101(5). doi: 10.1093/ptj/pzab094
12. Popoola M, Dingle M, MacLaren J, Dyson J. What are the barriers to nurses mobilising adult patients in intensive care units? an integrative review. *Aust Crit Care*. 2022;35(5):595-603. doi: 10.1016/j.aucc.2021.09.002
13. Paton M, Lane R, Paul E, Cuthbertson GA, Hodgson CL. Mobilization during critical illness: a higher level of mobilization improves health status at 6 months, a secondary analysis of a prospective cohort study. *Crit Care Med*. 2021;49(9):e860-e869. doi: 10.1097/CCM.0000000000000508
14. de Souza PN, Kroth JB, dos Santos Ligerio A, et al. Effectiveness of a quality improvement strategy with implementation of a specific visual tool to promote ICU early mobilization. *Scientific Reports*. 2022;12:1-9. doi: 10.1038/s41598-022-21227-y
15. Schallom M, Tymkew H, Vyers K, et al. Implementation of an interdisciplinary AACN early mobility protocol. *Critical Care Nurse*. 2020;40(4):e7-e17. doi: 10.4037/ccn2020632
16. Chen B, Xie G, Lin Y, et al. A systematic review and meta-analysis of the effects of early mobilization therapy in patients after cardiac surgery. *Medicine*. 2021;100(15):1-11. doi: 10.1097/MD.00000000000025314
17. Larsen T, Lee A, Brooks D, et al. Effect of early mobility as a physiotherapy treatment for pneumonia: a systematic review and meta-analysis. *Physiother Can*. 2019;71(1):82-89. doi: 10.3138/ptc.2017-51.ep
18. Booth K, Rivet J, Flici R, et al. Progressive mobility protocol reduces venous thromboembolism rate in trauma intensive care patients: a quality improvement project. *Journal of Trauma Nursing*. 2016;23(5):284-289. doi: 10.1097/JTN.0000000000000234
19. Krupp AE, Ehlenbach WJ, King B. Factors nurses in the intensive care unit consider when making decisions about patient mobility. *Am J Crit Care*. 2019;28(4):281-289. doi: 10.4037/ajcc2019624
20. Society of Critical Care Medicine. ICU Liberation bundle (A-F). n.d. Accessed May 20, 2023. <https://www.sccm.org/Clinical-Resources/ICULiberation-Home/ABCDEF-Bundles>
21. Bedside Mobility Assessment Tool (BMAT 2.0). Hill-Rom Services, Inc. 2020. https://www.myamericannurse.com/wp-content/uploads/2020/07/Fig-A-210673-EN-r2_BMAT-2.0-Stair-Step-Chart_Presentation-LR2-Copy-1-2.pdf
22. Dammeyer J, Dickinson S, Packard D, Baldwin N, Ricklemann C. Building a protocol to guide mobility in the ICU. *Crit Care Nurs Q*. 2013;36(1):37-49. doi: 10.1097/CNQ.0b013e3182750acd
23. Nieto-García L, Carpio-Pérez A, Moreiro-Barroso MT, Alonso-Sardón M. Can an early mobilization programme prevent hospital-acquired pressure injuries in an intensive care unit? a systematic review and meta-analysis. *Int Wound J*. 2021;18:209-220. doi: 10.1111/iwj.13516
24. Devlin JW, Skrobik Y, Gélinas C, et al. Clinical practice guidelines for the prevention and management of pain, agitation/sedation, delirium, immobility, and sleep disruption in adult patients in the ICU. *Crit Care Med*. 2018;46(9):e825-e873. doi: 10.1097/CCM.0000000000003299
25. Progressa Bed User Guide. Hillrom. September 2020. <https://www.hillrom.com/en/products/progressa-bed-system/in-service-tools/>
26. Anderson R, Kleiber C, Greiner J, Comried L, Zimmerman M. Interface pressure redistribution on skin during continuous lateral rotation therapy: a feasibility study. *Heart & Lung*. 2016;45:237-243. doi: 10.1016/j.hrtlng.2016.02.003
27. Scholten EL, Beittler JR, Prisk GK, Malhotra A. Treatment of ARDS with prone positioning. *Chest*. 2017;151(1):215-224. doi: 10.1016/j.chest.2016.06.032
28. Dirkes SM, Kozlowski C. Early mobility in the intensive care unit: evidence, barriers, and future directions. *Crit Care Nurse*. 2019 Jun;39(3):33-42. doi: 10.4037/ccn2019654
29. Dickinson S, Taylor S, Anton P. Integrating a standardized mobility program and safe patient handling. *Crit Care Nurs Q*. 2018;41(3):240-252. doi: 10.1097/CNQ.0000000000000202
30. Rukstele CD, Gagnon MM. Making strides in preventing ICU-acquired weakness: involving family in early progressive mobility. *Crit Care Nurs Q*. 2013 Jan-Mar;36(1):141-7. doi: 10.1097/CNQ.0b013e31827539cc

Baxter.com

Baxter International Inc.

One Baxter Parkway / Deerfield, Illinois 60015

Baxter, FullChair, Hillrom, Mobility STEP and Progressa+ are trademarks of Baxter International, Inc. or its subsidiaries.

US-CS390-230042 v1 07/23