Margin of Excellence

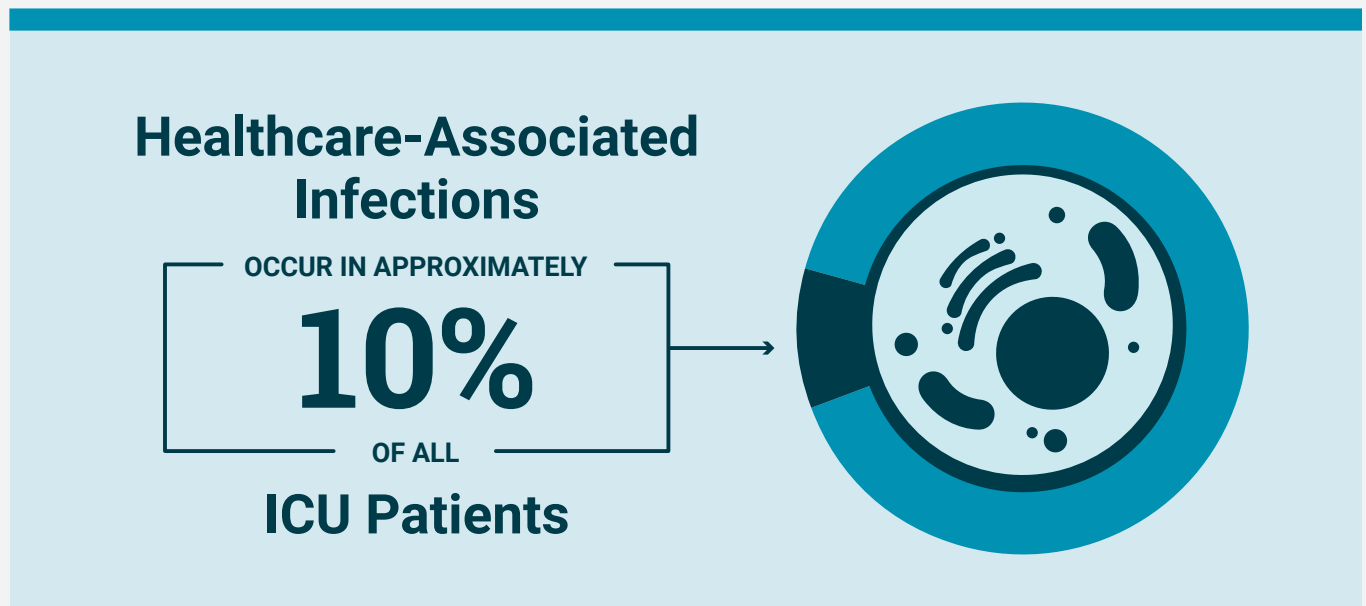
Intensive Care Unit (ICU) Utilization

"Margin of Excellence" is a series of reports dedicated to uncovering next generation, evidence-based total cost management savings and quality improvement opportunities relying on integrated data and services. The reports provide detailed insights on costs looking at a single setting, or multiple settings, and across the continuum. The data and benchmarks can be leveraged to implement evidence-based strategies and tools designed to tackle inefficiencies in healthcare, ranging from variation in clinical practice and resource utilization – fulfilling the dual mission of improving care and reducing costs. The analyses tap Premier's robust database, which offers a holistic view – linking clinical, financial and supply chain data.

Executive Summary

The intensive care unit (ICU) is a setting where some of the most critically ill patients are seen for close observation and monitoring. Physicians practicing within the ICU have expertise in critical care, and the unit is staffed with a multi-disciplinary team and specially-trained nurses who care for one or two patients at a time, each shift. Additionally, special equipment like ventilators and machines used to monitor a patient's heart, blood pressure and respiratory rates help keep patients stable.

Yet, putting patients in ICU when it's not necessary or keeping them there longer than needed can be potentially harmful. ICU stays have been linked to increased risk for healthcare-associated infections (HAIs).



One study found healthcare-associated infections occur in approximately 10 percent of all ICU patients, usually due to extensive use of invasive devices.[1] To break it down, urinary tract infections account for 31 percent of the infections, of which 95 percent are associated with urinary catheters; pneumonia accounts for 27 percent of HAIs in the ICU, with 86 percent associated with mechanical ventilation; and bloodstream infections account for 19 percent of hospital-acquired infections the ICU, and 87 percent are associated with central lines.[2]

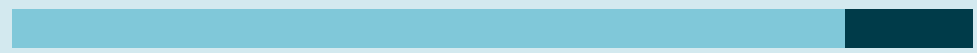
Adult ICU patients are one of the highest risk populations for medication errors and adverse drug events compared to other critically ill adult populations – one study found that increased length-of-stay (up to five days) is associated with preventable adverse drug events.[3]

Post-discharge, observational studies have also documented physical, cognitive and mental impairments affecting patients after a stay in the ICU, making ICU optimization a safety and quality issue a well. A

Cost of Intensive Care Services

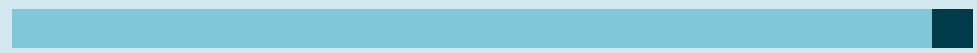
In 2005, intensive care services accounted for 13.3 percent of total hospital expenditures and 4.25 percent of national healthcare expenditures.[4]

TOTAL HOSPITAL EXPENDITURES



ICU = 13.3%

NATIONAL HEALTHCARE EXPENDITURES



ICU = 4.25%

2015 Premier analysis of 585 hospitals found 1.3 percent of patients on a ventilator experience delirium. And more than 20 percent of patients examined within the analysis exhibited one or more of the health factors that are associated with elevated risk of delirium. Effects of ICU-acquired pain, agitation, delirium and weakness can persist for years after hospital discharge, and in many cases, permanently alter the lives of critically ill patients and their families.[5]

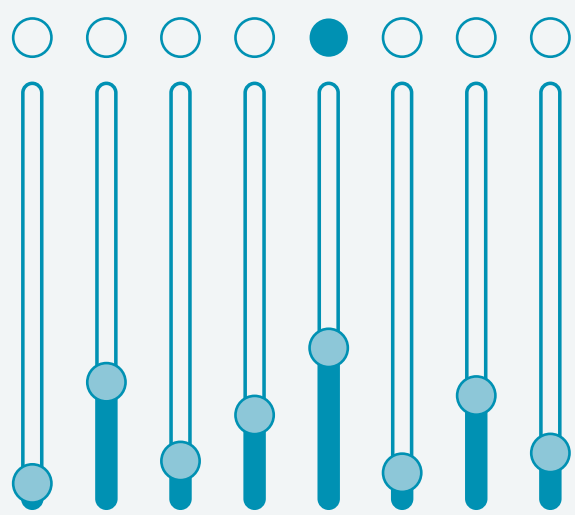
Intensive care is also expensive. And the Medicare reimbursement rate for intensive care covers only 83 percent of its costs.[6] In essence, every unnecessary day a patient spends in the ICU can negatively impact the bottom line, particularly for hospitals participating in value-based care models that hold providers accountable for total costs.

How Variation in ICU Care Impacts Quality and Costs

Despite the costs and quality risks associated with inappropriate ICU utilization, there remains significant variation in ICU practices and protocols across healthcare. The decision to admit patients to an ICU and how they are treated is often dependent on variable factors like patient clinical status, practitioner discretion, institutional policies and procedures as well as hospital capacity – it can often be a subjective call, rather than one guided by the evidence.

In a study conducted within the U.S. Veterans Affairs Health System, the rate of ICU admission for low-risk hospitalized patients varied from 1.2 percent to 38.9 percent.[7] Another study examined the four most common ICU conditions and found ICU utilization rates that ranged from 43.6-67.2 percent for diabetic ketoacidosis (DKA), 12.2-26.5 percent for pulmonary embolism (PE), 23.4-34.2 percent for upper gastrointestinal bleeding (UGIB) and between 9.6-28.7 percent for congestive heart failure (CHF).[8]

However, the same study also found that the variations in ICU use did not correspond to any improved outcomes – in other words, higher-level, more intensive care was not associated with better outcomes or an increased survival rate, meaning that many of these patients should have been provided care in a different, less costly setting.[9]



Low-Risk Patients Admitted to the ICU Vary Between ~1% and 39%

In a study conducted within the U.S. Veterans Affairs Health System, the rate of ICU admission for low-risk hospitalized patients varied from 1.2 percent to 38.9 percent.[7]

If hospitals who used the ICUs more frequently for these patient populations were to shift their utilization patterns and match their costs of hospitalization to those of lower ICU utilization hospitals, the estimated cost savings would be approximately $8 million for DKA, $3.5 million for PE, $6 million for UGIB and $120 million for CHF – and these figures don't even account for cost factors, such as physician charges.[10]

Another study found that when an 18-hospital system focused on ICU optimization efforts that focused on improving triage practices by using risk scoring models which help to predict hospital mortality rates, the project resulted in reduced ICU admissions of patients identified to be low-risk—representing a decline from 42 percent to 22 percent.[11]

Variation in ICU care, leading to overuse or misuse, has potential clinical consequences and contributes to unnecessary spending, making this a prime target for optimization. If a patient could be seen in a lower level of care without impacting quality, this move can simultaneously improve quality by reducing risk of ICU delirium, HAIs and other complications while making beds available to those who more urgently need this type of care. Additionally, longer ICU stays (4-5 days) are typically reimbursed at the same rate as shorter stays (1-2 days), creating an additional cost burden on the healthcare facility – particularly if a patient doesn't need to be in that level of care.

Appropriate use of ICU and value associated with optimizing patient flow within this level of care delivers both on quality and margins. In order to maximize the value of critical care services, leaders must understand trends in ICU care in terms of use, outcomes and costs, and invest in operational and performance improvements that can ensure that only the right patients are being seen in this setting.

Success Story:

CHARLESTON AREA MEDICAL CENTER – CHARLESTON, WV

Charleston Area Medical Center (CAMC), a West Virginia-based healthcare system made up of four acute care hospitals and nearly 50 outpatient facilities, recently embarked upon a focused performance improvement initiative targeting Medical Intensive Care and ICU utilization in two of their hospitals as an area of high variability and high costs.

To begin the project, CAMC analyzed data provided by Premier on key quality performance indicators such as Medical Intensive Care and ICU length-of-stay at the MS-DRG level, and realized that their performance did not match that of their peers. In fact, patients with conditions that typically required a three-day stint within the ICU at peer facilities were spending 3-4 days at CAMC on average, with no discernable effect on outcomes. In other words, these patients could have been moved to a lower level of care or discharged days earlier, generating significant cost savings without compromising quality.

With the data provided by Premier, CAMC began conversations with ICU staff to standardize care around the appropriate placement and length-of-stay for all ICU patients – and especially targeted preventable conditions and interventions such as hospital-associated infections and complications (Central Line-associated Bloodstream Infection, Catheter-associated Urinary Tract Infections, Ventilator-Associated Pneumonia), respiratory failure, ventilator support and tracheostomies. Practices and protocols used included:

- **Use multi-team multidisciplinary team rounds to improve patient flow:** Multidisciplinary team rounds led by an intensivist were initiated to track the path of the patient throughout their hospitalization, and progress goals for care were set each day. Mapping the entire patient journey and holding staff accountable for achieving specific daily recovery goals was important in order to standardize ICU and Medical Intensive Care unit length of stay and reduce fragmentation.

- **Ensure right staff in place:** Tapping the insights of physicians, nurse leaders, primary nurses, case managers or social workers, pharmacists, respiratory therapists, physical therapists, dietitians and others was vital to the success of the multidisciplinary team. The major benefit of a multidisciplinary team is having all the patient's care providers together at the same time to determine collaboratively the next steps in the most efficient way.

- **Establish intermediate level of care:** CAMC created step down protocols that would move patients from ICU but still support a high level of skilled nursing care and surveillance. This enabled them to move patients who were more stable into stepped down settings, with intensivists bridging patients to alternative settings that still provided high-touch nursing.

- **Reduce time on ventilator:** The team also looked at days on the ventilator to examine which physicians used this intervention more often and provided targeted, evidence-based education on strategies to wean patients off the ventilator sooner.

- **Hardwire best practices into electronic health records:** Leaders leveraged electronic health records (EHRs) to alert physicians and nurses to use evidence-based practices designed to help avoid complications that can extend ICU stays, such as CAUTIs and sepsis. This was a foundation to monitor physician performance compared to goals, ensure consistent use of medications and order sets for targeted disease states and deliver more consistency in care.

From these efforts, the health system has seen an overall reduction in length-of-stay within the ICU and Medical Intensive Care unit by 1.15 days over a 21-month period and deferrals have decreased dramatically. The team continues to build and improve on this work – hoping to continue to momentum on optimization efforts.

Assessment of Providers on Optimizing ICU Care

Variation exists across hospitals in terms of ICU care and tailored optimization efforts – these critical benchmarks provide insights for providers who are looking to make headway by leveraging best practices and implementing protocols within this care setting. These results can be leveraged by hospitals and health systems seeking to pinpoint areas of improvement in terms of quality and patient flow by examining how their performance compares to Premier's trend data on ICU care.

Targeting these patient populations in terms of length-of-stay within ICU and transferring appropriate patients to an intermediate care setting can significantly standardize care and improve performance. Every single extra day a patient doesn't spend in the ICU creates capacity for more urgent cases who need this type of care. It's better for patients – who face reduced risk of delirium, healthcare-associated infections and other complications associated with ICU stays. And it's better for margins. ICU care is expensive and has a lot of fixed costs. Longer ICU stays (4-5 days) are typically reimbursed at the same rate as shorter stays (1-2 days), creating an undue financial burden on the healthcare facility – especially if a patient can be seen in a stepped down level of care.

Additionally, lower levels of care, including intermediate or medical/surgical wings cost significantly less than daily ICU care. The analysis found the average for room and board across all patients can total up to nearly $2,000 per day. For a day spent in an intermediate level of care or the medical/surgical units, the cost significantly drops.

Researchers reviewed inpatient data from 786 facilities, representing more than 20 million patient discharges. Breaking it down further, the data accounts for more than five million ICU stays and 18 million ICU days overall. Experts examined 128 diagnoses that account for 80 percent of ICU days over a five-year period.

Within the analysis, Premier researchers found that value follows quality in ICU optimization efforts. When hospitals within the aggregate performed better than expected or even in the top quartile (top 25 percent in performance) with respect to patient outcomes and quality metrics like inpatient mortality rates and unplanned 30-day readmission rates, the average rates of length-of-stay within the ICU also improved – meaning patients were spending fewer days in the ICU and were seen in stepped down levels of care. And through these benchmarks, opportunities to view how variation could be reduced and care optimized if these performance levels were applied to the aggregate overall.

The biggest areas to target variation in care within the ICU setting include:

Key Finding

#1

If all hospitals within the aggregate performed at the same level of their top quartile, high-performing peers, length-of-stay within the ICU could potentially be reduced by 988,000 days over the study period or nearly 200,000 annually.

Key Finding

#2

Overall, patients treated at top-performing hospitals spent 24 percent less time in the ICU.

Key Finding

#3

Cardiac procedures present the biggest opportunity in terms of service line, with a potential to reduce length-of-stay within the ICU by 400,000 fewer patient days. This includes procedures and conditions including open heart surgery, coronary bypass and heart failure.

Key Finding

#4

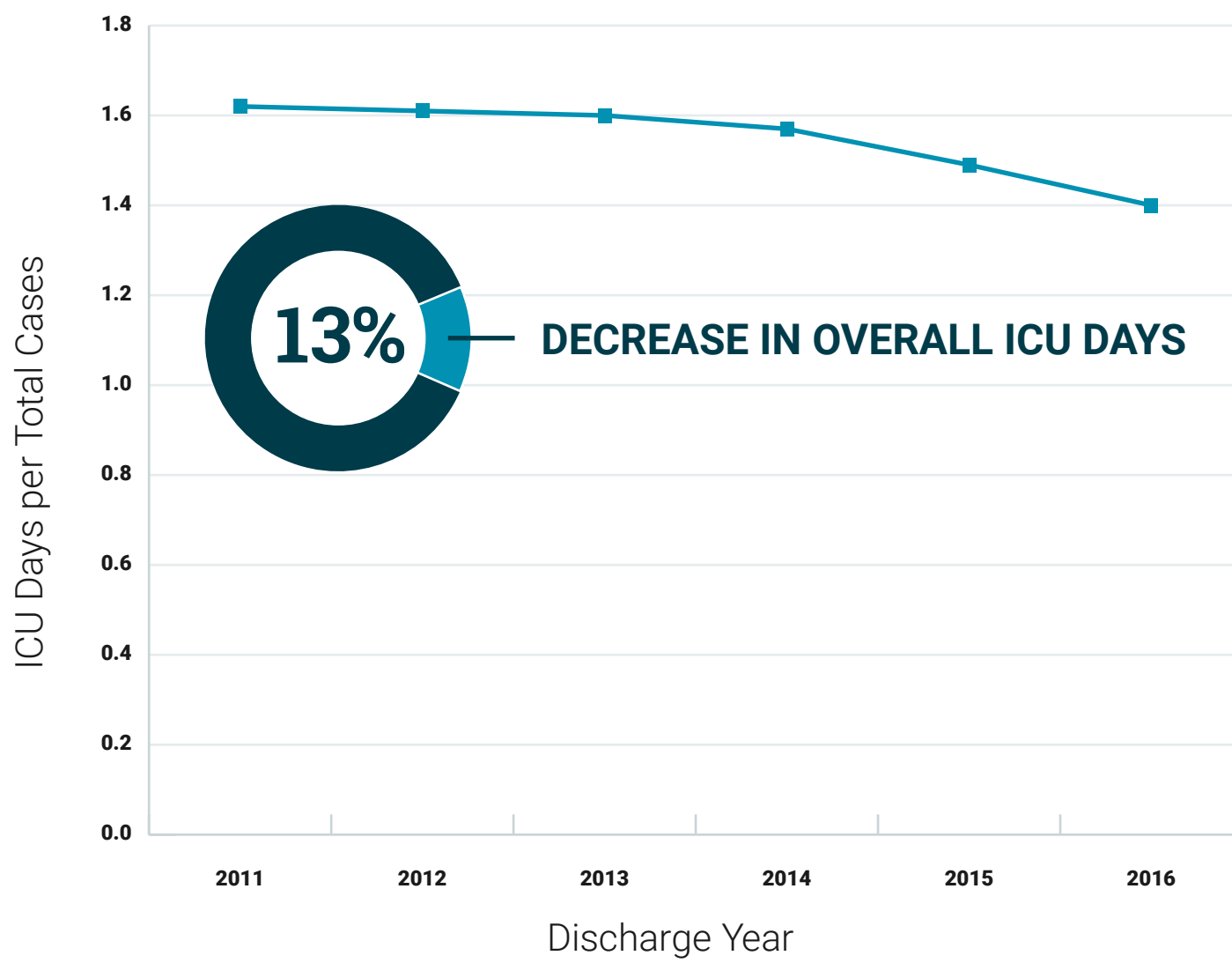
Sepsis patients also present major opportunity to optimize care and reduce clinical variation with the ICU, with the potential to reduce length-of-stay in the setting by up to 255,000 fewer days.

FIGURE 1: ICU LOS Opportunity (in days)

	Median ICU Use	Top Quartile ICU Use
Septicemia or Severe Sepsis W/O Mv >96 Hours W MCC	143,161	187,584
Infectious & Parasitic Diseases W O.R. Procedure W MCC	92,047	147,369
Cardiac Value & Oth Maj Cardiothoracic Proc W/O Card Cath W MCC	46,317	121,953
Coronary Bypass W/O Cardiac Cath W MCC	25,273	97,422
Respiratory System Diagnosis W Ventilator Support <=96 Hours	63,930	94,201
Craniotomy & Endovascular Intracranial Procedures W MCC	43,019	88,663
Septicemia or Severe Sepsis W Mv >96 Hours	57,854	67,464
Cardiac Valve & Oth Maj Cardiothoracic Proc W Card Cath W MCC	29,230	63,521
Cardiac Valve & Oth Maj Cardiothoracic Proc W/O Card Cath W CC	30,886	60,583
Heart Failure & Shock W MCC	38,855	59,351

When isolating 10 procedures accounting for most ICU use, providers have made progress in optimizing care as seen in the 13 percent decrease in terms of fewer patient days spent in the ICU setting within this set of diagnoses.

FIGURE 2: ICU LOS as a Part of Overall Population Length of Stay Top 10 MS-DRG's With ICU Use



Success Story:

INOVA FAIRFAX – FALLS CHURCH, VA

A team at Inova Fairfax, part of a five-hospital system within Inova Health based in Northern Virginia, sought to reduce variation in clinical practice and standardize care within their ICU to create better outcomes for patients and sustain higher performance on quality-based metrics such as length of stay, complications, readmissions, as well as improved costs with regards to better disposition.

As part of this effort, they sought work on process improvement within the Neurological ICU and patient outcomes for complex procedures like craniotomy (i.e. surgical removal of part of the bone from the skull to expose the brain) – which is dependent on high-quality care delivered by a multidisciplinary team of health professionals, including neurosurgeons, intensivists, neuro-hospitalists, nursing, case management, physician assistants and physical and occupational therapists.

To understand current practice trends, the Clinicians and the Quality Clinical Effectiveness (CE) team leveraged PremierConnect quality data and analytics to gain access to critical quality performance metrics – looking at the rates of complications, readmissions and length-of-stay associated within this patient population. The team drilled down on existing variation among these metrics and how they compared to the peer benchmarks within Premier's database (top performing hospitals and a cohort of other Premier members performing craniotomy procedures). The initial data assessment laid the foundation for the implementation of the program by providing the care team with monthly dashboards highlighting progress and clinician scorecards to help identify what was working and pinpoint improvement opportunities.

The following process improvements were set in place: operationalization of workflow, including collaboration with case management to develop a protocol to improve a patient's transition of care from higher to lower levels of care; creation of a step down unit for such patients; improved communication between care teams at all levels

by utilizing EHRs and multidisciplinary rounds; and implementation of evidence-based clinical pathway for better management of hemorrhage patients by reducing clinical variation.

Within a year of implementation, the team has achieved critical success milestones. Within a 10-month period, the overall length-of-stay for Neurological ICU was reduced from 5.2 days to 2.1 days. Additionally, patient readmission to ICU decreased by 54 percent.

Similar programs are being scaled across Inova Health System, including targeting other clinical effectiveness sprints using evidence-based practices with ICU patient populations who have had a tracheostomy and use an extracorporeal membrane oxygenation (ECMO) devices. Additionally, a system wide ICU pain and sedation is also underway.

Benchmarking Progress

Using Premier data, providers have a compass, helping them improve clinical variation within the ICU and measure progress against Premier member benchmarks. With constrained resources, hospitals and health systems are doing “less with more.”

Using this intelligence to highlight how a hospital or health system’s performance compares to their peers, leaders have an opportunity to target standardization in protocols within the ICU and reign in ineffective practices to improve care and reduce costs. Whether looking at optimization system wide or pinpointing specific procedures that account for ICU misuse or overuse, providers can drive real change across services lines and apply evidence-based practices when working with physicians, nurses, critical care professionals, surgeons, respiratory and physical therapists and other frontline medical providers on shifting habits around appropriate ICU use.

Success Story:

MERCY HEALTH – CINCINNATI, OHIO

Premier worked with physicians and system leadership to utilize benchmark data and identify specific patient populations with unjustified variation in level of care and length of stay within Mercy Health, a health system with 22 acute care facilities serving residents in Ohio and Kentucky. The analytics compared their performance for each facility by service line, drilling down to specific diagnoses and comparing each facility to top performing peers within the Premier's robust database, which offers a holistic view—linking clinical, financial and supply chain data. Top performing hospitals were identified based off of mortality, complications, length-of-stay, level of care, readmissions and cost metrics.

The data determined the percentage of patients placed in each level of care at a greater frequency than the peer group by MS-DRG while looking also at costs, then compared this view to the total length-of-stay within each level of care. Savings were quantified using the difference in room and board costs for each level of care.

Approximately 65 percent of the opportunity to optimize utilization of higher levels of care resided in use of ICUs. This included patients who were placed in a higher level of care than could be justified using established admission, discharge and triage criteria on admission, as well as to the inability to appropriately transition them to a lower level of care, including intermediate care, medical-surgical, hospice and long-term care units when they did not meet ICU criteria. When targeting these opportunities, Premier experts worked with the Mercy Health physicians, leaders and frontline team members to ensure admission, discharge and triage criteria approved by the medical staff was implemented for each level of care. Barriers to appropriate bed placement and transition to the next level of care were identified and multidisciplinary process improvement teams prioritized initiatives focused development of solutions for their specific facility.

Strategies leveraged to implement the transformation efforts included sharing of data with quality and service line departments; engagement of physicians to identify operational issues which delay patient transfers; use of physician champions to lead improvement teams for specific areas of focus in cases involving septicemia or heart failure; development of evidence-based order sets and care bundles; definition of metrics and data sources for tracking and monitoring progress; determining most appropriate methods for communicating metrics in an ongoing basis; and outlining process for review of outlier diagnoses for cases by unit and physicians.

In the collaboration between Premier and Mercy Health to leverage and understand data trends, as well as streamline changes across institutions and departments that touch ICU and critical care, the health system generated $6,798,125 in savings over a two-year period without compromising quality of care.

Best Practices in ICU Optimization

While not low-hanging fruit, focusing on ICU optimization has the potential to improve patient outcomes, reduce payment penalties, create additional bed capacity, decrease patient holding time within the Emergency Department, optimize workflow and increase patient satisfaction while reducing cost pressures and creating additional savings. Each hospital and health system is different – so there is no single, one-sized fits all solution to tackling variation in ICU utilization. Therefore, a multifaceted approach to achieve change performance improvement should be tailored to based on the institution's resources, patient populations, unique data trends and leadership priorities.

Prior to implementing any plan to optimize the ICU, it's crucial for leadership to have a handle on the current state. Data is fundamental to developing an understanding of exactly how the facility compares to others when it comes to ICU admission and discharge rates, length-of-stay and complications at a service line and MS-DRG level, medication prescription practices, work and patient flow protocols and clinical

practices. Once current practices and benchmarked outcomes are understood, leaders can begin to set priorities for tackling outlier areas with guidelines, clinical feedback and other investments that may be needed to ensure ICUs are only utilized by patients whose condition meets criteria for the appropriate level of care and time that is warranted.

With a manageable list of data-driven priorities, hospital leaders can have in-depth conversations with frontline medical staff about why this care transformation ultimately benefits patients and helps reduce cost pressures. Additionally, being able to monitor and track performance of individual physician practice patterns will help leaders examine physician compliance and understand why some care may be delivered in the ICU, as opposed to another setting in compliance with evidence-based guidelines.

Although optimizing the ICU is a highly-customized initiative, there are common areas of focus that health systems should consider. How to best address these areas of focus will vary, but best practices from health system leaders provides at least a roadmap for getting started.

01 ICU BEST PRACTICE: USE OF BUNDLES

When tackling improving patient care within the ICU, bundles that include best practices have proven to demonstrate progress on reducing risk for healthcare-associated infections, complications, pain and delirium. In order for these initiatives to truly be effective, data is crucial to understand current practices and monitor progress once these practices and protocols are introduced. When implemented effectively, these processes, resources and tools can enhance care delivery incorporating recent guidelines and assessment tools – with a focus on preventing complications like ventilator-associated pneumonia (VAP) and healthcare-associated infections like central-line associated bloodstream infections (CLABSI). Clinician decision support tools such as computerized physician order entry (CPOE) or electronic ordering provides a useful channel to “hardwire” guidelines from the bundles. These systems can provide alerts that are triggered by questionable practices – helping redirect physicians to an alternative action with clinically relevant information. These tools provide education, review, feedback and rationale through use of references,

reminders, alerts, recommendations and guidelines around best practices. Proper implementation of protocols within bundles can result in major savings: one study found implementation of a pediatric VAP bundle created $2.3 million in savings over two years[12] and use of proven strategies to prevent CLABSIs reduced costs by $1.9 million per year in an adult ICU.[13]

Success Story:

INOVA LOUDOUN HOSPITAL – LEESBURG, VA

Nurses at Inova Loudoun ICU endeavor to not only help their patients survive their critical illness, but also to make it home without the serious complication of delirium. Delirium is a rapid onset of confusion, inattention and memory problems, which ICU patients are especially prone to develop due to the nature of their illnesses and treatment. Delirium can negatively impact patients even after discharge from the hospital. Survivors of ICU acquired delirium experience higher rates of cognitive and functional impairment and institutional placement as each additional day of delirium is associated with a 10 percent increased risk of death at six months.[14] In terms of financial impact, ICU costs associated with delirium are estimated from $4-16 billion annually.[15]

An interdisciplinary team was created to implement the ABCDEF bundle of interventions to prevent the onset of delirium, decrease length of stay in the ICU and reduce risk of post-intensive care syndrome. Each day, the nurses collaborated with respiratory therapy in order to ensure daily spontaneous awakening and breathing trials were performed on the ventilated patients. A pharmacist educated the ICU physicians on the current recommended sedation medications and suggested the use of the ventilator, sedation and pain medication order set. Physical and occupational therapists worked closely with the nurses to promote early mobility.

Additionally, to engage and educate the loved ones of ICU patients, the team made a video to promote understanding of delirium and the role families play in preventing the onset of delirium or reducing the length of the condition.

Challenges included learning to recognize the factors that lead to delirium and identifying ways to reduce those risk factors. For example, the team educated staff on sedation level goals for mechanically ventilated patients. Longer time on the ventilator has been linked to developing delirium. The education focused on research supporting proper pain management and light sedation for early removal of mechanical ventilation.

Since the implementation of the ABCDEF bundle over a two-month period, delirium prevalence was reduced by 14.5 percent. For delirium-positive patients, length-of-stay in the ICU was reduced by 0.9 days and overall hospital length-of-stay decreased by 1.7 days.

The project resulted in a cost savings of $173,091 for the number of delirium positive patients seen during the two-month project in the ICU at Inova Loudoun Hospital, and the team is looking to incorporate these evidence based practices on a wider scale throughout the hospital system.

ABCDEF BUNDLE

The ABCDEF bundle is one example where hospitals have seen progress in ICU optimization which was created and spearheaded by the Society of Critical Care Medicine. Pain, agitation and delirium can all impact patients who undergo the prolonged use of sedation drugs. Anywhere from 60-80 percent of mechanically ventilated adult ICU patients experience delirium.[16] And once discharged, delirium within the ICU can increase risk of long-term cognitive dysfunction. How the medication is being administered as well as the type of sedative medication are both important in terms of patient outcomes within the ICU. Less is more with sedation medication, but these practices haven't become widely incorporated into ICU care. To accurately diagnose delirium, valid and reliable assessments should be used and early mobility and rehabilitation should be leveraged to reduce the incidence and duration of delirium, reduce ICU length-of-stay and overall hospitalization times while reducing hospital costs. Yet, many are still not using a valid

delirium screening tool. The ABCDEF bundle which outlines initiatives an ICU care team should incorporate in the patient's plan of care:

- **A**ssess, prevent and manage pain
- **B**oth spontaneous awakening trials (SATs) and spontaneous breathing trials (SBTs)
- **C**hoice of analgesia and sedation
- **D**elirium monitoring and management
- **E**arly mobility and exercise;
- **F**amily engagement and empowerment

Success Story:

BAPTIST MEMORIAL HOSPITAL – MEMPHIS, TN

Baptist Memorial Hospital – Memphis (BMH-Mem) is a quaternary care medical center comprised of a 38 bed medical/surgical ICU and 12-bed neuro ICU. In 2015, the hospital was chosen to participate in the ICU Liberation Collaborative, a national quality improvement initiative sponsored by the Society of Critical Care Medicine (SCCM). The goal of this initiative was to implement the ABCDEF bundle with hopes of improving the lives of patients in the ICU by decreasing sedative use, optimizing pain management, reducing the incidence of delirium, mobilizing patients earlier and engaging patients and their families in care.

Before embarking upon the work, the team tapped PremierConnect's quality data and analytics to compare internal trends to national benchmarks. The ABCDEF Bundle provides a checklist to effectively and thoroughly evaluate a patient's clinical status and detail how a multidisplinary team should establish and reassess goals for each patient in terms reducing ventilator use, limiting sedation time and ensure patients are as active and alert as possible depending on their condition to avoid delirium and other ICU-related complications.

By implementing the bundle, it was anticipated that there would be a decrease in the amount of time spent on mechanical ventilation, a decrease in ICU and hospital length of stay and improvement in the long-term outcomes and the quality of life for patients.

Overseeing the implementation included a committee made up of individuals who were passionate about changing the culture in the ICU and consisted of nursing staff, a pharmacist, physical and occupational therapists, respiratory therapists, palliative care, intensivist, a staff member from the quality department and information systems support due to the significant data collection needs.

The overwhelming amount of education to the ICU staff on the ABCDEF Bundle was the most important element in order to be successful with this collaborative. ICU staff were educated through multiple channels. Additionally, a partnership was developed with the informatics team at the system level in order to embed various protocols and documentation tools into the EHRs. This collaboration streamlined provider documentation and protocol implementation, as well as acquisition of compliance data.

Some of the biggest takeaways from the endeavor included changing sedation drugs and promoting early mobility. The team developed a coordinated and interprofessional approach where nurses, rehabilitation experts, physicians and respiratory therapists worked together to ensure the patient achieved their highest potential mobility level, even when ventilated. The nurses worked diligently to interrupt sedation and minimize its use to ensure the patient was awake for the activity.

With implementation of the ABCDEF Bundle over a 20-month period, a vast majority of patients ever comatose (74 percent) spent two or fewer days in a coma. Similarly, of those who experienced delirium, a majority (75 percent) experienced two or fewer days of delirium. Additionally, patients were 15 percent more likely to be discharged alive from the hospital ($p = 0.02$). The project was so successful that leaders are actively engaged in providing education training sessions to spread and scale the best practices across ICUs within the 22 hospitals in their health system.

As patients experienced fewer days comatose and delirious, they subsequently spent fewer days in the ICU. In 2017, patients averaged a 0.56 day decrease in length-of-stay – which translated into cost savings of nearly $800,000. The ABCDEF Bundle implemented in ICUs at BMH-Mem was able to positively impact the lives of patients, and the hospital continues to apply and spread the bundle.

02 ICU BEST PRACTICE: PALLIATIVE CARE

The goal of any ICU setting is to provide high-touch, acute care that transitions patients from a severe, life-threatening condition back to normal ranges of functioning. It is not necessarily the best setting for chronically ill patients to live out their last days. Yet, the literature proves that nearly 40 percent of deaths in the United States occur in the hospital, with more than half of these mortalities occurring within the ICU.[17] For terminal, end-of-life patients, it's important for ICU frontline medical providers to question the utility of intensive care at this stage, and present patients and families with other options that can ultimately better align with their wishes and their desire for quality of remaining life.

In a randomized trial of patients with metastatic non-small-cell lung cancer, patients assigned to early palliative care not only experienced better quality of life and fewer symptoms of depression compared to patients receiving standard care and survived more than two months longer on average.[18] They also reported greater satisfaction with care, experienced less pain and spent less time in ICUs.[19]

Investing in palliative care and advanced care planning can help transition chronic, end-stage patients to more appropriate settings that allow for a better quality of life and increased access to family during this challenging time. Research suggest that incorporating these interventions into the ICU may reduce intensity of care at the end of life while also reducing the length of stay and ICU admissions – all critical for reducing ICU costs.[20]

Incorporating interventions such as proactive consultation to palliative care and ethics services by the ICU team at the time of admission, compared to when all care has been exhausted, and meeting family regularly to discuss the prognosis and plan end-of-life care options are critical success factors. To navigate these difficult discussions, health systems may produce guidelines and protocols around care management for terminal patients, including checklists for symptom management and when to initiate discussions about the possibility of leaving the ICU in favor of hospice or home care. This leaves patients and their families in the driver's seat, able to make educated choices about the most appropriate setting for their situations.

03 ICU BEST PRACTICE: ESTABLISHING ADMISSION, DISCHARGE, AND TRIAGE CRITERIA AND AN INTERMEDIATE CARE SETTING

Research has found that up to 40 percent of ICU patients could be treated at a lower level of care.[21] While the ICU is absolutely necessary for critically ill patients, those with stable bodily functions should be stepped down. However, clinicians may fear this step, particularly if they are in the intermediate stage of needing less care than that provided in the ICU, but more than is provided in a general ward. Intermediate care settings provide a more effective care triage that helps transition patients who are steadily improving, and opens beds for other patients who need more intensive care. The intermediate care unit can help streamline and improve patient workflow by getting patients the right level of care they need at the right time – facilitating appropriate patient reallocation, reducing costs and preventing unnecessary ICU days.

Researchers who studied the introduction of this care setting found that resources were being used more effectively and efficiently with a reduction of inappropriate bed use – resulting in an increased capacity for patients in need of ICU care.[22] To do it properly, an intermediate care area needs to be created, and protocols need to be developed so that the decision to step down does not remain based on subjective judgment by critical care physicians and nurses, but rather is guided by patient needs and a multidisciplinary perspective on appropriate care.

04 ICU BEST PRACTICE: MULTIPROFESSIONAL TEAM ROUNDING AND CHECKLISTS

Multiprofessional team rounding and use of daily checklists facilitate improved management of critically ill patients by standardizing how care is delivered, creating a comprehensive approach with individualized daily goals and progress. This work can help enhance interprofessional communication and practice between physicians, nurses, pharmacists, residents and other members of the ICU staff so everyone is on the same page about care delivery and patient safety. Daily tracking should focus on proactively addressing the patient's next level of care. Review of ventilation, sedation, central venous access, nutrition and pharmaceutical interventions by this team facilitates discussions to identify changes needed to the patient

plan of care as well as to identify any barriers to the achievement of progression in the patient reaching their optimal level of wellness.

Researchers have found checklists utilized by a multiprofessional care team helps achieve improved outcomes for patients.[23] One group of researchers found the use of checklists improved compliance with evidence-based infection control bundles targeting VAP and CLABSIs.[24] Additionally, the use of checklists helped lead to an improved understanding among nurses and residents about the goals for their patients, which was associated with a decrease in ICU length-of-stay from 2.2 days to 1.1 days.[25]

05 ICU BEST PRACTICE: STAFFING

Major medical groups like the Society for Critical Care Medicine recommend that ICU should be intensivist-led. An intensivist is a board-certified physician with advanced training who provides specialty care for critically ill and complex patients. These frontline medical staffers within the ICU act as air traffic control – overseeing the flow of patients and their cases with a multidisciplinary team including physicians, nurses, pharmacist, respiratory therapists and others. One study analyzed data from 112 hospitals representing more than 107,000 patients and found that daily intensivist-led multidisciplinary rounds were independently associated with lower mortality rates in ICU patients.[26] The team approach to critical care delivery is still considered a crucial foundation to deliver the best care possible within the ICU to ensure standardization in how care is provided, as well as opportunity to hear diverse viewpoints necessary to make for the best possible decisions for patients. For example, when ventilator liberation protocols were implemented by a multidisciplinary team, researchers demonstrated patients were far less likely to be on a ventilator for extended period of time (reduction of 4.9 days), a decrease in ICU length-of-stay (4.5 days) and a reduction in median cost per stay in the unit ($13,312 reduction in costs).[27]

06 ICU BEST PRACTICE: OPERATIONAL EFFICIENCIES AND BED AVAILABILITY

There should also be a focused review of operational efficiencies to confirm processes are in place to ensure the patient is placed in the most appropriate level of care on admission and that there are processes to efficiently transfer the patient when the order is written. To facilitate this, leaders should engage physicians in a collaborative review of practice variation and unintentional outcomes to determine key performance indicators (KPIs) included in a quality scorecard. Having mutually agreed upon key performance indicators and goals sets the stage for outliers to be identified in an objective manner. This structured approach to performance improvement leads to fruitful discussions around metrics including optimal time a transfer order is placed measured against the amount of time measured when tracking a patient being transitioned to the next level of care, room turnover time, time of patient discharge and hours a patient is held while waiting for a bed assignment – all crucial when determining key targets for care transformation within the ICU.

Summary

Dollars follow quality when investments are made into the optimization care delivery. While ICU optimization may not be easy, leaders and clinical staff are increasingly in tune with the importance of standardizing care within this setting to ultimately benefit patients with the secondary goal being delivering value and reducing costs.

Premier's trend data highlights the tremendous opportunity that lies within critical care to embark upon performance improvement and generate real results and care improvements.

For more information on Premier's expertise and data which helps providers optimize blood utilization across institutions, contact our team to learn about resources and solutions we've developed to guide members through this opportunity to improve care and reduce costs.

Methodology

Premier's database acquires, aggregates, cleanses and manages clinical, financial and operational data on approximately 40 percent of U.S. health system discharges. Tapping this resource, our blood utilization analysis included data from 786 facilities, representing more than 20 million discharges from 2011-2016. Only inpatient cases were included from 128 Medicare MS-DRGs which account for more than 80 percent of ICU stays at these hospitals.

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