Evaluation of Pain Assessment Tools in Patients Receiving Mechanical Ventilation

Factors Related to Successful Transition to Practice for Acute Care Nurse Practitioners

SYMPOSIUM: PATIENT AND FAMILY POST–INTENSIVE CARE SYNDROME

Implementing a Mobility Program to Minimize Post–Intensive Care Syndrome

A Clinic Model: Post–Intensive Care Syndrome and Post–Intensive Care Syndrome-Family

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Mortality rates of critically ill patients have decreased markedly in recent years thanks to advancements in care.\(^1\) Given the improved survival rates of critically ill patients, investigators have broadened their focus from short-term mortality to long-term mortality and morbidities that are often underrecognized by intensive care unit (ICU) practitioners. The Society of Critical Care Medicine (SCCM) has defined post–intensive care syndrome (PICS) as a new or worsening decrement in mental, cognitive, or physical health following critical illness that persists beyond the acute hospitalization.\(^2\) Many medication-related risk factors are associated with development of cognitive impairment in critically ill patients, including glucose dysregulation,\(^3,4\) delirium,\(^5\) and medications.\(^6\) Medications have also been associated with acute neuromuscular weakness following an ICU admission.\(^7\) In the past decade, the increased risk of adverse drug events (ADEs) during transitions of care has become widely known. This column focuses on how medication management strategies in the ICU, after the ICU, and after hospitalization may prevent or help manage PICS.

**In the ICU**

**Glucose Dysregulation**

Both hyperglycemia and hypoglycemia are associated with cognitive dysfunction in critically ill patients. Hyperglycemia decreases cerebral blood flow,
injures the vascular endothelium, increases permeability of the blood-brain barrier, and increases excitatory neurotransmitter release and resultant neuronal death. A retrospective study of 74 survivors of acute respiratory distress syndrome (ARDS) demonstrated that having a blood glucose value of 153.5 mg/dL (to convert to millimoles per liter, multiply by 0.0555) was associated with a 2.9 times greater chance of cognitive impairment. Additionally, a retrospective, case-control study of 37 surgical ICU patients who had experienced at least 1 episode of hypoglycemia during treatment showed that cognitive dysfunction, specifically in visuospatial skills, was higher in the hypoglycemia group than in the control group ($P < .01$).  

Hyperglycemia is also a risk factor for critical illness polyneuropathy (CIP) and critical illness myopathy (CIM). Insulin has anti-inflammatory effects, protects endothelium, improves the metabolism of lipids, and is an anabolic hormone. Intensive insulin therapy (maintaining blood glucose levels between 80 and 100 mg/dL) in surgical ICU patients decreased neuropathy from 51.9% to 28.7%. Also, intensive insulin therapy decreased the prevalence of CIP and CIM from 49% to 25% in surgical ICU patients ($P < .001$) and from 51% to 39% in the medical ICU ($P = .02$) in patients who had an ICU stay of at least 1 week. Moreover, the percentage of patients receiving mechanical ventilation for at least 2 weeks was reduced from 42% to 32% in the surgical ICU ($P = .04$) and from 47% to 35% in the medical ICU ($P = .01$). However, a subsequent study, NICE-SUGAR, showed increased mortality in the intensive insulin group (27.5%) compared with conventional glucose control ($< 180$ mg/dL; 24.5%; $P = .02$). On the basis of that study, SCCM guidelines for the use of an insulin infusion in critically ill patients suggests that patients with a blood glucose level of 150 mg/dL or greater receive an intervention to maintain blood glucose level at less than 180 mg/dL while avoiding hypoglycemia.  

**Pain, Agitation, and Delirium**  
The pain, agitation, and delirium (PAD) guidelines were published by SCCM in 2013 and summarize the best evidence available for providing physical and psychological comfort through management of PAD. A program called the ICU Liberation Collaborative has been started by SCCM to aid in the implementation of the PAD guidelines in 77 hospitals in the United States that are committed to improving outcomes for patients and their families.  

**Delirium.** In 2013, a large, multicenter, prospective observational cohort study of 821 adult medical and surgical ICU patients with respiratory failure, cardiogenic shock, or septic shock, called Bringing to Light the Risk Factors and Incidence of Neuropsychological Dysfunction in ICU Survivors (BRAIN-ICU), was reported. The researchers sought to estimate the prevalence of long-term cognitive impairment following critical illness. The strongest independent predictor of cognitive impairment was ICU delirium, which was found in 50% of study patients. Three months following hospital discharge, a Repeatable Battery for Neuropsychological Status (RBANS) score similar to what has been seen in individuals with mild Alzheimer’s disease (2 standard deviations below the population mean) was found in 26% of patients, and a score similar to the scores seen in patients with moderate traumatic brain injury (1.5 standard deviations below the population mean) was found in 40% of patients.  

**Pain.** Inadequate pain management has been associated with numerous complications, including nosocomial infections, increased duration of mechanical ventilation, and delirium. The treatment of pain with opiates in critically ill patients has been associated with an increased risk of delirium in some studies and a decreased risk of delirium in others. Although other medications such as gabapentin (Neurontin), nonsteroidal anti-inflammatory drugs, and acetaminophen (Tylenol) are good adjunctive therapies, opioids are the medication class of choice for treating pain in critically ill patients. The potential for the development of delirium highlights one of the many reasons why pain assessment in critically ill patients is so imperative. The PAD guidelines recommend that all adult critically ill patients be routinely assessed for pain. Self-reporting of pain is considered the reference standard for pain assessment. However, if a patient is nonverbal, the PAD guidelines recommend use of the Behavioral Pain Scale or the Critical Care Pain Observational Tool in ICU patients who are unable to self-report pain.  

**Sedation.** Benzodiazepines have been associated with the development of delirium in
several studies.\textsuperscript{15,16} The PAD guidelines recommend using nonbenzodiazepine sedation strategies (eg, dexmedetomidine [Precedex]) in delirious patients.\textsuperscript{13} Three studies\textsuperscript{17-19} have demonstrated that patients are less likely to remain delirious if dexmedetomidine is used. In a double-blind, randomized, controlled trial of 106 patients receiving mechanical ventilation, The Maximizing Efficacy of Targeted Sedation and Reducing Neurological Dysfunction (MENDS) study,\textsuperscript{20} researchers found that the median number of days alive without delirium or coma was 7 in the dexmedetomidine group versus 3 in the lorazepam (Ativan) group ($P = .01$). The daily prevalence of delirium was lower in the dexmedetomidine group than in the lorazepam group ($P = .004$) after the day of randomization.\textsuperscript{20}

In a second double-blind, randomized, controlled trial of 375 medical/surgical ICU patients, the Safety and Efficacy of Dexmedetomidine Compared with Midazolam (SEDCOM) study,\textsuperscript{17} researchers found that 60.3\% of dexmedetomidine patients and 59.3\% of midazolam (Versed) patients were delirious at baseline according to the Confusion Assessment Method for the ICU. During the study period, the prevalence of delirium was 54\% in the dexmedetomidine group compared with 76.6\% in the midazolam group ($P < .001$).\textsuperscript{17}

A pilot, phase 3, double-blind, randomized study was conducted by Ruokonen et al\textsuperscript{18} in 2009 to compare dexmedetomidine with standard care (midazolam or propofol [Diprivan]). Patients with a target score of 0 to -3 on the Richmond Agitation-Sedation Scale (RASS) were more likely to be at the target RASS score with dexmedetomidine (74\%) than with standard care (64\%).

In a phase 3, multicenter, randomized, double-blind trial,\textsuperscript{19} MIDEX, researchers found that the composite outcome of agitation, anxiety, and delirium occurred in 27\% of patients who received midazolam versus 29\% of patients who received dexmedetomidine ($P = .69$). In a second phase 3, multicenter, randomized, double-blind trial,\textsuperscript{20} PRODEX, researchers found that the composite outcome of agitation, anxiety, and delirium occurred in 29\% of patients who received propofol versus 18\% of patients who received dexmedetomidine ($P = .008$). Overall, these studies suggest that the use of dexmedetomidine results in increased days alive without delirium and reduced daily prevalence of delirium compared with benzodiazepines.

### Management of Delirium

Nonpharmacological management of delirium through risk factor reduction has been studied in non-ICU patients, and the results generalize to the ICU population. However, these interventions need to be investigated further in critically ill patients. An example of risk-reducing strategies that can be simplified into a simple phrase “Stop, THINK, and Medicate” is presented in Table 1.

Pharmacological interventions should be considered only after nonpharmacological strategies have been implemented and modifiable risk factors have been addressed.
Beneficial effects of haloperidol (Haldol) or atypical antipsychotics on decreasing the duration of delirium in adult ICU patients have not been definitively demonstrated (ie, no large randomized controlled trials). In a prospective pilot study,21 18 delirious patients were randomized to receive scheduled quetiapine (Seroquel) and 18 delirious patients were randomized to receive placebo. All patients could receive intermittent haloperidol. Faster resolution of delirium was found in the quetiapine group compared with the placebo group (1 day vs 4.5 days, \( P = .001 \)) as well as a shorter duration of delirium (36 days vs 120 days, \( P = .006 \)). Additionally, less intermittent haloperidol was required in the quetiapine group (3 vs 4 days). Both groups experienced a similar amount of QT interval prolongation and extrapyramidal symptoms, but more somnolence was found in the quetiapine group (22% vs 11%, \( P = .66 \)).

Currently, a multicenter, randomized, placebo-controlled, study sponsored by the National Institutes of Health called Modifying the Impact of ICU-Associated Neurological Dysfunction—USA (MIND-USA) is being conducted in delirious medical and surgical ICU patients with respiratory failure or shock to determine the effects of haloperidol versus ziprasidone versus placebo on the number of days alive without delirium or coma, mortality, and long-term cognitive function.

Medications That Cause Delirium

Medications are a common yet easily reversible cause of delirium, accounting for 12% to 39% of all cases. The American Geriatric Society recently updated the Beers criteria, listing potentially inappropriate medications to be prescribed in elderly adults. In addition, the Society also published a list of alternative medications to use instead of high-risk medications. Although narcotics and benzodiazepines have been discussed in prior sections, many other deliriogenic medications are commonly prescribed to patients in the ICU22 (Table 2).

Excess dopamine, decreased acetylcholine, and alterations in \( \gamma \)-aminobutyric acid are all mechanisms behind the development of delirium.23 Dopamine agonists used as antiparkinsonian agents can contribute to delirium. If these medications are deemed necessary, a dosage reduction or change in schedule may alleviate the problem. Quinolone antibiotics have weak dopaminergic activity. Morphine also increases the release of dopamine.24 Anticholinergic medications result in a cholinergic deficiency and are a modifiable risk factor for delirium. Additionally, digoxin (Lanoxin), lithium (Lithobid), and histamine\(_2\) blockers demonstrate some cholinergic binding activity, although they are not traditionally classified as anticholinergic agents.25 The proposed mechanism behind benzodiazepine-induced delirium is alterations in \( \gamma \)-aminobutyric acid.24

A prospective cohort study25 of 1112 critically ill patients in a 32-bed medical-surgical ICU for a total of 9867 days was conducted to determine whether anticholinergic exposure...
increased the probability of a transition to delirium occurring. The transition from “awake and without delirium” to “delirium” occurred on 6% of ICU days. A 1-unit increase in the Anticholinergic Drug Scale demonstrated a nonsignificant increase in the probability of a transition to delirium occurring the following day (odds ratio, 1.05; 95% CI, 0.99-1.10). However, the authors did not evaluate whether the dose of the medication affected the transition to delirium and also did not consider patients who were already delirious and remained delirious while receiving anticholinergic medications.25

Medications can also potentiate CIP and CIM (Table 2). Neuromuscular blockers enhance microvascular permeability, stimulating denervation of the muscle in addition to having direct toxic effects on the nerve. Concomitant administration of steroids enhances the toxic effects of neuromuscular blockers on muscles. The risk of acute myopathy increases with coadministration of neuromuscular blockers and corticosteroids for longer than 24 to 48 hours.26 Additionally, hypermagnesemia, metabolic acidosis, and concomitant medications including aminoglycosides and clindamycin promote prolonged neuromuscular blockade.27 Studies on the effects of corticosteroids on CIP/CIM have yielded both positive9,10 and negative28 results. The clinical situation must be considered when determining if the use of corticosteroids is merited.

Careful review of the patient’s medication list can identify potentially deliriogenic or CIP/CIM-inducing medications. Drug/disease state interactions and drug/drug interactions resulting in delirium or CIP/CIM should be considered when dosing and choosing medications.7,24 Hepatic and renal impairment can lead to accumulation of medications, resulting in delirium and/or CIP/CIM if the medication dose is not adjusted appropriately.7,24

Transitions of Care

Although ADEs can occur at any time, it has become evident in the past decade that a significant risk for ADEs occurs during periods of transition of care.29 One of the first studies that highlighted the medication errors that occur during transitions of care demonstrated that 54% of errors were made by prescribers when ordering medications at hospital admission.30 Further, many emergency room visits and readmissions to hospitals following discharge have been associated with medications. In response to the growing amount of data demonstrating medication errors at transitions of care, The Joint Commission on Accreditation of Healthcare Organizations declared “sustaining and properly communicating correct medication information” to be a National Patient Safety Goal in 2011.

Patients with cognitive impairment or those taking more than 5 medications per day (also known as polypharmacy) are 2 examples of populations of patients at higher risk for an ADE during transitions of care.29 Additionally, the number of medications a patient is receiving is an independent risk factor for delirium.31 “Deprescribing” is defined as the process of tapering or discontinuing medications to minimize polypharmacy and improve patients’ outcomes. The following 5-step protocol for deprescribing has been suggested: (1) determine that each medication has an indication; (2) consider the overall potential harm of the medications in determining how many agents should be discontinued; (3) assess each individual drug to determine if it should be discontinued; (4) prioritize the order of medications to be discontinued; and (5) initiate and monitor a drug discontinuation plan. Deprescribing can be further enhanced in the ICU by determining if medications have a current indication. For example, a patient taking an antihistamine at home for allergies and an anticholinergic agent for an overactive bladder may not need these medications when admitted to an ICU with a urinary catheter.32

A single-center study33 of 120 elderly adult ICU survivors evaluated the frequency of prescribed potentially inappropriate medications (PIMS) and actually inappropriate medications (AIMs). PIMS were defined as those medications potentially harmful to the elderly according to prior research and knowledge of pharmacological effects. PIMs could then be classified as AIMs if the benefit of the drug was outweighed by the harm after considering a patient’s clinical circumstances. Charts were reviewed and medications were identified as PIMS by using the 2003 Beers criteria and medication safety data published since 2003. In order to determine where AIMs were initiated, medications were identified at 5 distinct points during the hospital stay: admission, medical/surgical unit admission, ICU admission, ICU discharge, and hospital discharge.
The most common categories of PIMS identified at hospital discharge were the following: opioids, anticholinergic medications, antidepressants, and drugs causing orthostasis. The clinical panel, consisting of a hospitalist, geriatrician, and clinical pharmacist, determined that 36% of these PIMs were considered to be AIMs. At hospital discharge, the PIM categories with the highest positive predictive values for being AIMs included anticholinergics (55%), nonbenzodiazepine hypnotics (67%), benzodiazepines (67%), atypical antipsychotics (71%), and muscle relaxants (100%). The number of discharge PIMs was independently predicted in multivariate analysis by the number of preadmission PIMs \((P < .001)\), discharge to somewhere other than home \((P = .03)\), and discharge from a surgical service \((P < .001)\).

Also, nearly two-thirds of AIMs were initiated in the ICU. It is likely that many of these medications initiated in the ICU or at any other time during the hospital stay may have been appropriate for temporary or short-term use depending on the patient’s clinical situation. However, the failure to discontinue these medications once no longer indicated led to inappropriate and prolonged use. This study further highlights the need to review patients’ medication lists daily and during transitions of care to determine if deprescribing is merited.

In addition to the continuation of unnecessary medications following hospital discharge, patients’ home maintenance medications may not be initiated upon hospital admission. In a large population-based Canadian cohort study of 396,380 patients aged 66 years or older, researchers looked at records of hospital and outpatient medications prescribed from at least 1 of 5 of the following groups: (1) statins, (2) antiplatelet/anticoagulant agents, (3) levothyroxine, (4) respiratory inhalers, and (5) gastric acid-suppressing drugs. Patients were divided into 3 groups: hospitalization with an ICU admission, hospitalization without ICU admission, and nonhospitalized patients (controls). Patients admitted to a hospital without an ICU stay were significantly more likely to have medications discontinued compared with control patients. Also, patients admitted to a hospital with an ICU stay were significantly more likely to have medications discontinued compared with all 5 of the medication groups compared with control patients.

The risk of medication discontinuation was higher in all medication groups with the exception of respiratory inhalers in patients hospitalized with an ICU admission, compared with patients hospitalized without an ICU admission. The composite risk of death, hospitalization, and emergency department visits up to 1 year after hospital discharge in all study patients was significantly higher in patients in whom a statin or anticoagulant was discontinued. As this study was retrospective, the clinical reasons why long-term medications were discontinued could not be delineated. However, this study highlights the importance of medication reconciliation with changes in patients’ status and transitions of care to prevent errors of omission in the patient’s discharge medication list when leaving the hospital.

### Post-ICU Clinics

Fifty percent of patients who are readmitted within 30 days of discharge did not have a posthospitalization visit to a primary care provider. Lack of understanding of home and discharge medications was a contributing factor to readmissions. Readmissions occurred in 20% of Medicare recipients within 30 days of discharge and in 34% within 90 days of discharge in 1 study.

One method of smoothing the transition back to a primary care provider following an ICU stay is use of a post-ICU clinic. Primary care providers may not be familiar with the specific critical care issues seen in patients following critical illness and may not have the tools to assess and manage these complications. An interdisciplinary team of individuals in a post-ICU clinic can use their expertise about specific complications related to critical care to aid in the diagnosis and treatment of PICS.

Medication therapy review, reconciliation, and counseling should all be considered crucial parts of a patient’s visit to a post-ICU clinic. These functions are ideally performed by a pharmacist. The steps of the complete medication use process are listed in Table 3.

### Patient Testimonial

Scottie Grayson is a 42-year-old man who had a 30-day hospitalization after a witnessed ventricular arrest with subsequent acute kidney injury, prolonged ventilation, and heparin-induced thrombocytopenia who was seen at the ICU Recovery Center at Vanderbilt.
University Medical Center. The following is Mr Grayson’s testimonial regarding how targeted medication interventions affected his post-ICU recovery:

Recently I suffered a cardiac arrest and spent 30 days in Vanderbilt Medical Center. When I returned home I was shocked to learn that I was bringing home 11 prescriptions for a total of 24 pills a day. For someone who was taking zero prescriptions previously, it was very overwhelming. I repeatedly had to ask my wife what all these pills were for and if I really needed them. Although the staff had gone over all these medications with my wife, I was in the dark. During my first few weeks home, I was in a fog. I don’t know how much of it was the medication and how much of it was my body still healing from the trauma. I believe I would have been less anxious and overwhelmed if I personally would have had a better understanding of what all the medications had been for. The complete medication review by the pharmacist at the ICU Recovery Center at Vanderbilt helped me to feel better about my medications.

During his visit at the ICU Recovery Center at Vanderbilt, Mr Grayson was provided a pill caddy to help organize his medications. Additionally, 3 medications, omeprazole, sodium bicarbonate, and quetiapine, started for acute needs in the hospital, were discontinued.

**Conclusion**

Medication management strategies in the ICU, upon transition to the medical/surgical unit, and after hospitalization are critical to preventing and treating PICS. Glucose management strategies, delirium prevention and treatment, and avoidance or proper dosage adjustment of deliriogenic or neuromuscular weakness–inducing medications are all strategies to prevent PICS.

**REFERENCES**


**Table 3: The Complete Medication Use Process**

1. Before clinic visit: review of patient’s chart for medical history, hospital course, and medications
2. Medication reconciliation: compare and reconcile medication lists before, during, and after hospitalization
3. Medication therapy review: ensure that each medication has an appropriate indication
4. Patient interview: identify adverse drug events, identify any untreated problems
5. Patient counseling: review medication indication, directions, potential adverse effects, and monitoring
6. Assessment: review barriers to obtaining medications, promote medication regimen adherence, and order any needed laboratory tests
7. Conclusion of visit: discuss medication changes and patient’s follow-up plan


**CE Test Instructions**

This article has been designated for CE contact hour(s). The evaluation tests your knowledge of the following objectives:

1. Describe medication related risk factors associated with cognitive impairment that develop in critically ill patients.
2. Discuss medications associated with acute neuromuscular weakness following an intensive care unit stay.
3. Evaluate the role of a post–intensive care unit clinic in providing a comprehensive medication review for easing the transition from the critical care setting to home.

**Contact hour: 1.0**

Pharmacology contact hour: 1.0

Synergy CERP Category: A

To complete evaluation for CE contact hour(s) for test #ACC632, visit www.aacnacconline.org and click the “CE Articles” button. No CE test fee for AACN members. This test expires on April 1, 2019.

American Association of Critical-Care Nurses is an accredited provider of continuing nursing education by the American Nurses Credentialing Center’s Commission on Accreditation. AACN has been approved as a provider of continuing education in nursing by the State Boards of Registered Nursing of California (#01036) and Louisiana (#LSBN12).
Whether you are a registered nurse, an advanced practice registered nurse, nurse manager, director, or chief nursing officer, you most likely have been using some form of analytics to improve patient care and outcomes. Is it sufficient? Are the analytics you are using today transforming nursing care or are they promoting incremental, albeit important, improvements?

Look around you at all of the technology in your work setting from infusion pumps to patient monitoring systems, point-of-care laboratory systems, electric beds, electronic health records (EHRs), smartphones, and more. What’s happening to the enormous amounts of data being generated by these diverse technologies, and what should be happening? How do we combine these data with data from other sources, including genomic data and patient-generated health data?

This Technology Today column is intended to provide initial answers to these questions, taking current data analytics to a new level by illustrating an emerging analytics framework, outlining key milestones, and enabling a more precise analytics strategy. Although the technology we use in acute and critical care helps us take care of individual patients, the aggregated data from all patients, largely untapped, can be transformative not only for nursing but for all of health care. If you have found success in today’s analytics known as “analytics 1.0,” often illustrated in run charts and bar graphs, you can begin to imagine the opportunities and impact of analytics 2.0 and 3.0. First let’s look at key definitions.

Definitions

Analytics

Analytics is the discipline of applying mathematical sciences to data for the purpose of making better decisions. You have most likely heard that health care is data rich but information poor. You may also have wondered how your organization is using the abundance of data in the EHR, largely derived from manual data entry by nurses and other health care professionals. Analytics serves to convert the increasing amounts of data into actionable information for improving practice and patients’ outcomes.

Nomenclature of 1.0, 2.0, 3.0

The nomenclature of 1.0, 2.0, and 3.0 refers to evolving versions of something. For example, versioning of the Web or software employs this nomenclature, using whole numbers with zero in the first decimal place. This

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The nomenclature has been around for years and is denoted as 1.0, 2.0, and so on, signifying substantial changes in the software or programming. Minor changes, updates, or upgrades are more often denoted as 1.1, 1.2, and so on and are sometimes broken down further into 1.1.1 and 1.1.2. The nomenclature of 1.0, 2.0, and 3.0 is similarly used here to outline significant changes in analytic endeavors within a health care organization.

Analytics 1.0, 2.0, 3.0

The 3 currently recognized stages of analytics are illustrated in the Figure. Each type of analytic denotes significant advancements from the previous stage. As can be seen, descriptive analytics will continue but will play a smaller and smaller role as the more valuable predictive and then prescriptive analytics come into play.

Analytics 1.0: Descriptive Analytics

Traditional-data analytics use descriptive statistics that are based on a small amount of historical or retrospective data to identify issues and/or generate reports.1 Data are extracted that occur at one particular point in the past or several points over longer periods of time but are predefined in terms of the data being captured from the past. Data extraction often uses manual processes.

Analytics 1.0 does not directly yield actionable information. Decisions based on the descriptive analyses of 1.0 are identified by using root cause analyses, best practices, or evidence-based practices affording limited amounts of change. Data analysts focus largely on collecting and preparing data for analysis and reporting.

Analytics 2.0: Predictive Analytics

Analytics 2.0 is powered by big data allowing predictive analytics.2 The term big data is defined as “data . . . too big to fit on a single server, too unstructured to fit into a row-and-column database, or too continuously flowing to fit in a static data warehouse.”2(p1) It is often described by the so-called “3 V’s” of volume, variety, and velocity or “4 V’s” if you add value; however, this simplistic description is lacking. How precisely can we define variety and will a large volume of data today be a large volume tomorrow?

Big data analytics differs markedly from the traditional analytics 1.0. Analytics 2.0 includes unstructured data, such as radiology images and electrocardiograms, is 100 terabytes to petabytes, deals with a constant flow of data, and the data are analyzed by using technologies specific for big data that differ from the technologies used with traditional analytics.2 An example is natural language processing used to analyze free text entered into the EHR by clinicians.

Predictive analytics provide illustrations of trends in data that inform users of past tendencies and can be used to predict future tendencies. Similar to descriptive analytics, predictive analytics do not directly yield actionable information. Clinicians combine the prediction with best evidence and the individual’s unique circumstances to determine what actions to take.

Analytics 3.0: Prescriptive Analytics

Uses big data
Enabled by real-time, streaming data
Optimal behaviors or actions are suggested at the point of decision
Important for individuals involved in self-management of their health
Drives transformation

Figure: Key differences in analytics 1.0, 2.0, and 3.0.
Making the transition from descriptive analytics to predictive analytics should be part of nursing’s strategic plan. If an organization is currently using descriptive analytics, the addition of predictive analytics is important for providing more advanced information. This transition is essential not only for nursing practice but also for advancement of the discipline. Nursing’s participation in the big data and data science initiatives now underway is essential to ensure that the discoveries not only be shaped by our profession’s unique understanding of the patient experience but also that the discoveries lead to knowledge that is useful to nursing.\textsuperscript{3(p477)}

Analytics 3.0: Prescriptive Analytics

Analytics 3.0 makes a significant advancement by adding the more beneficial prescriptive analytics at the point of decision.\textsuperscript{1,4} Prescriptive analytics are embedded in operational and decision processes suggesting optimal behaviors and actions both for clinicians and for people involved in self-management of their health or illness.

Prescriptive analytics are enabled by incorporating real-time, streaming data composed of continuous, rapid data from a variety of sources. The physical data of humans is continuous and can change quickly and insidiously. The vast majority of real-time or continuous data are not currently collected, stored, and analyzed but they will be in the future because these continually streaming physical data are what make real-time analytics for prescribing decisions possible at the point of care.

The ultimate benefit of prescriptive analytics surrounds speed and impact.\textsuperscript{4} In health care, this equates to prompt and effective prevention, early intervention, avoidance of complications, value, and transformation. Decisions about individuals built on their historical data, such as occurs with descriptive and predictive analytics, are insufficient to affect the individuals’ current situation.

Discussion

Achieving the purpose of better decision making through analytics requires careful consideration. This requirement is in part due to competing demands for resources in building analytic systems to answer questions and in part due to the accessibility of necessary data to provide sound answers. Many decisions in patient care require additional factors that may not be readily available, such as whether or not the decision is locally obtainable, are costs incurred, who pays, are there cultural or religious implications for the patient, does it require clinician expertise and is that expertise available, and is it legal in the state in which it will be delivered? Although analytics can move health care forward in making better decisions, electronic analyses are limited to the adequacy of the data available.

Underlying all analytics is the quality of the data being analyzed. As the saying goes, “garbage in, garbage out.” The data should be accurate, relevant, and timely.\textsuperscript{4} To achieve quality data requires sound data capturing, removal of errors, a sound method for examining outliers, appropriate capture and analyses of free text and unstructured data, the ability to capture data from multiple and sometimes disparate applications, and more.

It may be surprising that this column does not further define analytics 1.0 as “nursing analytics.” The jury may be out on this, but it seems highly unlikely that the silos of documentation data seen today in EHRs will continue. Data used in analytics 1.0, 2.0, and 3.0 are about health care consumers and are driven by patients’ goals and the contribution of each health care discipline as well as the patient and the patient’s family.

Key takeaways from this column on analytics include using the analytics framework to evaluate where your organization is in its analytics journey and develop a sound strategy and operational plan for using analytics and for how you may contribute. Consider starting now to acquire or develop the nursing talent to move analytics forward, because current opportunities are outpacing current preparation in the health care industry. Nurses involved in quality improvement roles may be poised to add analytics knowledge to their repertoire of skills. The role of a chief nursing informatics officer is evolving to meet the needs of health care organizations analyzing data, including EHR data, to meet the demands of population health management.\textsuperscript{6} Multiple professional development opportunities are available through professional organizations such as the International Institute for Analytics (www.iianalytics.com) and continuing education or formal education/degree programs in analytics.
Conclusion

The continuing addition of new and improved technologies, increasing interoperability, and data analytics are changing what is possible in nursing and health care and what is possible for the people we serve. The promises of the digital age are truly transformational but can be costly in terms of time, energy, and money, especially if not effectively planned and managed. This Technology Today column depicts a framework for analytics and provides nurses with a roadmap for advancing practice and improving outcomes by successfully navigating the digital terrain of analytics.

REFERENCES

The role of the clinical nurse specialist (CNS) blends leadership and advanced clinical practice to improve patient care, nursing practice, and organizational outcomes. Successful role implementation as a CNS is dependent on a multitude of factors, including clinical knowledge and skills, individual and group leadership skills, effective communication, and the ability to influence change.1(p13) A leadership skill critical to the success of the CNS and the organization, yet often overlooked, is emotional competence. The focus of this article is to describe the essential role that emotional competence plays in successful CNS practice, provide tools for self-assessment and development, and discuss implications for nurse leaders.

Emotional Intelligence Versus Emotional Competence

Emotional intelligence is the ability to assess an individual’s and others’ emotions through emotional awareness, discern the impact of those emotions, and then use that information to positively affect behavior.2,3 Another way to describe emotional intelligence is being aware of what you are feeling, sensing what others are feeling, and motivating yourself to complete tasks and perform at your optimal level.3 Emotional intelligence has been defined by Goleman4 to include self-awareness, self-regulation, motivation, empathy, and social skills.

Emotional competence is the ability to successfully apply the concepts of emotional intelligence in everyday practice to effectively lead and influence individuals and groups.5 As with other competencies, emotional competence can be developed over time.3 Emotional competence includes attributes such as self-awareness, humility, resiliency, passionate optimism, and appreciation of ambiguity and paradox among others (Table 1).5

The attributes of emotional competence are interrelated and build on one another. For example, an individual must be self-aware to appreciate the limit of his or her given knowledge of a subject. The individual must exhibit humility and appreciation of knowledge to seek out other resources on the subject.
The individual must then display openness and appreciate ambiguity with the information discovered. Finally, as the information is shared with colleagues, passionate optimism and compassion are required to convey the intended message effectively.

Emotional Competence in the CNS Role

The importance of emotional competence in health care leadership must be fully appreciated for organizations to thrive in its current changing landscape. For example, emotional intelligence has been correlated with positive individual, nurse leader, and organizational outcomes.6-14 Person-specific emotional intelligence outcomes include increased job satisfaction, increased work engagement, increased retention, and reduced burnout.6-8 In clinical practice, collective emotional intelligence has been associated with improved organizational performance on nursing-sensitive indicators, including decreased infections, falls, and improved pressure ulcer screening.9 In nursing leaders, emotional intelligence has a positive effect on quality of care, teamwork, nurse satisfaction, turnover, and burnout.10-14 When leaders possess high emotional intelligence, outcomes for patients, nurses, and organizations may improve.

Emotional competence is a fundamental prerequisite to actualizing the CNS core competencies including consultation, systems leadership, collaboration, and coaching. For example, in systems leadership, the CNS is tasked with using “effective strategies for changing clinician and team behavior to encourage adoption of evidence-based practices and innovations in care delivery.”13(p20) To successfully facilitate teams and lead change, the CNS must have emotional awareness of the group dynamics to optimize contribution of all team members while navigating any potential controversy. In the authors’ experience, emotional competence is vital to create effective and collaborative relationships with all members of the health care team.

CNSs are in a unique leadership position to create a healthy work environment, which can be accomplished through emotional competence.16 The healthy work environment (HWE) standards are evidence-based strategies for creating an atmosphere that supports excellent nursing practice and patient outcomes.17 The authors propose that emotional competence is critical to actualizing several of the HWE standards, including skilled communication, authentic leadership, true collaboration, and meaningful recognition. For example, in the skilled communication domain of the HWE standards, skilled communicators must focus on finding solutions and hearing relevant perspectives, which aligns with the emotional competence attributes of appreciation of knowledge and openness. Furthermore, the CNS can contribute to an HWE through leading by example. An emotionally competent CNS is in a position to assess the emotional competence of others and offer strategies for development.

The journey to emotional competence involves critical self-appraisal and an assessment of current level of performance before learning and growing in capability. In an effort to assist CNSs in developing and realizing emotional competence, 3 attributes will be highlighted, with key questions to assess one’s current state and strategies for expanding emotional competence.

**Table 1: Emotional Competence Attributes**

<table>
<thead>
<tr>
<th>Attribute</th>
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<tbody>
<tr>
<td>Self-awareness</td>
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<tr>
<td>Humility</td>
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<tr>
<td>Resiliency</td>
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<tr>
<td>Passionate optimism</td>
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<tr>
<td>Appreciation of ambiguity and paradox</td>
</tr>
<tr>
<td>Appreciation of knowledge</td>
</tr>
<tr>
<td>Mindfulness</td>
</tr>
<tr>
<td>Openness</td>
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<tr>
<td>Impulse control</td>
</tr>
<tr>
<td>Willpower</td>
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<tr>
<td>Compassion</td>
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*a Based on information from Porter-O’Grady and Malloch.*5

The journey to emotional competence involves critical self-appraisal and an assessment of current level of performance before learning and growing in capability. In an effort to assist CNSs in developing and realizing emotional competence, 3 attributes will be highlighted, with key questions to assess one’s current state and strategies for expanding emotional competence.

**Self-awareness**

Emotional competence and success in the CNS role build on a foundation of self-awareness. In order to understand and relate effectively to those within their spheres of influence, successful CNSs must first take the time to thoughtfully examine their personal experiences and further delve into the emotions surrounding them, acknowledging their impact.18 The ability to honestly feel and admit one’s own emotions allows an individual with emotional competence to separate the emotions from the event, assisting the CNS to navigate emotionally charged situations successfully, and also leads to the
ability to sense and anticipate how a situation may affect others. This ability is the basis of empathy and an important attribute of an effective collaborator and consultant. Only with an accurate assessment of self can an individual act decisively and with authenticity. The questions in Table 2 may be used to prompt self-assessment and gauge an individual’s level of self-awareness.

The development of self-awareness as a strategy to succeed in the CNS role is affected largely by the practice of reflection. Reflection on practice or reflective learning is a method based on educator and philosopher John Dewey’s practice of purposeful and careful consideration of beliefs and knowledge. Current literature recommends reflective learning for practicing nurses and nursing leaders for its effectiveness in promoting thoughtful practice. Fruitful reflection involves thinking about the experience and allowing the identification of emotions, motivations, and intentions, which may then lead to the uncovering of deeply held beliefs and values. Analysis and synthesis of situations and perspectives then assists a self-aware leader in uncovering strengths and limitations, with appreciation for the experiences and emotions of others.

To engage in reflection and thus grow in self-awareness, it is helpful to use a structure or model. The model in Figure 1 may be used to guide the CNS when examining a situation or experience. For example, in consulting on a challenging situation involving a patient, a CNS may find himself or herself assuming direct patient care without including the bedside nurse. A confrontation may occur or there may be unspoken resentment from nursing staff. In reflecting on the event and examining what occurred in comparison to what the standards define, a self-aware CNS may recognize a desire to feel clinically relevant and demonstrate skills and knowledge that made the clinical staff feel excluded or dismissed.

Reflection allows an honest appraisal of the self and the emotions and motivations involved, and it ideally results in a changed perspective. With an accurate awareness of self, a CNS offers honesty and authenticity to others. Honesty fosters humility, another important attribute of emotional competence.5

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<table>
<thead>
<tr>
<th>Table 2: Emotional Competence Self-Assessment Questions</th>
<th>Implications of Self-Assessment Answers</th>
</tr>
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<tbody>
<tr>
<td><strong>Self-Awareness</strong></td>
<td>Recognition of how emotions can drive thoughts and actions.</td>
</tr>
<tr>
<td>How does my mood affect my performance at work?</td>
<td>Once recognized, emotions and mood can be controlled.</td>
</tr>
<tr>
<td>What situations have the potential to make me very angry at work?</td>
<td>When emotionally competent leaders understand themselves, it allows them to anticipate what will work for others.</td>
</tr>
<tr>
<td>What are my strengths? Weaknesses? Blind spots?</td>
<td></td>
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<tr>
<td><strong>Humility</strong></td>
<td>Emotional competence allows leaders to maintain focus on the organization.</td>
</tr>
<tr>
<td>How quickly do I ask for help with a project?</td>
<td>Leaders with emotional competence realize that continued growth is possible only with a constant flow of new information.</td>
</tr>
<tr>
<td>How easily and/or quickly can I admit when I do not know enough about a topic?</td>
<td>An organization’s collective wisdom is valued over individual talent.</td>
</tr>
<tr>
<td>How willing am I to learn from others?</td>
<td></td>
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<tr>
<td><strong>Resilience</strong></td>
<td>Feedback and sharing of ideas allows an organization to address disappointments as a whole not as individual failure.</td>
</tr>
<tr>
<td>Do I seek feedback when things don’t go as planned?</td>
<td>Emotionally competent leaders seek feedback as essential to growth.</td>
</tr>
<tr>
<td>Can I receive that feedback graciously, incorporating it into future initiatives?</td>
<td>Analysis of failures increases an organization’s capacity to minimize future errors.</td>
</tr>
<tr>
<td>Am I willing to fail when planning new projects or anticipating a practice change?</td>
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*a Based on information from Porter-O’Grady and Malloch.5*
Humility

Humility may bring to mind self-deprecation, or someone of little value; however, humility can be considered the epitome of self-confidence and a major contributor to success. With self-awareness and an accurate appraisal of knowledge, skills, and abilities, humble leaders do not feel the need to boast or demand recognition for their accomplishments. An accurate assessment of the self is one part of the definition of humility put forth by Smith. Other behaviors representative of humility are willingness to learn and showcasing the strengths of others. In the leadership of large and successful companies, personal humility also can take a company from good to great. The characteristics described by Collins include modesty, not aspiring for individual success, and when assigning the responsibility for poor results, never blaming other individuals or external factors, looking “in the mirror, not out the window.”

To assess one’s level of humility and ascertain any opportunity to cultivate this attribute of emotional competence, ask the questions in Table 2. The last question provides a key tactic to cultivate humility. It is an insatiable curiosity and constant seeking of new knowledge that activates the humility of a leader. Through reflection and the process used to develop self-awareness, honest leaders must admit there are things they don’t know. Admit these knowledge or skill deficits, and recognize their presence in others. Know when to defer or delegate to the gifted people surrounding you and welcome what they can teach you!

Persisting with the usual or comfortable patterns of problem solving and the “same way of doing things” stifles humility and hinders success. Leadership is not focused on being right, it is focused on doing the right thing, coupled with the ability to understand that other people may have greater insight about a situation. Doing so creates a CNS who is a good role model for safe nursing practice and a CNS on the path toward possessing emotional competence.

Resilience

As nurse leaders risk exposing their flaws or failures by exercising humility, another vital attribute of emotional competence is being developed. Resilience may be defined as the ability to move forward in a positive manner, adapting to adversity and maintaining equilibrium. Confronting adversity in a leadership role is often inevitable. However, emotional competence allows CNSs to maintain a sense of control over their environment, measuring their responses and exhibiting a strong sense of self even when facing difficulties. When working in the organizational sphere, barriers to optimal nursing practice or patient care may arise. Examples of barriers include medical resistance to adopting new evidence-based practices or the lack of usability of an electronic medical record. An emotionally competent CNS recognizes that questions and resistance may allow further beneficial developments in practice or that persistence in advocating for enhancements of electronic medical records can facilitate future workflow improvements.

The CNS actualizes the role in 3 spheres of influence: patient/client, nurse/nursing practice, and organizations/systems. The relationships fostered by a CNS within the spheres of influence benefit from the cultivation of resilience as resistance and disappointment may occur in the care of a patient, development of the nursing staff, or in working within a system. Again, as a role model, the nurse leader who exhibits resilience or hardiness helps the nursing staff to respond to challenges creatively and energetically. Resilience can also have a positive effect on organizational outcomes and patients’ experience. To self-assess the current state of one’s resilience,

Figure 1: Reflective learning model. Used with permission from Sharp Memorial Hospital, San Diego, California.
ask the questions in Table 2 and determine your current state of hardiness or buoyancy in the CNS role.

Fortunately, many of the practices explored in this article, especially reflection and self-assessment, will build resilience in the CNS on the journey to emotional competence. In addition to building and maintaining satisfying relationships with others for support through networking, a nurse leader who desires to become more resilient must practice self-acceptance, developed through mindfulness.29,30 Being mindful is being aware of the present moment and accepting it as it is.31 Mindfulness assists individuals in separating themselves from events and subsequent emotions. This separating assists the individual CNS to notice, yet not take personally, events or situations with patients, fellow nurses, or the organization. The practice of mindfulness has 5 steps (Table 3).32 With practice, responses can be measured and regulated without emotional outbursts or rumination that can hijack thoughts and decrease effective leadership.31

In the pursuit of emotional competence and the reward of authentic leadership, 3 attributes have been highlighted. In the journey to discover, develop, and deepen self-awareness, humility, and resilience, a CNS may hone the knowledge, skills, and attitudes of an essential leadership skill.

**Implications for Nurse Leaders:**

**Organizational Strategies for Fostering Emotional Competence in CNSs**

It is equally important to address the leader’s role in fostering emotional competence from an organizational perspective. Leaders within an organization determine the perspective. Leaders within an organization determine the vision and standards for emotional competence of team members. The authors propose that leaders can influence the level of team members’ emotional competence through hiring practices, ongoing competency assessment, and professional development activities, mentoring, and (when necessary) coaching or providing corrective action.

Practices for hiring CNSs include not only identifying minimum educational and experience requirements but also key desirable attributes related to emotional competence (Table 1). Once attributes are identified, questions may be developed to elicit responses, which assist interviewers in assessing the knowledge, skills, and attitude of a candidate. Bloom33 identified knowledge, skills, and attitude as the 3 domains or goals of learning. The attitude or affective domain addresses how individuals deal with events or experiences emotionally. Assessing all 3 domains (knowledge, skill level, and the emotional competence or attitude) is essential to have a complete picture of a candidate’s fit within an organization. Behaviorally based interview questions can assist the hiring team in screening candidates on the basis of their level of emotional competence (Table 4).5

Once a CNS is employed by the organization, it is important to continually evaluate his or her emotional competence. Competence in health care organizations is typically assessed upon hire and at least annually thereafter. Competency tools, which integrate the tenets

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<th>Table 3: 5 Steps to Mindfulnessa</th>
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<tbody>
<tr>
<td>1. Mindful breathing</td>
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<tr>
<td>2. Concentration</td>
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<tr>
<td>3. Awareness of your body</td>
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<tr>
<td>4. Releasing tension</td>
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<td>5. Walking meditation</td>
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*a Based on information from Hanh.32*

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<th>Table 4: Emotional Competence Behaviorally Based Interview Questionsa</th>
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<tr>
<td>Give an example of how you established trusting relationships with members of the health care team.</td>
</tr>
<tr>
<td>Give an example of a situation where you felt you needed to modify or change your behavior. How did you know? What did you do? What was the outcome?</td>
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<tr>
<td>Tell us about a time when you realized a conversation wasn’t going very well. What did you do? What was the outcome?</td>
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<tr>
<td>Tell us about a particular work-related setback you have faced. How did you deal with it? What was the outcome?</td>
</tr>
<tr>
<td>Talk about a situation where some of your team members disagreed with your ideas or approach. How did you handle the situation? What was the outcome?</td>
</tr>
<tr>
<td>Tell us about a change you have led or been involved in. What kind of resistance did you encounter and how did you manage it? Would you do anything differently?</td>
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*a Used with permission from Sharp Memorial Hospital, San Diego, California.*
of emotional competence, are useful to evaluate employee attributes and ongoing growth. An effective competency format incorporates all 3 domains of learning and ensures that emotional competence is evaluated. Figure 2 provides an excerpt of a competency used to assess the attitude (affective) domain of an emotional competence attribute. Integration of Benner’s novice to expert framework facilitates assessment of progressive growth of emotional competence.14

When an performance gap in emotional competence is identified, it is important for leaders to support employees to develop desired attributes. According to Daniel Goleman,15 emotional competence can be enhanced and starts with a personal commitment to change followed by an assessment of associated attributes or competencies. Many strategies exist for ongoing development of emotional competence and include engaging in reflective learning, enlisting a mentor, attending courses, reading books, and reviewing online content. If it becomes apparent that an employee is unable or unwilling to demonstrate or develop emotional competence, it is incumbent upon a nurse leader to jointly develop a remediation plan with the employee. The plan, with defined objectives, action steps, and completion dates, should include regular progress evaluation meetings with the employee and nurse leader. If the plan is ineffective, the nurse leader may use the corrective action process to remove the employee from the organization to maintain the integrity and functioning of the team.

Summary
The importance of emotional competence in the role of the CNS cannot be minimized. Emotional competence increases an individual’s job satisfaction and work engagement and decreases burnout.6-8 As CNSs lead and facilitate teams, emotional competence is required to achieve desired outcomes and create lasting change.9 Development of emotional competence, starting with self-assessment, therefore, is a worthwhile endeavor for achieving success in the CNS role. Furthermore, from an organizational perspective, interviewing for emotional competence by using behaviorally based questions is one tactic to ensure a good fit within the organization. As with ongoing competency development in nursing staff, using a leadership competency that includes

<table>
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<th>Attitude (Affective)</th>
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<tr>
<td>■ Affective skills to obtain information, understanding, or assistance; meet need of other</td>
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Novice Performance Criteria

- Notices different styles of communication
- Accepts the contributions of self and others to effective team function
- Focuses on being an effective team member
- Open to continually assessing and improving skills as team member and leader

Figure 2: Excerpt of a competency used to assess the attitude (affective) domain.
Used with permission from Sharp Memorial Hospital, San Diego, California.

the tenets of emotional competence also facilitates development of emotional competence in the newly hired CNS. In these ways, individuals and the organization in which they function can foster emotional competence and contribute to successful role implementation of the CNS.

REFERENCES


Creating a Healthy Workplace

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Department Editor

Shared Governance for a Healthy Work Environment in a Pediatric Cardiothoracic Intensive Care Unit

Nida Sulit Oriza, BSN
Victoria Winter, MSN
Flerida Imperial-Perez, MN

A healthy work environment (HWE) is a key component of affirming the role of nurses in promoting excellent outcomes for patients. In 2005, when the American Association of Critical-Care Nurses (AACN) implemented its HWE standards, a group of staff nurses from the cardiothoracic intensive care unit’s (CTICU’s) recruitment and retention committee collaborated with the leaders of the unit to implement the HWE standards. The impetus for adopting the HWE standards was the unit’s staff turnover rate, which was as high as 30%, requiring the hiring of 10 new nurses every year, a pace that was still not enough to keep up with the staff resignations. Moreover, the frequent use of agency nurses, overtime pay for regular staff, and the cost of training and orientation of new hires had a financial impact on the organization. The unit’s leaders believed that staff engagement was an important aspect of achieving an HWE. The unit’s philosophy for staff employment evolved into hiring for fit within the work values and culture. Consequently, a shared governance council was formed to provide a venue for and sustain staff engagement. This column describes using the HWE standards to implement a unit-based shared governance council.

Setting

The Heart Institute of Children’s Hospital of Los Angeles (CHLA) is a worldwide leader in the treatment of congenital or acquired heart disease in children. The Heart Institute includes a 24-bed CTICU, a 21-bed cardiovascular acute unit, 2 cardiac catheterization laboratories, an echocardiography laboratory, and ambulatory practice. The CTICU is often referred to as the “heart of the Heart Institute,” serving patients from 0 to 21 years of age. The unit provides care for medical and surgical cardiac patients and has a mean of 900 surgical admissions per year.

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Creating a Healthy Workplace

Shared Governance Council

Shared governance is a care system model based on professional values and ideals of autonomy, decision making, and participation. Nurses have the freedom to participate fully in the practice of nursing and in shaping their work environment. An HWE must meet 6 standards: skilled communication, true collaboration, effective decision making, appropriate staffing, meaningful recognition, and authentic leadership. These 6 attributes were used as the guiding principles in implementing the unit-based shared governance council.

Unit leaders and nursing staff worked together to transform the unit into an HWE, 1 standard at a time. A staff survey was developed with questions based on the 6 HWE standards. The staff response from the survey confirmed the unhealthy state of the work environment and served as a driving force in addressing and implementing changes in the workplace. An oversight group was developed to assist with this process, and it included nurses, unit nursing leaders, physicians, and respiratory care practitioners. The group developed a mission statement that served as a guide to implementing change and achieving the goal of providing excellent care to patients and their families.

A formalized shared governance structure was implemented in the CTICU to provide a venue for the CTICU staff to bring up clinical practice issues. A core group of staff nurses met with the clinical nurse specialist to develop a shared governance council model in alignment with the house-wide collaborative governance council model. The CTICU's shared governance council structure provides nurse-driven solutions to practice issues, evidence-based nursing care standards, and Lean measures of care delivery. It provides a forum where all staff can bring any concerns or questions related to patients. As concerns in current practice are identified, proposed changes are collaboratively developed, and strategies for implementation of the changes are discussed in the monthly meetings of the shared governance council. Every year, the shared governance committee selects goals for the year. For 2015, 3 main goals were identified.

Goal 1: Focus on Transforming Care at the Bedside

Objective: Develop Transformational Leaders or Staff Champions Who Can

Develop Evidence-Based Practice Standards. Staff champions developed standards of care for safe sleep, prevention of hospital-acquired pressure ulcers, and care of patients with the HeartWare ventricular assist device (HeartWare International Inc). After deliberations among council members, they assign the strength of the evidence using the evidence rating scale of the Johns Hopkins Nursing Evidence-Based Practice Model and Guidelines. Nurses are engaged in the review of current research and in the development of clinical guidelines to better align nursing practices with the best available scientific evidence. Working with the clinical nurse specialist and the rest of the CTICU nurses, the staff nurses are empowered to identify performance gaps with the goal of establishing interventions that are based on best evidence.

Goal 2: Engage in Interdisciplinary Interventions to Prevent Hospital-Acquired Complications

Objective: Achieve, Exceed, and Sustain Core Measure Targets. The unit-based interdisciplinary performance improvement committee defines and compares patient outcome measures with the Centers for Disease Control and Prevention, AACN Healthy Work Environment, and the Agency for Healthcare Research and Quality. Staff nurse champions work closely with the unit-based clinical nurse specialist and where applicable present and publish results of outcome measures studied. They continue to measure key patient outcomes, including hospital-acquired infections, addressing hand hygiene compliance, ventilator-associated pneumonia, catheter-related bloodstream infections (CR-BSIs), urinary tract and surgical site infections, reduction of medical errors, and improvement of hand-off communications. Different staff members are involved in implementation of processes for monitoring compliance and improvement of current practices.

One example of ongoing work is the implementation of evidence-based practices to decrease CR-BSIs that was started in 2005. The outcomes were presented at AACN's National Teaching Institute and Critical Care Exposition in 2009, in the poster titled “The Impact of Evidence-Based Practices in Reducing Catheter-Related Blood Stream Infections in a Pediatric CTICU.” Since then, CR-BSI
rates have ranged from 0 to 1.5 per 1000 catheter days; however, by July 2015, the CTICU had experienced an increase in CR-BSIs. The shared governance council engaged staff champions to address the current problem. The group used the fishbone diagram, also known as cause and effect analysis, introduced by Dr. Kaoru Ishikawa. The diagram is a graphic illustration of the relationship between the many potential causes and all factors that affect the increase in CR-BSIs. The staff champions assessed the knowledge and compliance of nursing staff and reviewed the quality of our current evidence-based practices. Key causes were prioritized and action plans were developed. The CTICU is currently in the implementation phase of the campaign to decrease the rate of CR-BSIs to zero. This program remains a collaborative effort between the nursing staff, nursing leaders, the physician group, and the hospital’s infection control department. We continue to monitor CR-BSI events closely, and for every confirmed infection, a root cause analysis is done and presented to the CTICU’s performance improvement committee and the staff for follow-up. More emphasis is placed on compliance with best practices and staff accountability.

**Goal 3: Focus on the Top 5 Problem List**

**Objective: Use “I” Reports as a Platform to Identify Measures to Improve Patient Safety.** From incident reports, the shared governance council can identify the top 5 problems related to patient safety in the unit. Staff members are encouraged to identify various staff champions and team members who will work on the problems identified. They work on finding solutions and identifying and presenting standards of care needed. Staff champions are currently working on standardization of parenteral and lipid infusions, interhospital transport guidelines, and a standard of care for pacier wires.

Magnet and Beacon Designations

CHLA is a Magnet-designated hospital and the CTICU is an AACN Gold Beacon awardee. In 2002, McClure and Hinshaw reported results of a national survey indicating that 55% of units surveyed had formalized shared governance structures, legitimizing nurses’ decision-making control over their professional practice. Magnet-designated facilities have shared governance as the most common structure reported. Involving nurses in effective decision making through the use of shared governance structures also meets a crucial requirement of the AACN Standards for HWE. Embracing the shared governance model has resulted in increased staff participation in identifying and presenting patient care issues, identifying ways to participate in finding solutions, attending meetings, and providing feedback. Participation and engagement of the staff nurses on the night shift in various unit projects has also increased. Various structures and processes are in place in the unit that support an HWE and are in line with the AACN HWE standards. Numerous initiatives spearheaded by the CTICU’s shared governance council are described in the next section.

**CTICU Projects Categorized by HWE Standard**

**True Collaboration and Effective Decision Making**

The shared governance council uses true collaboration and effective decision making, with every CTICU staff member contributing to the overall achievement of any given project. An example is the withdrawal prevention protocol, developed and instituted by a team of physicians, nurse practitioners, pharmacists, and bedside nurses. Implementation of this protocol resulted in a decrease in overall ICU days and length of hospital stay.

**True Collaboration and Skilled Communication**

Another example of true collaboration is the CTICU daily goal sheet (DGS). Following the implementation of nurse-led daily rounds, the DGS was developed by nursing staff champions, nurse leaders, and the CTICU’s medical team. Daily interdisciplinary rounds allow a real-time exchange of information, making the goals and plan of care clear to every member of the health care team. Before this work, communication between members of the health care team was suboptimal, but communication has improved with the use of the structured form. Use of the DGS was intended to close the loop of the team’s plan of care for the upcoming 24 hours. The aims of the project included (1) development of the DGS as a tool for communicating the daily plan of care among all of the child’s caregivers,
including consultants and team members who may not have been present during the daily rounds, (2) facilitating communication with team members on the night shift, and (3) encouraging and reminding nurses and physicians about timely interventions and alterations to the plan of care for changes in clinical status. The work group has used staff input through online surveys to revise the DGS to make it user-friendly and to increase awareness of the DGS. Through efforts such as these, the nursing staff has opportunities to influence decisions that affect the quality of patient care. Staff members feel that they are valued and committed partners in care.

In 2005, the CTICU had a 30% turnover rate. Lack of effective communication was identified as a unit problem. Reports of The Joint Commission on Accreditation of Health Care Organizations8 cited inadequate communication as the most frequent root cause of sentinel events. Skilled effective communication is the key to develop and ensure high-quality, patient-centered care while engaging and retaining staff. The CTICU uses multiple strategies to improve communication, teamwork, and patient safety.

Rounding for Outcomes. Developed by the unit nursing managers and the medical director, weekly rounding with staff for day and night shifts initiates discussions between staff and unit managers regarding patient safety issues and staff dissatisfiers. Feedback is solicited in relation to concerns with unit work flow, process improvement, and staff morale. Staff members are also given opportunities to identify what is positive and working well in the unit and recognize their coworkers who have made a difference in their work.

Unit Huddles. Unit huddles are started before each shift. Assignments are given to the incoming nurses, and the needs of the unit and patient throughput are also presented.

Situational Awareness. A charge nurse also leads a situational awareness session with the CTICU’s multidisciplinary team at the beginning of each shift. The charge nurse presents the unit census, availability of staff and beds for admissions, discharge/transfer plans to be approved, in-house patient transports for diagnostic imaging, and planned patient procedures such as sternum closure or balloon septostomy to be done at the bedside. Patients who may need closer monitoring to prevent a more critical event are also identified. These processes are examples of ways to improve communication and collaboration among the team members and facilitate efficient patient and unit work flow.

Appropriate Staffing

Inadequate staffing is “one of the most harmful threats to patient safety and the well-being of the nurses.”1 The CTICU provides care for patients with the highest mean acuity at CHLA. To meet this challenging demand, a highly skilled nursing staff is required. The AACN Staffing Blueprint: Constructing Your Staffing Solutions9 and the AACN Synergy Model for Patient Care10 provide resources for best practices that guide CTICU staffing. Patients’ outcomes are optimized when patients’ needs and nurses’ competencies are matched with one another. Staffing practices are designed to meet the needs of patients and their families, address the needs of the nursing work force, and promote the health and well-being of every staff member involved.1 The CTICU staffing guidelines updated in 2015 are based on the changing conditions of patients’ acuity; nurses’ skills, training, and experience; availability of support staff; and the physical layout of the unit.

The charge nurses continuously assess the work flow of the unit and consistently match patients to nurses to ensure safety and best outcome. They evaluate and obtain real-time updates that are based on changing patient acuity. The charge nurse collaborates with the CTICU’s attending physician and the bedside nurses to make adjustments in response to changes in patient acuity, as well as in the needs of patients’ families. The CTICU’s managers are available 24 hours a day for support and assistance with staffing demands.

Onboarding. One strategy used by the unit for recruitment and retention is the concept of onboarding. Onboarding is defined as a holistic approach that combines people, process, and technology to optimize the impact of a new hire to the organization. Onboarding requires more than just an orientation. It also requires long-term employee support and follow-up. New hires all have a bachelor of science degree in nursing. Schmalenberg and Kramer11 cited the reports of Aiken and Tourangeau that hospitals with lower mortality rates have higher percentages of nurses with bachelor’s degrees in nursing. The CTICU’s
managers have included staff bedside nurses in the interview process for potential nursing staff for early identification of the applicant’s core values, attitudes, and behavior in relation to the CTICU’s mission and its values. This process ensures early alignment and accountability of new nurses.

**Residency Program.** The CTICU has a staff-driven, preceptor-based residency program for new hires. The postorientation debriefing serves as a venue to discuss difficult situations and to have crucial conversations to develop trusting relationships. When problems are identified, strategies are discussed for resolution and resources are identified to assist the new staff member. Open communication is maintained throughout the onboarding process.

**Advancement Programs.** Another strategy to improve retention is the implementation of various advancement programs for CTICU nurses. Members of the CTICU’s education committee develop processes for recognizing nurses’ development from novice to expert in providing or influencing patient care. The CTICU’s pull-back program is a specialized unit-based continuing education program for staff who are within 2 years of hire. This program addresses concerns about knowledge gaps of novice nurses. An advancement resource nurse is assigned to new staff who recently completed their orientation, to support them in time management, prioritization skills, performance of CTICU standards of care, delegation, and documentation. Staff-driven, 8-hour heart conferences and symposiums, supported by the Heart Institute and held annually during the congenital heart disease month of February, are well attended by nursing staff and other disciplines. The symposium presents current innovations and strategies with regard to excellent care of patients with congenital and acquired heart disease. Highlights include a continuum of care including fetal diagnosis and surgical/medical interventions to discharge. Families are also invited to share the challenges of their journey as they deal with the care of their child. New technologies of care such as the Berlin Heart (Berlin Heart GmbH) and HeartWare ventricular assist devices are also presented. A road-to-leadership training program to prepare staff to take on informal leadership roles in the unit by developing the knowledge and skills required to meet leadership responsibilities is another advancement program provided to staff after they have 2 years of clinical experience in the unit. The curriculum includes more leadership concepts of emotional intelligence, servant leadership, and tools for effective communication and conflict resolution.

Our highly acute and fast-paced CTICU creates challenges that potentially impede the growth and development of staff at all levels of experience. We have an increase in novice nurses, diverse and individualized professional development needs, and some feelings of inadequate management support. Attention to the growth and development of each member of the nursing staff increases job satisfaction and is a predictor of the nurses’ intent to stay. Staff champions in collaboration with nursing managers developed color-coded professional development teams. Nurses are divided into 3 color-coded teams. One team is highlighted every 6 weeks of the current schedule. The nurses discuss with a specific manager their development needs and goals that can be addressed during the rotation. The goals can vary from more opportunities to care for higher acuity patients to advance their clinical growth or assigning them to serve as a preceptor, shift resource nurse, or team leader to advance their leadership skills. The goals are accessible to charge nurses, who can help provide the opportunities as they make assignments for the shift. This program facilitates open communication between management and staff. It also encourages the staff to be more accountable and empowered to reflect on their own professional and personal development. It offers development related to advanced critical thinking skills as the nurses are given higher acuity patient assignments and leadership opportunities. This nurse advancement program incorporates the 6 strategies of the AACN HWE, creating an environment of nurse empowerment. This program was presented to the Association of California Nurse Leaders (ACNL) in February 2015, titled “Promoting Staff Engagement and Professional Development Teams in CTICU.”

**Meaningful Recognition and Authentic Leadership**

Leaders in the unit are strong advocates for HWEs and they truly model the behavior they expect from the staff. These authentic leaders do what they can on a regular basis to support the staff and celebrate their successes. They give kudos to their staff when they have
done something that is worthy of meaningful recognition, and staff members feel supported as a result of this recognition.

Summary

Each member of the CTICU nursing team is committed to the principles of HWEs. The shared governance council has facilitated control of their nursing practice. Shared governance enables the CTICU nurses to use evidence-based practices to improve the quality of care they provide to patients and patients’ families. Team members are responsible and accountable for the shared decisions of the team. This arrangement affects patient care as well as patient/family and staff satisfaction. The CTICU has increased its recruitment and retention rate and decreased its turnover rate from 30% in 2005 to 5% in 2015. With progress and improvement, the challenge remains for all of the staff to be accountable as a team, sustaining the success of having an HWE in the pediatric CTICU.

REFERENCES

Family-centered care is an approach to medical care rooted in the belief that optimal health care outcomes are achieved when patients’ family members play an active role in providing emotional, social, and developmental support. Attention is shifted away from disease and toward the patient within the context of family and community. The family is recognized as the child’s primary source of strength and support. It is recognized that perspectives and information provided by families and their children are essential components of high-quality clinical decision making. Patients and their families are viewed as integral partners with the health care team.

Although the term was not coined then, family-centered care was the approach for infants born in the United States in the 1800s. Most infants were born at home with little involvement of physicians. Care was almost exclusively provided by the mother, with help from extended family members who were usually female. This approach changed in the 1900s, when Dr Martin Couney invented the incubator, which separated mothers from their infants. This era also marked the beginning of the separation of the neonate from its family. This separation continued into the 1930s as labor and delivery moved from the home into the hospital, owing to improved health outcomes brought about by medical inventions and infection control measures. Mother-infant care dramatically shifted from in-home and family-focused care to the hospital. Laboring women were separated from their family, and mothers were separated from their infants. Stricter regulations about family presence and participation in care caused physicians to become authorities, nurses to become gatekeepers, and families to become bystanders.

In the 1940s, the necessity to address the family’s need for proximity in the hospital was identified. It was not until the 1970s, however, that the family-centered care movement began. In 1993, the Institute for Patient- and Family-Centered Care was founded, and family-centered care concepts were introduced. Evidence from research revealed that better clinical outcomes could be achieved when the patient’s family was included in decision making. In 2001, the Institute of Medicine strongly recommended that health care delivery systems become patient-centered rather than disease- or clinician-centered. Treatment recommendations and decision making were to be tailored to the patient’s preferences and beliefs. In this model, patients and their families

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are to be kept informed and actively involved in decision making and self-management, patient care is coordinated and integrated across providers, delivery systems provide for the physical comfort and emotional support of the patient/family, providers have a clear understanding of the patient’s concept of illness and cultural beliefs, and providers understand and apply the principles of disease prevention and behavioral change appropriate for diverse populations.9

Currently, many neonatal intensive care units (NICUs) continue the practice of closing the unit to parents, siblings, and visitors during shift changes, report, medical rounds, admissions, emergencies and deaths. The rationale for this practice is to protect the privacy of the infants. Parents are often still asked to step out during medical procedures despite evidence that parental presence can reduce the child’s pain and parental anxiety.1 NICU culture is inconsistent within and among units. Parents report dissatisfaction with their opportunities for involvement, physician to parent communication, availability of information, and planning for the transition home.10

Impact on Unit Design and Culture

Family-centered care concepts have brought about many changes over the years. Unit designs for pediatric intensive care units (PICUs) and NICUs have changed from large open bays separated by curtains to single/private room designs. Unit design includes space for the patient and space designed with amenities for parents to be able to stay overnight in the patient’s room. This encourages parental participation in daily care such as feeding and presence at procedures. Parental presence and participation in caregiving builds parents’ confidence long before discharge.11-13 Having parents at the bedside decreases the child’s emotional distress, increases the child’s coping during procedures, and improves the child’s adjustment during the hospitalization, after hospitalization, and during recovery.1 Parental presence and participation in caregiving builds parents’ confidence long before discharge.11-13 Having parents at the bedside decreases the child’s emotional distress, increases the child’s coping during procedures, and improves the child’s adjustment during the hospitalization, after hospitalization, and during recovery.1 Parental presence and participation in caregiving builds parents’ confidence long before discharge.11-13 Having parents at the bedside decreases the child’s emotional distress, increases the child’s coping during procedures, and improves the child’s adjustment during the hospitalization, after hospitalization, and during recovery.1 Parental presence and participation in caregiving builds parents’ confidence long before discharge.11-13 Having parents at the bedside decreases the child’s emotional distress, increases the child’s coping during procedures, and improves the child’s adjustment during the hospitalization, after hospitalization, and during recovery.1 Parental presence and participation in caregiving builds parents’ confidence long before discharge.11-13 Having parents at the bedside decreases the child’s emotional distress, increases the child’s coping during procedures, and improves the child’s adjustment during the hospitalization, after hospitalization, and during recovery.1 Parental presence and participation in caregiving builds parents’ confidence long before discharge.11-13 Having parents at the bedside decreases the child’s emotional distress, increases the child’s coping during procedures, and improves the child’s adjustment during the hospitalization, after hospitalization, and during recovery.1 Parental presence and participation in caregiving builds parents’ confidence long before discharge.11-13 Having parents at the bedside decreases the child’s emotional distress, increases the child’s coping during procedures, and improves the child’s adjustment during the hospitalization, after hospitalization, and during recovery.1

Implementation of Kangaroo (Skin-to-Skin) Care and Lactation Support

Support for exclusive breastfeeding or the provision of breast milk has increased. Lactation support has improved with the hiring of lactation counselors and consultants in many hospitals. Kangaroo care (skin-to-skin) has been implemented as a means to help mothers maintain their milk supply. Skin-to-skin holding contributes to a parental sense of well-being, confidence, and competence while reducing stress.19 Skin-to-skin contact also decreases maternal postpartum depression and anxiety20,21 and increases maternal sensitivities, affectionate behaviors, and bonding.19,22 Fathers report decreased fear of holding and harming their infant when they are participating in skin-to-skin care.23

Parent and Family Education

Resources

The provision of education for parents increases their participation in discussion and decreases maternal stress.2,11,24 Education can also lead to more effective use of health care resources and improved follow-through with the collaborative discharge plan.3 Health information is now being provided via a variety of means such as hospital kiosks and websites with a consumer focus. Classes may include cardiopulmonary resuscitation, sudden infant death syndrome prevention/safe sleep, how to have a smoke-free home, and
car seat safety. Many hospitals have new NICU parents spend the night in a transition room before discharge.25

Family Support Resources
Support for parents comes in a variety of forms also. Families may be provided with books, scrapbooking materials, craft projects, or journals to fill the long days. Support may focus on specific populations such as children with congenital heart disease, spinal muscle atrophy, or prematurity. Families may now have a designated family support person to help them navigate the health care system.26

The role of the family support specialist is to decrease parental stress and increase parent-child interaction.1 Support groups or parent-to-parent support offers contact with other families who have or had a child in the NICU/ PICU. These supports have effectively adapted to or integrated the experience and can be a valuable source of information, advice, hope, and support.1,11,26,27 Active message boards with online communities offer an alternative to face-to-face support groups. Parents with peer support experience less state anxiety, less depression, and greater social support.28

Outcomes of Implementation of Family-Centered Care
When family-centered care is implemented, length of stay has decreased in many studies.13,24,29 thus decreasing health care costs.3 A significant reduction in nonurgent visits to the emergency department has also been reported.30 Parental satisfaction with overall care increased in many studies.26,31,32 Parents had an improved perception of the providers’ competence.33 Staff also benefit when family-centered care is implemented. Many studies report improved staff satisfaction as evidenced by more positive feelings about work,1 a decrease in the number of nursing vacancies,5(p14-15) improved job performance,1 and an increased ability to recruit and retain staff.26

Have we gained from implementing family-centered care in our intensive and acute-care pediatric environments? Looking back over 32 years, I say yes. The evidence also suggests that there is much to gain when patients, parents, and health care providers partner to restore health.

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Evaluation of Pain Assessment Tools in Patients Receiving Mechanical Ventilation

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ABSTRACT

Pain assessment poses a great challenge for clinicians in intensive care units. This descriptive study aimed to find the most reliable, sensitive, and valid tool for assessing pain. The researcher and a nurse simultaneously assessed 47 nonverbal patients receiving mechanical ventilation in the intensive care unit by using 3 tools: the Behavioral Pain Scale (BPS), the Critical-Care Pain Observation Tool (CPOT), and the adult Nonverbal Pain Scale (NVPS) before, during, and after turning and suctioning. All tools were found to be reliable and valid (Cronbach $\alpha=0.95$ for both the BPS and the CPOT, $\alpha=0.86$ for the NVPS), and all subscales of both the BPS and CPOT were highly sensitive for assessing pain ($P<.001$). The NVPS physiology ($P=.21$) and respiratory ($P=.16$) subscales were not sensitive for assessing pain. The BPS was the most reliable, valid, and sensitive tool, with the CPOT considered an appropriate alternative tool for assessing pain. The NVPS is not recommended because of its inconsistent psychometric properties.

Keywords: pain, pain assessment tools, turning, suctioning, BPS, CPOT, NVPS

Patients in critical care settings confront a variety of stressors that can cause pain and suffering. Many routine procedures, such as turning and tracheal suctioning, are known to cause pain in patients in intensive care units (ICUs). Furthermore, the pain experienced by critically ill patients can be complicated by many other factors, such as underlying disease, surgical interventions, wounds, invasive catheters, and endotracheal intubation. Inadequately treated pain in critically ill patients can lead to marked alterations in immunity and cardiovascular, neurological, and pulmonary function.

Unfortunately, pain assessment poses a great challenge for clinicians in ICUs. Communication barriers can exist owing to the complexity of patients’ conditions, as many ICU patients are either undergoing mechanical ventilation, heavily sedated, or cognitively impaired. Thus nonverbal pain assessment tools are needed. Much attention has been paid to the development of standardized pain assessment scales for critically ill patients; however, some of these tools show limitations and lack generalizability.

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Because inadequately managed pain can cause many adverse physiological effects and undesirable consequences, it is important to investigate the reliability and validity of the existing nonverbal pain assessment tools such as the Behavioral Pain Scale (BPS), the Adult Nonverbal Pain Scale (NVPS), and the Critical Care Pain Observation Tool (CPOT) in order to assess pain optimally in critically ill nonverbal patients.

**Setting and Design**

**Setting**

The study was conducted in the medical, surgical, and cardiac ICUs at King Fahd University Hospital in Al Khobar, Kingdom of Saudi Arabia. King Fahd University Hospital is one of the major health care centers in the Kingdom of Saudi Arabia with 600 beds. It includes 14 ICU beds with 6 beds and 1 isolation room each in the surgical and medical ICUs. The surgical ICU provides care to neurosurgical, trauma, and critically ill surgical patients. The medical ICU receives patients with respiratory disorders such as pneumonia, respiratory failure, and chronic obstructive pulmonary disease, as well as gastrointestinal and nontrauma neurological cases. The cardiac ICU is a 10-bed unit, providing care and monitoring for critically ill cardiac patients such as those with heart failure or coronary artery diseases and after open heart surgeries and percutaneous cardiac interventions.

The study was approved by the local committee of biomedical ethics at Dammam University and King Fahd University Hospital. Informed consent was obtained from each patient’s first-degree relatives during the hospital’s visiting hours.

**Design**

A descriptive research design was used for this study, and a convenience sample of ICU patients was recruited during a 3-month period, from January 2014 through March 2014. The sample included all patients undergoing mechanical ventilation who were unable to self-report pain, were more than 18 years old, and whose condition was hemodynamically stable. Patients receiving neuromuscular blockers and patients who were quadriplegic, exhibited brain death, or had conditions that mask behaviors or facial expressions were excluded from the study.

**Tools**

A data collection tool was designed to document demographic and medical data, including age; sex; medical diagnosis; score on the Ramsay Sedation Scale; score on the Glasgow Coma Scale (GCS); hemodynamic data; onset, duration, and setting of mechanical ventilation; analgesic and sedative agents; and score on the Acute Physiology and Chronic Health Evaluation II (APACHE II).

The reliability, validity, and sensitivity of 3 pain assessment tools (BPS, CPOT, and NVPS) were studied.

**BPS.** The BPS was developed by Payen et al to assess pain in patients who were sedated or receiving mechanical ventilation. The BPS contains 3 behavioral domains: Facial Expression, Upper Limb Movement, and Compliance With the Ventilator. Each domain is rated from 1 to 4. The minimum score is 3, indicating no pain, and the maximum is 12, indicating the worst pain. The Facial Expression domain was based on a study by Prkachin, who divided the painful facial expressions into 4 categories: brow lowering, orbit tightening, closing of the eyelids, and nose wrinkling/upper lip rising. The other domains were adopted from the COMFORT scale used to assess distressed children in the ICU.

**CPOT.** The CPOT was developed and validated by Gélinas et al. It has 4 subscales, each rated on a 3-point Likert scale from 0 to 2, with a total score ranging from 0 to 8. The subscales are Facial Expression, Body Movement, Muscle Tension, and Compliance With the Ventilator or Vocalization for Extubated Patients. Each domain of the CPOT has an operational definition to facilitate objective rating. Gélinas et al note that some subscales and their related descriptions were derived from previously established pain assessment tools such as the BPS and the COMFORT scale, whereas other indicators were established on the basis of a retrospective review of medical records, interviews, and focus groups with nurses and physicians to determine the most frequent pain indicators in critically ill patients.

**NVPS.** The NVPS was developed at Strong Memorial Hospital/University of Rochester, validated initially by Odhner et al and revised by Kabes et al. The scale was based on the Faces, Legs, Activity, Cry, Consolability (FLACC) scale after some behavioral indicators.
that are specific to children, such as cry and consolability, were eliminated.\textsuperscript{13} The NVPS consists of 3 behavioral and 2 physiological domains with specific descriptions and definitions. Published evidence regarding the process of selection of these domains is insufficient.\textsuperscript{14} The behavioral component consists of Face, Activity/movement, Guarding, and the physiological indicators include Physiology/vital signs and Respiratory. The physiological indicators are described as any change in the past 4 hours of more than 20 mm Hg in systolic blood pressure or more than 20 beats per minute in heart rate, and respiratory indicators as a change of more than 10 breaths per minute above baseline or a 5% decrease in oxygen saturation as measured by pulse oximetry.\textsuperscript{12}

Before the start of data collection, a teaching and training session was given individually to each primary ICU nurse who was responsible for each study patient. Twenty ICU nurses were involved during the study period. The duration of the teaching session was based on the individual nurse’s needs, with a mean duration of 30 minutes. Teaching strategies included oral discussion regarding the impact of pain on critical illness, description of the aim of the study, and explanation of the components of each pain assessment tool. The oral discussion was supported with figures of facial pain expression that were inspired from Prkachin and used by the authors of the BPS and the CPOT.\textsuperscript{6,7,9} Furthermore, the published figures for BPS by Chanques et al\textsuperscript{15} were used as supportive educational tools to clarify the other subscales of the BPS. The published guidelines for the CPOT with the facial figures in the study by Gélinas et al\textsuperscript{16} also were used during the teaching session. The operational definitions of the NVPS were explored in relation to the author’s description in the revalidated version of the scale.\textsuperscript{12} A trial of practical performance of pain assessment at rest by using the 3 assessment tools was included in the teaching session to clarify any knowledge defects that could affect the accuracy of the assessment.

Methods
Each patient was assessed for pain at 5 measurement points: at rest (baseline) before the first procedure, during suctioning, 20 minutes after suctioning, during turning, and 20 minutes after turning. Each patient was exposed only once to these 5 measurement points that included both turning and suctioning. Both nociceptive procedures were performed only if the patient’s care required them, with an interval of at least 30 minutes between them. The 3 pain assessment tools were continuously used throughout the 5 measurement points by both the researcher and the ICU bedside nurse simultaneously, without any communication between them. Both assessors had identical, but separate forms that contained the printed scales, with consistent use in the following order: NVPS, CPOT, and BPS. The hemodynamic data and analgesic or sedative agents used were recorded at each point of the assessment.

Statistics
SPSS version 19 (SPSS Inc) was used for data analysis of descriptive and inferential statistics. The reliability value ($r$) for each tool was obtained from the Pearson correlation test.\textsuperscript{17} The interclass correlation coefficient (ICC), defined as the $r$ value, was used to examine the reliability of the subscales of each tool in all measurement points across the 2 raters. Validity was established by calculating the Cronbach $\alpha$ to determine internal consistency. The Student $t$ test was used to examine the sensitivity of each pain assessment tool.\textsuperscript{18}

Each tool and its items were evaluated for responsiveness, which is manifested by the ability of the tool to respond to minor changes in the pain level over time. Responsiveness is calculated by the effect size coefficient; first find the difference between the mean score at rest and the score during the painful procedure, and then divide that difference by the standard deviation at rest. The effect size is considered small when it is less than 0.2, moderate when it is near 0.5, and large when it is more than 0.8.\textsuperscript{19} Principal-factor analysis was used to evaluate the scale dimension, by identifying the large contributing factors to overall pain scores.\textsuperscript{20} All results were considered significant when $P$ was less than .05 and highly significant when $P$ was less than .001.

Results
Demographics
Forty-seven patients from the medical, surgical, and coronary ICUs at King Fahd University Hospital who were receiving mechanical ventilation were recruited to the study. Most of the patients (49%) were recruited from the surgical ICU (Table 1). Patients assessed within
24 hours of intubation constituted 15% of the study sample, 21% of patients were assessed for pain during the first 24 to 48 hours, whereas 64% of patients were assessed more than 48 hours after mechanical ventilation was started.

With regard to the analgesic and sedative agents used in this study, it was noted that 19 patients (40%) were not receiving any sedative or analgesic agents; however, these 19 patients had a mean (SD) score on the GCS of 6.94 (2.09). A total of 28 patients (60%) were receiving a variety of agents that were administered as continuous infusions only, with most (40%) receiving a combination of fentanyl and midazolam infusions. The patients’ consciousness level (GCS scores) were from 3 to 11 with a mean (SD) score of 6.38 (2.6) on the GCS and a mean (SD) score of 4.77 (1.2) on the Ramsay Sedation Scale (Table 1). Unconscious patients who scored 5 to 6 on the Ramsay Sedation Scale constituted 64% of the study sample.

**Pain Assessment**

All 3 nonverbal pain assessment tools were adequately reliable and valid with both Cronbach α and r values greater than 0.85 (Table 2).

**BPS.** The sensitivity of the BPS to the presence of pain was established by a significant increase in the mean pain scores during suctioning and turning (P < .001). These significant differences in the scores indicate that the tool and its components are a valid instrument to measure pain. In addition, the BPS was adequately responsive to minor changes in pain level over the period of measurement points (Table 3). The ICC was excellent at rest across Facial Expression, Upper Limb Movement, and Compliance With the Ventilator with r values of 0.95, 0.92, and 0.90, respectively. Lowest agreement was found in the Facial Expression subscale during suctioning with an r value of 0.77; the r value for Upper Limb Movement was 0.85, and the r value for Compliance With the Ventilator was 0.80.

During the turning procedure, the ICC was 0.88 for the Facial Expression subscale, 0.94 for the Upper Limb Movement subscale, and 0.80 for the Compliance With the Ventilator subscale.

The correlation matrix of the BPS components was positively correlated at P less than .001. The principal contributing factor to pain was the Facial Expression subscale with an r of 0.84, while the Compliance With the Ventilator was the lowest contributing subscale (r = 0.70; Table 4).

**CPOT.** The CPOT and its subscales were highly sensitive (P < .001), with variable responsiveness to pain, ranging from moderate to large (Table 5), with a Cronbach α of 0.95, and an r value of 0.93. The interrater reliability (r value) at rest was 0.94 for Facial Expression, 0.99 for Body Movement, 0.74 for Muscle Tension, and 0.99 for Compliance With the Ventilator. During suctioning, the r values were 0.81 for Facial Expression, 0.92 for Body Movement, 0.47 for Muscle Tension, and 0.83 for Compliance With the Ventilator. During turning, the r values were 0.82 for Facial Expression, 0.98 for Body Movement, 0.69 for Muscle Tension, and 0.89 for...
Table 2: Comparison of the Psychometric Properties of 3 Pain Assessment Scales

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Behavioral Pain Scale</th>
<th>Critical-Care Pain Observation Tool</th>
<th>Nonverbal Pain Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability (r)</td>
<td>0.90</td>
<td>0.93</td>
<td>0.86</td>
</tr>
<tr>
<td>Validity (Cronbach α)</td>
<td>0.95</td>
<td>0.95</td>
<td>0.86</td>
</tr>
<tr>
<td>Interclass correlation coefficient</td>
<td>The lowest agreement in the Facial Expression subscale during suctioning (r=0.77)</td>
<td>Weak agreement in the Muscle Tension subscale: r=0.47 during suctioning and r=0.88 during turning</td>
<td>Lowest agreement in the facial expression subscale during suctioning (r=0.72)</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>P&lt;0.01</td>
<td>P&lt;0.01</td>
<td>P&lt;0.001 (total scale)</td>
</tr>
<tr>
<td>Comments</td>
<td>Large responsiveness during suctioning (r=1.20) and turning (r=1.87)</td>
<td>Large responsiveness during suctioning (r=1.37), moderate during turning (r=0.77)</td>
<td>Large responsiveness during suctioning (r=1.01) and turning (r=1.20)</td>
</tr>
<tr>
<td>Principal contributing factor</td>
<td>Facial Expression (r=0.84)</td>
<td>Facial Expression (r=0.80)</td>
<td>Facial Expression (r=0.87)</td>
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<td></td>
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<td></td>
<td>Very low contribution from the Physiology and Respiratory subscales (r=0.20-0.40)</td>
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<td></td>
<td></td>
<td>Inconsistent psychometric property of the Muscle Tension subscale</td>
<td>The Physiology and Respiratory subscales are weak, with inconsistent sensitivity and responsiveness across different measurement points</td>
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<td></td>
<td></td>
<td>Variable responsiveness across the tool's subscales</td>
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Table 3: Psychometric Properties of the Behavioral Pain Scale

<table>
<thead>
<tr>
<th>Behavioral Pain Scale</th>
<th>Change in Mean Scores From Rest to Suctioning, a Mean (SD)</th>
<th>Effect Size Coefficient</th>
<th>Change in Mean Scores From Rest to Turning, a Mean (SD)</th>
<th>Effect Size Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facial expression</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Researcher</td>
<td>1.68 (1.12)</td>
<td>1.50</td>
<td>1.27 (1.17)</td>
<td>2.30</td>
</tr>
<tr>
<td>ICU nurse</td>
<td>1.51 (1.10)</td>
<td>1.20</td>
<td>1.10 (1.20)</td>
<td>2.00</td>
</tr>
<tr>
<td>Upper limb movement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Researcher</td>
<td>0.53 (0.68)</td>
<td>0.64b</td>
<td>0.44 (0.68)</td>
<td>0.77b</td>
</tr>
<tr>
<td>ICU nurse</td>
<td>0.48 (0.62)</td>
<td>0.64</td>
<td>0.38 (0.61)</td>
<td>0.79b</td>
</tr>
<tr>
<td>Compliant with ventilator</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Researcher</td>
<td>0.85 (0.55)</td>
<td>0.56b</td>
<td>0.38 (0.61)</td>
<td>1.88</td>
</tr>
<tr>
<td>ICU nurse</td>
<td>0.78 (0.62)</td>
<td>0.47b</td>
<td>0.29 (0.65)</td>
<td>1.30</td>
</tr>
<tr>
<td>Total score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Researcher</td>
<td>3.08 (1.69)</td>
<td>1.20</td>
<td>1.97 (1.70)</td>
<td>1.87</td>
</tr>
<tr>
<td>ICU nurse</td>
<td>2.85 (1.74)</td>
<td>1.03</td>
<td>1.74 (1.81)</td>
<td>1.03</td>
</tr>
</tbody>
</table>

Abbreviation: ICU, intensive care unit.

a All changes highly significant, P<0.001.
b Moderate responsiveness.
Compliance With the Ventilator. The Muscle Tension subscale showed weak ICC during suctioning and lower agreement across other measurement points.

The Facial Expression subscale was the principal contributing factor to overall pain scores with a coefficient weight (r) of 0.80, and the Muscle Tension subscale was the least sensitive and lowest contributing factor to overall pain scores across all measurement points (r=0.65; Table 6).

NPVS. The psychometric properties of the NVPS subscales were variable. Inconsistent sensitivity and responsiveness were found in the Physiology and Respiratory subscales during turning and suctioning (Table 7). The Cronbach α and r values were 0.86, which is lower than the values for the other 2 tools. The ICC for all subscales ranged from 0.85 to 0.95 across all measurement points. The lowest ICC agreement was found in the Facial Expression subscale during suctioning, with an r value of 0.72. The principal contributing factor was the facial expression with an r value of 0.87. The Physiology and Respiratory subscales were inadequately contributing to pain scores (r=0.36) and correlated poorly with the principal contributing factor (Facial Expression), with r values of 0.05 and 0.01, respectively (Table 8).

When the psychometric properties of the 3 pain assessment tools were compared,
variations were noted when examining the subscales of each tool. The BPS and all its components were proven to be reliable, sensitive, and valid in assessing pain in our sample of nonverbal patients. The CPOT had a weak subscale (Muscle Tension) in terms of all psychometric properties. The NVPS had a lower extent of psychometric properties compared with the other pain assessment tools. There were 2 weak subscales (Physiology and Respiratory) of the NVPS in terms of all psychometric properties. Other subscales had moderate, variable responsiveness and ICCs across the 2 raters and across different measurement points (Table 2).

Discussion
In this study, evaluation of 3 nonverbal pain assessment tools (BPS, CPOT, and NPVS) was undertaken to determine the most sensitive, reliable, and valid tool for measuring pain in patients receiving mechanical ventilation.

Psychometric Properties of the BPS
The reliability and validity of the BPS were supported by excellent Cronbach α values

---

Table 6: Correlation Matrix of the Critical-Care Pain Observation Tool and the Principal Contributing Factor

<table>
<thead>
<tr>
<th>Critical-Care Pain Observation Tool Subscales</th>
<th>Facial Expression</th>
<th>Body Movement</th>
<th>Ventilator Synchrony</th>
<th>Muscle Tension</th>
<th>Correlation Coefficient (r)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facial expression</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>0.80</td>
</tr>
<tr>
<td>Body movement</td>
<td>0.51</td>
<td>1</td>
<td></td>
<td></td>
<td>0.76</td>
</tr>
<tr>
<td>Ventilator synchrony</td>
<td>0.44</td>
<td>0.46</td>
<td>1</td>
<td></td>
<td>0.75</td>
</tr>
<tr>
<td>Muscle tension</td>
<td>0.28</td>
<td>0.38</td>
<td>0.37</td>
<td>1</td>
<td>0.65</td>
</tr>
</tbody>
</table>

a All correlations are significant at P<.001.

Table 7: Psychometric Properties of the Nonverbal Pain Scale

<table>
<thead>
<tr>
<th>Nonverbal Pain Scale Subscales</th>
<th>Change in Mean Scores From Rest to Suctioning, Mean (SD)</th>
<th>Effect Size Coefficient</th>
<th>P</th>
<th>Change in Mean Scores From Rest to Turning, Mean (SD)</th>
<th>Effect Size Coefficient</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facial expression</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Researcher</td>
<td>1.10 (0.72)</td>
<td>1.36</td>
<td>&lt;.001</td>
<td>0.89 (0.78)</td>
<td>&lt;.001</td>
<td>1.68</td>
</tr>
<tr>
<td>ICU nurse</td>
<td>1.10 (0.69)</td>
<td>1.50</td>
<td>&lt;.001</td>
<td>0.85 (0.78)</td>
<td>&lt;.001</td>
<td>1.61</td>
</tr>
<tr>
<td>Activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Researcher</td>
<td>0.59 (0.68)</td>
<td>0.56a</td>
<td>&lt;.001</td>
<td>0.19 (0.39)</td>
<td>.002</td>
<td>0.83</td>
</tr>
<tr>
<td>ICU nurse</td>
<td>0.46 (0.74)</td>
<td>0.44a</td>
<td>&lt;.001</td>
<td>0.31 (0.78)</td>
<td>.008</td>
<td>0.65a</td>
</tr>
<tr>
<td>Guarding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Researcher</td>
<td>0.46 (0.58)</td>
<td>0.63a</td>
<td>&lt;.001</td>
<td>0.38 (0.53)</td>
<td>.000</td>
<td>0.78a</td>
</tr>
<tr>
<td>ICU nurse</td>
<td>0.42 (0.71)</td>
<td>0.56a</td>
<td>&lt;.001</td>
<td>0.31 (0.62)</td>
<td>.001</td>
<td>0.75a</td>
</tr>
<tr>
<td>Physiology</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Researcher</td>
<td>0.12 (0.44)</td>
<td>0.34a</td>
<td>.06</td>
<td>0.08 (0.45)</td>
<td>.21</td>
<td>0.50a</td>
</tr>
<tr>
<td>ICU nurse</td>
<td>0.17 (0.43)</td>
<td>0.40a</td>
<td>.10</td>
<td>0.12 (0.39)</td>
<td>.32</td>
<td>0.53a</td>
</tr>
<tr>
<td>Respiratory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Researcher</td>
<td>0.14 (0.51)</td>
<td>0.22b</td>
<td>.51</td>
<td>0.10 (0.51)</td>
<td>.17</td>
<td>0.40a</td>
</tr>
<tr>
<td>ICU nurse</td>
<td>0.14 (0.55)</td>
<td>0.21b</td>
<td>.07</td>
<td>0.08 (0.54)</td>
<td>.29</td>
<td>0.40a</td>
</tr>
<tr>
<td>Total score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Researcher</td>
<td>2.46 (1.36)</td>
<td>1.01</td>
<td>.001</td>
<td>1.93 (1.68)</td>
<td>.001</td>
<td>1.20</td>
</tr>
<tr>
<td>ICU nurse</td>
<td>2.17 (1.41)</td>
<td>0.94</td>
<td>.001</td>
<td>1.76 (1.64)</td>
<td>.001</td>
<td>1.15</td>
</tr>
</tbody>
</table>

Abbreviation: ICU, intensive care unit.
a Moderate responsiveness.
b Small responsiveness.
evaluated the CPOT in 96 patients receiving mechanical ventilation by assessing pain before, during, and after turning. They reported results similar to ours in terms of reliability and validity.

Unlike our results, Keane \(^3\) reported a low reliability value of the tool and low interrater reliability in a study of 21 patients after open heart surgery. This discrepancy could be due to the difference in sample size; limited patient characteristics because the study participants were only patients who had undergone heart surgery; and the study design, which included 3 assessment points: on arrival from the operating room, during mechanical ventilation, and after extubation. \(^3\)

Psychometric Properties of the NVPS

When examining the psychometric properties of the NVPS, the tool showed satisfactory validity and reliability, but to a lesser extent than the previous tools. The Physiology and Respiratory subscales showed poor psychometric properties, with weak contributions to the overall pain scores. Their described definitions were not achieved by most of the study patients during nociceptive procedures, even when other subscales were scored the maximum 2 out of 2. Additionally, these subscales were not sensitive for detecting pain, with narrow responsiveness. This observation has not been reported in any previous studies that validated the NVPS; however, Li et al\(^23\) argued that the descriptions in these subscales were not justified or supported by evidence that explained these changes in hemodynamic ranges.

Although the NVPS was sensitive and responsive, most subscales showed moderate to small effect size. This variable responsiveness could affect the utility of the tool for detecting changes in pain in different clinical settings.
Patients could experience severe pain before they become agitated, rigid, or exhibit vital sign changes as defined in the scale.

The work of Marmo and Fowler yielded similar findings when both the CPOT and NVPS were compared in 24 patients after open heart surgery. The NVPS was highly reliable with a Cronbach \( \alpha \) similar to the values obtained in our study. Vranic et al reported contrary results in a study evaluating the NVPS and CPOT in 66 neurosurgical patients. They reported low and weak interrater reliability of the NVPS scale. Although the NVPS showed statistically significant results in their study in terms of sensitivity, the internal consistency as indicated by Cronbach \( \alpha \) was weak to moderate.

Comparison of Psychometric Properties Among the 3 Pain Assessment Tools and Subscales

When examining the subscales of the BPS, all components were highly sensitive during both nociceptive procedures, making them valid behavioral indicators in pain assessment in nonverbal patients. The third component of the BPS, Compliance With the Ventilator, has similar descriptions in its parallel in the CPOT subscale labeled as Compliance With the Ventilator. In both tools, this subscale was less responsive among the 2 raters. The study by Payen et al yielded similar results; they found this subscale to have the smallest weight of contribution to pain scores. It is unknown whether the mode of ventilation affects the degree of responsiveness and contribution.

In our study, the Muscle Tension subscale of the CPOT was identified as the weakest component in terms of all psychometric properties. When comparing this scale with its parallel in the NVPS, labeled Guarding, the NVPS subscale also showed a lower degree of responsiveness but satisfactory agreement among raters. However, in both tools, this subscale contains a general description and common words such as tense, very tense, and rigid. Evaluation of this behavioral indicator implies a subjective property, and it is unknown how ICU nurses would define and quantify these terms. Marmo and Fowler also reported the same observation when comparing the CPOT and NVPS; however, they considered the operational definitions of the Muscle Tension subscale in the CPOT to be more specific and reliable than was Guarding in the NVPS.

When evaluating the 3 assessment tools that were used in our study, we found the BPS to be the most valid, reliable, and sensitive tool to be used appropriately in our ICUs, followed by the CPOT, which can be an alternative to the BPS because it showed excellent psychometric properties despite the presence of 1 weak subscale (Muscle Tension). The NVPS was a weaker tool than the BPS and CPOT in terms of all psychometric properties.

Systematic reviews of the nonverbal pain assessment tools have been published. Barr et al critically analyzed the pain, agitation, and delirium guidelines that were established by the Society of Critical Care Medicine and ranked these recommendations on the basis of the quality of the existing evidence. Those authors considered a scale as appropriate for clinical use when it has moderate to very good psychometric properties with a weighted score of more than 12 points. They concluded that both the CPOT and the BPS have moderate psychometric properties and that they are the most valid and reliable scales for pain assessment in variable ICU populations except in patients with brain injury and motor dysfunction. The NVPS was reported to have very low psychometric properties.

Clade systematically reviewed and evaluated all pain assessment tools including the BPS, CPOT, and NVPS and reported findings similar to our results. The BPS was identified as the most valid among other tools, as it was tested in mixed clinical settings. Clade further reported the CPOT as a promising tool in pain assessment. However, Clade argued that the author of the tool did not examine the factor analysis adequately to test the structure of the entire tool, that the studies undertaken to evaluate the NVPS were inadequate, and that the design used by the authors was generally weak.

Few reports of comparative studies that combine these 3 tools have been published. In a recent study, Chanques et al compared the BPS/BPS-NI (for nonintubated patients), the CPOT, and the NVPS. The psychometric properties of these tools were explored in terms of validity, interrater reliability, responsiveness, and feasibility during turning and endotracheal suctioning. The study involved 30 nonverbal medical ICU patients who were either delirious, sedated, or receiving mechanical ventilation. The BPS and CPOT were deemed as superior to the NVPS. Furthermore, the BPS
had higher responsiveness than did the CPOT, and the NVPS showed limited responsiveness. The BPS was reported as more feasible for use in clinical practice settings. However, the CPOT and the BPS were considered adequately applicable in both nonverbal intubated and nonintubated adults.1-4

Marmo and Fowler1 reported results similar to ours: when the CPOT and NVPS were compared, the CPOT showed higher agreement and higher psychometric properties. They concluded that the CPOT was more appropriate than the NVPS for assessing pain in nonverbal ICU patients.4

Limitations of the Study
The major limitation of the current study is the small sample size of ICU patients with multiple diagnoses. In addition, further data are needed to investigate the association between those pain scores and the doses of analgesic agents used in order to establish the optimal analgesic doses for appropriate pain management in this sample of ICU patients.

Conclusion and Recommendations
The BPS was the most valid and appropriate tool in pain assessment in nonverbal ICU patients, with the CPOT considered an appropriate alternative. The NVPS is not appropriate as a pain assessment tool because of its inconsistent psychometric properties. Routine procedures such as turning and suctioning were painful to all patients in this study, regardless of the presence of an analgesic infusion. Therefore, repetitive exposure to these painful procedures could expose patients to the complications of unrelieved pain. We recommend not excluding the possible presence of pain in those ICU patients who cannot self-report, especially in challenging patients with neurological disorders. Nurses are in the best position to assess patients’ behaviors during their ICU stay. Pain assessment and management are based on the principle of beneficence that entitles nurses to provide sensitive and empathetic care to patients who cannot verbalize their pain and needs. These principles cannot be attained without the use of a valid and reliable assessment tool. ICU nurses must be adequately educated and trained to assess pain using behavioral indicators in nonverbal patients by using recommended pain assessment tools. Further research is warranted to examine the BPS and CPOT in different clinical settings in a larger sample.

REFERENCES
Factors Related to Successful Transition to Practice for Acute Care Nurse Practitioners

Deborah L. Dillon, RN, DNP, ACNP-BC, CCRN, CHFN
Mary A. Dolansky, RN, PhD
Kathy Casey, RN, MSN
Carol Kelley, RN, PhD, CNP

ABSTRACT

The transition from student to acute care nurse practitioner (ACNP) has been recognized as a time of stress. The purpose of this descriptive, correlational-comparative design pilot study was to examine: (1) the relationships among personal resources, community resources, successful transition, and job retention; (2) the difference between ACNPs with 0 to 4 years and ACNPs with more than 4 years of prior experience as a registered nurse in an intensive care unit or emergency department; and (3) the skills/procedures that ACNPs found difficult to perform independently. Thirty-four participants were recruited from a social media site for nurse practitioners. Organizational support, communication, and leadership were the most important elements of successful transition into the ACNP role. This information can help ACNP faculty and hospital orientation/fellowship program educators to help ACNPs transition into their first position after graduation.

Keywords: acute care nurse practitioner, transition, practice, graduate nurse practitioner, academic, nurse practitioner fellowship

The demand for acute care nurse practitioners (ACNPs) has increased in the past several years. This demand has been created by an increase in hospitalized and critically ill patients as well as duty-hour restrictions for medical residents implemented by the Accreditation Council for Graduate Medical Education. It is vital that ACNPs working in hospital settings be supported as they transition into their new roles.

The Institute of Medicine’s report on the future of nursing recommends transition-to-practice residency programs to address health care workforce shortages. The Institute of Medicine suggests that healthcare organizations take actions to support nurses’ completion of a transition-to-practice program (nurse residency) after they have completed an advanced practice degree program or when they are transitioning into new clinical practice areas.
Hospital orientation or fellowship programs can benefit by targeting interventions to ensure successful transition. Although factors related to nurse practitioners’ transition to clinical practice have been identified, how the factors affect successful transition to practice for ACNPs has not been examined. The complexity of the acute care setting and the specific skills/procedures required by ACNPs make their transition factors unique.

Background
Schumacher and Meleis defined situational role transition as a change in role function and scope of practice. Shaping the new role involves a balance between role loss as a registered nurse and role expansion as a nurse practitioner. Furthermore, formal education of nurse practitioners is not sufficiently preparing new nurse practitioners to feel ready for practice. According to Hart and Macnee, recent nurse practitioner graduates (> 61% were family nurse practitioners) report that better clinical reasoning skills, ability to interpret electrocardiograms and other diagnostic tests, as well as having clinical faculty who were more experienced would improve their readiness to practice; however, only 1% of the nurse practitioners in this sample (n = 5) were ACNPs.

Role development and successful transition for nurse practitioners have been linked to mastering the 5 elements described in the literature, which include the development of self-confidence, patient safety, organizational support, professional satisfaction, and effective communication/leadership. The Meleis Transition Theory explains the process that is necessary to achieve a successful outcome as well as resources that influence the transition process (see Figure).

In the Meleis model, situational transition, which is experienced by the newly graduated nurse practitioner, is defined as a transition event. The nature of this transition event can include changes in identity, roles, relationships, abilities, and patterns of behavior. Personal and community resources affect successful transition.
Meleis defined global indicators for all successful transitions: (1) subjects’ well-being, (2) role mastery, and (3) well-being of relationships. The model for this particular study (adapted from the Meleis model) examined factors related to successful ACNP transition to practice. The study model corresponds to these indicators by identifying successful transition variables as (1) comfort/confidence, (2) patient safety, and (3) professional and job satisfaction (see Figure).

Description of the Problem
Few reports of graduate nurse practitioners' perception of the transition experience have been published; thus little is known about the factors related to successful transition for any nurse practitioner, including the ACNP. Barnes explored the relationship between experience as a registered nurse and the transition to the nurse practitioner role and found that prior nursing experience did not affect successful transition into practice. In an unpublished dissertation, Duke used hermeneutic phenomenology to examine the lived experience of new graduate nurse practitioners in a group of 12 nurse practitioners (adult, family, and acute care) with at least 1 year of hospital-based experience. She identified a transition period that ranged from 6 to 18 months and was most intense during the first 9 months of practice. Challenges encountered during this time frame included navigating and negotiating a new health care provider role, becoming integrated into a hospital system in what was a new role for the practitioner and often a new role for the system, learning how to function effectively as a NP while working to re-establish themselves as proficient clinicians with a newly expanded practice scope, building key relationships, and educating physicians, hospital leaders, clinical staff, patients and families about the NP role.

Registered Nurse Transition to Practice
The Casey-Fink Graduate Nurse Experience Survey has been used extensively to examine various factors that affected the transition from the student role to the registered nurse role. Consistent with Casey and colleagues, Newhouse et al also identified the new graduate experience as stressful with high turnover unless it was partnered with an internship. The importance of a preceptorship in developing a greater degree of perceived competence in development of clinical skills was examined by Kim. Casey et al reported that newly graduated nurses require consistent support and professional development during the first year of practice. The Casey-Fink Graduate Nurse Experience Survey was developed from themes identified from the literature that influenced the graduate nurse experience and included consistency of role socialization support, the quality of the clinical orientation, and the level of support from nursing leaders.

Purpose of the Study
The purpose of this descriptive, correlational-comparative design study was to identify (1) the relationships among personal resources (prior experience in intensive care unit [ICU]/emergency department [ED] and stressors) and community resources (organizational support and communication/leadership), a successful transition (comfort/confidence, patient safety, and professional job satisfaction), and job retention experienced by ACNPs within their first 6 months of employment; (2) the differences in personal and community resources, successful transition, and job retention between ACNPs with 0 to 4 years and ACNPs with more than 4 years of prior nursing experience in the ICU/ED; and (3) skills and procedures that new ACNPs found difficult to perform.

Tool Validation
No instrument is available in the literature to evaluate the factors related to successful ACNP transition, so the Casey-Fink Graduate Nurse Experience Survey was modified, with permission, to apply to the ACNP experience. The Casey-Fink Graduate NP Experience Survey was developed to evaluate the ACNP role transition experience. Specifically, the original instrument was modified to collect data on personal resources (prior nursing experience in the ICU/ED and stressors), community resources (organizational support and communication/leadership), and successful transition factors (comfort/confidence in performing both clinical and relational skills/
procedures, patient safety, professional and job satisfaction, and job retention). The skills or procedures in the modified instrument were adopted from those published by Kleinpell et al after a national survey.

After the modified survey was developed, 2 expert clinical faculty members and 5 ACNPs evaluated the instrument for content validity. A revised survey was pilot tested on 3 ACNPs for applicability.

**Methods**

**Design**

A descriptive, correlational-comparative design was used for this pilot study. Approval was obtained from the institutional review board at Case Western Reserve University and from the group administrator of the social media site used to recruit participants (www.linkedin.com/groups).

**Sample Characteristics**

The study included a convenience sample of 34 ACNPs who were members of an Acute Care Nurse Practitioner Network social media site. Respondents were eligible to participate if they met the following inclusion criteria:

1. Board-certified ACNP or adult-gerontology ACNP (AG-ACNP) with more than 6 months and less than 3 years of active practice in an ACNP or AG-ACNP role.
2. Member of the social media ACNP Network.

**Data Collection and Procedures**

Participants were recruited through an introductory cover letter on the ACNP Network’s social media site. They were informed of the purpose of the web survey, what participation entailed (completion of the Qualtrics survey), and the survey length (20 minutes). Respondents were asked to recall their first 6 months of employment as an ACNP when answering the survey questions. Voluntary consent was implied by the participant’s completion of the survey. Participants were assured that the data would be confidential and that no identifiers were linked to e-mail addresses or participants’ data.

**Instrument**

The Casey-Fink Graduate NP Experience Survey was used for data collection and to identify factors related to successful ACNP transition to practice. The survey consisted of 5 sections: (1) demographic information; (2) skills/procedure performance (drop-down list of 30 items); (3) subscales related to successful transition (comfort/confidence, patient safety, professional satisfaction, job retention); (4) subscales related to community resources (organizational support and communication/leadership); and (5) subscales related to personal resources (stressors and prior work experience as a nurse in the ICU/ED). All responses on subscales were added to calculate total scores for each subscale. Table 1 describes the concepts, gives example of items, and specifies the reliability and validity of the study variables.

**Statistical Analysis**

Statistical analyses were performed by using IBM Statistical Package for Social Sciences version 22 (IBM SPSS Inc). Survey items and demographics were summarized by using descriptive statistics. Bivariate correlations and nonparametric tests were used to examine the research questions.

**Results**

A description of the demographic variables is displayed in Table 2. The sample was predominantly white women between 41 and 50 years old. Fifteen states and Puerto Rico were represented. Most participants had a master of science degree in nursing. Eighty-two percent had more than 5 years of nursing experience, and 75% had more than 5 years of nursing experience in an ICU or ED. Most had an orientation that lasted 8 weeks or less. Twenty-nine percent of the respondents reported no orientation. Fifty-two percent of the respondents remained in their first position after graduation for less than 2 years. Forty-six percent of the respondents reported experiencing stress, with job performance and personal finances reported as the top 2 stressors.

The relationships among personal and community resources and successful transition and job retention are listed in Table 3. Statistically significant positive correlations were found among organizational support and comfort/confidence ($r=0.49; P<.01$), patient safety ($r=0.38; P<.05$), professional satisfaction ($r=0.72; P<.05$), and job satisfaction ($r=0.53; P<.01$). The relationship between communication/leadership was also
### Table 1: Reliability and Validity of Study Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Sample Items</th>
<th>No. of Items</th>
<th>Cronbach α</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Successful transition</strong></td>
<td></td>
<td><strong>Comfort/confidence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Perceptions of efficacy/ability to perform basic skills required of ACNP</td>
<td>I was able to identify goals and outcomes for patients I was confident in prescribing diagnostic interventions I was comfortable in prescribing pharmacologic interventions I was able to develop a plan of care using evidence-based guidelines</td>
<td>7</td>
<td>0.79</td>
</tr>
<tr>
<td><strong>Professional satisfaction</strong></td>
<td></td>
<td>I felt my work was exciting and challenging I felt satisfied with my chosen nursing profession I felt that the nurse practitioner/physician provided encouragement about my work</td>
<td>3</td>
<td>0.79</td>
</tr>
<tr>
<td><strong>Job retention</strong></td>
<td></td>
<td>I was prepared to complete my job responsibilities I felt supported by my nurse practitioner or physician preceptor</td>
<td>2</td>
<td>0.89</td>
</tr>
<tr>
<td><strong>Job satisfaction</strong></td>
<td></td>
<td>How satisfied were you with the following aspect of your job: salary, vacation, benefits, hours worked, weekends off per month, amount of responsibility, opportunities for career advancement, encouragement and feedback, on-call time, reimbursement for on-call time, and flexibility of hours</td>
<td>11</td>
<td>0.81</td>
</tr>
<tr>
<td><strong>Patient safety</strong></td>
<td></td>
<td>I was able to complete a history and physical in a timely manner (&lt;45 minutes) I felt overwhelmed by my patient care responsibilities and workload I felt I might harm a patient because of my lack of knowledge and experience I was comfortable formulating a differential diagnosis I had difficulty prioritizing differential diagnoses</td>
<td>5</td>
<td>0.79</td>
</tr>
<tr>
<td><strong>Personal and community resources</strong></td>
<td></td>
<td>Prior experience in intensive care unit or emergency department Employed as a registered nurse in an intensive care unit/emergency department</td>
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<td>NA</td>
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<tr>
<td><strong>Stressors</strong></td>
<td></td>
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<td>1</td>
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<tr>
<td><strong>Communication/leadership</strong></td>
<td></td>
<td>I felt comfortable communicating with physicians I felt comfortable communicating with patients and their families I felt comfortable making suggestions for changes in the medical plan of care</td>
<td>4</td>
<td>0.79</td>
</tr>
</tbody>
</table>

*Continued*
significant with comfort/confidence ($r=0.68; P<.01$), patient safety ($r=0.62; P<.01$), professional satisfaction ($r=0.44; P<.05$), and job satisfaction ($r=0.57; P<.01$). There was a significant negative correlation between communication/leadership and job retention ($r=-0.35; P<.05$; Table 3).

No significant differences were found between nurses with 0 to 4 years and nurses with more than 4 years of ICU/ED experience in the measures of personal and community resources, successful transition, and retention (Table 4). Of the 30 identified skills/procedures adopted from the survey results of Kleinpell et al, only 15 were selected by the respondents. The top 3 skills that were deemed most difficult to perform were cricothyrotomies, dictation or electronic medical record documentation of a history and physical, and billing and coding. Table 5 identifies the top 7 skills/procedures the participants found difficult to perform.

**Discussion**

The majority of the sample was more than 40 years old and had more than 4 years of nursing experience in the ICU/ED before becoming an ACNP. We found no differences between nurses with 0 to 4 years and nurses with more than 4 years of ICU/ED experience in relation to successful transition and retention. Contrary to the results of our study, Hart and Macnee identified that nurse practitioners with more prior experience as a nurse (mean, 11 years) felt more prepared in practice than those with little nursing experience. Consistent with our study, Barnes reported no relationship between prior nursing experience (mean, 13.8 years) and the transition to the nurse practitioner role. Previous nursing experience is important, considering that most ACNP programs require between 1 and 2 years of ICU/ED experience before acceptance, and this requirement may be related to our finding that only 8 ACNPs had less than 4 years of ICU/ED nursing experience. The low number of ACNPs with less than 4 years of ICU/ED nursing experience may have been responsible for the lack of a relationship between these variables.

The findings in our study are consistent with the Meleis model. Overall, the community resources of organizational support and communication/leadership were related to successful transition (comfort/confidence, patient safety, and professional and job satisfaction) for ACNPs during their first 6 months of practice. Support from the nurse practitioner/physician mentor and their availability for new situations and procedures was deemed important by the new ACNPs. Feedback about their work was important and helped the ACNPs to develop confidence in their assessment and diagnostic skills. Support from families and friends during this time frame was also important, consistent with findings identified by Heitz et al in their study of nurses’ transition into practice. New ACNPs felt supported in their position by their mentors, in contrast to new nurses, who voiced concerns about peer and preceptor relations and communication with physicians. This difference in relationships may be related to the ACNP being perceived on more of a peer level as well as the
difference between a preceptor and a mentor. Consistent with the Casey-Fink Graduate Nurse Experience Survey, nurse practitioners also identified the importance of organizational support.21

No relationships were found between personal resources and successful transition. This may be representative of the high percentage of prior nursing experience in the ICU/ED in this sample. Although stressors (eg, job performance and finance) were identified, they did not seem to affect successful transition and job retention. This finding was consistent with the findings of Barnes20 that organizational factors were more important than personal factors in the successful transition of nurse practitioners.

Responses to the skills/procedures items revealed a lack of comfort in performing cricothyrotomies, dictation or electronic medical record documentation of a history and physical, and billing and coding. Cricothyrotomy is not a commonly performed procedure, which would correlate with a lack of comfort in performing. The ACNP skills survey31 lists cricothyrotomy as a required skill, so including cricothyrotomy in a simulation portion of an ACNP program would improve comfort for a new ACNP. Although the new ACNPs felt comfortable collecting a medical history and doing so in a timely manner (< 45 minutes), they were less comfortable in their ability to translate or organize this information into the required documentation. Continued exposure to the skill of organizing history and findings on physical examination and dictating/documenting in electronic medical records during the student ACNPs’ clinical practicums would improve this skill. Billing and coding were also identified as difficult skills. This information is similar to that found by Hart and Macnee7 in their study of predominantly family nurse practitioners. The inclusion of billing and coding skills in ACNP programs is unknown; however, including billing and coding in the classroom training as well as incorporating it into the clinical practicum would most likely increase new ACNPs’ comfort with billing and coding.

Other findings of interest were that the mean duration of orientation was 8 weeks or less and that 29% of the respondents reported not having any orientation. It is not surprising that limited orientation would impact the transition process. This finding is

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>26 (79)</td>
</tr>
<tr>
<td>Male</td>
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<tr>
<td><strong>Ethnicity</strong></td>
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<tr>
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<tr>
<td>Black</td>
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<td>Hispanic</td>
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<tr>
<td>Asian</td>
<td>1 (3)</td>
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<tr>
<td><strong>Area of working specialty</strong></td>
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<tr>
<td>Intensive care unit/emergency department</td>
<td>13 (39)</td>
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<tr>
<td>Not in intensive care unit</td>
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<td>Master of science in nursing</td>
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<td>Doctorate in nursing practice</td>
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<td><strong>Nurse practitioner certification</strong></td>
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<td>American Nurses Credentialing Center</td>
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<tr>
<td>American Academy of Nurse Practitioners</td>
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<tr>
<td>American Association of Critical-Care Nurses</td>
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<td><strong>Retention</strong></td>
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<td>Still ongoing</td>
<td>14 (41)</td>
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<tr>
<td>0-6 months</td>
<td>5 (15)</td>
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<tr>
<td>7-12 months</td>
<td>2 (6)</td>
</tr>
<tr>
<td>13-18 months</td>
<td>6 (18)</td>
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<tr>
<td>19-24 months</td>
<td>7 (21)</td>
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<tr>
<td>Feelings of leaving your job within the first 6 months of employment</td>
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<tr>
<td>&lt; Once per month</td>
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<tr>
<td>Once per month</td>
<td>12 (36)</td>
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<td><strong>Age, years</strong></td>
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<td>20-30</td>
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<td>31-40</td>
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<td>41-50</td>
<td>14 (41)</td>
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<tr>
<td>51-60</td>
<td>3 (9)</td>
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<tr>
<td>&gt; 61</td>
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<tr>
<td><strong>Length of orientation</strong></td>
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<tr>
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<td>1 (3)</td>
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<tr>
<td>0 or &lt; 8 weeks</td>
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<tr>
<td>9-12 weeks</td>
<td>5 (15)</td>
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<tr>
<td>13-16 weeks</td>
<td>2 (6)</td>
</tr>
<tr>
<td>&gt; 24 weeks</td>
<td>1 (6)</td>
</tr>
<tr>
<td>Did not have one</td>
<td>10 (29)</td>
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<td><strong>Prior experience in intensive care unit/emergency department, years</strong></td>
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</tr>
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<td>0-4</td>
<td>8 (24)</td>
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<td>13 (38)</td>
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<td>10-14</td>
<td>7 (21)</td>
</tr>
<tr>
<td>15-20</td>
<td>6 (18)</td>
</tr>
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</table>

*Percentages may not total 100 because of rounding.
inconsistent with the literature recommendations for increased orientation/residency programs for ACNPs or all nurse practitioners. Of concern was that 52% of the respondents remained in their first position after graduation for less than 2 years. The reason for leaving their first position was not identified in the study.

Limitations

A study limitation was the small sample size; a larger number of participants may affect the study results. In addition, the participants were asked to recall the first 6 months of practice, and memory may have played a factor in their responses.
Future Research

Expanding the data collection method to include more settings may provide a more representative and larger sample of ACNPs as they transition to practice. Performing a comparative design study evaluating ACNPs at 6 and 12 months of practice would enable evaluation of changes over time in the studied variables. Future research to evaluate strategies to enhance successful transition and retention is important as the demand for ACNPs in hospital settings increases. Facilitating the transition of the new ACNPs into competent health care providers by providing them with support and assistance in their practice environment is an important component of these strategies.

Conclusion

Successful role transition is determined by the extent to which individuals demonstrate mastery of the skills and behaviors needed to manage their new situations or environment.3 A successful transition of an ACNP into practice depends on an understanding of the community resources that are important for ACNP transition. The importance of organizational support, communication, and leadership during the transition was supported by the Modified Casey-Fink Graduate NP Experience Survey.

Hospitals that perform poorly in retention spend a mean of $3.6 million more than those with higher retention rates.31 Highly trained and specialized health care professionals are difficult and expensive to replace in any health care setting.3,31 Nurse practitioners’ turnover is costly and disruptive to continuity of patient care.35 It is vital that ACNPs working in acute care settings be supported as they transition into their new roles. Recommendations have been made to facilitate the transition of new ACNPs into competent health care providers by providing them with support and assistance in their practice environment.7 Bush stated that nurse executives have the opportunity to champion postgraduate NP training programs. Designing programs for recent NP graduates can help ensure adequate retention and job satisfaction of a rapidly growing and important segment of the clinical workforce.3,35,36

Postgraduate and fellowship training programs provide community resources such as organizational support, communication, and leadership, which the results of this study indicate are related to successful transition.

REFERENCES


Patient and Family Post–Intensive Care Syndrome

Symposium Editors

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- Introduction
- Implementing a Mobility Program to Minimize Post–Intensive Care Syndrome
- Developing a Diary Program to Minimize Patient and Family Post–Intensive Care Syndrome
- Peer Support as a Novel Strategy to Mitigate Post–Intensive Care Syndrome
For years it has been known that many patients who survive critical illness do not return to their original state of health, resulting in long-term consequences of critical illness. Weakness acquired in the intensive care unit (ICU) is a physical consequence occurring in 25% to 80% of patients who receive mechanical ventilation for more than 4 days and in 50% to 75% of patients with sepsis. Nearly all patients affected with ICU-acquired weakness have symptoms that persist years later. Issues with cognitive function occur in 30% to 80% of ICU survivors and include memory, planning, problem-solving, visual-spatial, and processing problems. Cognitive consequences may improve during the months after discharge. However, 25% of patients with adult respiratory distress syndrome (ARDS) have long-term persistent cognitive impairment 6 years after discharge. In several studies, survivors of severe sepsis who were more than 65 years of age still had cognitive impairment 8 years after hospital discharge. Anxiety, depression, and sleep disturbances can last from months to years. Survivors also experience posttraumatic stress disorder (PTSD) long-term, with an incidence between 10% and 50% and persisting for up to 8 years. Follow-up studies longer than 8 years have not been reported, and for some survivors, these consequences of critical illness may not resolve.

Together, these physical, cognitive, and mental changes may affect socioeconomic status and quality of life. Caregiving assistance is required by 50% of patients 1 year later, consisting of help with daily living activities and in some cases a need for full care. One year following discharge, 50% of ARDS survivors have not returned to work. One year after discharge, less than 10% of patients who required more than 4 days of mechanical ventilation are alive and independent.

Families of survivors and nonsurvivors can have difficulty coping with the ICU experience, encountering psychological and social consequences of exposure to critical illness. Anxiety is present in 10% to 75% of families, with symptoms of PTSD reported in 8% to 42% of families and in up to 50% of decedents or parents of critically ill children. At discharge, one-third of families are taking medications for depression or anxiety. As in ICU survivors, these psychological consequences may remain for many years. In families of decedents, complicated grief may occur.

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The authors declare no conflicts of interest.
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The Birth of Post–Intensive Care Syndrome and Post–Intensive Care Syndrome–Family

In 2010, the Society of Critical Care Medicine (SCCM) convened a task force to examine the long-term consequences of critical illness. This group of scientists and clinical experts gathered for a summit. The state of the science was reviewed for outcomes associated with critical illness for both patients and patients’ families. Participants agreed to refer to the new or worsening mental health, physical, and cognitive outcomes that linger past the ICU stay as post–intensive care syndrome or PICS. When those outcomes affect patients’ family members, an “F” is added and the term becomes PICS-F.

Raising Awareness

One of the major goals of the stakeholder conference was to identify and promote strategies to increase awareness of PICS and PICS-F outside the critical care health care community and among ICU survivors and their families. Attendees have given presentations to their peers, published in their journals, and begun initiatives toward this end. It became clear to us that a transfer out of the ICU should include a functional reconciliation to assess distance from baseline condition before hospitalization. This checklist would follow the patient’s progress through their postdischarge care and serve to inform caregivers of potential often-missed issues.

The SCCM THRIVE Initiative is a grant-funded project to test a program of peer-to-peer support to treat PICS and PICS-F. Demonstration projects are in progress. SCCM’s ICU Liberation Task Force is developing standard slide sets and work tools to inform clinicians about the efforts to reduce PICS through appropriate and minimal sedation, mobility programs, and delirium prevention and assessment. During a second summit, the ABCDE bundle, which addresses the PICS risk factors of delirium, immobility, sedation, and duration of mechanical ventilation, was endorsed as a method of minimizing PICS. The letters in ABCDE stand for airway (A), spontaneous breathing trials (B), care coordination and communication between disciplines (C), delirium assessment (D), and early mobility (E). An FGH was added to the ABCDE mnemonic to address issues with the family and transitions of care: family follow-up referrals and functional reconciliation (F), good handoff communication (G), and handout educational materials on PICS and PICS-F.

To promote awareness in patients and families, YouTube videos have been created by patients and their families to describe their experiences. We established a definition of PICS on Wikipedia and created a new PICS brochure for patients and their families that is available through the SCCM website.

This Issue: A PICS and PICS-F Primer

Even though the problem of PICS and PICS-F is clearly recognized, much more can be learned about effective interventions to minimize symptoms and conditions experienced by ICU survivors and their families. In this issue, we have invited authors to describe strategies they are exploring to improve outcomes. It should be recognized that the science supporting these strategies is young. However, in the absence of strong evidence, we have a duty to take action in the best interest of the health of our community given what is known today. To that end, this issue is designed as a primer to promote new ideas and programs targeted at improving care in and out of the ICU to prevent, recognize, and treat PICS and PICS-F.

We have asked each team of authors to provide replicable steps for starting new initiatives in care. They have also invited a survivor and/or family informant as coauthor to keep the focus on the real issues and values at the forefront of why practice needs to change. We learn most when we listen, and we hope that the guidance offered in these articles will provide a compelling impetus for change.

The details of implementing an early mobility program in the ICU are described by Ramona Hopkins and her team from Intermountain Medical Center in Utah. Mary McCarthy and her nursing colleagues from Madigan Army Base in Tacoma, Washington, describe their fledging diary program and the steps needed to implement diaries in the ICU. Diaries have been used in the Netherlands and Europe for more than 20 years with some promising results for both survivors and their families. Use of diary programs in the United States has not been reported before. Moving outside of the ICU, Huggins and colleagues discuss how to establish a post-ICU clinic to
help patients and families who are dealing with PICS and PICS-F. Finally, Mark Mikkelson, a leader from the SCCM THRIVE Initiative, describes one of the demonstration projects in progress to establish peer-to-peer support programs to help survivors and families after an ICU stay.

In addition to the articles in the symposium series, 2 of the regular columns in this issue also address the topic of PICS and PICS-F. In the Drug Update column, Joanna Stollings and colleagues discuss medication management options to ameliorate PICS. The ethics of PICS and PICS-F are explored through a historical case study in the Ethics column. It was originally planned that Jessica, an ICU survivor whose story is publicly available on video and in print,[16,17] would coauthor that manuscript. However, with much regret, we report that she died this year, presumably of complications of her ICU stay many years ago. We dedicate this issue to Jessica and all those who share their ICU experiences with us so that we can learn from them.

These articles will provide practical guidance on how to start programs like these in your own organization, measures of success for quality monitoring, and a list of potential research questions related to addressing the gap in evidence.

In conclusion, it is our goal through this issue not to raise awareness surrounding PICS and PICS-F, but to stimulate adoption of strategies to enhance family-centered care, to decrease the modifiable risk factors of PICS (immobility, oversedation, duration of mechanical ventilation, and delirium), and to study the effects of these strategies on outcomes. This is an important time for critical care nurses and nurse scientists. Interventions are being tested to address PICS and PICS-F, and further research is needed in all areas related to these potentially devastating syndromes.

REFERENCES

Implementing a Mobility Program to Minimize Post–Intensive Care Syndrome

Ramona O. Hopkins, RN, PhD
Lorie Mitchell, RN, MSN
George E. Thomsen, MD
Michele Schafer
Maggie Link, PT
Samuel M. Brown, MD, MS

ABSTRACT

Immobility in the intensive care unit (ICU) is associated with neuromuscular weakness, post–intensive care syndrome, functional limitations, and high costs. Early mobility–based rehabilitation in the ICU is feasible and safe. Mobility-based rehabilitation varied widely across 5 ICUs in 1 health care system, suggesting a need for continuous training and evaluation to maintain a strong mobility-based rehabilitation program. Early mobility–based rehabilitation shortens ICU and hospital stays, reduces delirium, and increases muscle strength and the ability to ambulate. Long-term effects include increased ability for self-care, faster return to independent functioning, improved physical function, and reduced hospital readmission and death. Factors that influence early mobility–based rehabilitation include having an interdisciplinary team; strong unit leadership; access to physical, occupational, and respiratory therapists; a culture focused on patient safety and quality improvement; a champion of early mobility; and a focus on measuring performance and outcomes. Keywords: early mobility, rehabilitation, intensive care unit, critical illness, post–intensive care syndrome

The old notion that the treatment of critical illness ends at discharge from the intensive care unit (ICU) is no longer sufficient. The large majority of adults treated in the ICU survive their critical illness, producing an expanding group of survivors. These survivors may have serious morbidities that are the aftereffects of both the critical illness and its treatment. These morbidities are associated with a substantial burden for patients, their families, and society.1,2 Specifically, post–intensive care syndrome (PICS),3,4 which includes physical, psychological, and cognitive impairments, develops in many ICU survivors.5,6 PICS can persist for years after a patient leaves the ICU, adversely affecting patients and their families.5,6 Many individuals do not return to work because of functional or cognitive impairments, have substantial ongoing medical problems that require...
expensive treatment, and often have substantial reductions in quality of life.12-14 Although most survivors are glad to be alive and grateful for the care of ICU clinicians, they are often eager for ways to improve their symptoms and disabilities.

A growing area of research is focused on patient-centered outcomes among survivors of critical illness.15 Preventing or treating PICS has become a substantial priority.16 Early mobility–based rehabilitation—a therapy that depends on ICU nurses, physical and respiratory therapists, and physicians for its success—has been a promising focus for efforts to improve PICS.17-22 The effect of critical illness on an individual’s overall function, quality of life, and reintegration into the home and work setting provides a strong justification for early mobility/acute rehabilitation and preventive measures, if they prove effective. Immobility in the ICU is associated with the need for extended nursing care or treatment in a rehabilitation facility and an inability to walk and complete activities of daily living.23,24 To date, exercise or mobility-based rehabilitation in the hospital has been reported to improve physical function for critically ill patients.18 As the evidence continues to accumulate, key questions arise regarding how to implement early mobility, how it is experienced by patients and their families, and what barriers must be overcome to create and sustain early mobility programs. Centrally, to what extent can early mobility programs developed in one clinical environment transfer successfully to another?

Evidence-Based Practice Project Plan

In this article, we review the effects of early mobility–based rehabilitation on ICU outcomes. We describe the experience in a respiratory ICU (RICU), where a care practice model for early mobility was developed and implemented. We then describe the experience with early mobility programs in 4 other ICUs in our corporation, exploring relevant similarities and differences regarding patient mobility among these ICUs. The experience of early mobility is described from the perspective of a patient (M.S.) who is a member of our ICU Patient-Family Advisory Council. Finally, we review the effect of early mobility–based rehabilitation on long-term outcomes and discuss factors that may affect early mobility–based rehabilitation.

Project Team

The project team included 2 intensivists involved in early mobility–based rehabilitation in the ICUs described, a nurse psychologist who studies ICU outcomes, the nurse manager of 1 of the ICUs, a physical therapist who works in one of the ICUs, and a patient who underwent early mobility during her critical illness.

Early Mobility and ICU Outcomes

Neuromuscular complications including ICU-acquired weakness are due, at least in part, to immobility in critically ill patients.7,25-28 The etiology of ICU-acquired weakness is unclear; risk factors include immobility, long duration of mechanical ventilation, high illness severity, hyperglycemia, and medications such as corticosteroids.29-31 Recent research has begun to establish an evidence base for early interventions to improve patients’ outcomes, including early mobility–based rehabilitation. In adult ICU populations, early mobility–based rehabilitation is safe and feasible17,19 and may improve PICS.14 Researchers in a number of studies have documented improvements in physical function with early mobility. Table 1 shows the effects of early mobility–based rehabilitation on important outcomes for patients: increased ability to stand, pivot, and bear weight,34 improved lower extremity muscle strength,40 and getting out of bed sooner.41,42 Although the studies mostly include small numbers of patients, a consistent trend is apparent in decreasing hospital length of stay (LOS), days of mechanical ventilation, and time to first out of bed with an increase in activity/ambulation. Early mobility increased the number of ventilator-free days34,32 and reduced hospital readmissions.38 Early mobility increases the number of people who ambulate, and not only do they ambulate, they ambulate sooner than other ICU patients and ambulate greater distances than do patients who do not participate in mobility-based rehabilitation.17,19,22,34,37

Studies33,34,37,38 have demonstrated that ambulation shortens both ICU and hospital LOS. Winkelman et al35 reported that use of an activity protocol reduced ICU LOS, suggesting that even brief episodes of low-intensity exercise may be sufficient to improve outcomes.
<table>
<thead>
<tr>
<th>Study</th>
<th>Study Design</th>
<th>Patients Studied</th>
<th>Sample Size</th>
<th>Outcomes</th>
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<td></td>
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<tr>
<td>Bailey et al, 2007</td>
<td>Prospective cohort study</td>
<td>Acute respiratory failure</td>
<td>103 Mobility</td>
<td>Ambulate &gt; 100 feet (30 m)</td>
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<td>Morris et al, 2008</td>
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<td>165 Mobility</td>
<td>Time to first out of bed ICU LOS</td>
<td>Out of bed at 5 days vs 11 days, ( P \leq .001 )</td>
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<td></td>
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<td>165 Usual care</td>
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<td>ICU LOS</td>
<td>Shorter ICU LOS 5.5 days vs 6.9 days, ( P = .02 )</td>
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<td>Hospital LOS</td>
<td>Shorter hospital LOS 11.2 days vs 14.5 days, ( P = .006 )</td>
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<td>Delirium duration</td>
<td>Decreased delirium duration 2.0 vs 4.0 days, ( P = .02 )</td>
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<td>Ventilator-free days</td>
<td>More ventilator-free days 23.5 vs 21.1 days, ( P = .05 )</td>
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<td>Global Mobility Score—IMOVE tool</td>
<td>No difference in ICU LOS, quadriceps force, or score on Berg Balance Scale</td>
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<td>ICU LOS</td>
<td>Reduced delirium duration 53 days vs 31 days, ( P = .003 )</td>
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<td>Hospital LOS</td>
<td>Decreased ICU LOS 7.0 days vs 4.9 days, ( P = .02 )</td>
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<td>ICU LOS</td>
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<td>Decrease in ICU LOS 4.0 days vs 3.46 days, ( P = .004 )</td>
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<td>Activities of daily living</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ICU LOS</td>
<td>Decreased ICU LOS 19.6 days vs 14.6 days, ( P = .03 )</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No difference in delirium, muscle strength, or activities of daily living</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patients Studied</th>
<th>Sample Size</th>
<th>Outcomes</th>
<th>Significant Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute respiratory failure</td>
<td>103 Mobility</td>
<td>Ambulate &gt; 100 feet (30 m)</td>
<td>69% of patients could ambulate &gt; 100 feet at hospital discharge</td>
</tr>
<tr>
<td>Acute respiratory failure</td>
<td>165 Mobility</td>
<td>Time to first out of bed ICU LOS</td>
<td>Out of bed at 5 days vs 11 days, ( P \leq .001 )</td>
</tr>
<tr>
<td>Acute respiratory failure</td>
<td>165 Usual care</td>
<td>ICU LOS</td>
<td>Shorter ICU LOS 5.5 days vs 6.9 days, ( P = .02 )</td>
</tr>
<tr>
<td>Acute respiratory failure</td>
<td>165 Usual care</td>
<td>Hospital LOS</td>
<td>Shorter hospital LOS 11.2 days vs 14.5 days, ( P = .006 )</td>
</tr>
<tr>
<td>Mechanical ventilation &lt;72 hours</td>
<td>49 Physical rehabilitation</td>
<td>Delirium duration Ventilator-free days</td>
<td>Decreased delirium duration 2.0 vs 4.0 days, ( P = .02 )</td>
</tr>
<tr>
<td>Mechanical ventilation &lt;72 hours</td>
<td>49 Physical rehabilitation</td>
<td>Delirium duration ICU LOS Hospital LOS</td>
<td>No difference in ICU LOS, quadriceps force, or score on Berg Balance Scale</td>
</tr>
<tr>
<td>Mechanical ventilation 4 days or more</td>
<td>27 Usual care</td>
<td>Delirium duration ICU LOS Hospital LOS</td>
<td>Reduced delirium duration 53 days vs 31 days, ( P = .003 )</td>
</tr>
<tr>
<td>Mechanical ventilation 4 days or more</td>
<td>27 Usual care</td>
<td>Delirium duration ICU LOS Hospital LOS</td>
<td>Decreased ICU LOS 7.0 days vs 4.9 days, ( P = .02 )</td>
</tr>
<tr>
<td>Mechanical ventilation 4 days or more</td>
<td>27 Usual care</td>
<td>Delirium duration ICU LOS Hospital LOS</td>
<td>Decreased hospital LOS 17.2 days vs 14.1 days, ( P = .03 )</td>
</tr>
<tr>
<td>Neurological ICU</td>
<td>166 Mobility</td>
<td>Global Mobility Score—IMOVE tool</td>
<td>Global mobility score 14.5 days vs 44.7, ( P &lt; .001 )</td>
</tr>
<tr>
<td>Neurological ICU</td>
<td>166 Mobility</td>
<td>ICU LOS</td>
<td>Decrease in ICU LOS 4.0 days vs 3.46 days, ( P = .004 )</td>
</tr>
<tr>
<td>Neurological ICU</td>
<td>166 Mobility</td>
<td>Hospital LOS</td>
<td>Decrease in hospital LOS 12 days vs 8.6 days, ( P = .01 )</td>
</tr>
<tr>
<td>Medical and surgical ICU</td>
<td>55 Exercise</td>
<td>Delirium Muscle strength Activities of daily living ICU LOS</td>
<td>Decreased ICU LOS 19.6 days vs 14.6 days, ( P = .03 )</td>
</tr>
</tbody>
</table>

Continued
### Table 1: Effects of Early Mobility or Rehabilitation on Outcomes in Critically Ill Patients (Continued)

<table>
<thead>
<tr>
<th>Study (Year)</th>
<th>Study Design</th>
<th>Patients Studied</th>
<th>Sample Size</th>
<th>Outcomes</th>
<th>Significant Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ICU Outcomes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dong et al, 2014</td>
<td>Randomized controlled trial</td>
<td>Mechanical ventilation &gt;48 hours</td>
<td>30 Rehabilitation 30 Controls</td>
<td>Time to first out of bed Duration of mechanical ventilation ICU LOS</td>
<td>Shorter time to first out of bed 3.8 days vs 7.3 days, P &lt; .001 Decreased duration of mechanical ventilation 5.6 days vs 12.7 days, P &lt; .005 Decreased ICU LOS 12.7 days vs 15.2 days, P = .01</td>
</tr>
<tr>
<td>Klein et al., 2015</td>
<td>Prospective pre-post cohort study</td>
<td>Neurological ICU</td>
<td>260 Usual care 377 Exercise</td>
<td>Pivot, bear weight, and ambulate ICU LOS Hospital LOS</td>
<td>Increase in ability to pivot, bear weight, and ambulate 21.2% vs 42.7%, P &lt; .001 Decreased ICU LOS 7.3 days vs 4.75 days, P &lt; .001 Decrease hospital LOS 15.16 days vs 10.21 days, P &lt; .001 More likely to be discharged home 25.8% vs 31.7%, P = .03</td>
</tr>
<tr>
<td><strong>Post-ICU Long-term Outcomes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schievekent et al., 2009</td>
<td>Prospective randomized controlled trial</td>
<td>Mechanical ventilation &lt;72 hours</td>
<td>49 Exercise 55 Controls</td>
<td>Hospital discharge: Independent functional status: ability to perform activities of daily living (bathing, dressing, eating, grooming, transferring from bed to chair, using the toilet) and walking independently</td>
<td>Independent functional status in exercise group 29 vs 19 patients, P = .02 Higher Barthel Index scores 75 vs 55, P = .05 Longer distance walked 33.5 (0-91.4) m vs 0 (0-30) m, P = .004</td>
</tr>
<tr>
<td>Burtin et al, 2009</td>
<td>Prospective randomized controlled trial</td>
<td>ICU</td>
<td>45 Bedside cycle ergometer 45 Controls</td>
<td>SF-36 Physical Function item score 6-minute walk test at hospital discharge</td>
<td>Higher SF-36 Physical Function scores 21 points vs 15 points, P = .01 Greater 6-minute walk distance 196 m vs 143 m, P = .05</td>
</tr>
</tbody>
</table>

*Continued*
In a pre/post quality improvement project to reduce sedation and delirium, and increase physical activity, investigators documented that ICU LOS decreased from 7.0 to 4.9 days ($P = .02$), and hospital LOS decreased from 17 to 14.1 days ($P = .03$) in the intervention group.

In another study, not only did the number of patients who were able to bear weight, pivot to a chair, or ambulate increase from 21% to 43% after early mobility–based rehabilitation was implemented, the ICU LOS was shortened from 7.4 to 4.7 days ($P < .001$) and the hospital LOS declined from 15.2 to 10.2 days ($P < .001$).

To mobilize patients successfully, routine attention to reducing sedation, improving sleep, and decreasing delirium is needed to facilitate mobility-based rehabilitation. Most ICU mobility or physical rehabilitation protocols aggressively reduce sedation through at-least daily sedation interruptions and/or changing the sedative medications used.

Evidence is accumulating of the short- and long-term benefits of reducing sedation, including decreased delirium in critically ill patients and increased ambulation.

Data in the past 15 years have shown that the brain-based morbidity including delirium and cognitive impairments is central to PICS. Several studies have shown that early mobility–based rehabilitation not only affects the body, but reduces delirium as well. In a landmark study, Schweickert et al found that an exercise program along with targeted sedation including daily sedation interruption decreased the duration of delirium from 4.0 to 2.0 days ($P = .02$) in patients receiving mechanical ventilation.

Needham et al similarly reported that delirium decreased from occurring in 53% of patients before the quality improvement project to occurring in 21% of patients ($P = .003$) after the physical rehabilitation intervention was implemented.

### Table 1: Effects of Early Mobility or Rehabilitation on Outcomes in Critically Ill Patients (Continued)

<table>
<thead>
<tr>
<th>Study</th>
<th>Study Design</th>
<th>Patients Studied</th>
<th>Sample Size</th>
<th>Outcomes</th>
<th>Significant Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morris et al, 2011</td>
<td>1-year follow-up of prospective cohort study</td>
<td>Acute respiratory failure</td>
<td>134 Mobility</td>
<td>Hospital readmission or death within 12 months</td>
<td>Lack of early mobility was predictive of hospital readmission or death, odds ratio 1.15 (1.77-3.01), $P = .04$</td>
</tr>
<tr>
<td>Brummel et al, 2014</td>
<td>Pilot randomized controlled trial</td>
<td>Medical and surgical ICU</td>
<td>22 Usual care</td>
<td>Cognitive function Activities of daily living</td>
<td>No difference between groups for cognitive or functional outcomes at 3-month follow-up</td>
</tr>
<tr>
<td>Klein et al, 2015</td>
<td>Prospective pre-post cohort study</td>
<td>Neurological ICU</td>
<td>260 Pre-intervention</td>
<td>Depression Anxiety Hostility</td>
<td>No difference in depression, anxiety, or hostility after covariate control</td>
</tr>
</tbody>
</table>

Abbreviations: ICU, intensive care unit; LOS, length of stay; SF-36, Short Form 36 Health Survey.
Implementation of Early Mobility in the ICU

Early Mobility Program in the Respiratory ICU

The RICU—where our early mobility protocol was first developed—was initially designed to provide protocol-driven care for patients with respiratory failure, with the intent to provide outstanding clinical care and to optimize post-ICU outcomes. A team approach was used to identify areas for quality improvement, which resulted in development and implementation of care process models including minimizing sedation and delirium reduction, daily spontaneous breathing trials coupled with explicit mechanical ventilation protocols, and early mobility–based rehabilitation. The team included bedside nurses, nurse practitioners, a physician, critical care technicians, physical therapists, and respiratory therapists. Pioneering early mobility–based rehabilitation and related interventions often requires a change in ICU culture. The fact that these care processes were developed in the RICU by a multidisciplinary team appeared central to our early success. This process for culture change included the following steps: (1) identification of the problem, (2) development of goals to address the problem, (3) identification of the steps to reach the goals, and (4) measurement of whether the goals were met. This approach engaged the entire clinical team, provided immediate and direct feedback on progress toward the goals, and allowed rapid changes in patient care processes.

The RICU early mobility protocol was developed and implemented in 2001 and 2002. The mobility protocol goal was to ambulate more than 100 feet (30 m) before ICU discharge. For patients not able to ambulate, activity consisted of standing at the bedside, sitting in a chair, sitting on the edge of the bed, or exercising in bed. Data from the RICU showed that early mobility–based rehabilitation was feasible and safe and improved patient-centered outcomes: on the last full day in the RICU, 69.4% of patients ambulated more than 100 feet and 8.2% of patients ambulated less than 100 feet (30 m). Disposition of patients was as follows: 63.5% discharged home or to a rehabilitation facility, 33.4% admitted to a skilled nursing facility or long-term acute care hospital, and 18% died before hospital discharge.

In a subsequent study, we found that the strongest single predictor of early mobility was the ICU environment that emphasized early mobility, more so than improvement in the patients’ physiology, as measured by scores on the Acute Physiology and Chronic Health Evaluation (APACHE) II or other indices. Further, when patients were discharged from the ICU and transferred to a medical/surgical unit, we observed a substantial decrease in mobility on the first day on the medical/surgical unit: 55% of patients who ambulated in the ICU did not ambulate the first day after transfer, even though they had a provider’s order for ambulation. This significant decrease in mobility while in the general care area was unexpected and suggested that a culture of mobility-based rehabilitation similar to that in the RICU was essential in ensuring that mobility was carried out every day. This finding is supported by a recent study that showed a decrease in ambulation after transfer to a general inpatient care area.

Early mobility–based rehabilitation in critically ill patients is intrinsically linked with the unique culture of each ICU, the beliefs of the clinicians, available financial resources, and formal institutional support. Even in several ICUs within 2 institutions in 1 health care system, there are profound differences in unit culture and the approach to early mobility–based rehabilitation.

Early Mobility–Based Rehabilitation in Other ICUs

Organizational changes allowed us to evaluate to a certain extent the influence of institutional culture in ICUs on early mobility in our institution. The hospital that housed the original RICU, a medical ICU (MICU), and the shock trauma ICU (STICU) became a secondary care facility when the corporation opened a new flagship hospital in a neighboring city in 2007. The RICU, thoracic ICU (TICU), and STICU at the original hospital moved to the new hospital, and only the mixed-profile general MICU remained at the original hospital.

With the move to the new hospital, the RICU became a mixed-profile acute ICU with a focus on patients with respiratory failure, and the STICU doubled in size with a focus on postoperative patients, septic shock, liver failure, and acute trauma. In parallel, the medical director of the RICU moved to the
TICU, an ICU that treats patients after cardiac, thoracic, or major vascular surgery and patients with cardiac mechanical support devices. We briefly describe the early mobility program in each of these ICUs in the following sections.

Mobility in the MICU. The MICU’s early mobility–based rehabilitation was enhanced following a geographic transition and subsequent personnel changes as several RICU clinicians remained at the MICU, including several champions of early mobility–based rehabilitation (primarily bedside nurses, critical care nurse practitioners, and the new medical director).23 The MICU’s early mobility program consists of a multidisciplinary team that includes nurses, advanced practice providers, physicians, respiratory therapists (RTs), physical therapists (PTs), and critical care technicians.

The MICU continues twice-daily ambulation while minimizing sedation. Mobility requires a provider’s order, as is the case in all ICUs in the corporation because some patients have contraindications for early mobility–based rehabilitation. Physical rehabilitation is focused on ambulation, but in patients who are not able to ambulate, attempts are made to sit on the edge of the bed or engage in exercises in bed (passive range of motion). Each mobility-based rehabilitation session requires a nurse, PT, RT, and critical care technician.17 In addition to the main mobility intervention during the day carried out with PT, MICU nursing staff rounds each evening to mobilize all patients except those with a contraindication, accomplished without a change in nurse staffing patterns. Currently, the culture of mobility within the corporation is strongest in the MICU. Table 2 compares early mobility–based rehabilitation in the various ICUs.

| Practice                              | RICU Original Hospital | RICU New Hospital | MICU       | STICU       | TICU
|--------------------------------------|------------------------|------------------|------------|-------------|------
| Provider orders required             | Yes                    | Yes              | Yes        | Yes         | Standing order postoperatively
| Consistent physician practice        | Yes                    | Clinician specific | Yes        | Clinician specific | Yes
| Mobility protocol                    | Mobility protocol      | Evaluate and treat | Mobility protocol | Evaluate and treat | Mobility protocol
| Frequency of rehabilitation          | Twice daily            | Twice daily      | Twice daily | Once or more daily | Twice daily
| Physical therapy staff               | 2 devoted PT/OT resources | PT covers 2 units | PT covers 2 units | PT covers 2 units | PT covers 2 units
| Nurses assist with mobility          | Yes                    | Yes              | Yes        | Yes         | Yes
| Mobility champion(s)                 | Has varied             | Has varied       | Has varied | Yes         | Yes

Abbreviations: MICU, medical intensive care unit; OT, occupational therapist; PT, physical therapist; RICU, respiratory intensive care unit; STICU, shock trauma intensive care unit; TICU, thoracic intensive care unit.
remained with the RICU; however, with changes in the physical therapy budget, these PTs now cover 2 units, the same as PTs in all the ICUs. For a number of years, early mobility–based rehabilitation continued with twice daily ambulation, until the 2 dedicated PTs and nurse manager retired and several other key personnel left the unit for other opportunities. Now, the goal for RICU is to mobilize each eligible patient at least once per day, with an effort to mobilize twice per day when staffing allows. The RICU continues to emphasize and champion early mobility.

**Mobility in the STICU.** The STICU moved to the new flagship hospital, including the large majority of clinical staff, and began to incorporate more postoperative patients along with sepsis and trauma patients. The STICU was slower to adopt early mobility than were the other ICUs, with implementation occurring primarily in 2008 and 2009. In the STICU, the nurses and the PTs are the primary drivers of mobility. More seasoned nurses have tended to advocate early mobility, but younger nurses with less experience have often been less supportive of early mobility–based rehabilitation. There is no standard approach among the physicians (eg, medical intensivists, trauma surgeons, vascular surgeons, and orthopedic surgeons), resulting in diversity in practice. In addition, residents, fellows, and advanced practice providers are often not as aware of early mobility, have less training and exposure to early mobility (which is not formally part of house staff training/orientation), and are therefore less likely to focus on mobility. Although some physicians evaluate and discuss mobility as a part of daily rounds, others do not.

The course of early mobility in the STICU has fluctuated over time and was the strongest when there was a nurse champion for early mobility. Although the goal is for ambulation twice daily, early mobility regressed somewhat because of the absence of a nurse champion in the STICU. As such, leaders recognized the need for more nurse champions and have identified 5 nurse champions who are currently receiving early mobility training. The charge nurse also rounds daily with the bedside nurse to ensure that appropriate activity is provided. If a PT is unavailable for early mobility, the bedside nurse has the responsibility to mobilize the patient with the assistance of other staff, including the charge nurse, RT, and critical care technician.

The STICU attending physicians developed exclusion criteria to guide nursing practice regarding patients’ mobility-based rehabilitation. Activity exclusion criteria include the following:

- Unstable or uncleared thoracic, lumbar, or cervical spine until unrestricted by physician
- Unstable pelvic fracture until unrestricted by physician
- Lower extremity fracture until unrestricted by physician
- Patient receiving any vasopressors unless unrestricted by physician
- Patient with a head injury and intracranial pressure monitoring or a score <9 on Glasgow Coma Scale unless unrestricted by physician
- Liver or spleen laceration or other potentially unstable intra-abdominal bleeding until unrestricted by physician
- Dialysis catheter/arterial sheath placed in femoral vein unless unrestricted by physician
- Fraction of inspired oxygen ≥ 0.7 or positive end-expiratory pressure ≥ 10 unless unrestricted by physician

Using this guide, more experienced nurses are able to educate and assist all nursing staff by identifying patients who are eligible for early mobility but are not receiving it. The current goal is for once-daily mobility/rehabilitation. Although PTs would like to support twice-daily mobility, they cover at least 1 other unit in addition to the STICU, which reduces their ability to support twice-daily treatments. A number of barriers remain, but the STICU continues to actively pursue early mobility/rehabilitation.

**Mobility in the TICU.** The TICU participated in early mobility endeavors subsequent to development of the early activity program in the RICU. A key source of this participation has been through nursing staff who worked in both units. The PTs in the TICU became involved in early mobility after the RICU published their results. The TICU uses the Intermountain Heart Institute Open Heart Rapid Recovery Activity Protocol, which is activated by a standing postoperative order for all heart surgery patients (Figure 1). Physician involvement occurs through
cross-coverage by critical care physicians on weekends. Additionally, one of us (G.T., prior medical director of the RICU), moved his primary practice location from the RICU to the TICU in 2007.

The TICU has internal programs that promote early activity and minimize sedation. Recently the Society of Thoracic Surgeons (STS) has made time to extubation after heart surgery a major quality metric. As a consequence, the TICU undergoes careful scrutiny of the postoperative respiratory management of cardiac surgery cases. To achieve rapid postoperative extubation, a coordinated team (nurses, physicians, advanced practice providers, PTs, and RTs) evaluates each patient with an emphasis on reducing sedation and promoting early mobility–based rehabilitation. This attention has resulted in increasing success with early extubation in postoperative cardiac surgery patients (Figure 2).

The TICU cares for postoperative cardiac patients who have respiratory complications and prolonged ICU courses. These patients’ respiratory care and sedation management are similar to those specified in the guidelines originally developed in the RICU. In the TICU, physical therapy with a focus on early ambulation is conducted twice daily with patients who meet activity criteria (Figure 1). The TICU PTs are trained in ambulating patients with a variety of mechanical devices, including ventilators (Figure 3), left ventricular assist devices, and total artificial heart consoles. For patients who are not able to ambulate, attempts are made to have them sit on the edge of the bed or exercise in bed.

Summary of Mobility in the ICU
In our review of these 5 ICUs, we found marked variability in mobility across 2 hospitals in 1 health care system. Although all units were engaged in mobility-based rehabilitation, there were differences in the frequency of rehabilitation, use of a mobility protocol, physician practice, and presence of a mobility champion. The variable penetration of mobility-based rehabilitation suggests that, like any practice (eg, hand washing), there needs to be a process of continuous training and evaluation in order to maintain best practices. The biggest differences between the ICUs are the culture, the leaders who support and emphasize early mobility, and the presence or absence of a mobility champion. Similar findings come...
from a recent study\textsuperscript{54} in which mobilization practices in 9 Scottish ICUs and 10 Australian ICUs were compared. Mobilization occurred in 40% of patients in Scottish ICUs and 60% of patients in Australian ICUs; however, fewer patients were receiving mechanical ventilation in the Australian ICUs (16.3%) than in the Scottish ICUs (41.1%). Barriers to early mobilization included sedation, endotracheal tube, and cardiovascular or respiratory instability, suggesting (not surprisingly) considerable variability in mobilization practices across ICUs in 2 countries.\textsuperscript{54} Even in 2 hospitals in the same city and health care system, mobilization varies markedly across ICUs.

**Effects of Early Mobility on Long-Term Outcomes**

Most research to date has focused on the effects of early activity programs on short-term outcomes. The effect of acute in-ICU mobility-based rehabilitation on long-term outcomes and functional independence is a growing field of research (Table 1). Morris et al\textsuperscript{38} reported that during the first year after ICU discharge,
lack of early exercise/mobility was a predictor of hospital readmission or death ($P = .04$) among ICU patients. Early exercise in the ICU improved patients’ abilities to complete activities of daily living (bathing, dressing, eating, grooming, transferring from bed to chair, and using the toilet) and increased the distances they were able to walk compared with a control group. similarly, in a study that used a bedside cycle ergometer, researchers found that patients in the intervention group walked an average of 53 m farther than patients in the control group. in only 3 studies did researchers assess the effects of early mobility–based rehabilitation on cognitive function, psychological outcomes, or quality of life in ICU survivors. Burtin et al reported that patients who participated in bedside cycle ergometry had higher scores on the Short Form 36 Health Survey (SF-36) Physical Functioning Scale than did patients in the control group. The Physical Functioning Scale is used to assess functioning in 10 mobility activities, such as walking specified distances, bending, stooping, kneeling, carrying groceries, and bathing or dressing. The patients’ quadriceps forces correlated with both walking performance and SF-36 Physical Function scores, suggesting that increased strength affects not only walking but the perception of physical function. Thus, improvements in physical strength were

![Image of a flowchart](https://example.com/image.png)

**Figure 1:** The Open Heart Rapid Recovery Activity Protocol used in the thoracic ICU (Continued).
reflected both in a task of physical function (longer distance walked on the 6-minute walk test) and in patients’ assessment of their functional abilities (SF-36 Physical Function scores).

Researchers in the other 2 studies assessed the effects of early mobility–based rehabilitation on 2 important components of PICS, cognitive impairment and psychological morbidities. In a pilot study by Brummel et al, 87 critically ill patients were randomized to usual care, once-daily physical therapy, or once-daily early physical therapy plus cognitive therapy that included orientation, attention, memory, and problem-solving tasks. At 3 months, the patients did not differ significantly in functional abilities or cognitive function. Another prospective pre-post cohort study of 637 neurological ICU patients showed that an early exercise program in the ICU did not reduce symptoms of depression or anxiety at ICU discharge. Some data indicate that physical exercise/activity improves cognitive function and decreases depression and anxiety in both healthy and non-ICU

Figure 2: Time from surgery to extubation for postoperative cardiac patients in the thoracic intensive care unit (ICU). The category “Time to extubation < 24 hours all patients” includes all patients regardless of whether their stay in the ICU was short or long (> 3 days). Most patients in the thoracic ICU have shorter ICU stays because they are primarily there after cardiac surgery.

Figure 3: A patient ambulating in the thoracic intensive care unit while intubated.
Additional research is needed to understand fully the effects of early mobility–based rehabilitation on the cognitive and psychological morbidities associated with PICS.

**Partnering With Families for Early Mobility**

Having a loved one in the ICU is difficult at best, as the ICU environment can be a threatening and disorienting place. Both the severity of illness and the invasive therapies can contribute to dehumanization and isolation for both patients and their families. Engagement of both patients and their families is increasingly recognized as a priority in contemporary critical care. Families can participate as members of the clinical team in representing the patient’s values and priorities and in direct participation in bedside care. Early mobility–based rehabilitation provides opportunities for family to participate in education about the need for and the benefits of mobilizing their loved one. When invited, family members are often happy to participate in care of their loved one. Family members could participate in early mobility–based rehabilitation in various ways, including providing information about their family member, supporting their family member, walking alongside, providing encouragement, communicating the importance of early mobility, assisting with passive and active range of motion exercises, and coaching their family members. Rukstele and Gagnon used the following steps to engage patients’ families in early mobility: inviting them to participate in early mobility, education (about PICS morbidities, showing them how to do mobility, and about the importance of the task), and supporting the families. Staff in The University of Michigan Health System’s surgical ICU used these 3 steps and reported that compliance with mobility increased from 64% to 99% during a 6-month period, suggesting the importance of including patients’ families. Our experience has been that patients’ families are excited to participate in early mobility, feeling like their loved one is making progress and that they are able to participate. Such participation, where families desire it, has become routine in all Intermountain ICUs.

**Patient’s Perspective**

One of the authors (M.S.) had a long stay for acute respiratory distress syndrome in the RICU and is now a member of the STICU Patient and Family Advisory Council. We report here her memories of the experience of early mobility in the recovery phase, which extended from several months in the RICU to 1 month in a long-term acute care hospital to a readmission to the TICU for a post-acute complication.

When you are in the ICU you lose all your dignity, and you are at the mercy of the hospital staff. I don’t remember most of the early months, as I was in a coma and intubated. By the time I was out of the coma, physical therapy was ordered. My hands and feet were so swollen that I basically had no feeling in them, making it difficult to stand. The physical therapist would come by once or twice a day. At first it was just dangling my legs on the side of the bed. When they would try to stand me up, I would sometimes lose control of my bowels, which frightened me. In addition, my oxygen levels would drop so low they would have to lay me down most of the time. Eventually they were able to get me into a chair, which was so uncomfortable. I couldn’t even sit upright in the chair. I just wasn’t strong enough. I was finally able to take a few steps, and the nurses and respiratory therapists would take me to the shower in a wheelchair. I walked a few steps and they would have the chair right behind me. The doctors on their visit would tell the staff to get me up today. I was glad to hear that the doctor wanted me to get up. The therapist’s approach really matters. One of the physical therapists was kind and would coach me and explain each step in getting up and walking. Another was more brusque and didn’t help me to feel motivated, so our treatments together didn’t really work...
well. The nurses would come by twice a day to try to help me get up and walk. It is so important to work as hard as you can and try to stand as soon as you can. Getting up in the RICU helped me be ready for rehabilitation at the long-term acute care hospital. Once I was in the long-term acute care hospital, I was totally committed to getting stronger again. I would even sign up for extra PT appointments if other patients couldn’t do them. I am so very grateful for all the staff in the RICU as well as the staff at the long-term acute care hospital.

### Overcoming Obstacles: Barriers to Early Mobilization

Changes in clinical care should be evidence based. Minimizing sedation, facilitating spontaneous breathing, delirium screening, and early mobility–based rehabilitation are safe and feasible, improve important patient-centered outcomes, and are practice priorities in adult ICUs. Data to date suggest that early mobility–based rehabilitation is associated with positive short- and long-term outcomes, supporting incorporation of early mobility–based rehabilitation as a standard of care in the ICU.

Consistent implementation of early mobility is influenced by a variety of factors such as low census with flex staffing (PTs have to cover more units, fewer nurses, etc), unit-level knowledge of early mobility, implementation of a mobility protocol, administrative support, and funding. Some of these issues can be addressed at the unit level (eg, education), whereas others will be outside the direct control of the unit (eg, funding for rehabilitation staff). A recent review of early rehabilitation in ICU survivors revealed that barriers to successful mobility–based rehabilitation included insufficient or lack of availability of physical and occupational therapy, physiological or neurological instability, and an ICU culture that did not support early mobility. For example, researchers in one study found that early mobility–based rehabilitation was not provided to critically ill patients more than 50% of the time because of a shortage of rehabilitation staff. Implementation of mandatory mobility orders and a mobility protocol increased mobilization from 22% before implementation to 82% after implementation ($P < .05$). Further, numerous studies support the important role that ICU culture plays in early mobility–based rehabilitation in critically ill patients.

### Factors Associated With Successful Practice Change

Care bundles and professional society endorsements may help with the culture change required to support early mobility. Programs such as the Society of Critical Care Medicine’s ABCDE bundle were designed to improve modifiable risk factors of adverse outcomes. The ABCDE bundle includes daily sedation awakening trials, breathing coordination, assessment, preventing delirium and implementing early mobility–based exercise/rehabilitation. As Clemmer noted, management of sedation, delirium, and sleep are interdependently necessary in order to mobilize patients. Implementing new practices, especially ones (eg, early mobility) that are diametrically opposed to old ones (eg, sedation and bed rest) can be a monumental task. Important and dramatic changes in clinical practice are exactly what the ABCDE bundle is designed to address.

A report of the ICU Clinical Impact Interest Group, who participated in implementation of the ABCDE bundle, stated that a multidisciplinary team was required to implement the ABCDE bundle. Factors that were associated with better implementation of the ABCDE bundle included (1) ICUs that had good organizational characteristics, including strong and stable ICU leadership and consistent staff for physical and respiratory therapy; (2) an ICU culture focused on patient safety and quality improvement; (3) ICUs that had a clinical champion focused on implementing early mobility; and (4) ICUs that used multimodal training for clinical staff during implementation of the ABCDE bundle.

A recent article listed 7 guiding principles for implementing new evidence-based practices, such as the ABCDE bundle. The principles include the following: (1) PICS-associated morbidities are modifiable, and modifiable causes and risk factors should be the focus of interventions; (2) invested interdisciplinary teams who use evidence and a team approach to improve care delivery are needed; (3) interdisciplinary teams should use bidirectional
feedback and good communication for successful change; (4) the evidence-based ABCDE bundle should become standard clinical care; (5) patients will wake up, breathe on their own, and participate in early mobility–based rehabilitation with implementation of the appropriate care processes; (6) measurement of goals and outcomes is necessary to track progress and identify areas in need of improvement or change; and (7) processes should be put in place to monitor sedation, delirium, breathing, and mobility-based rehabilitation. Without such practices, there is no way to assess improvement in mobility-based rehabilitation.\(^{71}\)

**Limitations and Questions for Further Research**

Although research on mobility and exercise-based rehabilitation in ICU populations is increasing, a number of important questions remain. The optimal timing of, protocol for, and dose of mobility-based rehabilitation is unknown. Research is needed to better understand barriers to implementation of mobility-based rehabilitation, including patient-related, environmental, and cultural barriers. Education of patients’ families regarding the benefits of early mobility–based rehabilitation is needed, as are efforts to ensure that mobility-based rehabilitation continues when patients are transferred to the general inpatient unit. Research is also needed to understand the long-term benefits of early mobility as well as mechanisms of such benefits.

**Conclusions**

Multiple studies have shown that early mobility–based rehabilitation in the ICU is feasible and safe, and data are accumulating regarding improving outcomes in critically ill patients. Mobility-based rehabilitation varied markedly across 5 ICUs in 1 health care system, suggesting a need for continuous training and evaluation to maintain even a strong mobility-based rehabilitation program. Early mobility–based rehabilitation is associated with shorter ICU and hospital stays, reduced duration of delirium, increased muscle strength, and both the ability to ambulate and greater distance ambulated. Effects of early mobility on long-term outcomes include increased ability to do self-care, return to independent functioning, higher Physical Functioning scores, and reduced 1-year hospital readmission and death. Factors that influence early mobility–based rehabilitation include an interdisciplinary team, a strong and stable ICU leadership, access to physical, occupational, and respiratory therapy, an ICU culture focused on patient safety and quality improvement, a champion of early mobility, and a focus on measuring performance and outcomes.

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CE Test Instructions

This article has been designated for CE contact hour(s). The evaluation tests your knowledge of the following objectives:

1. Describe 2 components of implementation of early mobility–based rehabilitation.
2. Describe the effects of early mobility–based rehabilitation on intensive care unit and long-term outcomes.
3. List 3 barriers to early mobility–based rehabilitation.

Contact hour: **1.0**
Pharmacology contact hour: **0.0**
Synergy CERP Category: **A**

To complete evaluation for CE contact hour(s) for test #ACC6322, visit www.aacnacconline.org and click the “CE Articles” button. No CE test fee for AACN members. This test expires on April 1, 2019.

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ABSTRACT

The number of patients surviving critical illness in the United States has increased with advancements in medicine. Post–intensive care syndrome and post–intensive care syndrome–family are terms developed by the Society of Critical Care Medicine in order to address the cognitive, psychological, and physical sequelae emerging in patients and their families after discharge from the intensive care unit. In the United Kingdom and Europe, intensive care unit follow-up clinics have been used to address the complications of post–intensive care syndrome for some time. However, the interprofessional clinic at Vanderbilt University Medical Center is among the first in the United States to address the wide variety of problems experienced by intensive care survivors and to provide patients and their families with care after discharge from the intensive care unit.

Keywords: critical care, post–intensive care syndrome, follow-up clinic, rehabilitation

The number of patients surviving critical illness in the United States has increased with advancements in medicine. The long-term consequences of critical care survivorship have become evident. The implications of critical illness on patients’ short- and long-term health are vast and include consequences not only for patients, but also for their loved ones. Evidence suggests that one-third of intensive care unit (ICU) survivors have depression, one-half have cognitive impairment, and physical disability is common. Mental health outcomes have been reported among disease-specific groups of critical illness survivors, such as those with acute respiratory distress syndrome and sepsis. At 3 months after discharge, cognitive testing performed on survivors of critical illness has shown that an astonishing one-third of patients experience cognitive deficits similar to those seen in Alzheimer’s disease.
disease and an additional third have cognitive impairment similar to that seen after a traumatic brain injury. Delirium was independently associated with a spectrum of cognitive impairments affecting patients after hospitalization for critical illness. Older adults who survive critical illness have a significantly higher mortality rate in the 1-year period following discharge when compared with other hospitalized patients and the difference is even greater when compared with the general population. The mortality rate in patients discharged to a skilled nursing facility remains greater, at 24.1%, than the rate in patients discharged to home, which is 7.5%. These statistics may reflect a cohort of patients with a higher severity of illness and may highlight the need for improved care delivery to all survivors of critical illness owing to the unique problems afflicting this population.

Post–intensive care syndrome (PICS) is a term recently coined by the Society of Critical Care Medicine to encompass the cognitive, psychological, and physical issues that patients face after an ICU admission. The term post–intensive care syndrome-family (PICS-F) refers to the response to critical illness by families and describes the development of a cluster of physiological outcomes such as posttraumatic stress, depression, complicated grief, and anxiety, among others. Post-ICU clinics have been proposed as a strategy for improving long-term care and outcomes for ICU survivors. In the United Kingdom, post-ICU clinics have been in existence for more than 20 years; the first clinic opened there was in Reading in 1993. In the United Kingdom, a national survey reported that of the 288 ICUs nationally, 80 of them had an associated post-ICU clinic. Despite the wide use of these clinics in Europe, few data are available to demonstrate efficacy and guide further practice. Therefore, no consensus on the ideal model of care delivery has been established. Within the United States, clinics remain a novel way to improve the health of ICU survivors. Clinics at Indiana University and Vanderbilt University are among the first in the United States with the goal of improving post-ICU quality of life and reducing hospital readmission rates among medical and surgical ICU survivors.

The Post-ICU Clinic

Since 2011, 2 ICU follow-up clinics have been developed in the United States. The Critical Care Recovery Center (CCRC) at the Indiana University School of Medicine was the first post-ICU clinic to open in the United States in 2011. The CCRC targets geriatric patients with depression and psychological disorders and aims to improve the long-term health of ICU survivors, reduce readmissions, and provide care to optimize psychological wellness. Patients qualify for the CCRC if they were receiving mechanical ventilation or experienced delirium that lasted more than 48 hours. The clinic is operated by an interprofessional group that includes physicians, registered nurses, and social workers.

The ICU Recovery Center at Vanderbilt opened in 2012 with the objective of improving the long-term health and outcomes of patients who have survived critical illness through an interprofessional team approach. The Vanderbilt Model employs providers with expertise in critical care in an outpatient setting, a unique approach to deliver care that addresses the sequelae of critical illness and its associated increased mortality. Teaching caregivers about their loved ones’ recovery and supporting them through this often-difficult transition are integral parts of the model. In addition, the clinic is designed to gain subjective and objective information about the lives of patients after critical illness to guide research that will affect treatment guidelines in the ICU. The interprofessional team works together to recruit and screen patients on the basis of established criteria and to provide comprehensive follow-up care in an outpatient setting. Patients’ family members are invited to attend the clinic appointment at the discretion of the patient. At this time, the Vanderbilt ICU Recovery Center does not screen or treat these family members for PICS-F. As the outreach of the center grows, resources to address PICS-F will be a priority.

The ICU Recovery Center Team

The Vanderbilt ICU Recovery Center team consists of a medical ICU (MICU) nurse practitioner, a pharmacist, a pulmonary intensivist, a case manager, and a neurocognitive psychologist. The team is modeled after the interprofessional team composition used within the MICU. Each individual clinician is responsible for a component of the patient’s visit, and information is shared among team members during the clinic appointment for the purpose of forming a collaborative treatment plan.
Each individual clinician has a unique role and perspective that is considered in constructing a patient’s plan of care (Figure 1).

Recruitment of Patients

To understand better how survivors of critical illness and their families can best be served by a PICS clinic, a database is maintained to capture both patient referrals and the status of their appointment scheduling. Family members are encouraged to attend the clinic, but currently they are not recruited separately for evaluation of PICS-F. The recruitment and scheduling processes described here reflect a strategy that has evolved in the 3 years since the clinic’s formation.

Patient referrals to the Vanderbilt ICU Recovery Center come from all of the institution’s adult ICUs. However, the majority of referrals come from the MICU, most likely because the clinic team is made up of MICU providers. Any member of a patient’s health care team can make a referral, which is done by notifying the MICU nurse practitioner or by requesting a consultation via the electronic order entry system. In the MICU, the clinical pharmacist and case manager make the majority of referrals to the clinic. These referrals are then screened for the presence of inclusion and exclusion criteria.

The MICU nurse practitioners review the chart for inclusion and exclusion criteria (see Table). If the patient meets criteria for appointment scheduling, the patient is followed throughout the hospital stay until discharge planning is underway and outpatient follow-up can be arranged. One of the initial barriers to successful scheduling of a clinic appointment has been a patient or family’s familiarity with the ICU Recovery Center’s function. One strategy to increase compliance with appointment scheduling is rounding on patients and their families before discharge. This visit is used to encourage follow-up in the clinic and educate patients about the clinic’s function. With additional resources and personnel, introducing the clinic to all patients and scheduling an appointment before discharge will become standard.

Scheduling of Patients

The Vanderbilt ICU Recovery Center has a dedicated appointment scheduler who is notified when appointment scheduling is needed.
Ideally, the clinic’s aim has been to arrange for outpatient follow-up before the patient’s discharge, so that the visit is listed on the patient’s discharge letter. Again, the referral and scheduling process described has been reformed on the basis of the clinic team’s experience and may not reflect the ideal strategy for other institutions.

A secure database that can be accessed online can assist in storing data and gaining insight into features of a patient’s hospitalization, including when the patient moves out of the ICU and the anticipated discharge disposition. As previously mentioned, patients and their families are often unfamiliar with the purpose of the PICS clinic and thus are unwilling to schedule in the face of multiple appointments. Frequently patients are fearful of returning to the hospital, or lack the social support, finances, or transportation to return for multiple appointments. Tracking the reason(s) that patients/families cite for declining to schedule an appointment can provide insight into improving the scheduling process.

Using a data collection tool during the creation of a PICS clinic is necessary to gain valuable insight into trends associated with referrals of patients, appointment scheduling, and reasons observed for why patients do not attend the clinic. The model for referrals and recruitment of patients that is most successful will vary by institution, and internal review for quality improvement should be considered.

Initial Clinic Visit

At the initial ICU Recovery Center visit, each patient is asked to complete spirometry testing and a 6-minute walk test (if able). The results of these performance metrics are used to determine the patient’s physical capacity in comparison to the predicted ability. Each allows an objective measure of the patient’s physical capacity and can be used to track improvement throughout the patient’s recovery.

The MICU nurse practitioner completes a detailed history and physical examination as it pertains to the patient’s resolving critical illness. Special attention is focused on tracheostomy care, persistent respiratory insufficiency, indwelling vascular catheters, neuromuscular weakness, and skin breakdown. Key features of a patient’s hospital course are reviewed. A comprehensive health interview involving the patient and family (if present) details nutritional intake, activity tolerance, independence in daily living, and return to work status. Patients are asked to explain how their post-ICU life is different from their lives before hospitalization. The nurse practitioner then tailors the interview to investigate specific complaints further depending on the patient’s response. Complications, new deficits, and support systems are evaluated in every patient and then discussed with the clinic team. A clinical pharmacist completes a full medication review and provides medication education and reconciliation. Additionally, indications and eligibility for an annual flu shot and pneumococcal vaccine are reviewed and offered to the patient at this time.

A neuropsychologist meets with the patient to evaluate and screen for cognitive impairment, posttraumatic stress disorder (PTSD), anxiety, and depression. Validated tools are used in the psychological assessment portion
of each visit, per recommendations from experts in PICS. These tools include global measures of cognition, such as the Montreal Cognitive Assessment and Trail Making Tests A and B. These tools are augmented by tests of psychological functioning such as the Beck Depression Inventory II or the Hospital Anxiety and Depression Scale and the PTSD Checklist. Results from the cognition and psychological functioning tests are quickly interpreted by the neuropsychologist administering them and then used in both therapeutic conversations with patients and their families and for purposes of treatment planning.

Additionally, smoking status is reviewed, and cessation education and resources are discussed. A case manager is available should a patient need additional resources like home medical care, durable medical equipment, medications, primary care access, and affordable community health resources. We have found that many of the items that are addressed during the first clinic visit (eg, physical therapy, medication reconciliation, health, nutrition) were in place before discharge, but for various reasons are not appropriately in place weeks after discharge. We not only verify these support services and equipment, but also often set them up, reorder what is appropriate, and assist patients and caregivers with communication with social services.

Treatment Plan
The clinic team completes the visit with a collaborative review of pertinent findings and the proposed assessment and plan. The treatment plan often includes referrals to support services such as physical therapy, occupational therapy, or specialty providers. Survivors of critical illness have a variety of special needs following ICU discharge, all of which cannot be mentioned here. Health promotion and education on topics like immunization, smoking cessation, and weight management can help reduce further complications and readmissions to the hospital in these vulnerable patients. A pulmonary critical care attending physician meets with the patient and the patient’s family to conclude each visit. Pertinent findings are summarized and plans for future health care resources are agreed upon. A summary of the patient’s hospitalization and clinic appointment is sent to the patient’s primary care provider in an effort to improve communication and ensure that the patient will have access to ongoing follow-up. The clinic’s goal is not to replace a patient’s primary care provider. Rather, the clinic strives to bridge the gap between the ICU and outpatient care as a patient makes the transition from critical illness to home.

Measuring Success and Future Research
Data on the effect of Vanderbilt’s ICU Recovery Center remain anecdotal to date. Currently this clinic is unable to report on the outcomes of interest with quantitative findings. Future projects designed to grow the limited body of research are in the early stages. The value of the aforementioned model and the interprofessional team composition have not been established as the standard of care for PICS clinics. Additional specialties, not previously mentioned here, may also provide value for both patients and their families. For example, palliative care and primary care providers may play an important role (Figure 2 conceptualizes the many disciplines that can improve patient care through involvement in a PICS clinic). The feasibility of any team must be considered when developing a group of providers for a PICS clinic.

The specific research questions the ICU Recovery Center is focused on are evaluating the effectiveness of this post-ICU clinic on reducing hospital readmissions and improving long-term health. The interventions employed are screening for and treating psychological ailments associated with critical illness, reducing the number of adverse medication effects, and promoting health and safety. Currently the ICU Recovery Center has received approval from the institutional review board for data collection that focuses on readmission rates for ICU survivors who attend the clinic versus ICU survivors who do not, as well as approval for medication review and adverse outcomes, long-term psychological ailments from critical illness, and data that help to evaluate factors that contribute to clinic attendance.

The following are steps to initiate and apply the research process to determine the value of PICS clinics. The first will be establishing a clinic model that efficiently screens, tracks, and recruits patients to be seen in the clinic. The next step is to systematically evaluate and study a large group of PICS patients, identify major issues, and gather resources to treat them. Third, important research questions
will focus on the efficacy, the value and the impact that the PICS clinics have on long-term outcomes, allowing development of the ideal model. Finally, the knowledge gained through research of PICS can be used to establish PICS clinics and to prevent the development of PICS while patients and their families are in the ICU.

Overcoming Obstacles

Despite continued efforts, barriers to effective post-ICU care are still evident. Two of the most prominent obstacles experienced at Vanderbilt University Medical Center are the logistical challenge of recruiting and screening patients and the availability of adequate resources.

Patients who meet inclusion criteria for the ICU Recovery Center often have long and complicated hospital admissions. Tracking their transition from the ICU to a step-down unit and then to discharge is time-consuming and requires personnel who have access to the electronic medical record and can interpret the chart to estimate when discharge is likely. Therefore, a strong foundation of knowledge about critical care and illness trajectory is needed. Anecdotally, the clinic team has observed face-to-face recruitment for appointments to be effective. However, patients may feel overwhelmed when their anticipated long recovery process is described. Patients frequently cite a high number of providers or inability to return to the hospital as a reason for not scheduling an appointment. Barriers such as transportation, portable oxygen, family support, and financial constraints must be considered when offering a follow-up appointment.

Once patients do return, basic resources needed for specialists to identify and treat the problems associated with critical illness, such as a physical clinic location and laboratory capabilities, are necessary. Additional resources such as access to pulmonary function testing, radiography, and further subspecialty care are desirable.

Most of these barriers can be addressed with additional resources, personnel, and funds. The process of recruiting and tracking patients can be streamlined with a dedicated staff member who is able to recruit and track patients on a daily basis. In addition, a physician champion who is willing to advocate for patients and their participation in the clinic is key. As technologies advance and the electronic medical record is consistently used, the tracking, ordering and scheduling process for patients will become more efficient. Additional education and time spent with patients and their families describing the sequela of critical illness tend to improve participation of patients and their families. Once the range of difficulties that survivors of critical illness may encounter is reviewed, patients and family members can better understand the potential importance of attending a PICS clinic.

Patient’s Perspective: Millie Camp

In 2013, Mildred Camp, a previously healthy woman in her 60s, was admitted to Vanderbilt University Medical Center with a...
new diagnosis of thrombotic thrombocytopenic purpura. Her initial treatment plan included high-dose steroids and rituximab. Although she was discharged after 2 weeks, the treatment of the disease left her body weakened and susceptible to opportunistic complications. Soon after, Mrs Camp was readmitted to the hospital and transferred to the MICU with acute respiratory distress syndrome. She received mechanical ventilation for 17 days and was in the ICU for a month. Mrs Camp has little recollection of her time in the ICU, but recalls feeling frightened and helpless as she lay in bed unable to communicate her needs. The memory of looking out of the window into the hallway to see her nurse working at a computer sticks out in her mind. She recalls feeling powerless and vulnerable to her caregivers’ ability to remain aware of her needs. Mrs Camp’s family was by her side and has helped her to grasp the profound experience she endured. They clung to updates from the nurses and doctors, watched her monitor with intent, and prayed faithfully in the waiting areas when her condition became critical. She tells us,

I was so swollen that my wedding rings would not come off. So my husband of 41 years (longer than most of my caregivers had been alive) began the arduous hour-long process of cutting off my rings. You can imagine his pain and sorrow with this difficult task. ICU illness impacts the whole family. Mrs Camp left the ICU and spent months in long-term acute care and rehabilitation, where she worked tirelessly to rebuild her strength. The magnitude of her weakness was difficult to grasp; her physical capacity was so severely diminished upon leaving the ICU that she lacked the strength to sit up or roll over in bed without assistance. Mrs Camp was discharged after 3 months in hospitals, with portable oxygen and outpatient physical therapy scheduled for another 3 months. She was also scheduled in the ICU Recovery Clinic. She was committed to regaining her strength both mentally and physically but was plagued by “brain fog” and inattention. Three months after discharge, she was able to be weaned off of supplemental oxygen and had regained much of her physical strength with intense physical therapy, hiring a trainer after her outpatient therapy was complete.

Of the ICU Recovery Clinic, she says, The ICU Recovery Center was a great resource—answering every question, helping me recognize my progress, validating my efforts, and checking for post-ICU decline in physical, cognitive, and psychological realms. The clinic provided much-needed information, direction, and encouragement. I wanted to sing again but lacked the breath and vocal range. [I was referred to] The Vanderbilt Voice Center, [which] gave me vocal and breathing exercises, which benefited my overall breathing capacity. [A year after I fell ill] I returned to my barbershop chorus to sing, a major goal in my recovery.

Today, it has been more than 3 years since Mrs Camp was admitted to the MICU. She reminds us that recovery is a long process, one that requires not only physical endurance but mental and emotional endurance. She urges fellow survivors not to succumb to the moments of pain, fear, weakness, fatigue, confusion, doubt, hopelessness, and depression. However, she adds, “I was very lucky to not struggle with pain, depression, or anxiety after my critical illness as I recognize these ailments do suspend progress.” In closing, she says, “I battle to moderate my expectations as I continue my journey to optimal health and delight in each new day.”

Conclusion
With an aging population and a growing number of patients surviving critical illness, the implications of post-ICU deficits are profound. The ICU Recovery Clinic at Vanderbilt University Medical Center is one example of how critical care providers can use a PICS clinic to improve the care of patients. Patients and families benefit from the support of critical care clinicians outside of the ICU as a way to manage the transition of their care to a general practitioner. Future research is needed to determine the ideal model for PICS clinics in the United States and to quantify the effects such clinics have on quality of life after discharge and readmission rates.

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Developing a Diary Program to Minimize Patient and Family Post–Intensive Care Syndrome

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ABSTRACT

A series of evidence-based interventions beginning with an intensive care unit diary and a patient/family educational pamphlet were implemented to address the long-term consequences of critical illness after discharge from the intensive care unit, bundled as post–intensive care syndrome and post–intensive care syndrome–family. An extensive literature review and nursing observations of the phenomenon highlighted the potential for this project to have a favorable impact on patients, their families, and the health care team. The goal of this article is to explain the education of all stakeholders; the introduction of the diary, video, and educational pamphlet; and the evaluation of the acceptance of these interventions. This process began with an informal evaluation of the educational products and overall perception of the usefulness of the diary by patients, family members, and staff. The efforts described contribute to the evidence base supporting diaries as an adjunct to intensive care.

Keywords: intensive care, diary, post–intensive care syndrome

Post–intensive care syndrome (PICS) is an increasingly confronted phenomenon that encompasses physical, neurological, cognitive, and emotional issues affecting patients long after their stay in the intensive care unit (ICU). The prevalence of this syndrome is variable but can be high, occurring in 15% to more than 50% of ICU survivors. In addition, patients’ family members experience psychological and emotional trauma at a high rate, so the PICS definition has been broadened to include family members (PICS-F).

Patients may have survived their critical illness, yet they face considerable challenges to reach a full recovery. These challenges include ICU-associated posttraumatic stress disorder and anxiety disorders, neurocognitive deficits that are new or worse than they were before ICU admission. A series of evidence-based interventions beginning with an intensive care unit diary and a patient/family educational pamphlet were implemented to address the long-term consequences of critical illness after discharge from the intensive care unit, bundled as post–intensive care syndrome and post–intensive care syndrome–family. An extensive literature review and nursing observations of the phenomenon highlighted the potential for this project to have a favorable impact on patients, their families, and the health care team. The goal of this article is to explain the education of all stakeholders; the introduction of the diary, video, and educational pamphlet; and the evaluation of the acceptance of these interventions. This process began with an informal evaluation of the educational products and overall perception of the usefulness of the diary by patients, family members, and staff. The efforts described contribute to the evidence base supporting diaries as an adjunct to intensive care.

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were at baseline, extreme muscle weakness that limits activities of daily living, decreased pulmonary reserve that also limits activity, chronic pain syndromes, and any lingering effects of the disease process that initially required ICU admission.\(^1\) Unfortunately, patients and their families are often not educated about what to expect upon surviving a critical illness or injury because transitions from the ICU to the general care area and from there to home or another facility are usually focused on the acute care needs of the patient.

Additionally, the phenomenon of PICS has only recently been recognized by the critical care community, and many non-ICU providers are unaware of the impact that PICS and PICS-F may have on patients and their family members after discharge from the hospital.\(^3\) Patients are unsure of whether or not these symptoms are expected, and non-ICU providers may not recognize that a focused evaluation is needed. If health care providers could address the gap in PICS/PICS-F care by first educating patients and their families about what to expect after surviving an ICU stay, accompanied by an ICU diary to help patients remember what occurred and trigger follow-up discussions with primary care providers, they could potentially increase satisfaction of patients and patients’ families and improve transitions of care from the ICU to acute care teams.

**Literature Review**

Each year, millions of patients are admitted to the ICU, and one-third of them require mechanical ventilation.\(^2\) These patients are also often unconscious or sedated. ICU survivors have a high incidence of a variety of mental health symptoms that may affect their recovery, including nightmares, unwanted thoughts and memories, anxiety or depression, and posttraumatic stress syndrome.\(^4\) These memories contain actual events that occurred during the ICU stay, as well as delusions. ICU survivors describe memories and dreams that they are often unable to comprehend and that often lead to a reduction in their quality of life.\(^5\) Affected patients and their family members may benefit from a written document to reflect on their experience of critical illness. This record of events may allow them to move slowly past the delusional memories and misconceptions that formed in the disoriented mind during the ICU stay.

According to Garrouste-Orgeas et al,\(^6\) various studies have elucidated the following strategies designed to help family members actively provide support to themselves and the patient: flexible visitation policies, involvement in nursing care, and participation in maintaining a diary during the ICU stay. ICU diaries have been widely used in European countries as a low-cost technology to improve the quality of life after critical illness.\(^7,8\) Qualitative studies reveal that the diary enables patients to evaluate their recovery and improves communication with their families about their experiences, thus sustaining family-centered care.\(^6,7,9-13\) Diaries may also enable patients to make sense of their intensive care encounter, which they previously may have failed to understand.\(^7\)

Critically ill patients can have both negative and positive experiences during their time in an ICU. These experiences are due to a variety of factors, but one that stands out is the loss of time for patients who have been sedated or otherwise confined in the ICU. Critically ill patients also often suffer from disorientation and delirium, thus creating a “void” of what transpired during their stay. These “voids” are then filled in by what the patient thinks might have happened; by what they were told happened by staff, family, and friends; or by past experiences.\(^13\) Nurses can assist patients by addressing the risk for PICS/PICS-F upon admission and throughout the ICU stay, using the diary to help promote a more positive reflection on their illness episode. Nurses can also help manage expectations regarding the future plan of care goals with sensitive and meaningful communication via the diary.

The critical care community is aware of evidence suggesting that the struggles faced upon discharge from the hospital are often complicated by insufficient recovery and rehabilitation resources for both patients and family members, including a lack of specific knowledge on the part of primary care providers who interact with and follow up with survivors and close family members after the hospitalization.\(^14\) Specific inpatient interventions to address individual elements of PICS and PICS-F include delirium screening and prevention protocols, early mobility protocols, detailed management of sedation regimens, and ICU diaries.\(^1,14,15\) Our evidence-based practice (EBP) project team proposed that a combined ICU diary and patient/family
educational pamphlet might reduce symptoms of PICS/PICS-F and improve satisfaction of patients and their families with respect to preparation for discharge from the ICU and eventual discharge from the hospital. The team was optimistic that this project would also benefit the health care team by encouraging them to be more engaged with the patient and the patient’s family, demonstrating their commitment to the best possible outcomes for the patient along his or her illness trajectory.

**EBP Program Plan**

**Guiding Questions**

The ICU diary program was implemented as an EBP project using the Iowa Model of Evidence-Based Practice to Promote Quality Care. The setting for this program is a 20-bed mixed medical-surgical ICU in a 198-bed level II trauma center. It is the second largest military medical center and serves 25,000 active duty service members on the fourth largest military base, with an additional 110,000 beneficiaries in the surrounding Pacific Northwest community. Efforts at this time are focused on evaluating the processes and outcomes of the project in terms of feasibility, sustainability, and staff and patient/family satisfaction within the facility. The background questions for this EBP change project were

1. Given the complex care environment of the ICU and the highly mobile status of military nurses, is it feasible to implement a program designed to prevent PICS and PICS-F for select patients and their families in our level II medical center?

2. Given the frequent turnover of medical and nursing staff in a military ICU environment in a teaching hospital, can we achieve sufficient staff and patient/family engagement to support adoption of an ICU diary program?

3. Can we achieve a high level of patient and family satisfaction with the educational products (pamphlet, video, and diary) and staff interactions surrounding implementation to sustain an ICU diary program?

4. What tools and interventions will be needed to formally evaluate the impact of the ICU diary on long-term biopsychosocial outcomes once adoption of the practice has occurred? (Research question for future protocol)

**Preparation**

Before implementation of the ICU diary program, ICU nurses, clinical nurse specialists, and a nurse researcher with an interest in this project met every 2 weeks for 2 months to discuss the EBP model selection, review the literature, and develop a strategy for introducing the new program. Once those tasks were accomplished, the group set a “kick-off” date and arranged a nursing grand rounds presentation to introduce the program to potential stakeholders throughout the hospital. The team invited Dr Judy Davidson, a nationally recognized nurse and subject matter expert on PICS and PICS-F, to speak. The focus of the presentation was the biopsychosocial implications of PICS and PICS-F and EBPs that prevent or diminish the long-term effects, such as judicious sedation, early mobility, and use of an ICU diary. The audience included medical and nursing staff as well as ancillary support staff, such as the chaplain. This discussion provided the motivation needed to move forward with the ICU diary program.

**Project Team**

After determining that the EBP project was a priority for the organization, the next critical step was assembling a team. Selecting a dedicated group of professionals to lead the EBP project was viewed as crucial to its successful implementation. The team leader hired was an ICU nurse previously on staff at the hospital who had developed an excellent rapport with coworkers and interdisciplinary team members. Her credibility and advocacy for patients were undeniable, and she easily garnered widespread support from staff and leaders. She immediately set about building the team and identifying champions. Developing the educational tools and the curriculum for in-service training followed. The final team included a team leader, 2 ICU nurse managers, a critical care clinical nurse specialist, 2 ICU staff nurse champions, 2 ICU physician directors, 2 staff nurse champions from the step-down unit and 6 from the medical-surgical unit, and a nurse researcher. The chaplain and the palliative care team were also strong advocates and actively engaged in the program. The team could not have developed or purchased the educational tools and other materials without the support of the ICU supply specialist, the information management/visual information teams, logistics staff, the administrative officer from the Center for Nursing Science and Clinical Inquiry, and staff from the Public Affairs office.
Project Tools

The diary is an 18-page packet contained in a clear covered binder. Using a clip binder allowed the nursing staff to easily add pages, if necessary. The diary began with “Get to Know Me” pages dedicated to the patient’s personal information such as name, nickname, birth date, and general preferences, with space for other relevant details or patient and family photographs. The next section defined PICS, talked about the transition to other nursing units, the discharge process, and posthospitalization follow-up.

The team, with coordinated efforts from hospital support services and constructive feedback from the nursing staff, developed several educational tools to augment implementation of the ICU diary program. The packet also contained a section describing what to expect regarding the ICU stay and the purpose of devices and equipment in a typical ICU suite. Along with the diary, families were provided an educational brochure entitled “PICS & The ICU Diary: A Guide for Families and Patients.” The primary nurse initiating the diary also arranged for the family to view a short video on PICS/PICS-F that had been filmed in the ICU, featuring unit champions and choreographed by marketing experts from our Public Affairs office. The video was available on the patient education channel or on a portable DVD player. The new channel was projected for programming on in-room televisions and will eventually offer around-the-clock access hospital wide. The video was also made available on the hospital’s Facebook page for viewing by any military beneficiary/health care consumer interested in knowing more about PICS or PICS-F. This multimodal approach served to educate current and future patients and their family members.

In addition to the program tools, families were provided with an opportunity to use a Polaroid camera to take pictures of visitors, the patient, or the patient’s room, if they wanted to include photos in the diary. Health Insurance Portability and Accountability Act (HIPAA) concerns were addressed and cleared by the hospital’s legal office before the cameras were purchased. Photos taken by family members did not include details beyond the individual patient’s room. The intent was for the patient and family to keep this diary upon transfer from the ICU and encourage them to review it at their convenience, either on the acute care unit or once they returned home. While on the acute care unit, patients and loved ones continued to document the patient’s illness and recovery journey, if desired.

Implementation

The ICU diary program procedures adopted from the literature suggested that nurses typically initiated diaries on patients who were intubated for longer than 24 hours, and/or rated positive for delirium on the Confusion Assessment Method for the ICU (CAM-ICU) tool. For this program, the primary nurse was responsible for completing the initial diary entry, which included a brief explanation of why the patient was admitted to the ICU. Subsequent entries were written throughout the shift by the patient’s nurse, physician team, and/or ancillary services (eg, respiratory therapists, social workers, and chaplains). Participation in the ICU diary program was voluntary. Nurses were encouraged to contribute at least 1 entry per shift. Patients’ families and friends were invited to complete entries as well; the team believed that their participation in the diary would help patients better appreciate the support they provided throughout the illness experience. (For examples of diary entries, see Table.) The diary remained with the patient when the patient was transferred to an acute care unit or discharged to a skilled nursing facility or home.

A tracking tool was maintained by the team; unit champions rotated the task of checking in with nurses, patients, and family members to assess diary utilization, provide feedback on diary entries to the nurses, and answer any questions. This tool listed the patient’s initials, the date of admission, the date that the diary was initiated and by whom, the date when the patient was transferred from the ICU, the unit to which the patient was transferred, the name of team member following up with the patient/family and unit champion, and the date when the patient was discharged from the hospital. All nurses were informed of the tool and its secure central location in the ICU in order to enroll new patients and update the tool upon transfer from the ICU and discharge from the hospital. When patients were transferred to one of the acute care units, an ICU diary program champion attempted to follow up with them at least once before discharge from the hospital. Nurses identified as unit champions on the medical-surgical
and step-down units received education about the ICU diary program and were instrumental for follow-through on their units. Although the diary was started in the ICU, the nurse from the medical-surgical or step-down unit was most likely responsible for introducing the diary to the patient after their critical illness and confusion had resolved. Support from the acute care units outside the ICU was imperative for continuation of the diary, including patient participation in completing entries. The unit champions on the medical-surgical and step-down units also helped ensure that the diary accompanied the patient or family member upon discharge or transfer.
Measuring Success and Future Research

For the pilot phase of the program, assessing the knowledge and support of ICU staff (registered nurses, licensed practical nurses, physicians) for the ICU diary initiative was the primary interest. In order to solicit feedback on the educational efforts to date, the resources created, and the introduction of the ICU diary, we interviewed individual nurses and physicians and simultaneously distributed a 10-item staff perspective survey during a 2-week period. The survey used a Likert-type scale for 7 statements, as well as 3 open-ended questions to address the program’s biggest barriers, greatest benefits, and aspects needing improvement. We placed surveys in staff mailboxes and provided an opaque ballot box for the return of anonymous surveys. The low response rate was disappointing, and the team resorted to 12 informal individual interviews of nurses and physicians. Overall, feedback from nurses and physicians was very positive. Noticeable improvements in nurses’ initiating diary entries were seen each week as knowledge and comfort level increased. In the past 3 months, 17 diaries were initiated, compared with 3 in the preceding 2 months. More diaries were implemented without prompting from the unit champions, and more nurses and physicians were contributing entries on a regular basis. The diaries had a mean of 10 to 15 entries each, with 3 or 4 entries per day. A recent briefing to department chiefs in the surgical services line resulted in an invitation for a surgery grand rounds presentation about the program in order to engage more surgeons and surgical residents in the diary process for their ICU patients. Acute care units have welcomed the ICU diary program’s team leader for unit in-service training sessions, and the number of volunteers willing to be a part of the ICU outreach plan exceeded all expectations.

Team discussions have focused on next steps for the program, which would involve measuring the psychological impact of diaries on outcomes for patients and patients’ families at intervals recommended in the literature, possibly testing different methods and timing of diary debriefing after discharge to see which lead to the best outcomes, and exploring responses of patients and patients’ families to the diary program in the ICU with formal qualitative or experimental methods.

Overcoming Obstacles

The first obstacle in implementing a hospital-wide, multidisciplinary project was the need for widespread education about a new process. Having identified program champions early in the pilot phase, staff awareness challenges were overcome with one-on-one or small group in-service training sessions. Knowing what to write in the diary was one of the greatest struggles for the ICU nurses. Using examples from the literature or developed by the team, nurses gained confidence in writing about day-to-day events, messages of caring, and progress notes without describing clinical details typical of the medical record. As mentioned previously, educating the nurses on the acute care units was vital to ensuring follow-through after the patient left the ICU and ultimately to achieving project goals. These unit champions became responsible for engaging and educating their coworkers about the project as it moved forward. On the acute care units, we encouraged the nurses, during hand-off or change of shift, to write “ICU diary” on the white communication board posted in each room detailing daily goals.

Logistics hurdles occurred frequently, and the project team met to decide on sustainable solutions. One hurdle faced was identifying a specific location for all the program supplies and devices, as well as the diary itself. In some instances, the family seemed protective of the diary, keeping it with their personal belongings. Other times, the diary was hidden among all the other supplies in the ICU suite. The team developed a simple solution and had plastic file holders mounted on the outside of each patient’s ICU room. This provided a standardized location, as well as a visual cue, for nurses and other staff to be mindful of contributing to the patient’s diary. Family members could easily retrieve it from that spot as well. Project supplies such as additional diaries, pens, and the cameras and DVD players were maintained on a mobile cart secured in the ICU supply area.

Implementing a project of this magnitude does require institutional resources and funds. The team had the support of nursing leaders at all levels and a small grant to cover project expenses including team leader salary, the new education channel, DVD players, cameras, and a color printer. The team also purchased customized pens with the hospital logo and a window to display 1 of 6 reminder messages.
reflecting what to include in diary entries. These were provided to staff and family members. Examples of the messages include What noises are in your room?, Who visited you today?, and What happened in the world today? As mentioned previously, an experienced team leader was paramount to ensure adherence to program objectives, achievement of goals, and program adoption. We found the best way to deal with obstacles was to anticipate them and use the team’s energy to develop innovative solutions.

**Perspective of Staff, Patient, and Patients’ Families**

**Staff Perspective**

Attaining staff buy-in is an inherent problem of any EBP initiative on a busy clinical unit. A multitude of tasks already must be completed in a 12-hour shift, so adding another project that required education, training, and follow-up to ensure that it was implemented effectively was a challenge. Staff members provided insightful comments during different phases of the project rollout. Although these comments (listed in the following paragraphs) highlight feedback specific to implementation of this ICU diary program, they may serve to inform implementation processes at other health care facilities considering adoption of a similar program.

Even after initial training was provided, staff members voiced that they did not have enough knowledge about the ICU diary program to start a diary on a patient. Nurses expressed that they did not know what to write in the diary and requested that sample entries be provided during the initial education process, rather than later as had been done in this project. However, if a diary was already started and entries were already written in it, they felt it was easier for them to contribute. The nurses who contributed reported that the time required to write in the diary was minimal and was not perceived as a burden on their day. Several months after the project was underway, some staff nurses remained apprehensive. Other nurses considered diary entries to be one of their last priorities, especially when staffing was low or the patient load was increased. “If a nurse is busy and trying to catch up with charting [and it’s shift change], the last thing I want to do is stay after to write a journal entry” (L.B., oral communication, November 2015). One nurse said it was “tedious, like the updating of care plans,” and commented that “some nurses participated while others did not” (J.L., oral communication, November 2015).

A few staff members felt that writing in a diary posed a potential legal threat and that it might be used against them if a lawsuit occurred. Despite reeducation emphasizing that this was not a part of the patient’s medical record, they still felt that it could be used against them and were reluctant to participate. These feelings were amplified after a camera was offered to family members to take pictures of their loved ones while in the ICU, specifically for posting in the diary. It did not seem to matter that this idea was derived from published reports and was vetted through the hospital’s legal department with approval granted to proceed as long as photos included only the immediate ICU suite and patients and their family members.

Despite the aforementioned issues, the majority of nurses interviewed for feedback felt that the ICU diary program was a good idea overall. As far as its effect on the nursing staff, some felt that writing diary entries was a helpful way of sharing their support and feelings. Other comments included, “I can see if someone passes away, it could be a closure thing for family members and they can recount just how sick they were” (J.L., oral communication, November 2015). She added, “and the diary provided the family members something to do and focus on rather than staring at the monitors for 24 hours” (J.L., oral communication, November 2015). Another registered nurse stated, “It also provides the family and patient a means of helping them remember or reflect on events that occurred while in the ICU” (J.K., oral communication, November 2015). The nurses who participated felt that the patients’ families responded favorably to the project. One nurse stated, “I think it gives the family a job to help in their loved ones’ recovery. [It] kind of gives them a bit of control or input in [their] care” (B.W., oral communication, November 2015).

The diary also provided a level of emotional support as family members read entries from the staff and other friends and relatives. One staff nurse commented that it was nice to see the interest and enthusiasm of family members when they heard about the diary. She continued, “It gives me hope that both patients and family will benefit from simply keeping a daily
Patient/Family Perspective

One positive experience relayed to an ICU diary champion came from a 20-year-old woman who had a baby via cesarean section at 26 weeks’ gestation. Her child was immediately taken to the neonatal ICU (NICU) for care. A few days after the birth of her child, she was admitted to the ICU and intubated for sepsis from a postoperative infection. She remained intubated for 4 days. During this time, an ICU diary was started. The husband was oriented to the ICU diary, as he went back and forth from our ICU to the NICU to spend time with his wife and also his newborn child. During her intubation, the ICU patient remained lightly sedated and aware of her surroundings. She was able to write her care needs on a clipboard and frequently asked about her child. After getting written approval from the father and explaining the mother’s current situation in the ICU to the NICU nurse manager, a unit champion was able to educate and include the NICU nurse, who began writing entries in the ICU diary in order for the mom to have updates. Her nurse also obtained pictures of her child, with permission, that were placed in her ICU diary so she could see her child. This was met with great appreciation and approval.

After speaking with the patient, her husband, and her mother after extubation, it was evident that the ICU diary was going to help tremendously in her recovery. Her mother arrived from out of town and was able to read the entries to her; the patient felt that this helped her understand what had happened while she was intubated. The patient stated that she remembered some of the nurses, but after reading the entries she felt she remembered exactly who took care of her. She was also happy to find out that the diary was hers to keep and stated she was thankful she would be able to go back and read about what happened during her ICU admission. After reading the diary entries, she said they answered a lot of her questions that she was not able to ask while she had a breathing tube and was under the influence of medications. The patient’s mother was especially thankful that the diary was started for her and stated she learned a lot about her daughter’s care before her arrival by reading the diary. Both the patient and mother loved the added pictures taken of her child in the NICU. Overall, they were extremely appreciative of the accounts of her illness written in the ICU diary (S.M., oral communication, November 2015).

Other comments received from patients and/or their family members support the idea that knowing who visited and that they were not alone was very comforting:

- It is good to just tell about your day, and what their day was like. They might think no one came to visit them, but then realize that they did come to visit because it is written down. It helps him to know that he had support while he was here (R.Z., oral communication, November 2015).

In another instance where the family was dealing with a sudden and devastating condition involving their young adult daughter, the mother stated,

Me, personally, I find it very difficult to write in the book. I am still very emotional and it’s hard to write in it, but other family members have used it and I think it will be very helpful later down the road for both myself and for her. We have been reading the diary to her at the bedside, and it is a nice resource for us (S.M., oral communication, November 2015).

Conclusion

For more than a decade, the Institute of Medicine has advocated for the inclusion of patient- and family-centered care in the definition of health care quality because we now have evidence that this care is associated with better outcomes and greater patient satisfaction. In a recent publication, Auriemma et al describe their efforts to develop a framework for patient- and family-centered care outcomes for critical care. The most salient themes for both patients and family members included the following: sick, caring, suffering, comments about medical staff, description of emotional states, and physical qualities of the ICU (e.g., environment, medical equipment, and noise).
These researchers, and others who performed similar research, agree that the expressed themes are most likely related to satisfaction of patients and their family members with the ICU experience and care.14,16,19 Because of the similarities found in the perceptions and experiences of patients and their family members, it is important to include both in any initiative that addresses the phenomenon of critical illness.17-19

Although this ICU diary program was developed to help mitigate the negative effects of PICS/PICS-F, a secondary effect was that it was a source of inspiration to the patient, the patient’s family, and staff members. Writing daily entries about the patient’s progress in the ICU was viewed as therapeutic, especially when what was written included the eventual removal of the ventilator and, ultimately, transfer from the unit. The program was, and continues to be, a means for patients’ families to cope with the circumstances of their loved ones; it provided an outlet to deal with the daily struggles surrounding clinical progression or regression.

One of the great satisfactions in the critical care nursing profession is saving the lives of patients and seeing them leave the ICU, but it is vital to understand that this is only one step in the healing and recovery process. As this program continues to expand and improve, it will be crucial to create a mechanism to get feedback from patients and their family members so that we can understand how the ICU diary assisted in their recovery and return to everyday life. Numerous gaps remain in our understanding of the strategies most likely to favorably influence the affect of patients and their family members to the consequences of critical illness. More research by interdisciplinary ICU teams is needed to build an evidence repository for interventions, such as an ICU diary, that will reduce physical, cognitive, and mental health comorbid conditions and allow patients to regain their quality of life.

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REFERENCES

Peer Support as a Novel Strategy to Mitigate Post–Intensive Care Syndrome

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ABSTRACT

Post–intensive care syndrome, a condition defined by new or worsening impairment in cognition, mental health, and physical function after critical illness, has emerged in the past decade as a common and life-altering consequence of critical illness. New strategies are urgently needed to mitigate the risk of neuropsychological and functional impairment common after critical illness and to prepare and support survivors on their road toward recovery. The present state of critical care survivorship is described, and postdischarge care delivery in the United States and the potential impact of the present-day fragmented model of care delivery are detailed. A novel strategy that uses peer support groups could more effectively meet the needs of survivors of critical illness and mitigate post–intensive care syndrome. Keywords: critical illness; survivorship; quality of life; resilience; peer support
Post–intensive care syndrome (PICS), a condition defined by new or worsening impairment in cognition, mental health, and physical function after critical illness, has emerged as a common and life-altering consequence of critical illness. Unfortunately, PICS is also resistant to change, with several randomized controlled trials showing no benefit of various promising strategies. New strategies are urgently needed to mitigate the risk of neuropsychological and functional decline after critical illness and to prepare and support survivors on their road toward recovery.

In this article, we outline the present state of critical care survivorship. We focus on the impairments and vulnerabilities of this population of patients. We then detail postdischarge care delivery in the United States and the potential impact of the present-day fragmented model of care delivery. To bridge the gap between what survivors currently experience and what is needed, we offer a novel strategy that uses peer support groups and may more effectively meet the needs of survivors of critical illness.

**Critical Care Survivorship**

In the United States alone, approximately 5.7 million adult patients are cared for annually in an intensive care unit (ICU), and nearly 1 million of these patients will require mechanical ventilation. Advances in care have improved survival, resulting in millions of critical care survivors being discharged back into the community each year. Many survivors experience new or worsening functional impairments, leading some experts to herald these developments as a “hidden public health disaster” even as they praise the remarkable success of critical care medicine in reducing short-term mortality.

**PICS Sequelae**

At the time of hospital discharge, 46% to 80% of survivors experience cognitive impairment. At 3 and 12 months after discharge, 40% and 34%, respectively, of previously healthy survivors remain impaired to a degree that would be consistent with moderate traumatic brain injury. At 12 months, clinically significant symptoms of anxiety, depression, and posttraumatic stress disorder are present in 20% to 30% of survivors. Functional impairment, defined as impairment in activities of daily living (ie, activities that allow a person to live independently such as finances and medication management), afflicts 27% of survivors at 12 months. The result is that the majority of survivors of critical illness appear to suffer from PICS.

In addition to cognitive, mental health, and physical impairments, critical care survivorship frequently encompasses chronic pain, sexual dysfunction, disability, financial loss, and inability to return to work, all of which culminate in reduced health-related quality of life in survivors.

Qualitative studies of patients with severe sepsis and acute respiratory distress syndrome and their caregivers have illuminated the present-day experience of critical care survivorship. Survivors and their caregivers crave information at each step of recovery, yet frequently lack the knowledge required to understand what they have experienced and what to expect. Survivors struggle with the enduring impact of critical illness on their own health and the impact on caregivers. They lament the lack of support after discharge to tend to or learn to cope with their ongoing health needs and lack of independence. Additional studies are necessary to fully grasp the challenges experienced by survivors, and to identify strategies that facilitated recovery, the available evidence provides a blueprint for what survivors need.

**Post-ICU Follow-up**

Contemporary follow-up of ICU survivors in the United States is fragmented and uncoordinated. The fragmentation is characterized by poor communication between care providers, a reality exacerbated by the multitude of discharge destinations for survivors and high rehospitalization rates. While strategies evolve to improve communication between acute care and primary care providers, and integrated electronic health records should facilitate this important process improvement, PICS and other sequelae of critical illness remain underrecognized, understudied, and underfunded. A small number of ICU follow-up clinics have been established in the United States to combat this fragmentation. These clinics draw on 2 decades of experience from the United Kingdom and incorporate into clinical practice the identification of neuropsychological and physical problems and timely referral to other
health care providers. Although conceptually appealing, the effectiveness of nurse-led ICU follow-up clinics in the United Kingdom was not demonstrated when tested.38 More proximally, in a separate trial, increasing physical and nutritional rehabilitation during the post-ICU acute hospital stay did not result in improved physical recovery or quality of life as measured by the Short Form 36 Health Survey.11 However, germane to the constructs of preparation and support, the intervention that was paired with informational content delivery led to improved patient satisfaction with physical and nutritional support, coordination of care, and preparation at discharge.11 Additional studies drawing on the lessons learned from these seminal trials are needed.

Issues of survivorship are rarely addressed during the period of critical illness.39 As knowledge translation is notoriously slow, outpatient providers are most likely unaware of PICS and thus are even less likely to address issues of survivorship. The result is that millions of survivors of critical illness are being discharged into the community, unprepared and uneducated about what to expect and how best to cope, adjust, and recover. Impairments will therefore frequently go unrecognized and/or undermanaged. A substantial burden will fall on their informal caregivers,23 many of whom may be struggling with their own emotional sequelae from their ICU experience. Family members and caregivers are not immune to the psychological trauma of the ICU; in fact, they are also vulnerable to developing a form of PICS known as post–intensive care syndrome–family (PICS-F),40-42 which includes mental health consequences and may include physical symptoms and social isolation.

Novel strategies to augment survivors’ social support structure may be important to promoting a culture of resilience.43,44 These strategies would complement initiatives that aim to improve survivors’ physical and neuropsychological well-being. Additionally, these strategies could also facilitate coordination between inpatient and outpatient settings. Peer support has the potential to fulfill these imperatives.

Peer Support

We propose that peer support for ICU survivors may serve a crucial role in both improving the recovery of current survivors and in accelerating the progress of knowledge about recovery. We define ICU survivors in this context—in contrast to our technical use above—as patients and their loved ones who have emerged from critical illness. We believe that the continuum of survivorship begins at ICU admission and may continue for years or decades afterward. We define peer support as the process of providing empathy, offering advice, and sharing stories between ICU survivors. Peer support is founded on the principles that both taking and giving support can be healing if done with mutual respect. Peer support is centered on the notion that survivors can help each other through problems and have the willingness to do so. Peer support is not a clinician-centered model; the role of clinicians is to help provide the safe space in which survivors can work together to discover what they share to help each other.

The potential benefits of peer support emanate from the establishment of a community that promotes health and well-being through the shared experience of illness and recovery. The potential benefits, applied to survivors of critical illness, are many: mental reframing (hope, optimism), effective role modeling, information sharing, and practical advice that is not readily available to health care professionals at present.45,46 Peer support has proven effective in people with mental health disorders and substance abuse issues,45,46 in the self-management of diabetes,47 and among cancer survivors.48,49 It can lead to empowerment, self-advocacy, and improved outcomes. However, although “authentic empathy,” “validation,” and “acceptance” are important contributions offered by the peer support model,44 programs that formally integrate education into the program appear to be the most valuable.50 In the near future, sharing effective coping and compensation strategies by health care providers and peers may accelerate recovery further.51-53

As survivors and their caregivers have first-hand experience of the challenges that survivors face, these individuals are well suited to educate and prepare peer survivors for certain aspects of the recovery process. In addition, because spirituality and religion appear to be important in survivors’ support networks,6 and given the reluctance of health care providers to engage in the spiritual aspects of illness and recovery,11 peer support groups may be a vehicle through which these aspects of recovery can be explored and acknowledged.
Although the challenges experienced may differ between the adult, pediatric, and neonatal populations, the principles of peer support and the inherent potential of this strategy apply to each group, including hundreds of thousands of pediatric and neonatal survivors of critical illness.

**Structure and Process of Survivor Support Groups**

The ideal structure, process, and timing of support groups for survivors of critical illness is unknown—a fact that bears emphasis. We remain at a fluid, innovative stage of discovery as to how peer support is best used after critical illness. An urgent need and opportunity for creative practitioner/survivor combinations exists to invent a new layer of post-ICU support and then evaluate it rigorously. Some general structural principles we recommend, drawn from the general peer support literature and applied specifically to survivors of critical illness, are included in Table 1.

Whether and how the needs of former patients and caregivers would be expected to differ is unknown. It is conceivable that stress experienced by one group (ie, caregivers) may be the result of impairments incurred by the other (ie, survivors) or vice versa. If so, distinct support groups may be ideal. Yet it is plausible that combined meetings, in the presence of those further along the path of recovery, could be therapeutic and beneficial and mitigate both PICS and PICS-F. Alternative options include a combined model in which both patients and their family members meet together for part of the meeting and then separately for part of the meeting to address the unique needs of the patients and caregivers or individual peer-to-peer mentorship. This area is one of the many in need of empirical evidence.

Meetings should be held at a mutually convenient time for survivors, peer support leads, and clinical staff who may serve as coordinators and/or moderators. The anticipated duration of the meetings is 60 to 90 minutes. Engaging facilitators who have experience with peer support in other venues (eg, oncology patients) early in the process may be useful to align expectations and guide design strategy. Given the frequency of psychological distress among survivors of critical illness, holding meetings away from the ICU—possibly even away from the hospital—may be preferable.

The format of meetings most likely begins with general introductions and explanation of ground rules (eg, confidentiality), followed by shared experiences and encouraging survivors to share what would be most helpful to them. To draw survivors in, a dedicated longitudinal curriculum that addresses various aspects of the survivor experience should serve as the foundation for meetings. However, to facilitate shared group discussion, moderators should aim to encourage open dialogue and be open to go where the experience of those present leads the group. The frequency of meetings will depend on the target audience, logistics, and the availability of volunteers and staff. For example, peer-to-peer support groups embedded within ICU follow-up clinics, or juxtaposed to clinical settings (eg, long-term acute care hospitals), may stimulate the demand to schedule one or more meetings per month.

**Unique Challenges in Survivors of Critical Illness**

The precise problems that create the need for in-person peer support can make attending...
Table 2: Challenges of Survivors of Critical Illness and Possible Mitigation Strategies for Use in Peer Support Groups

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Possible Mitigation Strategies</th>
<th>References</th>
</tr>
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<tbody>
<tr>
<td>Cognitive impairment</td>
<td>Awareness, adjustment, and coping strategies for survivor and caregiver</td>
<td>1-4, 16, 17, 25, 27-30</td>
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<td></td>
<td>Empathy toward survivor and caregiver</td>
<td></td>
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<tr>
<td></td>
<td>Encourage rehabilitation and compensation training</td>
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<tr>
<td></td>
<td>Practical advice for obtaining a referral to a neuropsychologist</td>
<td></td>
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<td></td>
<td>Practical advice on use of memory aids, ways to break complex practical problems (doing the shopping) into easier tasks</td>
<td></td>
</tr>
<tr>
<td>Anxiety</td>
<td>Awareness, adjustment, and coping strategies for survivor and caregiver</td>
<td>1, 2, 4, 5, 18, 19, 27-30</td>
</tr>
<tr>
<td>Depression</td>
<td>Empathy toward survivor and caregiver</td>
<td></td>
</tr>
<tr>
<td>Posttraumatic stress disorder</td>
<td>Practical advice for obtaining a referral to a psychologist or psychiatrist to discuss medication and nonmedication (cognitive-behavioral) therapy</td>
<td></td>
</tr>
<tr>
<td>Physical impairment, including immobility, impairments in activities of daily living and instrumental activities of daily living, and chronic pain</td>
<td>Awareness, adjustment, and coping strategies for survivor and caregiver</td>
<td>1-5, 20, 21, 27-30</td>
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<tr>
<td></td>
<td>Empathy toward survivor and caregiver</td>
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<tr>
<td></td>
<td>Practical advice for obtaining a referral to receive physical and/or occupational therapy</td>
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<td></td>
<td>Shared experience with assistive devices (eg, showerheads and chairs, stools, walkers)</td>
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<tr>
<td>Negative financial impact</td>
<td>Empathy toward survivor and caregiver</td>
<td>23, 27-30</td>
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<tr>
<td></td>
<td>Practical advice for obtaining a social work or community health referral</td>
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<td></td>
<td>Connection to local charities</td>
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</table>

in-person support group meetings challenging. A brief list is provided in Table 2, along with potential mitigation strategies to discuss at meetings. Moreover, after critical illness, many survivors are in and out of various forms of health care venues, including long-term acute care hospitals or skilled care facilities. Frequent readmissions to the hospital or ICU and high short-term mortality further this challenge.

For survivors with functional impairments, which may include problems with mobility and driving, caregiver involvement and participation will frequently be required to permit the survivor to attend in person. Further, as noted previously, survivors with anxiety and posttraumatic stress disorder may be reluctant to attend meetings if scheduled at or near the ICU or hospital where the patient was admitted. Unlike other populations (eg, cancer survivors), who may have had time to process their illness and their recovery and to perform advanced planning, the nature of critical illness is that it is frequently acute and unexpected. In its wake, therefore, critical illness often leaves survivors with new impairments that they are not equipped or prepared to handle. This unique challenge must be acknowledged within critical care survivors broadly and peer support models specifically.

Sustainability of peer support groups requires engaged and active peer support leadership. Given the frequency and severity of impairments, some if not many survivors will be physically, mentally, or emotionally unable to serve in this role. For those survivors who are physically and mentally able to serve as leads, they may not be able to relate completely or to coach survivors with more severe injuries and disabilities as effectively as those with lesser impairments. Given the economic consequences of critical illness and the toll that it takes on survivors and their caregivers, the ability to attend meetings in a voluntary fashion may be cost prohibitive. For these reasons, virtual support is a plausible
alternative that warrants investigation; however, its utility in other populations has not been established.58 If centers of recovery emerge as an effective and financially solvent model, incorporating ICU staff and survivors into peer support staff as full-time employees or volunteers, as done successfully in mental health clinic models,41 may be prudent.

Design and Development of a Peer Support Collaborative

In 2015, the Society of Critical Care Medicine (SCCM) initiated the Thrive Supporting Survivors of Critical Illness initiative. Thrive has 3 pillars: a peer-support collaborative, expanding research into recovery, and education within and outside the ICU around PICS.59 The peer-support collaborative began with an international call for applications, the first action of the Thrive group. In the fall of 2015, 6 inaugural sites were awarded on the basis of their innovative and team-oriented design to implement, collaborate, and assess the effectiveness of peer-to-peer support groups applied to survivors of critical illness and their caregivers. The 6 sites include 5 adult hospitals and 1 pediatric hospital. We expect to expand the collaborative by 5 new sites each year for at least 2016 and 2017, balancing the needs of group cohesion with tremendous interest in participation.

The aim of the collaborative is to catalyze the development of a network of pioneer in-person support groups, testing the feasibility of peer support and amassing a body of proven experience and skills to grow and support survivors of critical illness. The underlying model of the peer-support collaborative is itself a form of collaborative peer support—that the leaders of the 6 sites convene monthly to share successes and challenges and to brainstorm solutions. The site leaders are joined on the monthly calls by SCCM staff and an international group of experts to be available as a resource for the sites. As the collaborative matures, the aim is for formal monthly communications to parallel frequent and informal idea exchanges and mentoring between sites. These efforts at group cohesion are facilitated by annual site visits by SCCM staff and a member of the Thrive initiative, and in-person meetings at SCCM’s annual congress.

A basic principle of the peer-support collaborative is that no evidence base for providing peer support to ICU survivors exists. We need to invent this future together. It is, by design, improvisational. In some ways, the collaborative is a support group for usually evidence-based clinicians busy working in an area without any evidence yet. The collaborative’s start-up culture is balanced by reporting to the broader SCCM Thrive initiative and to SCCM’s executive committee. Each year, the collaborative will share its current state of the art at SCCM’s annual congress and work to codify best practice in ways that can be scaled up and shared broadly.

We expect that in several years the evidence base will be sufficient to propose definitive clinical trials to evaluate alternative models of peer support. However, premature conduct of such evaluative trials—before the techniques of peer support have developed sufficiently to warrant testing—is not part of the collaborative’s mandate.

What to Expect

Based on the experience in the support group context and otherwise at the Vanderbilt Recovery Clinic, Intermountain Medical Center,60 and Toronto General Hospital,29,30,61,62 several recurrent themes should be anticipated when implementing a peer-support group. Chief among these relates to identity—that is, survivors grapple with questions related to who they are after intensive care. Acutely aware of new cognitive deficits, personality changes, and physical limitations, survivors frequently struggle in a quest to cope with loss and to define and eventually embrace a “new normal.” Even as they look ahead and brace for an unfamiliar future, they are regularly buffeted by feelings of frustration, guilt, and regret—sometimes for poor health decisions that led to critical illness and sometimes for contributing to the distress of family members. Regardless of prior health status, they tend to be preoccupied with health concerns, leading to vigilance, social disengagement, and withdrawal. In many cases, they feel powerless and victimized by circumstances, a dynamic that can result in decreased self-efficacy and a burgeoning sense of helplessness.

Facilitating support groups made up of individuals struggling with the aforementioned issues is both satisfying and challenging. Although successful group facilitators share certain characteristics regardless of the patient population in question—traits such as the ability to forge close connections and to relate to
others in a nonjudgmental fashion—effective leaders of post-ICU support groups should possess specialized knowledge. In particular, facilitators need to anticipate the natural history of PICS, as well as the impact of this condition on diverse domains of functioning so that they can expectantly manage and engage the issues that will most likely emerge and facilitate discussion. In addition, facilitators need to understand the resistance that patients often have to addressing important parts of their history, as discussions of their illnesses and in-hospital experiences are often highly traumatic. The group must possess a vision of what constitutes a “good” outcome. This hard-to-define metric will involve acceptance of limitations for some, subtle improvements or more for others, and ideally a richer sense of community and a revitalized sense of hope and purpose for all that attend. Coming together to jointly build this shared vision can be a rewarding part of the group process. Finally, the group must be prepared for how to handle and guide survivors who have medical and psychosocial needs that require attention and extend beyond the scope of the support group.

Conclusions
As the population of survivors of critical illness has grown, so has our understanding of the many challenges faced by survivors. To meet the needs of survivors, innovative strategies are urgently needed. Because so little is presently known regarding how to rehabilitate the functional disabilities that develop after critical illness, a potentially high-yield endeavor to complement hospital-based initiatives is to turn to survivors through the design and implementation of peer-support groups.

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A patient-reported outcome (PRO) is a report or assessment of the status of a patient’s health or health care experience that comes directly from the patient.¹ One common example used in acute and progressive care settings is the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey, which assesses patients’ satisfaction with care in the hospital setting.² Beyond providing a measure of satisfaction with previously delivered care, the broad array of available PROs represents a compendium of valuable tools for identifying patients’ future expectations for health-related goals, health engagement, or expectations for communication with health care providers, for example. Nationally, the Patient-Centered Outcome Research Institute has led the way in encouraging patients to engage actively with their health care team, in part through PRO surveys that ascertain, measure, score, or prioritize individual-level health beliefs, health goals, symptom perceptions, satisfaction with care and the care environment, and many other factors associated with the personal experience of health and illness.³

As nurses, we are increasingly focused on understanding and incorporating patients’ perspective in developing care plans and tailoring treatment regimens. To measure the effect of these efforts on the patient’s perceived quality of care, and to develop new knowledge for more effective patient-centered care planning, PROs are an important tool for clinical inquiry. The ability of PROs to serve a dual purpose, functioning both as a tool to guide care and as a measure of the quality of care delivered, enables these publicly reported scores to be particularly well suited for measuring change and evaluating improvements in quality. And yet, in clinical practice, a number of factors pose barriers to broad-scale use of PRO surveys as tools to guide care and evaluate outcomes in real time. Chief among these is the limitation of time itself. The purpose

Overcoming Barriers to Using Patient-Reported Outcomes for Clinical Inquiry

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of this article is to describe the value of PROs for patients and nurses and to propose strategies to overcome common barriers to using PROs in clinical settings.

Value of Patient-Reported Outcome Measures

Resistance to using PROs in clinical practice can be attributed in large part to the “newness” of PROs and underappreciation of these measures as a core value in patient care excellence.\(^4\) Although more than a decade of evidence has been generated to support the use of PRO data in usual patient care delivery, the value of collecting and using patient-generated data in clinical practice remains underappreciated. At the unit or hospital level, PROs can be used to identify short- and long-term goals for health and to develop a treatment plan that incorporates the patient’s understanding of the illness, his/her social and environmental support, and the perceived quality of financial and community-based resources that might be tapped to achieve his/her respective health goals. The added value of using PROs is the opportunity to elicit individuals’ health care decisions and choices in a meaningful, measurable, and reproducible way so that feedback can be given to patients and comparisons can be made over time.

What Is the Added Value for Patients?

Patient-reported outcomes quantify patients’ perspectives about the frequency and severity of symptoms, how disease affects physical functioning, and the degree to which illness limits quality of life.\(^5\) Both generic and disease-specific forms of PRO surveys have been developed (see Table) and represent valid, reproducible measures that are stable over

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**Table: Examples of Tools for Documenting Patient-Reported Outcomes in Patient Care Assessment**

<table>
<thead>
<tr>
<th>Usual Care Assessment</th>
<th>Opportunities for Integration of a Validated Assessment Survey (Patient-Reported Outcomes)</th>
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| Assessment of presenting problem or symptoms: “What brings you here today?” or “How do feel?” (e.g., regular checkup; pain, problems, issues?) | Emotional impact of disease  
Diabetes (PAID)  
Heart failure (KCCQ) |
| Symptoms and impact of illness on quality of life: “What symptoms or physiological problems, if any, affect or impede your daily activities?” | Symptom assessment and impact on quality of life  
General (HRQOL)  
General (PROMIS)  
Specific (KCCQ) |
| Medication use and management assessment: “What side effects, unanticipated effects, or reactions do you experience with your medications?” | Medication use patterns  
Morisky Medication Adherence Scale (MMAS)  
Belief in medications scale (BMQ) |
| Educational level and ability to read assessment: “What was the last grade you attended in school?” and “What is your preferred learning style?” | Health literacy  
REALM  
TOFHLA  
HeLMS |
| Evaluation of self-management strategies: “Do you weigh yourself each day?” “How do you usually monitor your blood pressure?” | Motivation, health behavior change  
PAM-13 |
| Knowledge about the current illness: “What is your understanding of your disease?” | Disease-specific tools  
DCP (diabetes) |
| Activity (current) and activity progression: “Tell me about your physical activity in a usual day.” | Current activity  
Stanford Questionnaire |
| Barriers to self-management of illness at home (including transportation, access to food, medications, or in-home care) | Assessments of physical environment and external social resources |

Abbreviations: BMQ, Brief Medications Questionnaire; DCP, Diabetes Care Profile; HeLMS, Health Literacy Management Scale; HRQOL, Health-Related Quality of Life; KCCQ, Kansas City Cardiomyopathy Questionnaire; PAID, Problem Areas in Diabetes; PAM-13, Patient Activation Measure-13; PROMIS, Patient-Reported Outcomes Measure Information System; REALM, Rapid Estimate of Adult Literacy in Medicine; TOFHLA, Test of Functional Health Literacy in Adults.
time and sensitive to clinical changes as they occur. As such, they provide opportunities for better data capture on the patient’s perception of health care and well-being.

When used as a standard part of care delivery, the time involved in obtaining PRO data is time well spent because it allows the patient to communicate measurable priorities, concerns, and perceptions to the health care team. Nurses and other care providers can then integrate direct patient input into the plan of care, the education plan, and plans to prepare for discharge. For example, assessing health literacy by using a standardized PRO tool may highlight opportunities for educational delivery method, such as the use of pictures rather than words, or the use of alternative medication information rather than standard pamphlets from the Food and Drug Administration. In addition, issues that are of particular concern to the patient or the patient’s family can more easily and systematically be identified and addressed, including knowledge gaps about the plan of care or gaps in the patient’s understanding of self-management expectations after discharge.

Despite more than a decade of encouragement to improve the quality of patient care by including PROs as a part of standard clinical assessment and clinical practice, these types of assessments of directly captured, PROs are still not routinely used. PROs are not typically integrated in usual care delivery or standard assessments of patients. In current clinical practice, we fail to assess PROs as an integral component of baseline information on patients, information that could be used to drive care delivery and develop a more patient-centered plan of care.

What Is the Added Value for Nurses and Providers?

The value of PROs for nurses and providers can be broken down into 4 opportunities: (1) enabling better data capture on patients’ perceptions of care, (2) allowing the nurse or provider to focus on the patient’s perceived concerns without wasting time on issues about which the patient may not be concerned, (3) providing structure for the nursing assessment to address and prioritize patient-centered concerns, and (4) improving communication and continuity of patients’ concerns and the plan for resolving those concerns across settings of care and over time.

Examples of these opportunities to use PROs to elicit patient-reported outcome data include assessment and care planning for patient literacy, patient-perceived quality of life, emotional impact of illness, medication-taking skills, patient goals for care including priorities, knowledge, skills, and ability to self-manage health conditions, or the social and psychosocial factors influencing patients’ self-management. Documentation of each of these key components of the patient assessment is required for high-quality care, and yet, the use of valid and reliable PRO tools to collect patients’ responses to these important assessment questions is far from “standard.” As a result, the patient’s response cannot be reliably compared across patients’ experiences or even within an individual patient’s experience, preventing nurses from assessing improvement at the individual level over time.

Powerful incentives to increase awareness of the value of PROs and encourage their use in clinical settings are emerging. For example, health care providers participating in accountable care organizations are now expected to provide evidence that the care they delivered produced value for the patient, as determined and reported by the patient. These new indications for use of PROs parallel suggestions that The Joint Commission and National Quality Forum may require use of PROs in order for organizations to be accredited. And yet, thus far, real-time clinical applications of PROs have been limited.

To date, the most commonly used and recognized examples of PROs in standard practice patterns include pain assessments (eg, the postoperative pain assessment, chest pain assessment, pediatric pain scales, and others) and assessments of satisfaction with care (eg, HCAHPS). Despite incentives for these examples and other use cases, PROs in clinical settings have major drawbacks, not the least of which are that they take considerable nursing time to administer to patients and that they are not reportable and actionable in real time. These drawbacks create a significant disincentive for PRO use for hospital nurses and a burden for ambulatory care nurses, where it can be challenging to find the results in the electronic health record (EHR) and difficult to maintain continuity and alignment with the plan of care.
Overcoming Barriers to Using PROs in Practice

Barriers in clinical practice settings present challenges for nurses who seek to improve practice quality and patients’ outcomes through clinical inquiry projects that depend on PROs. These barriers, though somewhat unique across patient populations and clinical sites, can be broadly grouped into 3 categories: (1) barriers to work-flow integration, (2) lack of real-time reporting for actionable metrics, and (3) technology-based barriers that prevent interoperability. Next we describe 3 brief solutions that highlight the promise of how these PROs can be used more effectively to contribute important data for clinical inquiry projects.

Work-Flow Integration

Although the opportunity to obtain important patient-centered clinical information (not available via any other mechanism or any other location in the EHR) is recognized by the health care team, the opportunity to obtain and use the information is not easily integrated into a unit’s work flow. The first step in addressing this challenge is through a shared governance platform, a meeting with a performance-services or Six Sigma process engineering team, or through a unit clinical practice council. Identify the decision-making informal leadership team in place, and use these leaders to evaluate work flow to accommodate PRO collection. The process of initiating change in established unit work flow can be difficult and is best addressed by partnering with established leadership groups such as these.13

The second step in ensuring that work flow accommodates PROs is to map not only the patient day, but also the entire course or plan of care. For example, the acute care nurse, discharging nurse, and follow-up nurse each have unique responsibilities that can be mapped across a shift as well as across the entire course of care or trajectory of illness. One example of a successful approach is shown in Figure 1.

Reporting Trends

Reporting PRO scores and trends in real time is another challenge that can stymie the use of PROs for clinical inquiry. Although the benefits of collecting and using these data are many, at a local level the front-line staff does not usually receive scores and trends on admission, during patient handoff, or even before the patient is discharged. The time delay makes using the survey responses difficult. The immediate opportunity for evaluation of the health care experience and communication between patients and providers about that experience is lost. Without the ability to obtain results of PROs in an actionable, real-time format, the value of the tools is diminished. One solution is to hardwire reports of actionable PROs into patient handoffs using an SBAR (situation, background, assessment and recommendation) reporting process for communication.14

Using SBAR for communication of PROs during patient report ensures that the results and actionable trends will be integrated into care planning and priority setting and will maintain integrity and continuity across shifts (Figure 2).

Although the opportunity exists to find trends in scores over time, send these trends to the clinic or referring provider, and print out these trends for patients to take home, scores are not always easy to find trends in and translate. One solution is to adopt criteria for selection of PROs to be used for a
given population of patients. The PRO most useful for clinical inquiry projects is one that is (1) actionable, indicating that the results have clinical meaning and drive or contribute significantly to the care plan; (2) interpretable, meaning that the scoring is clear immediately during use and does not require extensive programming to get a score during a given shift; (3) efficient to use, meaning minimal time is required for the nurse to administer the survey or tool; (4) patient-friendly, so that it can be completed independently, without the need for interpretation or additional instructions; and (5) obligatory, meaning the documentation of the measure is a valuable data point in the patient care process and is therefore an expectation of leadership and/or quality regulatory boards such as The Joint Commission or the National Quality Forum.

Technology and Incentives

The third broad category of barriers to PRO use in clinical practice includes technology-based challenges. The goal for PRO data capture is to achieve fully integrated EHR functionality, with interoperability across settings of care and across devices, such as electronic tablets, telephones, and other web-based devices. Although the horizon is shortening, and examples of PROs on electronic platforms are becoming more common, the state of “usual standard care” still does not typically include ePROs. As shown in Figure 3, electronic procurement of PROs to support clinical inquiry would include data sharing among providers across sites of care, graphic depiction of trends that are easy to interpret and share with patients, and online access to surveys for patients to complete at home or in the clinic waiting room after hospital discharge. Specific strategies for approaching technology-based barriers at a given hospital or in a specific unit will vary depending on the EHR system and the availability of information technology specialists; however, the pace of systematic changes across the country is rapidly moving forward in support of electronic PRO systems.16,17

Conclusion

The assessment of patients’ perspectives as key stakeholders in high-quality, high-value health care is quickly becoming an important and recognized opportunity for nurses. To improve the ability to tailor and shape care plans to the needs and goals of individual patients, we must improve our skills and the efficiency with which we select, interpret, and use PROs in clinical practice. Using strategies to address work-flow barriers,
maximize reporting opportunities, and resolve technology barriers will improve the clarity of the patient’s voice in clinical inquiry projects.

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Post–intensive care syndrome (PICS) is the constellation of consequences of critical illness that begins in the intensive care unit (ICU) and may persist long after hospitalization. Patients’ families may also experience sequelae from their experiences with a loved one in the ICU (PICS-F). A host of persistent physical, cognitive, and mental health problems may adversely affect quality of life, family integrity, and social outcomes. It is reported that at least one-third of ICU patients and their families experience PICS and PICS-F. Why some patients and families are affected and others are not is unknown.

Case Study

Jane walked into my office for her first day as a nursing leadership student in her last semester of a registered nurse to bachelor of science in nursing (RN to BSN) program. Traditionally these students wear business clothes to their clinical rotation. Her initial words to me were an apology. She felt badly that she had to wear orthopedic shoes because of the physical problems lingering from a traumatic accident. She lifted her pant leg slightly to expose a brace. I knew at that moment that this was not going to be a routine student experience and asked her to tell me more. She sat across from me and her story unfolded.

She had been struck on the way home from work one night by a drunk driver and spent more than a year in the hospital recovering: many months in the ICU and then several more in rehabilitation. Once her cognitive function had recovered to the point where she could study, she went back to school to obtain a bachelor’s degree in nursing. She hoped to obtain a nursing position that did not require 12-hour shifts because she could no longer spend that much time on her feet. That’s how she found me, randomly assigned to be her preceptor. What I wasn’t prepared for was to hear her experience of PICS and her mother’s experience of PICS-F. I had just returned from a trip to Chicago for the Society of Critical Care Medicine, where I had co-chaired a task force to explore the long-term consequences of critical illness. It was there in 2010 that we developed the terms PICS and PICS-F to help raise awareness about the subject and set forward a national research agenda. Her testimony validated the importance of our work.
As she recounted her postinjury experience, her strongest memory was of the fear caused by loneliness and abandonment. Many of her bones were broken, and in the beginning, she could barely lift a finger to press the call button. She was heavily sedated and receiving mechanical ventilation. The physicians would come to round each day with her mother present and declare, over her bed, that she would most likely not survive. She described their rounding dialogue in detail, remembering every word as if it were yesterday. Jane assumed that the team thought she was either too critically ill or too sedated to remember, so their discussion was frank and open in regard to how seriously ill she was.

She recalls that following a day of hearing about her poor prognosis, the night-shift staff encouraged her mother to go home to rest because they rationalized that her mother would need her strength to manage her daughter’s rehabilitation or death. But her mother did not want to leave her daughter’s bedside. She had rented a motor home to be as close to her daughter as she could be. She was plagued by the thought that her daughter might die alone without her family present.

When the nurses had encouraged her mother to leave her beside, they told Jane that if she pushed the call bell, they would call her mother and she could come in to be with her. Jane did push the call bell. The nurse came in and said she would call her mother for a visit. The clock was visible from the head of the bed. Jane remembers watching the second hand go around and around for hours. She prayed for her mother’s return, but it did not happen. The nurses, she assumed, felt she was too sedated or ill to remember.

Jane describes other instances of asking for her mother to be present at her bedside. She recalled that when the nurse left to get her mother, she overheard the nurses at the nursing station laughing, jeering at the thought that a grown young woman needed her mother so badly. She could not fathom why the nurses did not understand her need to have family with her. Jane perceived those nurses as cold and indifferent to her needs.

Jane’s mother, on the other hand, couldn’t cope with the imposed separation any longer. To avoid being asked to leave, on some evenings she hid under the bed. She would reach her hand up through the rails to touch Jane’s fingers. One night she even hid behind the curtains. She found a urinal and kept it with her in case she needed to use it. It gave her comfort to be able to still see her daughter. She continually feared that her daughter would die alone.

Jane shared that she and her mother both received psychiatric care for many years to treat the mental illness caused by their ICU experience; both were diagnosed with posttraumatic stress disorder (PTSD). PTSD has been noted in both critical care patients and family members of critically ill patients. Jane and her mother openly admitted their admiration for those who saved Jane’s life; but “the save” was not the end of the story. It was the beginning of a long and arduous journey of recovery. They remind us that how the second chapter unfolds can be shaped by the first chapter—the ICU stay. In PICS and PICS-F, anxiety, depression, or symptoms of PTSD related to the ICU stay may develop in the patient or the patient’s family. For instance, our best intentions at helping patients’ family members get rest or respite can be counterproductive to their strong desire for presence and safeguarding their loved one’s life.

**Ethics Analysis**

The ethical issues that attend the prevention or mitigation of PICS/PICS-F include individual clinician and systems/organizational interventions. Nurses are moral agents; institutions are moral communities. A straightforward ethical analysis of Jane and her mother’s case might invoke the ethical principles of nonmaleficence, beneficence, and respect for persons. We should, at a minimum, not harm our patients (or their families), and, given informed consent, we are obligated to provide them with empirically sound beneficial treatment. We are also obligated, at a minimum, to respect the dignity of patients and their family members as persons.

Jane and her mother are grateful for Jane’s lifesaving treatment—perceived benefits are not at issue. Further exploration is needed to understand the harms that resulted from the behaviors, inattention, or disregard for what Jane or her mother understood to be beneficial to them and their well-being. Both women report being emotionally traumatized by their forced separation, and by the apparent indifference, infidelity, and uncaring attitudes demonstrated by nurses and other critical care professionals.
Critical care nurses’ conception of professional duty is not limited to ethical analysis and ethical principles. Rather it is informed by a notion of moral agency that is consonant with the work of feminist philosopher Margaret Urban Walker. Walker sees morality not as a theory or a set of rules or principles, but as a set of practices in our everyday lives. Patients, in Walker’s words, are nurses’ business. She would see nursing practice as morally situated in 3 things: role, responsibility, and accountability. The critical care nurse is a professional: she (or he) has a body of expert knowledge that she professes to use for the good of others (her patients). In her role as a nurse, she is responsible for and accountable to her patients. The competent critical care nurse (physician or other clinician) presumes that an unconscious patient can hear, can understand, and thus is mindful to touch the patient, to reassure, to explain, to give the unconscious or even dying patient “the benefit of the doubt.”

The experiences of Jane and her mother and their subsequent struggle with PICS and PICS-F remind us of a key expectation of the nurses’ code of ethics: “The nurse practices with compassion and respect for the inherent dignity, worth and unique attributes of every person.” Treating vulnerable people with compassion and honoring their dignity is a rigorous, nonnegotiable standard for all nurses. What might have interfered with the nurses’ ability to demonstrate empathy and understanding for this patient and her mother? Although none of us were in this specific situation, we may have witnessed similar instances where members of the health care team have demonstrated a lack of empathy or caring. One possible explanation for the behaviors described is compassion fatigue.

Compassion fatigue is described as nurses losing their ability to nurture in their relationships with patients and patients’ families. An integral component of nursing is being present with patients and patients’ families, and as such, the nurse participates in both the joy and suffering that transpire in those interactions. Compassion fatigue is progressive and occurs in nurses as a result of the stress of prolonged, intense relationships with patients in which the nurses’ compassionate energy is expended and not restored. When compassion fatigue is present, changes in ethical and clinical values may occur, including lack of identification of patients’ needs and lack of enthusiasm for patient care. Compassion fatigue can also coexist with other factors such as moral distress that can further erode nurse’s abilities to engage with empathy and compassion.

In order for nurses to fulfill their ethical obligations, the code of ethics for nurses rightly calls nurses to care for themselves so that they can care for others. It states that the nurse owes the same duties to self as to others, including the responsibility to promote health and safety, preserve wholeness of character and integrity, maintain competence, and continue personal and professional growth.

It is vital that critical care nurses understand that the tension of persistently monitoring critically ill patients in order to ensure early detection of deteriorating condition and the witnessing of suffering and death take their toll. Failure to self-acknowledge the impact of this level of responsibility and subsequently engaging in self-care activities can result in expending a level of energy that exceeds the nurses’ ability to recover, and compassion fatigue ensues.

**Call to Action**

Providing care that minimizes the development of PICS and PICS-F and the harms associated with them is the ethical responsibility of nurses. Understanding the factors that contribute to PICS and PICS-F, a commitment to live the ethical values reflected in the code of ethics, awareness of the impact of compassion fatigue on caring behaviors, understanding patients’ experience, and contributing to an environment that supports humanistic care are elements of a multi-pronged approach.

**Understanding Patients’ Experience**

Mitigating the impact of development of PICS and PICS-F begins with a robust understanding of the experience of patients in the ICU. The Society of Critical Care Medicine has produced a number of videos available on YouTube (https://www.youtube.com/watch?v=mahm5WHx87Q). Patients discuss their experiences in their own words and identify interventions that they believe would be supportive of critically ill patients and their families. In one video (https://www.youtube.com
The patient poignantly shares the most meaningful care she received. She highlights that what might be considered mundane, like talking about the weather or some uplifting news, helped her to feel human and connected. Readers should consider viewing these videos with other members of the health care team in order to facilitate insight into the patient’s perspective of the ICU stay. As a team, consider incorporating recommendations into practice on your unit. Be cognizant of the right of patients and their families to participate in their own care by use of open visiting hours, participation in rounds, and answering questions honestly. It is also important to be aware of the words we say and how we say them, so that caring is evident with all interactions.

A variety of factors in the ICU have been noted to exacerbate the high rates of anxiety, depression, and PTSD noted in patients and their families after an ICU stay. One promising approach to diminishing the emotional aftermath of a stay in the ICU is the use of diaries. The diary is maintained by the ICU staff members and describes the patient’s daily activities, visitors, and the patient’s responses to those activities. Some diaries include photographs of the patient’s journey. Patients have responded positively to receiving the diaries. The diaries assured them that there were people who cared about them as they went through their illness. It has been reported that the patients and families who received diaries had lower levels of PTSD than did those who did not receive a diary.

Environments That Support Humanistic Care

Jenkins and Warren share the wisdom of Native Americans, who say, “each time you heal someone, you give a piece of yourself away.” How can critical care nurses ensure that they are able to give and restore in order to be ready to give again? Certainly taking care of themselves, learning stress management strategies, developing self-awareness, and being mindful of balance in one’s life is a start. Beyond that, leaders in the environment where nurses practice need to be mindful of the potential for compassion fatigue to develop in their staff.

Nursing leaders and colleagues need to monitor one another for signs of compassion fatigue, including chronic absenteeism, high turnover, and interpersonal conflict among the staff. Providing the staff with support and education on compassion fatigue is a start. Creating an environment that fosters nurses supporting each other is vital. Programs aimed at enhancing nurses’ resiliency are showing promising results in regard to decreasing compassion fatigue and increasing compassion satisfaction. The effects of these programs have been sustained over time. Likewise, administrative supports that promote a healthy work environment for all clinicians such as appreciative practice initiatives; compassionate care programs for caregivers, patients, and families; and institutional resources to address clinical ethical issues and moral distress are promising practices.

Conclusion

The lifesaving critical care environment is fraught with hazards for patients, their families, and the health care team. Understanding the nature of PICS and PICS-F as well as interventions to potentially mitigate the impact of an ICU stay is a key responsibility of the health care team. Being alert to the development of compassion fatigue and acting preemptively to diminish its development are key responsibilities of both leaders and members of the health care team. Having knowledge about our patients and caring for self allow us to be optimal agents of care.

REFERENCES


The ECG Challenge for this issue takes a diversion from the electrocardiogram to examine 2 important documents published simultaneously in October 2015. The first is the eagerly awaited 2015 American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care.1 The second is a brand new book-sized report from the Institute of Medicine (IOM) titled Strategies to Improve Cardiac Arrest Survival: A Time to Act.2 Both of these documents recommend that we take a bold new approach to the treatment of cardiac arrest in the United States.

According to the IOM report, sudden cardiac arrest is the third leading cause of death in the United States. The annual incidence (number of new cases in the United States per year) of cardiac arrest outside the hospital (OHCA) is 395,000 with 5.5% surviving to hospital discharge, and the incidence of cardiac arrest in hospitalized patients (IHCA) is 200,000 with 24% surviving to hospital discharge. Resuscitation outcomes in the United States have not improved in the past 30 years—overall survival rates are stable at 7.6%. Despite these dismal statistics, only 3% of the population of the United States receives instruction in cardiopulmonary resuscitation (CPR) each year.2 We know that resuscitation outcomes can be improved with prompt bystander CPR and early use of automated defibrillators.

The IOM report suggests the need for a comprehensive systems-based framework to identify short- and long-term strategies that focus on 5 factors for improving patients’ outcomes after cardiac arrest: the public, emergency medical services systems, hospitals and health care systems, researchers, and professional education and advocacy organizations.2 The American Heart Association (AHA) guidelines update announces the elimination of the 5-year guideline revisions timetable in favor of a continuously updated website with the aim of rapid translation of research to the bedside. The single “chain of survival” diagram is replaced with separate diagrams for OHCA and IHCA. The AHA report also reiterates 2 major impact goals for the period from 2010 to 2020: to double the rate of bystander CPR and to double cardiac arrest survival rates.1
Emergency Cardiac Care Guidelines Update 2015

The authors of the emergency cardiac care guidelines make it clear that the 2015 document published in *Circulation* is an update—not a revision. A revision is a change that corrects or improves, whereas an update reviews the most recent information about a topic. For example, when the International Liaison Committee on Resuscitation (ILCOR) changed the emphasis of emergency care from breathing and airway as the primary survey to circulation as the primary focus (ABC survey to CAB survey), that was a revision. In the current document, an upper limit is, for the first time, added to the rate of chest compressions. This change is an update based on research that indicates that overly rapid chest compressions do not allow adequate depth of compression.

The guidelines have been revised periodically in the past 50 years. CPR came into use in the early 1960s, and the National Academy of Sciences published the first US guidelines in 1966. The American Heart Association published 7 guideline revisions in the next 50 years, starting in 1974 and resulting in the current guidelines. This new iteration of emergency cardiac care guidelines takes advantage of current Internet technology and the need to quickly translate science into action. The complete searchable updates and current guidelines are now available for immediate review at https://eccguidelines.heart.org/index.php/circulation/cpr-ecc-guidelines-2/.

The method used for both gathering and evaluating evidence for the current guidelines and the update was also revised for 2015. The committee used the PICO method (population, intervention, comparator, and outcome) to formulate questions based on clinical significance and new evidence. One hundred sixty-five PICO questions were reviewed, resulting in 315 updates for emergency cardiac care. Levels of evidence and classifications of recommendations were also revised; the guidelines and updates are divided into 5 classes of recommendation, with 5 levels of evidence. Note that class III recommendations are newly divided into 2 subcategories: no benefit to a procedure or treatment, and dangerous treatments or procedures that should not be performed.

Table 1 summarizes the total number of updates with their levels of evidence. The high percentage of updates based on limited data or expert consensus as opposed to the low number of updates based on high-level evidence illustrates the paucity of high-quality, pertinent research in the field of resuscitation.

### Basic Life Support Updates

The basic life support (BLS) updates (Table 2) are focused on 2 areas: improving the quality and performance of CPR and instituting “just in time” bystander CPR by emergency medical response dispatchers. CPR quality issues include adding an upper limit of 120 compressions per minute to promote adequate depth of compressions and complete chest recoil, reducing pauses before and after a shock, and adding the use of intramuscular or intranasal naloxone by BLS health care providers when opioid-related stupor is likely. The update includes the addition of a new limit to compression depth of 2.4 inches for adult victims, along with a goal of increasing the chest compression fraction to at least 60%. Chest compression fraction is a measure of the percentage of time that chest compressions are actually in progress. Additionally, CPR providers are urged not to lean on the chest so that full recoil can be attained.

The BLS section of the update also places a heavy emphasis on improving the rate of bystander CPR. EMS dispatchers are urged to learn to identify cardiac arrest on the basis of descriptions of bystanders. Dispatchers should assume that the victim is in cardiac arrest if the bystander describes gasping (agonal breathing) or the absence of breathing. Dispatchers should then either provide support to a bystander who is trained in...
CPR or teach the untrained bystander to do “compressions-only CPR” until EMS providers reach the scene.5

Advanced Cardiac Life Support Updates

The advanced cardiac life support (ACLS) updates were developed by addressing 37 PICO questions related to oxygen use, advanced airways, ventilation rate, carbon dioxide detection, physiological monitoring, prognostication, defibrillation, drugs, and extracorporeal CPR (Table 3).6 Providers should continue to use the maximum feasible amount of oxygen during CPR. When feasible, the update recommends physiological monitoring such as quantitative waveform capnography and arterial pressure monitoring during CPR. Use of a bag mask valve device and use of an advanced airway for oxygenation and ventilation are considered equivalent from an evidence standpoint in the update, and either can be used depending on the skills of the provider. When an endotracheal tube is used, a combination of continuous waveform capnography and clinical assessment is the most reliable method of confirming and monitoring tube placement.6

The rate of assisted breathing for all breathless patients with an advanced airway is simplified to 10 breaths per minute (one breath every 6 seconds) to prevent excessive ventilation. Biphasic defibrillation is preferred over monophasic defibrillation, and the single-shock approach continues to be preferred over the stacked-shock method. Vasopressin was removed from the general-use pulseless victim algorithms because its effect is equivalent to that of epinephrine6; however, there remains a use for vasopressin in a bundled approach to IHCA with intravenous steroids.7 Epinephrine use in nonshockable rhythms was upgraded; epinephrine should be used as soon as feasible in cardiac arrest victims with nonshockable rhythms (asystole or pulseless electrical activity). Extracorporeal CPR (extracorporeal membrane oxygenation) is now included in the ACLS algorithm for use in special circumstances.6

The complete emergency cardiac care guidelines are available free from the website https://eccguidelines.heart.org/index.php/circulation/cpr-ecc-guidelines-2/, including a full-color PDF version of the highlights of the 2015 guidelines update.1 Updates are clearly compared with the 2010 guidelines, and the rationale for each change is included for all categories in the highlights of the PDF document. The journal Circulation is also allowing free access to the 2015 update via its website. For those who have the Circulation iPad application, both the ILCOR and AHA versions of the update are available as free downloads.

Table 2: Selected Updates for 2015 Guidelines for Cardiopulmonary Resuscitation Quality and Classification of Recommendation

<table>
<thead>
<tr>
<th>Emergency Cardiac Care Practice</th>
<th>COR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compression rate 100-120 (new upper limit)</td>
<td>Ila</td>
</tr>
<tr>
<td>Compression depth 2-2.4 inches (5-6 cm)</td>
<td>I</td>
</tr>
<tr>
<td>(new lower limit)</td>
<td></td>
</tr>
<tr>
<td>Reduce pauses before and after shock</td>
<td>I</td>
</tr>
<tr>
<td>Increase chest compression fraction (goal at least 60%)</td>
<td>IIb</td>
</tr>
<tr>
<td>Naloxone for opioid stupor (health care providers)</td>
<td>IIa</td>
</tr>
<tr>
<td>OHCA, shockable rhythm—3 cycles 200 compressions with passive oxygen insufflation (EMS only)</td>
<td>IIb</td>
</tr>
<tr>
<td>No routine passive ventilation for conventional CPR</td>
<td>IIb</td>
</tr>
<tr>
<td>Routine passive ventilation okay for EMS bundled services</td>
<td>IIb</td>
</tr>
<tr>
<td>EMS dispatchers—assess for consciousness and abnormal breathing</td>
<td>I</td>
</tr>
<tr>
<td>Dispatcher to assume victim is in cardiac arrest if no normal breathing</td>
<td>I</td>
</tr>
<tr>
<td>Educate dispatchers to identify cardiac arrest through a range of clinical signs and symptoms</td>
<td>I</td>
</tr>
<tr>
<td>Dispatchers provide “chest compression only” instructions for OHCA</td>
<td>I</td>
</tr>
<tr>
<td>10 breaths per minute during CPR with advanced airway</td>
<td>IIb</td>
</tr>
<tr>
<td>Artifact-filtering algorithms not recommended except for research</td>
<td>IIb</td>
</tr>
<tr>
<td>Audiovisual feedback devices may be used</td>
<td>IIb</td>
</tr>
<tr>
<td>Lay rescuers not to use head-immobilization devices</td>
<td>III</td>
</tr>
</tbody>
</table>

Abbreviations: COR, class of recommendation; CPR, cardiopulmonary resuscitation; EMS, emergency medical services; OHCA, cardiac arrests occurring outside of the hospital;6 Chest compression fraction measures the percentage of time that chest compressions are actually in progress.

CPR or teach the untrained bystander to do “compressions-only CPR” until EMS providers reach the scene.5

Advanced Cardiac Life Support Updates

The advanced cardiac life support (ACLS) updates were developed by addressing 37 PICO
Nurses are most familiar with the IOM for landmark reports on hospital safety in 1999 and on the future of nursing in 2011. This current IOM study and report was requested by the American College of Cardiology, the AHA, the American Red Cross, the Centers for Disease Control and Prevention, the National Institutes of Health, and the US Department of Veterans Affairs to study resuscitation research and resuscitation outcomes in the United States as a public health problem. The committee was charged to look at all aspects of resuscitation except for prevention of cardiac arrest.2

The report provides a broad overview of issues related to both IHCA and OHCA. Extensive reviews of the research literature are presented at the end of each chapter. Barriers to successful resuscitation outcomes, reviewed in detail, include lack of a national reporting system for cardiac arrest; lack of community engagement in resuscitation aims; disparities in treatment based on ethnicity, location of arrest, economic status, age, and sex; a dearth of research and funding for research; delayed translation of research to the field; and leadership deficiencies. The report concludes with 8 major recommendations for improvement and suggests organizational leadership for each area (Table 4).2

### IOM Recommendations

The first recommendation is to establish a national cardiac arrest registry through the leadership of the Centers for Disease Control and Prevention, with cooperation of state and local health departments. Accurate data collection for both OHCA and IHCA by using such a registry will encourage accountability and promote improvement in outcomes. The second recommendation is to promote public awareness and public readiness to participate in resuscitation activities. Bystander CPR and procurement of automatic external defibrillators (AEDs) are critical factors in improving outcomes for OHCA victims. The IOM suggests that state and local departments of health and education, in partnership with training organizations, should support CPR and AED training. Legislation to make CPR training a requirement for graduation from high school

### Table 3: PICO (Population, Intervention, Comparator, Outcome) Topics With Selected 2015 Advanced Cardiac Life Support Updates

<table>
<thead>
<tr>
<th>PICO Question Topic</th>
<th>Recommendation</th>
<th>COR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen use</td>
<td>Continue to use maximum feasible inspired oxygen during CPR</td>
<td>IIb</td>
</tr>
<tr>
<td>Physiological monitoring</td>
<td>It may be reasonable to use physiological parameters to optimize CPR quality</td>
<td>IIb</td>
</tr>
<tr>
<td>Advanced airway use</td>
<td>Either a bag-mask device or an advanced airway during CPR for OHCA and IHCA</td>
<td>IIb</td>
</tr>
<tr>
<td>Carbon dioxide detection</td>
<td>Use continuous waveform capnography and clinical assessment for confirming and monitoring correct placement of ETT</td>
<td>I</td>
</tr>
<tr>
<td>Ventilation rate</td>
<td>One breath every 6 seconds with advanced airway management</td>
<td>IIb</td>
</tr>
<tr>
<td>Defibrillation</td>
<td>Biphasic defibrillation preferred over monophasic defibrillation</td>
<td>IIa</td>
</tr>
<tr>
<td></td>
<td>A single-shock strategy (as opposed to stacked shocks) is reasonable for defibrillation</td>
<td>IIa</td>
</tr>
<tr>
<td>Prognostication</td>
<td>P\textsubscript{ETCO2} less than 10 mm Hg after 20 minutes CPR can be used as a factor when considering ceasing efforts</td>
<td>IIb</td>
</tr>
<tr>
<td>Antiarrhythmic drugs</td>
<td>Routine use of magnesium in adults not recommended (no benefit)</td>
<td>III</td>
</tr>
<tr>
<td>Vasopressors</td>
<td>Vasopressin removed as sole pressor for pulseless individual</td>
<td>IIb</td>
</tr>
<tr>
<td></td>
<td>Administer epinephrine as soon as feasible for pulseless nonshockable rhythm</td>
<td>IIb</td>
</tr>
<tr>
<td>Steroids</td>
<td>Steroid use in a bundled approach to IHCA</td>
<td>IIb</td>
</tr>
<tr>
<td>ECMO</td>
<td>Use in select patients where cause of cardiac arrest is potentially reversible</td>
<td>IIb</td>
</tr>
</tbody>
</table>

Abbreviations: COR, class of recommendation; CPR, cardiopulmonary resuscitation; ECMO, extracorporeal membrane oxygenation; P\textsubscript{ETCO2}, end-expiration partial pressure of exhaled carbon dioxide; ETT, endotracheal tube; IHCA, in-hospital cardiac arrest; OHCA, cardiac arrest outside of hospital.
ECG Challenges

Table 4: Institute of Medicine Recommendations to Improve Cardiac Arrest Survival

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Responsible Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish a national cardiac arrest registry</td>
<td>Centers for Disease Control and Prevention</td>
</tr>
<tr>
<td>Foster a culture of action through public awareness training</td>
<td>State and local departments of health and education, training organizations</td>
</tr>
<tr>
<td>Enhance the capabilities and performance of emergency medical services</td>
<td>National Highway Traffic Safety Administration</td>
</tr>
<tr>
<td>Set national accreditation standards related to cardiac arrest for hospitals</td>
<td>The Joint Commission</td>
</tr>
<tr>
<td>and health care systems</td>
<td>Hospitals, health care systems, and emergency medical services systems</td>
</tr>
<tr>
<td>Adopt continuous quality improvement programs related to cardiac resuscitation</td>
<td>National Institutes of Health, The American Heart Association, and The US Department of Veterans Affairs</td>
</tr>
<tr>
<td>Accelerate research on the evaluation and adoption of cardiac arrest therapies</td>
<td>National Institutes of Health, Agency for Healthcare Research and Quality, US Department of Veterans Affairs, Patient-Centered Outcomes Research Institute</td>
</tr>
<tr>
<td>Create a national cardiac arrest collaborative</td>
<td>American Heart Association and American Red Cross</td>
</tr>
</tbody>
</table>

* Based on information from Graham et al.2

(already in place in some states) is one of the tantalizing strategies suggested.2

The third recommendation is to enhance the capabilities and performance of emergency medical systems through the leadership of the National Highway Traffic Safety Administration. The IOM charges this administration with coordination of the various federal, state, and local agencies involved in training first responders and paramedics. Goals include standardized dispatcher-assisted CPR protocols and development of a consistent training curriculum across the country. The fourth recommendation charges The Joint Commission to collaborate with stakeholders to develop accreditation standards for health care facilities specific to care and treatment of patients with cardiac arrest. The IOM report notes that no accrediting agency requirements for hospitals to report outcomes from cardiac arrest are currently in place.2

With the fifth recommendation, the IOM charges hospitals, health care systems, and EMS systems to adopt continuous quality improvement (CQI) programs. CQI activities should include data collection, setting of performance benchmarks, feedback, and fine-tuning of cardiac arrest protocols to promote improvement of outcomes. Most hospitals use the principles of CQI for many quality indicators, but its use for emergency resuscitation in hospitals is not optimal.

Recommendation 6 calls for the acceleration of research in pathophysiology, new therapies, and translation of science for cardiac arrest. The IOM notes that traditional research methods using multiphase trials may not be appropriate for cardiac arrest research, and adaptive trial designs are more likely to lead to rapid translation of findings.2

Recommendation 7 calls for acceleration of research related to evaluation and adoption of cardiac arrest therapies through the leadership of the NIH, the Agency for Healthcare Research and Quality, US Department of Veterans Affairs, and the Patient-Centered Outcomes Research Institute. New technologies and treatments should be applied in a timely manner and evaluated for their effectiveness in improving resuscitation outcomes. The final recommendation, and perhaps the most important one, is to create a national collaborative for cardiac arrest led by the AHA and American Red Cross. The collaborative will develop strategies, convene working groups for projects, meet on a regular basis, and encourage the development of new technologies.2
Role of Nurses in Improving Cardiac Arrest Survival

The 2015 emergency cardiac care updates call for a renewed effort to provide timely and highly effective CPR both inside and outside the hospital. Nurses are the first responders in hospitals and are in the ideal position to take the lead in ensuring high-quality CPR for IHCA. As CPR providers, nurses can use their skills to provide compressions at the proper rate and depth to promote maximum effectiveness. Nurses can use their leadership, communication, and team-building skills to ensure that other CPR providers use the principles of high-quality CPR.

Even though most training centers rely on a retraining schedule of every 2 years, the emergency cardiac care guidelines note that the optimal training interval needed to maintain BLS and ACLS skills is unknown. BLS skills deteriorate rapidly after a training course, and it is reasonable to provide more frequent training for individuals who are likely to treat victims of cardiac arrest. Nurses can have an impact on skill maintenance by training regularly with mock codes, providing the skill reinforcement and self-efficacy needed to maintain optimal CPR skills and team process. Mini practice sessions on nursing care units using high-fidelity mannequins could provide opportunities for more frequent practice and self-guided skill checks. Internet-based simulation skill practice programs such as those developed by the AHA could also aid in skill maintenance.

Nurses are also hospital leaders in continuous quality management and are in a good position to influence leadership through data collection, setting benchmarks, and feedback. Nurses can provide support for CQI and outcomes measurement related to cardiac arrest care. Serving as busy direct care providers, nurses may not feel that they have the time to “stick around after a code” and review what went well and what did not, but critical debriefings are important and lessons learned should be documented and shared. Nurses can also promote appropriate use of targeted temperature management after cardiac arrest for victims of both OHCA and IHCA in emergency departments and intensive care units.

Nurses are in a good position to support thoughtful and realistic considerations of advance directives and patients’ preferences for resuscitation when appropriate. Most in-hospital cardiac arrests (82%) are associated with nonshockable cardiac rhythms, specifically pulseless electrical activity and asystole. IHCA numbers are high in part because of the serious nature of the illness of hospitalized patients, and one way to decrease the occurrence of IHCAs is to reduce futile care. Supporting critically ill individuals’ wishes for peaceful last days and appropriate, timely hospice care can have the secondary effect of decreasing the numbers of in-hospital resuscitations.

Although nurses are ideally positioned in their roles as bedside caregivers to improve IHCA outcomes, they need to be creative in order to have an impact on improving OHCA survival. One potential area in which nurses can influence OHCA is in teaching the basics of CPR to family members of at-risk individuals or providing CPR resources so that they can learn on their own. The AHA has a concise 1-minute video that teaches hands-only CPR. Such a video is useful for patient and family education both inside and outside of the hospital. Nurses can also become politically active and influence state legislators to pass legislation promoting citizen education in CPR and proper use of the AED. Nurses can participate in research related to knowledge gaps identified in both the emergency cardiac care updates and the 2015 IOM report.

Summary

Acute and critical care nurses endeavor to ensure optimal outcomes for patients in all of their interactions with critically ill persons. The current deficiencies in outcomes related to cardiac arrest and the lack of significant progress in the past 30 years is a concern for all of us. Nurses can make their optimal contribution in this area by fully supporting AHA and IOM initiatives to improve cardiac arrest outcomes.

REFERENCES


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