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Editorial

Measles: Eliminated but Not Eradicated

If you were a critical care nurse as old as I am, you would most likely have personal experience with the measles virus, gained first-hand while attending elementary school, when you had your turn feeling foul and febrile while wearing a nasty red rash for a week or so. Some of us were provided with an additional opportunity to develop antibodies against measles by contracting both its more benign as well as more serious form. In addition to conferring immunity to future instances of this illness, one or more bouts of measles could also leave us with enduring recollections of how it looks and feels, memories that can serve in later years to recognize the reappearance of measles in children, grandchildren, or patients.

Critical care nurses whose academic and professional years have spanned most of the past few decades, however, have had little opportunity to see measles in clinical practice. Since the first measles vaccine licensed in 1963 started eroding the scourge of this disease through the year 2000, when it was declared eliminated in the United States, and throughout the next decade, a median of only 60 cases of measles were reported in the United States annually. As a result, it would be entirely plausible for younger generations of critical care nurses to be more familiar with the measles-mumps-rubella (MMR) vaccine used since 1971 than with specific attributes of the clinical entity itself.

Critical care nurses who are not members of the baby boomer generation may also be less familiar with the morbidity and mortality associated with measles that existed before an effective vaccine was produced. Centers for Disease Control and Prevention (CDC) estimate that between 1963 and 1973, some 3 to 4 million people in the United States were infected with measles annually, of whom 48,000 required hospitalization, 4,000 were left with chronic disability from measles encephalitis, and 400 to 500 died. Measles was then and remains much more than an annoying childhood disease; it can and does disable and kill.

Between 2000 and 2013, the number of measles cases reported annually in the United States has varied from a low of 37 in 2004 to more than 200 cases in 2011 and a few less than 200 in 2013. Nearly all of these cases were imported into this country from outbreaks originating in other parts of the world. A measles case is categorized as imported when exposure to the virus occurred outside the United States 21 days before the rash developed and the rash occurred within 21 days following entry into the United States, with no known exposure to measles within the United States during that time. In 2014, the United States experienced 644 cases of measles, the highest number reported in the past 20 years. Through March 27, 2015, the CDC reported a total of 4 outbreaks and 178 cases of measles in the United States, with the largest count in California (see Figure).

Owing to the current resurgence of this disease as well as to its potential for causing serious and even fatal outcomes together with the possibility that some critical care nurses may not be as familiar with it to recognize and protect against it, I am devoting this editorial...
Critical Care Nurse readers with a synopsis of the essentials that critical care nurses need to know about this disease (see Table), derived primarily from our major resource for that information, the CDC.

Measles has never been eradicated from the United States. As the past 2 years have strikingly illustrated, cases will likely continue to arise as our citizens reenter or visitors newly enter our borders after contracting it.

Table: Essential information about measles for critical care nurses

<table>
<thead>
<tr>
<th>Attributes of measles</th>
<th>Essential information for critical care nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synopsis of measles</td>
<td>Measles is a highly contagious, acute viral respiratory illness with the potential for causing serious complications and death</td>
</tr>
</tbody>
</table>
| Rubeola and rubella: shared features | Caused by different viruses  
Highly contagious  
Originate outside the United States and are imported by travelers who enter or return to the United States  
Transmission is oropharyngeal; susceptible individuals exposed to an infected person who is coughing and sneezing  
Produce fever and rash  
Measles-mumps-rubella (MMR) vaccine protects against rubeola and rubella |
| Distinguishing between types of measles | Rubella and rubeola are different diseases caused by different viruses  
Rubeola (German measles, 3-day measles)  
• Rubella is a contagious viral disease with mild fever and rash that lasts only a few days before resolving spontaneously.  
• About half of patients have no symptoms.  
• The most significant concern is the possibility of congenital rubella: a pregnant woman contracting rubella early in her pregnancy may pass it to her fetus, who may then have a 20% or higher chance of birth defects, including cardiac defects, cataracts, deafness, mental retardation, and liver and spleen damage, or experience stillbirth or miscarriage  
Rubeola (“red measles,” hard measles, measles)  
• Although most people recover without problems, rubeola can lead to pneumonia or inflammation of the brain (encephalitis). |

Continued
### Attributes of measles

#### Prevention
The most effective way to prevent measles is through immunization (vaccination) with the MMR vaccine. The MMR vaccine protects against both types of measles. The MMR vaccine is about 95% effective in preventing either type. Children should receive 2 doses of the MMR vaccine. Vaccination is required for school entry.

- **1st dose at 12-15 months of age**
- **2nd dose at 4-6 years old (may be given earlier, if at least 28 days after 1st dose)**

Infants younger than 12 months should get one dose if traveling outside the United States. Any adult 18 years or older born after 1956 should receive at least 1 dose, unless they can show that they have been vaccinated or had all 3 (measles, mumps, rubella) diseases. The MMR vaccine may be given with other vaccines. For health care staff born before 1957, the CDC admonishes that facilities should consider vaccinating staff who do not have laboratory evidence of immunity, laboratory confirmation of past disease, or vaccination with 2 appropriately spaced doses of MMR vaccine. Health care personnel born in or after 1957, who have not had MMR vaccine and have no serologic evidence of immunity, should receive 2 doses of MMR (1 dose now, 2nd dose at least 28 days later).

- **Anyone who has ever had a life-threatening allergic reaction to the antibiotic neomycin**
- **Anyone who has had an allergic reaction to the MMR vaccine**
- **Pregnant women**
- **A number of other patient situations warrant notifying the physician if vaccination is considered, including patients who are sick when the vaccination is due and those with severe allergies, cancer, immunosuppressed or immunocompromised states, thrombocytopenia, or recent blood or blood product transfusion.**

#### Who should be vaccinated?
- Anyone who has ever had a life-threatening allergic reaction to the antibiotic neomycin
- Anyone who has had an allergic reaction to the MMR vaccine
- Pregnant women
- A number of other patient situations warrant notifying the physician if vaccination is considered, including patients who are sick when the vaccination is due and those with severe allergies, cancer, immunosuppressed or immunocompromised states, thrombocytopenia, or recent blood or blood product transfusion.

#### Who should not be vaccinated?
- Transmission is via direct contact or airborne spread when an infected person coughs, sneezes, or breathes. Virus remains infectious in the air and on surfaces for 2 hours after an infected person has left the area.
- Covering mouth, especially when coughing, and nose and mouth when sneezing plus good hand-washing help prevent spread.

#### Risk factors for measles
- **Being unvaccinated**
- **Traveling to countries where measles is more common**
- **Having a vitamin A deficiency**

#### Major clinical features
- Symptoms begin 7 to 21 days after exposure (incubation period)
- Prodrome begins 3 to 4 days before skin rash and includes high fever (>105°F); malaise; cough, coryza, and conjunctivitis
- Toward end of prodrome, a pathognomonic oral enanthema called Koplik spots may appear on buccal mucosa of the cheeks as small white spots on reddened areas
- About 14 days after exposure, a maculopapular rash appears and spreads from forehead to trunk to lower extremities, including palms of hands and soles of feet
- Patients are contagious from 4 days before to 4 days after the rash appears
- Providers should note that immunocompromised patients may not always develop the rash
- Rash gradually fades cephalocaudally
- Measles usually resolves on its own in 7 to 10 days
- Most patients fully recover

#### Appearance
- Appearance of measles a maculopapular rash
- Appearance of Koplik spots

![Appearance of measles a maculopapular rash]( Courtesy of CDC, Public Health Image Library, and Heinz F. Eichenwald, MD. phil.cdc.gov/phil/details.asp?pid=3168)

![Appearance of Koplik spots]( Available at CDC, Public Health Image Library, and Heinz F. Eichenwald, MD. phil.cdc.gov/phil/details.asp?pid=3187)

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### Essential information for critical care nurses

#### Transmission of measles
- Transmission is via direct contact or airborne spread when an infected person coughs, sneezes, or breathes. Virus remains infectious in the air and on surfaces for 2 hours after an infected person has left the area. Covering mouth, especially when coughing, and nose and mouth when sneezing plus good hand-washing help prevent spread.

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*Continued*
### Attributes of measles

<table>
<thead>
<tr>
<th>Diagnostic findings</th>
<th>Essential information for critical care nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complications are more likely in: • Children younger than 5 years • Adults over 20 years • Pregnant women • Anyone with compromised immune status</td>
<td><strong>Lab</strong>oratory confirmation can be obtained via samples of serum, naso- or oropharyngeal swab, or urine</td>
</tr>
<tr>
<td>Common complications • Ear infections • Diarrhea</td>
<td><strong>Diagnosis is confirmed via serologic detection of measles-specific findings:</strong> • Measles-specific immunoglobulin M antibody • Significant increase in measles immunoglobulin G • Isolation of measles virus • Measles RNA via nucleic acid amplification⁶</td>
</tr>
<tr>
<td>Severe complications • Pneumonia: develops in 1 of every 20 children; most common cause of pediatric death related to measles • Measles encephalitis: develops in 1 of every 1000 children who get measles; may cause deafness, convulsions, cognitive disability • Prematurity, low birth weight delivery</td>
<td>CDC¹ admonishes health care providers to be particularly vigilant for measles in patients who present with fever, rash, and characteristic signs such as the 3Cs (conjunctivitis, coryza, cough), especially if they also: • Are not vaccinated against measles; or • Live in an area experiencing cases of measles; or • Recently traveled (or were exposed to someone who recently traveled) outside the United States</td>
</tr>
<tr>
<td>Long-term complication • Subacut<strong>e</strong> sclerosing panencephalitis: arises 7-10 years after acute measles, despite apparent full recovery; rare, fatal degenerative central nervous system disorder; rarely seen in the United States; risk for developing may be higher for those who contract measles before 2 years of age</td>
<td><strong>Death</strong> • 1-2 of every 1000 children who get measles die¹⁵</td>
</tr>
</tbody>
</table>

### Index of suspicion

<table>
<thead>
<tr>
<th>Laboratory confirmation can be obtained via samples of serum, naso- or oropharyngeal swab, or urine</th>
<th>Diagnosis is confirmed via serologic detection of measles-specific findings:</th>
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<td><strong>Measles</strong>-specific immunoglobulin M antibody</td>
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<tr>
<td>Significant increase in measles immunoglobulin G</td>
<td>• Are not vaccinated against measles; or</td>
</tr>
<tr>
<td>Isolation of measles virus</td>
<td>• Live in an area experiencing cases of measles; or</td>
</tr>
<tr>
<td>Measles RNA via nucleic acid amplification⁶</td>
<td>• Recently traveled (or were exposed to someone who recently traveled) outside the United States</td>
</tr>
</tbody>
</table>

### What health care providers need to do if you suspect a case

<table>
<thead>
<tr>
<th>CDC recommended isolation in health care facilities:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Follow respiratory etiquette and airborne precautions</td>
</tr>
<tr>
<td>• Use respiratory protection and follow airborne infection control precautions</td>
</tr>
<tr>
<td>• Despite the low likelihood of MMR vaccine failure, all staff who provide care to infected patients need to follow airborne precautions</td>
</tr>
<tr>
<td>• Preferred placement for measles patients is in a single-patient airborne infection isolation room³</td>
</tr>
<tr>
<td><strong>Recognize and communicate that patients with measles are infectious from 4 days before through 4 days following appearance of the rash</strong></td>
</tr>
<tr>
<td><strong>Quickly report the case to the local health department</strong> At <strong>first contact</strong> with suspected cases, obtain the following laboratory samples for diagnosis and genotyping: serum, throat (or nasopharyngeal) swab, urine, and viral specimens⁴⁵</td>
</tr>
</tbody>
</table>

### Management

<table>
<thead>
<tr>
<th>Management is symptomatic, for example:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Rest for malaise</td>
</tr>
<tr>
<td>• Lukewarm water sponge baths and mild antipyretics for fever</td>
</tr>
<tr>
<td>• Fluids to avoid dehydration</td>
</tr>
<tr>
<td>• Humidifier or vaporizer for cough⁹</td>
</tr>
</tbody>
</table>

### Additional resources


**Table** Continued
elsewhere. Virtually all of the cases reported for 2014 (97%) were associated with importations rather than domestic origins.8 A majority of the importers are unvaccinated, as are those most likely to develop and spread the disease within the United States. The issue of some US citizens choosing to forego vaccination for themselves and/or their children has the potential for inflicting widespread public health burdens across our nation’s health care system. As the CDC so cogently summarized,6

These outbreaks demonstrate that unvaccinated persons place themselves and their communities at risk for measles and that high vaccination coverage is important to prevent the spread of measles after importation.

Although critical care nurses may not be able to mitigate the introduction of measles into our homeland, we can surely make our contribution to minimizing the potential harm that measles can inflict upon our patients, our unit, our health care facility, and community. Our prompt recognition, isolation, confirmation, reporting, and management of measles can surely assist in curtailing its further penetration into our lives for generations to come. CCN

JoAnn Grif Alspach, RN, MSN, EdD
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So do we.
Hiring Appropriate Providers for Different Populations: Acute Care Nurse Practitioners

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Acute care nurse practitioners, prepared as providers for a variety of populations of patients, continue to make substantial contributions to health care. Evidence indicates shorter stays, higher satisfaction among patients, increased work efficiency, and higher quality outcomes when acute care nurse practitioners are part of unit- or service-based provider teams. The Consensus Model for APRN Regulation: Licensure, Accreditation, Certification, and Education outlines detailed guidelines for matching nurse practitioners’ education with certification and practice by using a population-focused algorithm. Despite national support for the model, nurse practitioners and employers continue to struggle with finding the right fit. Nurse practitioners often use their interest and previous nursing experience to apply for an available position, and hospitals may not understand preparation or regulations related to matching the appropriate provider to the work environment. Evidence and regulatory guidelines indicate appropriate providers for population-focused positions. This article presents history and recommendations for hiring acute care nurse practitioners as providers for different populations of patients. (Critical Care Nurse. 2015;35[3]:e1-e8)

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Pain, Agitation, and Delirium Guidelines: Nurses’ Involvement in Development and Implementation

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The 2013 American College of Critical Care Medicine/Society of Critical Care Medicine clinical practice guidelines for the management of pain, agitation, and delirium in adult patients in the intensive care unit serves as a living example of nurses’ involvement in the development and implementation of professional guidelines. Nurses who served on this guideline-writing panel describe their experiences. Specific examples from the pain, agitation, and delirium guidelines for care are used to explore the roles of the nurse leader, nurse informaticist, staff nurse, and nurse researcher in relationship to guideline implementation. (Critical Care Nurse. 2015;35[3]:17-32)

This article has been designated for CE credit. A closed-book, multiple-choice examination follows this article, which tests your knowledge of the following objectives:

1. Examine the role of nurses in a guideline-writing panel for pain, agitation, and delirium (PAD)
2. Explain leadership strategies needed to implement new PAD guideline practices
3. Summarize the actions of nursing roles in implementing practice changes related to new PAD guidelines

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Authors of this manuscript are SCCM members, and several were involved in the guideline-writing process and/or a national task force through the SCCM to create work tools for guideline implementation (http://www.sccm.org/Research/Quality/Pages/ICU-Liberation.aspx).

**Nurse Serving on the Guideline-Writing Panel**

**Getting Involved**

One might wonder what involvement nurses have in the development of new professional guidelines for
care. Nurses benefit in many ways from associating with professional organizations related to their area of specialty practice.

The SCCM is an interdisciplinary organization that traditionally has comprised physicians, nurses, respiratory therapists, and pharmacists (www.sccm.org). Following development of the PAD guidelines, along with new recommendations for early mobility,1 the SCCM recognized that therapists specializing in critical care were essential partners in care, so a new section of SCCM has been established for therapists as well.

The leadership teams of the SCCM and the ACCM work together to elect members onto a guideline task force. The guideline task force establishes priorities and selects writing teams for the development of interprofessional practice guidelines. The SCCM/ACCM leadership team is diligent about constructing writing teams that represent all disciplines within the SCCM. Among 20 authors of the PAD guidelines, 5 were nurses, which is more than proportionate to the percentage of nurse members within the SCCM. It is not required to have a specific academic degree to participate in these activities. However, the guideline committee selected nurses with many of these experiences: active members of the SCCM, members who had served on SCCM committees in the past, had obtained fellowship through the ACCM, had a history of direct participation in developing work products to advance practice, had experience in guideline or other scholarly writing, had content expertise, or had conducted research in at least 1 of the PAD topics.
Role Expectations of the Nurse on the Guideline-Writing Panel

All members of the guideline-writing panel were treated with true collaborative respect and equality. Nurses did not serve as subordinates. All members had an equal voice in voting and revisions. All members of the writing panel were valued for their unique skill regardless of discipline, and learning was bidirectional. For instance, the panel included scientists with in-depth knowledge on a topic of interest, guideline and evidence analysis experts, and psychometric analysis experts. The evidence analysis skills that nurses learn in formal nursing education were of great benefit to the team.

All members worked within a strict framework for evidence analysis. The GRADE method served as the foundation for the creation of the document and provided a consistent, objective, transparent, and rigorous method to evaluate the literature with built-in checks and balances. The GRADE method allowed the writing team to use all types of research reports, not just randomized controlled trials (RCTs), in the review. This flexibility was especially important in areas where RCTs were not available or could not be performed for ethical reasons. At the beginning of the process, members were provided with training on how to use the GRADE method, and an expert was available at all times to review the work and ensure that the GRADE process was used correctly for each section of the guideline.

Before exploring the literature, the beginning of a guideline takes form by writing PICO questions. A PICO question is a research review question that defines the Population of interest, Intervention, Compared with what?, and Outcomes of interest. For instance, one PICO question within the document was “Should haloperidol or atypical antipsychotics be used prophylactically to prevent delirium in ICU patients?” Writing PICO questions is commonly taught in undergraduate nursing programs when students are learning about evidence-based practice, but this may not be the case for other disciplines. Nurses on the writing panel assisted others in becoming comfortable with the PICO writing process.

The PICO questions were selected on the basis of what the writing group thought were the most pressing issues on the topic to date. Writing a guideline from PICO questions does have a drawback. Only a select number of questions are asked. This limitation results in recommendations specific to only those questions. If the question was not asked, the process results in no recommendation for clinicians regarding other topics of interest. Questions will be left unanswered. For instance, a nurse may look through the document and wonder why there was no recommendation about bolus versus infusion administration of medications. This occurred because no PICO question was written in the beginning of the guideline development process to answer that practice question.

Another aspect of guideline writing that warrants explanation is the issue of using evidence versus consensus statements. This became an issue within the PAD guidelines related to the use of haloperidol. The answer to the PICO question regarding haloperidol in the guidelines could be frustrating for clinicians: “We do not suggest that either haloperidol or atypical antipsychotics be administered to prevent delirium in adult ICU patients” and “There is no published evidence that treatment with haloperidol reduces the duration of delirium in adult ICU patients.” The recommendation started with “We do not suggest” because evidence indicates that these drugs may cause harm due to QTc prolongation without evidence to support use.

It was difficult for the writing team not to write a haloperidol recommendation that used expert opinion in the absence of evidence because we knew clinicians would want guidance about treating delirium. In the past, guidelines were written by consensus statements, meaning that if experts agreed that a practice was helpful, or the most commonly held practice, they could write a recommendation for it, even without research evidence. However, the GRADE process discourages the use of expert opinion, and the SCCM had placed boundaries on the writing team to avoid the use of recommendations based on expert opinion. In the end, delirium preventive measures such as minimizing use of benzodiazepines, maintaining light levels of sedation, and early mobility replaced treatment recommendations because evidence was available to support preventive measures. Treatment with antipsychotics or any other drug did not have enough evidence of benefit, and therefore no recommendation could be made. Calling out the gap in the evidence by stating that no recommendation could be made was intentionally done to stimulate research in this area. The PAD guidelines were written...
purely by review of published evidence, which was a departure from the method used in previous versions of these guidelines.

The literature review was conducted with the expert advice of a research librarian, and all of the literature within each topic was gathered and reviewed. Members of the committee were assigned questions to answer, and at least 2 people reviewed each manuscript reviewed to answer the PICO question to prevent interpretation bias and the influence of intellectual bias. Often a nurse was paired with a physician or pharmacist, but they conducted the review in the same way, using the same structured but independent evidence summary table, and then compared notes at the end. Where there were differences in analysis, each person presented their point of view and rationale, which often resulted in consensus. This portion of the process required skills similar to those used in debate or conflict resolution. Only evidence, and not emotion, was used to carry a proposal for a recommendation forward.

The creation of evidence summary tables is common practice in advanced nursing education and is very helpful in guideline writing. The guideline-writing panel was divided into small writing teams based on these topics: pain, agitation, delirium, and outcomes. Later another team was formed to conduct the psychometric analysis of all of the assessment tools for pain, agitation/sedation, and delirium. Nurses led both the pain writing team and the task force that conducted the psychometric analysis of assessment tools given nurses’ particular recognized expertise in these subjects. The team leaders required skills in delegation, conflict resolution, and project management. They received higher level of authorship because of the extra work involved in leading the teams.

This guideline panel was specifically designed to include and benefit from the expertise of the scientists. The evidence review teams were constructed proactively to reduce the likelihood of intellectual bias. This meant that members of the guideline-writing team sometimes had to advocate when published results were inconsistent, even though other members of the writing team may have been involved in the original research. Leadership and communication skills were essential to maintain the integrity of the document and navigate through the tensions that stem naturally from finding that once-held truths have not been consistently replicated over time. One PAD-related example of this occurred with daily sedation interruption. It might be noted that daily sedation interruption, which was originally strongly recommended, is now tempered as a recommendation and rewritten as “We recommend either daily sedation interruption or a light target level of sedation be routinely used in mechanically ventilated adult ICU patients.” This tempering occurred because, since the last version of the guideline was published in 2002, several newer studies have had conflicting results. In studies that did not demonstrate improved outcomes with daily interruption of sedation, the research protocols had called for a lighter level of patient sedation. Daily interruption of sedation in these lightly sedated patients did not have the same effect as reported in studies evaluating daily sedation interruption in more deeply sedated patients. Upon further exploration, it was noted that another variable that might have driven a different result was that the newer studies were conducted in Australia, where 1 to 1 nursing and sedation protocols were common, which may have also diluted the effect of the intervention. This did not, however, negate the fact that daily sedation interruption has been found to be helpful for patients who are sedated to a deeper state or where no sedation protocol had been used, and therefore the practice remained in the recommendation.

The nurse on the writing panel needed to consider throughout the entire process, “Are the most important topics to a nurse being addressed?” “Can a nurse actually carry out these recommendations?” and “Is there anything else a nurse would need to know to make this work?” It is in this area that the nurse also provides advice about the development of work tools to measure success during guideline implementation. Following publication of the guideline, which is limited by size and space, nurse authors continued to present publicly and write additional manuscripts to provide lessons learned and more detail into how to interpret and implement the practice guidelines in real-life settings.

Psychometric Analysis During Guideline Writing

This section details the work behind analysis of the psychometric testing of the tools because it was another...
unique departure from the method used in generating past guidelines on this topic and also because the work was led by a nurse. For the first time, a critical analysis was conducted of the psychometric properties (ie, validity and reliability) of the pain, agitation/sedation, and delirium tools specific to use with critically ill adults.

Validity refers to the conclusions that can be drawn from the tool’s scores (eg, Does a particular score on a behavioral pain scale actually indicate that a patient is having pain or not?). Reliability refers to the overall reproducibility of a tool’s scores over time (ie, test-retest reliability) or between raters (ie, interrater reliability). Validity and reliability are not properties of tools per se but rather are related to their use. Therefore, an assessment tool can only be shown to be reliable and valid when used for a specific purpose in a specified group of individuals and in a given context. Considering this, it would not be appropriate to use a pain scale initially developed for critically ill infants with ICU adults unless it has shown good psychometric properties with ICU adults as well.

This initiative of the SCCM task force was a relevant addition to the guideline-writing process and can be used as a guide for nurses within the interdisciplinary team in the selection of assessment tools for ICU practice. Selecting appropriate assessment tools for clinical use is no simple matter, as it can have significant effects on patients’ evaluation and treatment and requires essential basic knowledge in tool development and psychometric testing.

Briefly, 3 psychometric scoring systems were developed for each domain (ie, pain, sedation, and delirium). In fact, validation strategies do not apply to all assessment tools, and the relevant ones must be captured in relation to the purpose of the tools’ uses. For instance, behavioral pain scales are meant to detect when pain is present (or absent) rather than to determine pain intensity (ie, mild, moderate, severe). Sedation scales are mainly used to titrate medication to a specific goal of sedation, and delirium tools are used to detect if delirium is likely to be present or not. Also, gold standards exist in the fields of pain (ie, patient’s self-report of pain). Debate continues about whether medical diagnosis by a psychiatrist or certified physician can be used in the ICU for delirium. There is no gold standard for assessing agitation/sedation. Therefore, strategies employed for tool development, feasibility, ease of use, and clinical relevance and impact of implementation into practice also were evaluated. The 3 psychometric scoring systems underwent rigorous content validation by 3 international experts in health measurement, including 2 nurses. Appropriate changes were made in response to their comments. A weighted scoring system from 0 to 20 that was inspired by a psychometric scoring system for pain scales previously developed by Zwakhalen et al was established to facilitate the interpretation of results of assessment tools for all 3 domains. Assessment tools with good to very good psychometric properties (weighted score ≥ 12) were considered to be the most valid and reliable scales/tools for use in critically ill adult patients.

A total of 6 behavioral pain scales, 10 sedation scales, and 5 delirium-detection tools and their related studies were analyzed independently by 2 reviewers from a panel subgroup involving 3 nurses. Reviewers directly involved in the development of an assessment tool did not take part in the analysis of those tools. Scores from 0 to 20 were attributed to each tool according to the highest quality of evidence and were based on a consensus between the reviewers. The quality of evidence for each assessment tool was also evaluated by using categories similar to those used in the GRADE method, with modifications adapted for the psychometric analyses.

Psychometric properties are not static properties of a particular assessment tool and can evolve as more evidence is generated and published. Recent reviews of behavioral pain scales and sedation scales were published after the PAD guidelines, which covered English manuscripts until 2010. In the pain scale review, 10 new studies including 2 other behavioral pain scales were analyzed: the Face, Legs, Activity, Cry, and Consolability (FLACC) scale (initially developed for children with cognitive impairment) and the Nonverbal Pain Assessment Tool. According to scores obtained with the psychometric scoring system, the Behavioral Pain Scale and the Critical-Care Pain Observation Tool remained the most valid and reliable for detecting pain in ICU adults, according to the available evidence so far. Similarly, in the sedation scale review, 9 new studies, including a new scale, the Nursing Instrument for the Communication of Sedation, were analyzed. In this
review, the Nursing Instrument for the Communication of Sedation was considered as another option for the evaluation of sedation with a weighted score greater than 12, and the psychometric scores of 5 scales addressed in the PAD guidelines increased. Of these 5 scales, the Ramsay Sedation Scale\(^{34,35}\) obtained a score much higher than the score reported in the PAD guidelines (13.1 vs 7.7), and the Richmond Agitation Sedation Scale\(^{36}\) as well as the Sedation Agitation Scale\(^{37}\) obtained the highest scores. These are good examples illustrating that as few as 2 to 3 years can make a difference and that being up-to-date with literature review is important when considering assessment tools for clinical use.

**Nurse Leader**

Once a new national guideline is written and published, a variety of nurse leaders are involved in translating the new recommendations into practice and eliminating outdated practices. These nurse leaders may be charge nurses, supervisors, managers, directors, clinical nurse specialists, nurse practitioners, educators, or staff nurses serving as project leaders. This section reviews the work needed to implement the guidelines from a leadership perspective.

**Selection of Assessment Tools**

The guidelines allow a choice between 2 of the top-rated tools for pain, agitation, and delirium; thus, the organization still needs to determine which tool it will use. As mentioned, tools have been evaluated since the publication of the PAD guidelines and may also be appropriate at the local level. The selection of assessment tools for clinical use in a specific organization should be made within an interprofessional committee on which nurses (eg, nurse informaticist, nurse manager, clinical nurse specialist, nurse practitioner, nurse educator, staff nurse) are represented. The involvement of nurses is essential and desired, considering their primary role in assessment of patients. Decisions for selecting an assessment scale or tool should be based on the following elements\(^{38}\):

1. Evidence of validity and reliability of its use with a similar patient population and context in which it is planned to be used;
2. Feasibility of use (eg, simple to understand, easy and quick to use);
3. Accessibility to directives of use and educational material;
4. Evidence of clinical relevance, for instance, effects of the tool’s implementation on ICU practices and patients’ outcomes is a plus value;
5. Author’s permission, copyright or license to use fees (if applicable).

In the case of the PAD guidelines, if the recommended tools are selected and used as published, no further permission is indicated. However, if the organization were to decide to use a tool in a way that was not intended, a discussion with the author is indicated. If the recommended tools are selected for clinical use (not for commercial use or publication) and are used as published, no further permission is usually indicated. This issue is complex and as a general principle, if the rules for use are not explicitly stated, the author should be contacted for permission to use the tool. The appropriate publication where the tool was first described should be cited. For instance, the American Association for Critical-Care Nurses (AACN) holds the copyright for the English version of the Critical-Care Pain Observation Tool. When used clinically, it should be referenced as follows: “Gélinas C, Fillion L, Puntillo KA, Viens C, Fortier M. Validation of the Critical-Care Pain Observation Tool in adult patients. *Am J Crit Care.* 2006;15(4):420-427. http://ajcc.aacnjournals.org/content/15/4/420.short.” When used for commercial purposes or publication, permission for use is obtained from AACN (M. Muscat, personal communication, April 28, 2014). Tools not readily available online often require permission for use.

In some cases, a subpopulation of patients may not be adequately served by the responses found on a tool, and special considerations are needed. Once a decision is made for the specific tool, it is important to ask the journal’s or author’s permission (whoever holds the copyright or license) to use the tool. Any relevant questions pertaining to its use or use with a subpopulation of patients for whom special considerations are needed should be addressed to the tool’s author. For instance, brain-injured ICU patients with altered levels of consciousness seem to display atypical pain behaviors that are not captured in existing behavioral pain scales.\(^{39-41}\) Specific instructions can be made by the tool’s author to guide nurses in application of the tool until a version of the tool adapted for these vulnerable patients is available.\(^{22}\)

Training for appropriate use of the assessment tool in the ICU should not be overlooked and must
be planned carefully. It is helpful to contact the tool’s author to request relevant educational material (eg, handouts, standardized training video) that may be available. Short training sessions from 20 to 60 minutes for the use of pain, sedation, and delirium scales with support tools such as posters, pocket cards, and videos have proven effective. Further information about the tools advocated within the PAD guidelines may be found online through the SCCM website Liberation initiative (http://www.sccm.org/Research/Quality/Pages/ICU-Liberation.aspx). Change champions who receive extra training and become specialists in this area of practice also are helpful during the implementation process to provide feedback and solve immediate problems. Implementation of pain, agitation/sedation, and delirium assessment tools has resulted in improved use of medication and improved patient outcomes such as shorter ICU stays and reduced mortality. These results may be related to the earlier identification and treatment of pain, agitation/sedation, and delirium.

Specific Leadership Activities: Mobility Examples

This section on mobility is reviewed in detail because it represents a significant change in the philosophy of how care is provided to critically ill patients and has a proportionately larger impact on the nursing staff than do other changes within the PAD guidelines. Immobility and bed rest have long been recognized as a cause of serious complications from critical illness, including pressure ulcer formation, thrombotic events, contractions, and skeletal muscle weakness and wasting. Yet sustained periods of bed rest resulting in immobility remain a widespread clinical practice in ICUs, particularly for patients receiving mechanical ventilation. In the new PAD guidelines, early mobilization of adult ICU patients is recommended to reduce the incidence and duration of delirium with a rating of +1B. This rating translates as a positive, strong recommendation (+1) based on moderate quality of evidence (grade B). Two reports form the basis of the recommendation. In the first study, 104 ICU patients admitted to 2 different medical centers and who had functional independence before admission were randomized to receive physical and occupational therapy versus usual care during their spontaneous awakening trial within the first 72 hours of mechanical ventilation. Patients who experienced early mobilization had a reduction in the duration of delirium by 2 days; had 2 more ventilator-free days; and stood, walked, or transferred on their own 3 days earlier than did patients who did not receive the intervention. A second report described a quality improvement project at a single center that included 57 consecutive medical ICU patients who were cognitively intact, without neuromuscular disease before admission to the unit, and required mechanical ventilation for 4 days or longer. An early mobility intervention led by a physical therapist had resulted in increased alertness, decreased delirium, and an ICU length of stay reduced by 2.1 days compared with historical data. Both reports used an intervention led by a physical therapist.

The nurse leader within each ICU must develop his or her own approach to getting ICU patients moving. Several common themes must be addressed when establishing a program of patient mobilization in the ICU (see Table). Although no published ICU-specific report details a single treatment plan for reducing immobility, several published protocols describe how to evaluate patients for readiness for and progression of mobility.

Many protocols and several reports use a dedicated rehabilitation team that consists of a unit-based full- or part-time physical therapist. The team leader should consider a quality improvement approach such as a comprehensive unit-based safety program or the plan, do, check, act cycle. Identifying potential barriers early and developing specific strategies to overcome those obstacles can assist in making a significant practice change. Leaders need to plan for a long lead time and incremental changes before realizing a successful change. Most reports about starting a new mobilization program in the ICU have described phases of team engagement and implementation that occur over 2 to 3 years. Generally, when caring for critically ill patients, each discipline has their prescribed roles and duties (eg, prescription vs dispensing vs administration of medications). However, mobilizing the critically ill patient is not one person’s job because, unlike administering medications, mobilizing patients can rarely be performed alone. It becomes the work of the entire team. Not only does the nurse need to shift mentality from condoning prolonged bed rest during critical illness to encouraging mobility, but also from doing work as...
a nurse to coordinating work of the team. The leader can expect the development of a team mindset to be an investment of time and energy, yet this process is essential for program success. To develop a team approach to mobility, the first step is making sure that the team is complete. In many ICUs, the first step will be to negotiate with leaders in rehabilitation services to obtain physical and occupational therapy support for critically ill patients. This adjustment may change work flow and staffing in their department. Realistically, if rehabilitation therapists are not already providing routine services in the ICU, the added support may require a full budget cycle to plan, train, budget, and implement.

Evidence supports that early and progressive mobility, particularly among patients with prolonged mechanical ventilation, is safe and feasible. A meta-analysis and 2 systemic reviews report that an early, progressive mobility intervention results in reduced length of stay in the ICU and hospital, direct costs (e.g., dedicated staff), changes in number of admissions (as a result of shorter stay), and days of no delirium or cognitive intactness. Additional research is needed regarding dose of early progressive mobility. Dose refers to how often or how long mobility is needed daily to produce results. Data supporting specific strategies or interventions to promote mobility in ICU settings and identifying activities that have the greatest benefit to patients are needed. Strategies include steps taken to implement cultural, environmental, and team-based changes that result in increased mobility in eligible patients. It is not known whether placing the bed in a chair position has the same benefits for patients as passive transfer to a chair, dangling or sitting at the edge of the bed, or weight-bearing pivot transfer to a bedside chair. Targeted research will help with clinical decisions about how to start and progress mobility.

Early progressive mobility is endorsed by the PAD guidelines as an intervention to reduce delirium. Patients need to have periods of light or no sedation in order to participate in this effective intervention. Decreasing immobility in the ICU does not occur in isolation from other ICU treatments. A treatment plan to reduce immobility is intertwined with management to reduce pain, agitation, and delirium in our critically ill adults.

**Measuring the Impact of Change**

The nurse leader measures the success of the change through selected quality metrics. Sample strategies
have been previously published. 1,13,19 The end points in the original research articles (eg, length of stay, days of mechanical ventilation, discharge disposition, functional status) can serve as long-term measures of success. However, when first enacting a change, measuring adherence to the protocol is important. For instance, the percentage of eligible patients who have attempted mobility this shift could be monitored at the bedside toward the end of the day. The nurse leader then further explores the reasons why patients may not have attempted mobility. Many times the obstacle to achieving the goal is related to available equipment or labor resources, which the leader will need to address personally.

The nurse leader can effect change by making frequent rounds, being consistent with the message, and giving timely feedback to staff to ensure implementation of the guideline. During rounds, coaching and feedback can be used to educate staff one on one. Providing this education at the point of care is a key step that can help the bedside practitioner embrace the change and help spread the message. 71

One approach to support practice change is for the nurse leader to make rounds daily during the first 2 weeks and then twice a week for the next 2 weeks. Then, as time goes on and the practice changes are solidified, the frequency can be reduced to weekly. The length of time needed to monitor the process will depend on whether changes are made all at once or incrementally. The more practices that require a change, the longer focused attention on the process will be needed.

Nurse Informaticist: Maintaining Psychometric Integrity of Assessment Tools

The nurse informaticist uses clinical knowledge to create the documentation in the electronic medical record (EMR) to match the thought process and work flow of clinicians who use the system while ensuring that essential elements required by regulatory and professional standards can be easily recorded within the EMR. The nurse informaticist is an important link to successful implementation of the guideline. For example, within the PAD guidelines, a choice of 2 different assessment tools are recommended for each: pain, sedation/agitation, and delirium. The organization may need to change or add assessment tools in the EMR to meet the new recommendations. Translating these tools properly into a usable form for the EMR is essential for optimal adherence to the protocol. If there is no place to document the assessments, or an outdated tool exists in the EMR, the recommendations within the guideline have less chance of being followed.

Earlier we described the rigorous analysis process that was used to ensure that the selected tools were valid and reliable. This work could be negated if the tools were shortened, abridged, or altered in any way to “fit” into the EMR. Altering them could decrease reliability and validity further. 23 If the electronic system has character limits that prevent use of the intact tool, the intact tool needs to be easily available as a reference. No independent “tweaking” of the tool should occur because this would invalidate the psychometric properties related to the tool use and could result in false-positives or false-negatives, which could possibly affect patients’ treatment and outcomes. Last, because psychometric properties evolve as more research is published about the use of the tool, the EMR must be nimble and responsive enough to adapt to updates on the tool over time. Someone on the change team needs to be assigned to monitor the current status of official published tool revisions so that the nurse informaticist can be informed of the need to update as indicated.

The nurse informaticist may support the guideline implementation process by reviewing order sets to determine where EMR prompts and decision support may be designed to drive protocol adherence. The order sets may also be built with embedded sedation or analgesia targets. The nurse informaticist also supports the quality monitoring process by designing EMR prompts that can capture key quality metrics. As a result, queries through the EMR can be created to streamline the work of data collection, report synthesis, and analysis of outcomes. For example, queries could be set up to answer the questions: What percentage of hours per day are patients undergoing mechanical ventilation maintained at the goal sedation target? Is there a relationship between maintaining the sedation target and achieving mobility goals? Partnering with the nurse informaticist early in the change process to develop real-time reports can alert change teams to problematic areas of protocol adherence so that action plans can be redefined and problematic areas can be reinforced on rounds.
**Staff Nurse**

**Staff Nurse as Change Leader**

It is possible that the staff nurses have heard about the new recommendations and realize the need for change before the leadership team does. Staff nurses may have heard about the recommendations at a lecture or conference or they may have read the guidelines or an article such as this one that increased their awareness of the updated evidence related to pain, agitation, and delirium. Staff nurses who are active in self-governance councils are often the leaders to promote change. If not already done, the staff nurse serving as a change agent can conduct an initial assessment by performing a gap analysis. The gap analysis is an audit or survey that identifies the gaps between recommended and current practice and identifies varied practices that might exist. If the guideline recommendations are not in practice, then the staff nurse can meet with operational nurse leaders, the medical director, and unit practice council members to present the evidence and obtain organizational support for change. Even in the most autonomous of nursing practices, because resource issues are involved in making the changes recommended within the PAD guidelines, it is important to have endorsement of operational leaders from the beginning of the project so that the necessary resources and support to sustain the practice change can be obtained. An example of this situation would be the need to work across disciplines to increase physical therapy time in the unit to support mobility goals.

Skepticism or resistance to change may exist because, as new research is published, what was once advocated as best practice may become outdated. All those involved may have been through the complete cycle of bringing in a new practice only to find a year later that the practice is not effective or actually harmful (eg, tight glycemic control). Those in practice longer may have incurred repeated experiences like these over time. This situation is unavoidable, yet it highlights why it is important to understand the guideline-writing system. Evidence is scored from high to very low on a scale that uses strict criteria. Guideline-writing panels may produce recommendations to change practice even without high levels of evidence if the benefit of the intervention is thought to outweigh the risk or cost and the intervention is something most patients would want. If the recommendation starts with “we recommend,” it was written from stronger evidence than one that starts with “we suggest.” When choosing which changes to make in the workplace, looking at the strength of the evidence and the wording can help the team to decide priorities for change. Those involved in proposing the change also must consider the cost, values, and feasibility when selecting recommendations for change within the local health care setting.

In the case where operational nurse leaders propose a practice change, it is helpful for clinical staff to volunteer to become change champions. These champions must study the new recommendations to be in the best position to help effect the change. Often staff nurses bring credibility to the change team because of their role in validating that proposed changes are feasible at the bedside, and as such, they serve as opinion leaders. The endorsement of change from a practicing staff nurse can be very effective in changing behaviors of those reticent or skeptical of change. Staff nurses are the direct advocates for patients, as they have the more face-to-face time with patients and patients’ families. Coaching and performance feedback is best achieved when provided in real time in responses to actual cases. In the early process of practice change, the staff nurse is in the position to identify successes from actual cases that can be advertised through word of mouth, huddles, and case review to solidify commitment to the recommended change. Because of the volume of time spent at the bedside, trusted staff nurse opinion leaders may actually have more opportunities than operational nurse leaders to redirect others to achieve protocol adherence.

**Staff Nurse as Recipient of Planned Change**

Clinical practice guidelines that are published do not automatically improve patients’ outcomes. Staff engagement in the process produces a greater likelihood of effective improvement in patients’ outcomes. The new guidelines contain 32 practice recommendations and suggestions and 22 statements in the areas of pain, agitation/sedation, and delirium. It is unlikely that all of these practices are currently in place in any given unit; therefore, change can be anticipated. The likelihood that these recommendations will be translated into practice increases if nurses who provide direct patient care accept the change and hold each other accountable for sustaining practice change.

One example of expected change that will directly affect staff nurses while providing care revolves around the pain assessment. Specifically, the PAD guidelines...

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recommend that pain be assessed routinely in all ICU patients. The target gold standard is patient self-assessment, as nurses and family members are poor surrogate assessors of pain. The guidelines no longer recommend using vital signs as a marker of pain. Many nurses have been taught for years to use vital signs as evidence of pain, and uprooting this outdated practice can be an expected change. Further, for patients with intact motor function who are unable to self-report, the Behavioral Pain Scale and the Critical-Care Pain Observation Tool are proposed within the guidelines as the most valid and reliable behavioral pain scales for monitoring pain in adult patients in medical, surgical, or trauma ICUs. Assessing pain every hour or when needed reduces use of sedation, as well as reducing days of mechanical ventilation and ICU days. The staff nurse should evaluate whether the pain assessment tools currently in use include the Behavioral Pain Scale or Critical-Care Pain Observation Tool. If not, then a practice change is indicated and should be brought to the attention of the leadership team. If the culture has been to use vital signs as part of the pain assessment in lieu of a validated assessment tool, this practice too should be challenged.

To understand what will be most helpful to control the pain and support the patient’s full recovery, it is important to find out about the patient’s experience with pain and the use of pain medications. For example, in many organizations, practices related to use of pain medication before chest tube removal vary. The guidelines recommend that preemptive analgesia and/or nonpharmacological intervention such as relaxation techniques should be administered before chest tube removal. The nurse can take initiative to find out about the patient’s preference and then make sure that pain medication is available before the chest tube is removed.

The PAD guidelines recommend that dosages of sedative medications be titrated to maintain a light rather than a deep level of sedation, unless clinically contraindicated. Light sedation is defined by the patient still being able to respond purposefully to commands. The example included in the guidelines specifically states that the patient should be able to do 3 of the following: wiggle toes, stick out tongue, open eyes, maintain eye contact, and squeeze hand. Maintaining light levels of sedation is associated with improved clinical outcomes for patients and thus shorter stays in the ICU. Therefore, the nurse needs to communicate any problems achieving the lighter sedation goal to the treatment team, since the nurse is primarily responsible for sedation delivery and dose titration. The recommendation to maintain light levels of sedation will most likely be one of the hardest to adhere to because of the extra work imposed when caring for patients who are awake. It will be the nurses at the bedside who can hold each other accountable during handoffs (shift breaks and change of shift) for maintaining the patients in an awake and calm state by minimizing use of sedatives. Inability to keep the patient both awake and calm may be due to insufficient pain management. The PAD guidelines recommend analgosedation (treating pain first) to prevent this problem. Further, if the goal of a light level of sedation is not ordered, the nurse will need to serve as the patient’s advocate. In the early phase of practice change, nurses may have to advocate obtaining the appropriate orders because physician colleagues may not be aware of the recommended changes in practice. The time period surrounding implementation of new guidelines tests the advocacy skills of nurses.

Another factor to consider for critically ill patients is the high risk for delirium, which is associated with increased mortality and prolonged ICU stay. The PAD guidelines recommend routine monitoring with use of the Confusion Assessment Method for the ICU or the Intensive Care Delirium Screening Checklist. So far, these tools have shown the strongest evidence of reliability and validity for detecting delirium in adult ICU patients. If the delirium assessment tools are not being used in the practice setting, then the nurse has the opportunity to advocate for such a change. Delirium assessment is less likely to be confounded by the cognitive and behavioral manifestations of sedation when the patient is maintained at a light level of sedation.

Whereas some ICUs may have to add or change an assessment tool, the major changes within these guidelines relate to level of sedation and early mobility, both of which are a dramatic departure from previous practice standards. Practicing nurses can expect to do more physical activities with patients and find ways to keep
patients who are awake occupied and safe. It would be common practice to include an evaluation of sedation level on interdisciplinary rounds. The patient, with very few exceptions, will be expected to be awake and able to participate in care, not just nod in response to questions. It has been suggested that embracing the presence of patients’ family members will distribute some of this burden from the nurse. Nurses may actively encourage patients’ family members to help with distraction, range-of-motion exercises, and cognitive activities; to coach mobility efforts; and to report evidence of pain, agitation, and delirium.18-20

Nurse Researcher: The Need for Future Research

When reading the PAD guidelines, it is clear where evidence is missing in this area of practice, signifying the need for further research. Take, for example, the section on nonpharmacological management of pain. The finding that almost no research on nonpharmacological methods to reduce pain has been done led guideline panelists to make no recommendations in this area except to medicate patients before chest tube removal. Furthermore, ample information has been published about the fact that ICU patients do not get enough sleep or enough quality sleep. However, no new studies related to interventions to improve sleep for critically ill patients have been published in the past 10 years. Two small studies76,77 were published regarding sleep and ventilator management, but no recommendation could be made on the basis of the results because the sample sizes were too small for confidence in the outcomes. Interventions to improve sleep and the relationship between mode of mechanical ventilation and sleep are fertile areas for future research.

Evidence also was insufficient to support a recommendation for the use of haloperidol. This, too, presents an area of needed study. The impact of delirium assessment on changes in treatment plan and outcomes has not been thoroughly studied, nor has the specific relationship between delirium and mortality. Finally, it is not known whether increased participation of patients’ family members at the bedside would help to improve protocol compliance with the PAD guidelines recommendations. All of these concepts lend themselves to interdisciplinary research inclusive of colleagues from respiratory therapy, pharmacy, physical therapy, and medicine. A list of research questions arising from the PAD guideline has been published.20

Conclusion

Nurses who are active in professional organizations have the opportunity to participate in the development of practice guidelines. This process requires leadership, communication skills, evidence analysis skills, and content expertise. Nurse leaders are expected to organize and execute change efforts while supporting the change efforts of clinical staff nurses who are change champions. Leaders also measure and communicate the impact of change, remove obstacles that prevent protocol adherence, and optimize facilitators of protocol adherence. Nurse informaticists have a role in converting the approved assessment tools into an electronic format without disrupting the validity and reliability of the proposed assessment tools. The staff nurse engages in changing front-line practice while encouraging peers to sustain a change in practice. Clinical staff may also provide input to nurse leaders regarding the obstacles or successes encountered with practice change or resources needed to optimize new goals such as early mobility and light levels of sedation. Nurse researchers develop new studies to address the gaps in knowledge and questions left unanswered within the guidelines. The nurses who served on the guideline-writing panel continue to serve as content experts available to support organizations with practice change. In summary, using the living example of the PAD guidelines, we have described how guideline development and implementation provide opportunities for nurses in a variety of roles to advance nursing practice. CCN

Financial Disclosures

None reported.

eLetters

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dotmore

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Learning objectives: 1. Examine the role of nurses in a guideline-writing panel for pain, agitation, and delirium (PAD). 2. Explain leadership strategies needed to implement new PAD guideline practices. 3. Summarize the actions of nursing roles in implementing practice changes related to new PAD guidelines.

1. Which of the following describes how the GRADE method was used to develop the pain, agitation, and delirium (PAD) guidelines?
   a. Assist in evidence collection for the literature review
   b. Analyze and grade the quality of evidence collected
   c. Provide a methodology for writing research review questions
   d. Limit the evidence collection to randomized controlled trials

2. Which of the following statements demonstrates the psychometric property of reliability when using an assessment tool?
   a. Two intensive care unit (ICU) nurses assess a patient for level of agitation/sedation and obtain the same assessment score.
   b. One nurse assesses delirium is present, while the second nurse states no delirium is present using the same tool.
   c. An ICU nurse uses a pain assessment tool studied in infants for assessing a critically ill, nonverbal adult.
   d. A nurse uses an agitation assessment tool to determine whether the patient requires analgesics.

3. What strategy was used to validate assessment tools for the domains of pain, agitation, and delirium?
   a. Corroboration of tool results by a psychiatrist or certified physician.
   b. Development of 3 psychometric scoring systems for scales/tools used in each domain.
   c. Content validation of each assessment tool reviewed in each domain.
   d. Assessment of clinical relevance and impact of practice implementation for tool development.

4. Which of the following elements is important to consider when selecting an assessment scale/tool for clinical use?
   a. The tool is generalizable to different patient populations and contexts.
   b. The tool is easy to understand and simple to use by bedside clinicians.
   c. The tool is available in the public domain.
   d. The tool does not affect current ICU practices or routines.

5. Which of the following is important for successful implementation of new assessment tools for pain, agitation/sedation, and delirium?
   a. Ensuring clinicians understand the importance of improved patient outcomes related to tool use.
   b. Presence of the tool’s author to clarify any misunderstandings with assessment and scoring.
   c. Nursing leadership support through increase of staffing numbers during day 1 of tool use.
   d. Availability of practice specialists who can troubleshoot immediate problems with the tool.

6. Which of the following mobility strategies resulted in reduction of incidence and duration of delirium in patients receiving mechanical ventilation?
   a. Early mobility activities within the first 72 hours of mechanical ventilation.
   b. Delay of mobilization interventions until day 4 of mechanical ventilation.
   c. Physical therapy with passive range of motion during spontaneous awakening trials.
   d. Institution of progressive mobility with a dedicated rehabilitation team.

CE Test Test ID C1532: Pain, Agitation, and Delirium Guidelines: Nursing Involvement in Development and Implementation

Test answers: Mark only one box for your answer to each question. You may photocopy this form.

1. a  2. a  3. a  4. a  5. a  6. a  7. a  8. a  9. a  10. a  11. a  12. a
   a  b  c  d  a  b  c  d  a  b  c  d

Test ID: C1532 Form expires: June 1, 2018 Contact hours: 1.0  Pharma hours: 0.0  Fee: AACN members, $0; nonmembers, $10  Passing score: 9 correct (75%) Synergy CERP Category A  Test writer: Elisa Giglio-Siudzinski, MSN, RN, CCRN
Effective Pain Management and Improvements in Patients’ Outcomes and Satisfaction

Diane Glowacki, RN, MSN, CNS, CNRN-CMC

Adequate pain management is a compelling and universal requirement in health care. Despite considerable advancements, the adverse physiological and psychological implications of unmanaged pain remain substantially unresolved. Ineffective pain management can lead to a marked decrease in desirable clinical and psychological outcomes and patients’ overall quality of life. Effective management of acute pain results in improved patient outcomes and increased patient satisfaction. Although research and advanced treatments in improved practice protocols have documented progressive improvements in management of acute and postoperative pain, little awareness of the effectiveness of best practices persists. Improved interventions can enhance patients’ attitudes to and perceptions of pain. What a patient believes and understands about pain is critical in influencing the patient’s reaction to the pain therapy provided. Use of interdisciplinary pain teams can lead to improvements in patients’ pain management, pain education, outcomes, and satisfaction. (Critical Care Nurse. 2015;35[3]:33-43)

Effective pain management is a national and global challenge. Lack of integration of current knowledge and practice of effective pain management by health care professionals into day-to-day care adversely affects patients, resulting in unnecessary physical, psychological, and emotional manifestations. Implementation of research findings on pain management has slowly evolved and led to improvements in patient care. The Joint Commission and the World Health Organization, along with many national professional organizations and agencies, have recognized that pain management is an essential aspect of patient care.

CE Continuing Education

This article has been designated for CE credit. A closed-book, multiple-choice examination follows this article, which tests your knowledge of the following objectives:

1. Discuss improved outcomes for effective pain management
2. Review the use of evidence-based practice in pain management and assessment
3. Describe the pathophysiology of pain and its impact on the patient

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In this article, I discuss improved outcomes due to effective pain management in patients with acute pain, highlight the dimensions of pain management, review use of recommended evidence-based practices in pain management and assessment, describe the pathophysiology of pain, update research findings on multimodal balanced analgesia, and report the increase in patient satisfaction related to effective pain management. Participation of Mercy Hospital of Buffalo, Buffalo, New York, in a National Database of Nursing Quality Indicators (NDNQI) study revealed successful methods that have positively affected nursing practice and procedural changes.

Pain has been defined as "an unpleasant physical, sensory and emotional experience associated with actual or potential tissue damage, as well as an unpleasant and therefore also an emotional experience." Pain is whatever the experiencing person says it is, existing whenever the experiencing person says it does."

**Dimensions of Pain Management**

Five identified dimensions contribute to pain management. The dimensions have physiological, sensory, affective or cognitive, and sociocultural components unique for each patient that should be considered. Research on pain management in the 1970s and 1980s peaked as a breakthrough in theoretical knowledge of the physiological, psychological, and social aspects of improved quality of life associated with pain relief, but application of the findings to the general practice of medicine have been delayed. Aggressive pain control is still lacking for patients with acute pain. Although some concepts have been integrated into practice to enhance effective pain management, application of the concepts in the treatment of patients with pain has been slow, despite the availability of efficacious analgesics and multiple published clinical practice guidelines for management of acute pain. The American Pain Society published the most current guidelines in 2005 for improving the management of acute pain and cancer pain (the initial guidelines were released in 1995). The 5 most current guidelines include prompt recognition and treatment of pain, involvement of patients in the pain management plan, improvement of treatment patterns, reassessment and adjustment of the pain management plan as needed, and monitoring processes and outcomes of pain management.

**Pathophysiology**

Acute pain can be due to surgery, an injury, or a pathophysiological event such as ischemia or embolus. The central nervous system (CNS) conveys signals from the spinal cord to the brain, then to the nerves, and finally throughout the body. The spinal and supraspinal components of the CNS play critical roles. Both the peripheral and the central nervous systems are involved with the perception of pain. The peripheral system includes both motor and sensory nerves. Afferent nerves receive information, or stimuli, and efferent nerves carry the sensation to the muscles and stimulate responses.

After tissue injury and the effect of physical stress on the body, the sympathetic nervous system is activated, and damaged cells trigger a cascade of changes in the peripheral and central systems, releasing chemical mediators such as catecholamines, cytokines, and inflammatory markers at the cellular level, causing further tissue damage. The signals from these peripheral neurotransmitters intensify the noxious process. The signals travel through afferent pathways to the dorsal horn of the spinal cord, reach the subcortical and cortical areas of the brain, which play a role in the transmission of pain centrally through the spinal cord, and thus provoke pain (Table 1). At the cellular level, this series of events results in vasodilatation, increased vascular permeability, and activation of inflammatory cells that affect cardiovascular, gastrointestinal, renal, endocrine, respiratory, and metabolic functions and cause suppression of the immune system, which can result in postoperative infections and delayed healing. The potential for depression and anxiety also often occurs with mismanaged pain.

**Author**

Diane Glowacki is a clinical nurse specialist at Mercy Hospital of Buffalo, Buffalo, New York. She has held nursing leadership roles in project management, program development, process changes in best practice, and evidence-based clinical nursing practice. She led the development of a designated New York State stroke center and has had roles in stroke coordination. She leads the pain management team and assists in developing strategies to improve patients’ experience and satisfaction.

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Patients’ Outcomes

Adequate pain management enhances earlier mobility and lessens the complications of ileus, urinary retention, and myocardial infarction. Sleep deprivation, which can increase postoperative fatigue, resulting in decreased mobility, is also reduced, as are pulmonary complications, and an aggravated catabolic hormonal response to injury.14,15 When physiological complications are better controlled, patients and their families are better able to respond to stress and to cope with the patient’s situation.2,6 Additional benefits of adequate pain management include decreased length of stay, lower readmission rates, earlier overall recovery,16 improved quality of life, increased productivity, and decreased costs for patients and the health care system.14,17

During the early 2000s, the dissemination of research, science, and evidence-based practice was slowly embraced by clinicians, even though the literature had long described available pain interventions and methods to reduce potential pain.1 The American Pain Society developed one of the first national quality improvement programs in which the emphasis shifted from improved delivery of effective pain management to measurable patient outcomes, such as decreased length of stay, reduced hospital costs, and increased patient satisfaction.11

Lack of pain education provided to patients about preoperative and postoperative surgical procedures and expectations can result in poorer outcomes for the patients. Egbert et al18 reported that providing pain education to preoperative and postoperative patients resulted in significant improvements in the patients’ outcomes. Patients who received pain education required 50% fewer narcotics during hospitalization, excluding the day of the procedure, and were discharged sooner than were patients who did not receive the education. When acute pain is predictable, providing effective pain education and information on the anticipated postoperative experience should include special regard to the multiple causes and effects of pain, along with the range of treatments available to a patient. This pain education can reduce patients’ distress, reduce the number of signs and symptoms, and improve functional status.3 What a patient believes and understands about pain is critical in influencing the reaction to the pain therapy provided.12 Pain education alone may be the most effective treatment provided by health care professionals.3

The clinical practice guidelines of the American Pain Society recommend that patients and their families receive pain education during the presurgical visit that includes an explanation of the surgical procedure; the expected postoperative routine; the interventions and options for pain relief, including available pain medication; and the need for progressive increased mobility. Proper education and adequate treatment of postoperative pain can also result in positive emotional outcomes for patients, such as a decrease in anxiety and depression.

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Table 1  The pain pathway and analgesic interventions that can modulate activity at each point of the central and the peripheral nervous systems

<table>
<thead>
<tr>
<th>Progression of events</th>
<th>Pharmacological interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury or trauma</td>
<td>Local anesthetics</td>
</tr>
<tr>
<td>Peripheral nociceptor stimulation and release of noxious neurotransmitters</td>
<td>Traditional nonsteroidal anti-inflammatory drugs</td>
</tr>
<tr>
<td>Peripheral nerves travel through ascending or afferent central nervous system pathway</td>
<td>Cyclooxygenase-2 inhibitors</td>
</tr>
<tr>
<td>Signal reaches dorsal root ganglion, which has synapses in the dorsal horn of the spinal cord</td>
<td>Local anesthetics</td>
</tr>
<tr>
<td>Signal travels along the spinthalamic tract to the thalamus and cortex</td>
<td>Opioids</td>
</tr>
<tr>
<td>leads to Pain</td>
<td>α2-Agonists</td>
</tr>
<tr>
<td></td>
<td>Cyclooxygenase-2–specific inhibitors</td>
</tr>
<tr>
<td></td>
<td>Centrally acting analgesics</td>
</tr>
</tbody>
</table>

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an increase in coping skills, a greater sense of individual control, and an increase in a sense of well-being.6,18

**Improvement of Pain Assessments**

Lack of proficient and uniform pain assessment is one of the most challenging barriers in achieving adequate pain control.6,19 The most acknowledged and recognized barrier to effective pain assessment is patients’ subjectivity, the individual, personal, and private experiences within the dimensions of pain management. Assessment of a patient’s pain requires that professionals become well educated in recognizing a patient’s perception of pain, previous experiences with pain, current knowledge of pain, spiritual and religious beliefs, and sociocultural components.5,6 A thorough pain history and shared goal setting are critical components of effective pain management that leads to beneficial outcomes.6 Synergistic concepts of pain assessments are complex and include assessment of a patient’s clinical status, pain history, age, body weight, comorbid conditions, psychological status, previous exposure to analgesic medication, opioid-naïve status (an opioid-naïve patient is one who has not previously received opioid drugs and now, often because of trauma or surgery, receives regular daily doses of opioids), and insight into the patient’s current treatments for pain, along with the specific type of surgery the patient will undergo.9

Pain assessment is only the first step in effective pain management; what is done with that information can make a marked difference for a patient.2 The measurement and treatment of pain must be appropriate for each patient.18 The outcome of each patient’s pain experiences varies according to the risks and benefits associated with different analgesics administered. Different treatment approaches should guide each patient’s pain therapy without relying on pain scales alone.20

Use of a patient’s self-report has typically prevailed as the major component of a comprehensive pain assessment and is most commonly performed by using a numeric rating scale.21 Although no single, universally accepted metric pain assessment tool is available,3 Breivik et al6 found that a numeric rating scale and a visual analogue scale were equally sensitive in clinical assessments of pain and were better than other pain scales. The American Board of Family Medicine and the Institute of Medicine identified the numeric rating scale as a reasonable tool for pain screening,21 consistent with previous findings. However, opportunities still exist to devise a pain tool to better tease out information on the quality and character of a patient’s pain experience.

Improved pain assessments can help nurses prevent analgesia gaps, or lapses in administration of pain medication, that can increase pain or even lead to uncontrolled pain.5 Analgesia gaps can occur while a patient is emerging from anesthesia, being transferred from a postanesthesia care unit to a surgical unit, having the route of administration changed from epidural to intravenous to oral, and during progression in mobility. By astutely identifying anticipated postoperative phases that might require additional analgesia during a patient’s acute recovery, nurses can avoid interruptions in pain therapies.7 Principles of analgesic management include using fixed doses of scheduled analgesics when continuous pain is anticipated rather than solely using medications for breakthrough pain. Modifications to administration of analgesics depend on an accurate pain assessment, including pain intensity, pain relief, and side effects, such as nausea and vomiting, lightheadedness, dizziness, and urinary retention, and use of adjuvant medications such as nonsteroidal anti-inflammatory drugs.8,22 Assessment of the intensity of acute postoperative pain at rest is as important as pain assessment during subsequent postoperative activity. Assessing pain only at rest will not provide the critical information necessary to determine effective pain management.

**Balanced Analgesia**

The concept of multimodal analgesia was introduced in the early 1990s and is currently established in clinical practice. However, this type of analgesia is not used as widely as it could be.22 A continuing increase in the knowledge base of pain management has led to the concept of multimodal pharmacology or balanced analgesia.8,23 Balanced analgesia incorporates the combination of multiple analgesics that result in synergistic effects (Table 2). Postoperative pain management targets various physiological pain pathways and mechanisms of action, allowing for enhanced analgesia.

Pharmacological adjuvants such as ibuprofen, acetaminophen, naproxyn, ketorolac, gabapentin,
pregabalin, and local anesthetics alone often have inadequate potency for effective pain management. Opioid analgesics continue to be the primary medications for managing pain in hospitalized patients. Opiate drugs act primarily on the CNS, blocking the transfer of pain signals from the spinal cord to the brain. However, adverse side effects of excessive opioid therapy can hinder a patient’s recovery, especially in the early ambulation phase of postoperative care. Unintended progressive sedation and respiratory depression are 2 of the most critical side effects with aggressive opioid analgesia and are significantly correlated with increased mortality. The American Society of Anesthesiologists Task Force 2012 recommends that clinicians include a medication regimen of around-the-clock therapy with combinations of drugs for 24 to 48 hours after surgery. The multimodal approach to pain management has been an inspiring success in the research for patients’ comfort postoperatively.

Further recommendations include the establishment of interdisciplinary teams who can monitor current pain practices, identify areas for improvement, delineate and define quality improvement plans, and have clear lines of responsibility. These teams are essential for successful pain management programs. Recommended members of an interdisciplinary team include personnel from anesthesiology, surgery, postanesthesia care, nursing, pharmacy, and physiotherapy.

Research by Carr and Goudas suggests that providing effective analgesia in the early postoperative period leads to clinically important benefits, including improved long-term recovery and a decreased incidence of chronic pain. The results of Sinatra further support the findings that analgesic regimens of multimodal therapies reduce the incidence of chronic pain. If chronic pain develops, it can become a disease of its own through atypical activity of the CNS, with effects such as immune system impairment, increased susceptibility to disease, and maladaptive psychological, family, and social consequences. Progression of chronic pain redirects treatment approaches to focusing on the malfunctioning nervous system altogether or a “mechanism-based therapeutic approach” rather than strictly a “symptom-based approach.” According to Relieving Pain in America, progress has been made in identifying the pathophysiological mechanisms of acute and chronic pain, but this knowledge has not resulted in the development of newer analgesic medications with improved efficiency, safety, and patients’ tolerance.

Provider Education

In a column in USA Today, Pho wrote that according to the American Society of Interventional Pain Physicians, 80% to 90% of physicians have had no formal training in prescribing controlled substances, and only 5 of the 133 medical schools in the United States have required courses on pain management. According to Relieving Pain in America, medical schools’ training in pain management is not well assimilated into medical practice, and the care of pain in patients is delayed and inadequate. The average teaching time in training students about pain management in US medical schools has ranged from 1 to 31 hours. The Institute of Medicine has recommended courses to enhance better understanding of pain assessment and management strategies in hopes of increasing the number of health care professionals with expertise in pain care.

The American Nurse Credentialing Center reported that as of 2013, only 1672 registered nurses in the United States were certified in pain management. The Nurse Practitioner Healthcare Foundation has suggested development of a standardized curriculum in pain management and better training in the knowledge of prescribing opioids for patients with acute pain. Nurse practitioners most likely will have an increasingly

Table 2: Examples of multimodal analgesic drugs used in the postoperative period

<table>
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<th>Drug Type</th>
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<tbody>
<tr>
<td>Acetaminophen</td>
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<tr>
<td>Nonsteroidal anti-inflammatory drugs</td>
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<tr>
<td>Glucocorticoids</td>
<td></td>
</tr>
<tr>
<td>Strong opioid agonists</td>
<td>(eg, morphine, hydromorphone, fentanyl)</td>
</tr>
<tr>
<td>Weak opioid agonists</td>
<td>(eg, oxycodone, hydrocodone, tramadol)</td>
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<tr>
<td>Local anesthetic wound infusion</td>
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<tr>
<td>Local anesthetic wound infiltration</td>
<td></td>
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<tr>
<td>Continuous peripheral nerve block</td>
<td></td>
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<tr>
<td>Continuous epidural nerve block</td>
<td></td>
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<tr>
<td>Continuous paravertebral block</td>
<td></td>
</tr>
<tr>
<td>Transdermal analgesic patches (eg, fentanyl, lidocaine)</td>
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a Based on information from White and Kehlet.

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<tr>
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<tr>
<td>Continuous paravertebral block</td>
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</tr>
<tr>
<td>Transdermal analgesic patches (eg, fentanyl, lidocaine)</td>
<td></td>
</tr>
</tbody>
</table>

a Based on information from White and Kehlet.
Proper pain education and adequate treatment of postoperative pain can result in positive emotional outcomes.

Patients’ Satisfaction and Implications

In 2001, the Joint Commission instituted requirements that focused on improvements in quality pain management, emphasizing that pain should be proficiently assessed and treated in all patients. The commission established that acute pain and chronic pain were major causes of patients’ dissatisfaction in the US health care system. Wolosin et al suggest that scores for overall patient satisfaction on the Hospital Consumers Assessment of Healthcare Providers and Systems (HCAHPS) survey would most likely increase the most with improvements in nursing care such as managing nurse workloads and providing nurses more time for personalized patient care that would enhance pain management.

The Centers for Medicare and Medicaid’s value-based purchasing program, or pay for performance, published in 2012, instituted payment reforms that included financial incentives for hospitals that showed higher patient satisfaction scores. The required focus of hospitals was to identify specific outcomes and quality of patient care and incorporate evidence-based practices. Hospitals were mandated to participate in federal and public reporting to qualify for full payment based on scores on the HCAHPS survey. Patient satisfaction translates into increased pay for performance; thus hospitals will not only have additional incentives for improving patient satisfaction, but ultimately will have no other options but to develop improved patient satisfaction processes. The objectives of the Centers for Medicare and Medicaid included the recognition of patients’ rights to pain relief and development of policies to educate patients and patients’ families specifically about efficacious pain management. Patients’ perspectives of management of signs and symptoms and functionality have been the strongest in association with patients’ satisfaction. Patients are more likely to experience dissatisfaction if they perceive a lack of validation in their pain experience or negative attitudes from their clinicians.

NDNQI Study

An NDNQI pain study, Coordinating Center for Dissemination and Implementation of Evidence-Based Methods to Measure and Improve Pain Outcomes, was initiated in March 2011. The goal of the study was to implement and evaluate a research program that would measure and improve pain care processes and outcomes from a sample of hospitals nationwide. The overall goals were to evaluate the impact of implemented pain quality indicators, assess the effect of implemented strategies, and evaluate the barriers in measuring and improving pain management at the level of medical-surgical units. A total of 400 hundred hospitals in the United States participated in phase 1 of the study, which began in March 2011 and included administration of the survey/questionnaire to patients in the 400 hospitals.

At Mercy Hospital of Buffalo, distribution of the survey/questionnaire prepared by the NDNQI and approved by the hospital institutional review board was administered to the patients by trained registered nurses. As a result, the hospital was invited to participate in phase 2 of the study. For phase 2, only 2 of the medical-surgical or telemetry units were included, as selected by the NDNQI. Phase 2 began in August 2011 and ended in December 2011 and was devoted to developing strategic problem-solving initiatives. An interdisciplinary team was formed that included a clinical nurse specialist, a nurse manager, a pharmacist, and 4 registered nurses on staff. The action plan created by the team identified 3 objectives: provide staff education with evidence-based best practice of pain management, distribute pain folders to the patients that included pain education material, and provide daily pain rounds for all patients. The team members for pain rounds consisted of the clinical nurse specialist, the nurse manager, a pharmacist, and the primary registered nurse on staff. The data reported from the NDNQI linked the team’s initiatives with improved pain management and increased patient satisfaction. Publication of site-specific data of the national comparative data findings by the NDNQI was not allowed; however, the data are presented in the NDNQI Nursing Quality News.

The direct results of the NDNQI study prefaced the development of a hospital-wide interdisciplinary pain team at Mercy Hospital of Buffalo that implemented the successful initiatives from the study. This team...
consisted of the clinical nurse specialist, a nurse manager, a pharmacist, and the primary registered nurse in partnership with the physician, nurse practitioners, and physician assistants. The initiatives were implemented January 2012 through May 2012. The initiative of daily pain rounds included assessing each patient’s pain and providing pain education to the patient and staff. Patient experience scores related to pain management of the National Resource Corporation were used to analyze the hospital’s data. The results strongly linked the team’s initiatives with improved pain management and a continuance of increased improvement in patient satisfaction scores after the completion of the study in May 2012 (Figures 1 and 2). Both nursing and pharmacy practices have changed as a result of the NDNQI study on evidence-based practice. Daily pain rounds led to significantly improved patient outcomes, improved pain management methods, and improved patient satisfaction. Increased engagement of physicians with pharmacists and nurses also resulted in a sustained team approach in providing effective pain management for the patients.

**Conclusion**

Disparities in treating pain continue. A major challenge in providing patients the most effective treatments for pain lies in the difficulty of translating research to practice. Examples of barriers include developing new analgesics, applying evidence-based approaches in practice, and the integration of interdisciplinary team approaches. Research indicates a persistent gap between an understanding of the pathology of pain and recommended treatment of pain.

Pain relief has been acknowledged as a basic human right by the World Health Organization: “The

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**Figure 1** Patients’ satisfaction scores (percentage of positive responses) overall to the survey (HCAHPS) question “Did everything to help your pain.” Running chart depicts onset of National Database of Nursing Quality Indicators pain study with implementation of interdisciplinary daily patient pain rounds. Administration of the pre-study pain satisfaction survey started in March 2011. Daily pain rounds were implemented on 1 patient care unit in October 2011. Daily pain rounds were implemented on all patient care units (except maternal child and critical care units) in May 2012.

Abbreviations: HCAHPS, Hospital Consumer Assessment of Healthcare Providers and Systems; MHB, Mercy Hospital of Buffalo, Buffalo, New York; NRC, National Resource Corporation.

Source: NRC Picker eReports.

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Financial Disclosures
None reported.

References

Effective Pain Management and Improvements in Patients’ Outcomes and Satisfaction

Facts

Adequate pain management is a compelling and universal requirement in health care. Ineffective pain management can lead to a marked decrease in desirable clinical and psychological outcomes and patients’ overall quality of life. Improved interventions can enhance patients’ attitudes to and perceptions of pain.

- Lack of pain education provided to patients about surgical procedures and expectations can result in poorer outcomes. When acute pain is predictable, providing effective pain education on the anticipated postoperative experience should include special regard to the multiple causes and effects of pain, along with the range of treatments available to a patient. This pain education can reduce patients’ distress, reduce the number of signs and symptoms, and improve functional status.

- The clinical practice guidelines of the American Pain Society recommend that patients and their families receive pain education during the presurgical visit that includes an explanation of the surgical procedure; the expected postoperative routine; the interventions and options for pain relief, including available pain medication; and the need for progressive increased mobility.

- Proper education and adequate treatment of postoperative pain can also result in positive emotional outcomes for patients, such as a decrease in anxiety and depression, an increase in coping skills, a greater sense of individual control, and an increase in a sense of well-being.

- Assessment of a patient’s pain requires that professionals become well educated in recognizing a patient’s perception of pain, previous experiences with pain, current knowledge of pain, spiritual and religious beliefs, and sociocultural components.

- Synergistic concepts of pain assessments include assessment of a patient’s clinical status, pain history, age, body weight, comorbid conditions, psychological status, previous exposure to analgesic medication, opioid-naive status, and insight into the patient’s current treatments for pain, along with the specific type of surgery the patient will undergo.

- Use of a patient’s self-report has typically prevailed as the major component of a comprehensive pain assessment and is most commonly performed by using a numeric rating scale.

- A continuing increase in the knowledge base of pain management has led to the concept of multimodal pharmacology or balanced analgesia, which incorporates the combination of multiple analgesics that result in synergistic effects.

- Pharmacological adjuvants such as ibuprofen, acetaminophen, naproxen, ketorolac, gabapentin, pregabalin, and local anesthetics alone often have inadequate potency for effective pain management. Opioid analgesics continue to be the primary medications for managing pain in hospitalized patients.

- Further recommendations for successful pain management programs include interdisciplinary teams who can monitor current pain practices, identify areas for improvement, define quality improvement plans, and have clear lines of responsibility. Recommended members of an interdisciplinary team include personnel from anesthesiology, surgery, postanesthesia care, nursing, pharmacy, and physiotherapy.

1. Which of the following identifies the 5 dimensions that contribute to pain?
   a. Physiologic, somatosensory, cultural, social, and communicative
   b. Sensory, sociological, sociocultural, cognitive, and perception
   c. Physiologic, sensory, affective, sociocultural, and cognitive
   d. Physiologic, cognitive, social, subcultural, and affective

2. Which of the following statements is true about the pathophysiology of acute pain?
   a. Afferent nerves receive information.
   b. The central nervous system (CNS) includes both motor and sensory nerves.
   c. The CNS conveys signals to the afferent nerve fibers.
   d. Afferent nerves receive information.

3. After tissue injury and the effect of physical stress on the body, the sympathetic nervous system is activated causing which of the following?
   a. Damaged cells trigger a cascade of changes in the peripheral and central systems.
   b. Signals travel through the efferent pathways to the dorsal horn of the spinal cord.
   c. A cascade of changes in the peripheral nervous system cause the release of cytokines and inflammatory-resistant markers at the cellular level.
   d. Vasoconstriction and vascular permeability

4. Adequate pain management enhances earlier mobility and lessens complications resulting in all except which of the following?
   a. Decreased length of stay
   b. Complications of ileus
   c. Earlier recovery
   d. Improved stress and coping capabilities

5. Research supports that providing pain education to the preoperative patient population resulted in which of the following?
   a. 30% fewer hospitalizations
   b. Minimal changes in narcotic therapy
   c. Improvements in patient outcomes
   d. No changes in discharge times

6. Improvement of pain assessment may include all except which of the following elements?
   a. Patients' perceptions and previous experiences with pain
   b. Inclusion of patients' current knowledge and religious beliefs
   c. Development of a pain management plan by the nurse, physician, and pharmacist
   d. Obtaining a pain history

7. Analgesia gaps that can lead to increased pain include all except which of the following?
   a. During transfer of care between departments
   b. Emergence from anesthesia
   c. Progressing the patient from epidural to intravenous to oral
   d. Using physician-dependent pain management progression orders

8. Multimodal analgesia practices in the hospital setting incorporate which of the following pain management practices?
   a. Use of opioid analgesia exclusively
   b. Use of adjuvants such as ibuprofen, acetaminophen, naproxyn, and local anesthetics in place of opioid therapy
   c. Combination of multiple analgesics that result in a synergistic effect
   d. None of the above

9. The American Society of Anesthesiologists Task Force on Acute Pain Management recommends which of the following for postoperative patients?
   a. Immediate postoperative pain management using an aggressive opioid therapy
   b. Around the clock pain therapy with a combination of drugs for 24-48 hours
   c. Pain management regimen with a combination of drug therapies for 4-24 hours
   d. Use of a single drug regimen approach for the first 24-48 hours

10. Which of the following statements is true regarding the impact of adequate pain management training for physicians in the United States?
    a. 80%-90% of physicians have had adequate formal training in pain management practices.
    b. 133 US medical schools have required courses in pain management.
    c. 80%-90% of physicians have not had adequate formal training in pain management practices.
    d. Average teaching time for medical students is 31 hours.

11. Which of the following statements is true regarding the impact of adequate pain management on patient satisfaction?
    a. Patients' perspectives of pain management are strongly associated with patient satisfaction.
    b. There is no correlation between pain management practices and patient satisfaction.
    c. Acute pain and chronic pain management practices are not factors in improving patient satisfaction.
    d. All of the above

12. Which of the following is a major challenge in treating pain?
    a. Standardized pain management practices
    b. Use of a multidisciplinary team approach
    c. Difficulty translating research into practice
    d. Adequate training programs for physicians and nurses
Posttraumatic Stress Syndrome Associated With Stays in the Intensive Care Unit: Importance of Nurses’ Involvement

Heather Warlan, RN, PhD, CCRN
Lois Howland, RN, DrPH, MSN

More patients in the intensive care unit are surviving their critical illnesses because of advances in medical care. This change in survival has led to an increased awareness of the emotional consequences of being critically ill. Posttraumatic stress disorder has been identified in approximately 9% to 27% of critically ill patients compared with 7% of the general US population. Risk factors such as treatment with mechanical ventilation, sedation, delusional memories, and agitation are associated with development of posttraumatic stress disorder in patients in the intensive care unit. Individuals with posttraumatic stress disorder are more likely to experience negative physical and psychiatric health outcomes and a lower quality of life than are patients without the disorder. Early identification and treatment of patients experiencing these signs and symptoms may reduce these physical and psychological comorbid conditions. Through careful monitoring of medications, early mobilization, sleep promotion, and pain management, nurses may be able to reduce signs and symptoms of posttraumatic stress disorder. (Critical Care Nurse. 2015;35[3]:44-54)

The Society of Critical Care Medicine has estimated that each year 5 million patients in the United States will be admitted to an intensive care unit (ICU). Treatment of critically ill patients has improved so that an increasing number are surviving to be discharged home or to a long-term care facility to make a meaningful recovery. This change in survival has led to an increased awareness of the emotional and physical consequences of lifesaving interventions and critical illness.
Posttraumatic stress disorder (PTSD) is a severe anxiety disorder that results when a person experiences or witnesses trauma. The disorder is characterized by reexperiencing the traumatic event via flashbacks or nightmares and by arousal of the autonomic nervous system, which can be manifested as difficulty sleeping, irritability, and exaggerated startle response. Persons with PTSD also report a numbing feeling and tend to avoid places, people, and situations associated with the trauma. Diagnosis of PTSD requires that signs and symptoms cause impairment in an important area of functioning and be present for at least 30 days after the traumatic event.

ICU patients are particularly at risk for PTSD because of their experience of a life-threatening illness or trauma and because of treatments and interventions received in the ICU. Critically ill patients in whom PTSD develops may have a more complicated recovery than do other patients because the disorder is associated with higher rates of coronary heart disease, chronic pain, gastrointestinal disorders, arthritis, and decreased quality of life. In this literature review, we examine the phenomenon of PTSD and the risk factors and complications associated with ICU-related PTSD to help nurses recognize the factors that place critically ill patients at risk. We also suggest potential nursing interventions that may mitigate these risk factors.

Prevalence of PTSD and ICU-Related PTSD

According to estimations, PTSD affects 6.4% to 8.7% of adults in the United States. The prevalence of post-ICU PTSD has been difficult to determine; estimates range from 0% to 64%. This wide variation has been attributed to research-related factors, including small sample sizes, high dropout rates of participants, and the use of a wide variety of assessment measures (eg, use of screening tools vs diagnostic tools). In a systematic review of these issues, Wade et al compared studies from 1997 through 2007 with studies from 2008 through 2012 of post-ICU PTSD in both surgical and medical patients. The reviewers followed a specific protocol to determine the risk of bias for each study and included only high-quality studies in the final analysis. Prevalence rates between the 2 groups of studies were similar: 8% to 27% (1997-2007) and 9% to 27% (2008-2012). These numbers suggest ICU patients are at higher risk for PTSD than are members of the general population.

Risk Factors for ICU-Related PTSD

Personal Factors

Some risk factors for ICU-related PTSD are non-modifiable; however, for earlier identification of ICU patients with this disorder, nurses must understand what personal factors place patients at higher risk. Patients who have anxiety and depressive disorders before ICU admission have a higher rate of PTSD after discharge from the ICU than do patients who did not have psychological problems before admission. In addition, patients who are female or who are younger than 65 years are at greater risk than are males or older patients for ICU-related PTSD. The factors that predispose women to a greater risk for PTSD are not well understood. The difference between PTSD rates in men and women is not accounted for by the higher rates of depression and anxiety or sexual assault experienced by women.

ICU Factors

Categories associated with the critical care environment for ICU-related PTSD include use of specific medications such as vasopressors and sedatives, treatment with mechanical ventilation, delusional memories of the ICU, and agitation. By understanding these risk factors, nurses who provide care for critically ill patients may be better prepared to identify and potentially mitigate some of the risk factors.

Vasopressors. Vasopressors, such as phenylephrine and norepinephrine, are often administered in the
ICU to counteract profound hypotension due to cardiac or vascular failure or systemic infections. Physiologically, these medications mimic the stress response for extended periods, acting on target organs such as the heart to increase heart rate and contractility. In addition, blood vessels constrict, bronchioles expand, and blood is diverted away from nonessential areas, such as the gastrointestinal tract and peripheral circulation, allowing higher volumes of oxygen to reach vital organs. In a prospective cohort study of 100 mixed-diagnosis ICU patients, use of vasopressors and inotropes was correlated with anxiety. Use of vasopressors for an extended time creates a chronic stress state, putting the body at risk for excessive systemic inflammation leading to immune and metabolic dysregulation, endothelial damage, cytokine imbalance, carbohydrate intolerance, dyslipidemia, and insulin resistance. Further support for the link between vasopressors and PTSD is provided by research on the relationship between β-adrenergic antagonists, such as propranolol, and the occurrence of PTSD. In theory, propranolol crosses the blood-brain barrier, inhibiting fear conditioning by blocking catecholamine receptors in the amygdala. In an observational study of 128 patients, Krauseneck et al. found that female patients who received β-blockers (metoprolol) after cardiac surgery had lower levels of PTSD signs and symptoms and fewer traumatic memories 6 months after surgery than did women who did not receive the medication.

Sedation. In a literature review, including 26 articles from 1997 through 2012, Wade et al. found that use of benzodiazepines and duration of sedation were associated with signs and symptoms of PTSD. Furthermore, benzodiazepines have an amnesic effect, and amnesia has been positively correlated with higher levels of PTSD signs and symptoms. Despite the extent of research on the role of benzodiazepines, whether these medications are a causative factor in the development of PTSD is still unknown.

Spontaneous awakening trials were developed to reduce the amount of sedatives patients receive in the ICU. The results of research on the relationship between spontaneous awakening trials and both length of hospital stay and duration of mechanical ventilation are conflicting. Furthermore, the relationship between the use of spontaneous awakening trials and a reduction in PTSD signs and symptoms has not been validated. Therefore, some researchers suggest a focus on lighter levels of sedation might be more beneficial than a focus on the more time-consuming spontaneous awakening trial.

Mechanical Ventilation. Various studies and systematic reviews have indicated an association between mechanical ventilation and signs and symptoms of PTSD in mixed-diagnosis ICU patients. For example, in a follow-up study of 186 patients with acute lung injury or acute respiratory distress syndrome from 13 ICUs who received mechanical ventilation, PTSD signs and symptoms were detected in 35% of the patients during a 2-year period. Also, longer duration of mechanical ventilation has been associated with increased risk for PTSD in patients who survive acute lung injury or acute respiratory distress syndrome. Although nurses have little control over a patient’s initial need for mechanical ventilation, they may have an opportunity to reduce risk for PTSD in ICU patients by advocating for interventions that promote earlier extubation, such as spontaneous breathing trials, lighter levels of sedation, and early mobilization.

Delusional Memories. Delusional memories in the ICU context are memories of frightening perceptual experiences patients had while critically ill. ICU patients report unsettling delusional memories of their hospitalizations interwoven with real events from that time that are experienced as intrusive memories, as well as flashbacks or nightmares. The association between PTSD, delusional memories, and delirium is mixed. In a multicenter follow-up study of 238 patients who had received mechanical ventilation in the ICU, delusional memories were associated with the development of PTSD and were more likely to be retained over time than were factual memories. Unfortunately, factual memories of real events are less emotionally prominent to a person and therefore decrease over time, leaving the emotionally charged delusional memories as the primary recollections of the ICU experience. However, having no memory of the ICU is not...
beneficial either. In a large multicenter study, nearly half of the patients had no memory of their admission to the hospital or the ICU and noted a strong positive association between this amnesia for early events in their hospital course with the level of PTSD reported. Currently, no association between delirium and increased risk for PTSD has been reported. In these studies, delirium was identified by using the Confusion Assessment Method for the ICU or by nursing documentation stating the patient was “confused, disoriented, or had difficulty following commands.”

Agitation. In a systematic review, Davydow et al found that episodes of agitation and use of restraints were associated with PTSD. In the ICU, some patients are restrained to prevent them from removing life-sustaining devices such as endotracheal tubes or to minimize safety risks to themselves or staff if the patients are highly agitated or aggressive. Agitation is often managed first with sedative medications, but for patients in whom sedation is contraindicated, physical restraints are used as a last resort. Some research suggests that associations exist between agitation, use of restraints, and the development of PTSD in patients discharged from the ICU, thus highlighting the potential importance of managing agitation. ICU nurses must recognize agitation in patients and determine underlying causes, such as pain, delirium, and hypoxemia, before treating patients with benzodiazepines. In ICU patients who are not experiencing alcohol withdrawal, nonbenzodiazepines may be more helpful than benzodiazepines for treatment of agitation. Patients who experience stress, fear, loss of control, and an inability to express their wishes are at a higher risk for PTSD than are patients who do not experience these conditions. These emotions and frustrations may manifest themselves as agitation, emphasizing the importance of evaluating underlying causes of a patient’s agitation.

Severity of Illness and Length of ICU Stay

Two factors that may be major contributors to the development of PTSD in ICU patients are severity of illness and longer ICU stay, although the research is not conclusive. Length of stay and severity of illness, as measured by using the Acute Physiology and Chronic Health Evaluation II, have not been consistently associated with the development of PTSD in critically ill patients. Possibly, a patient’s perceptions of the ICU experience rather than the length of ICU stay or severity of illness contribute to the signs and symptoms of PTSD.

Adverse Health Outcomes Associated With PTSD

Cardiovascular Disorders

Mechanisms that link PTSD with poor health outcomes are multifactorial. Alterations in the hypothalamic-pituitary-adrenal axis and the sympathetic adrenal medullary axis, as well as autoimmune dysfunction, are commonly linked to the pathophysiological changes of PTSD. Cardiovascular complications due to activation of the 2 axes lead to hypertension, tachycardia, dyslipidemia, diabetes, and endothelial dysfunction. If this upregulation of the stress response is prolonged, these cardiovascular changes cause endothelial damage to vessels and eventually atherosclerosis, which is associated with myocardial infarction and embolic stroke.

A meta-analytic review of 6 studies indicated that after adjustments for depression, PTSD was independently associated with an increased risk for coronary heart disease. Furthermore, these cardiovascular changes place patients at greater risk for morbidity and mortality compared with patients without clinically important stress levels.

Other Associated Disorders and Decreased Quality of Life

In addition to cardiovascular disease, PTSD may also be linked with metabolic syndrome, a known cluster of cardiovascular signs and symptoms that puts a person at risk for coronary artery disease, stroke, and type 2 diabetes mellitus. In a survey of more than 36,000 Canadians, PTSD was associated with chronic pain, respiratory diseases, gastrointestinal disorders, cancer, and higher rates of disability compared with people without PTSD. Arthritis is another chronic condition strongly and consistently linked to PTSD. Other autoimmune disorders, specifically psoriasis and hypothyroidism, are also correlated with PTSD signs and symptoms. Although the association between these various disease states and subsequent development of...
PTSD after discharge from the hospital is not clearly understood, these clinical conditions may provide markers of patients at greater risk for PTSD.

Compared with the general population, ICU survivors are well known to have a decreased quality of life due to the limitations and obstacles the survivors face as part of their physical recovery. PTSD in a patient recovering from a critical illnesses or trauma increases the patient’s difficulty in functioning optimally in society and interpersonally. Some evidence suggests that patients given corticosteroids in the ICU have a better physical quality of life at 3 months after discharge than do patients who do not receive corticosteroids.

Psychological Disorders

The link between PTSD and concomitant psychological disorders has been well studied and is documented in the Diagnostic and Statistical Manual of Mental Disorders. If patients with PTSD also have depression, they are at an even higher risk for suicidal behaviors than are PTSD patients without depression. Furthermore, these disorders themselves are associated with various health risks. In patients who are already vulnerable because of their critical illness and who also have PTSD, the risk for another psychiatric disorder increases the potential for the onset of chronic physical conditions and exacerbations of existing conditions, complicating the patients’ recovery and decreasing their quality of life.

Early Detection of ICU-Related PTSD

Although it may seem intuitive that screening ICU patients would help reduce the signs and symptoms of PTSD, screening has not been adequately studied in survivors of critical illness. In addition, because of the stigma of psychiatric disorders, many patients with psychological conditions, including PTSD, often do not seek help for their illnesses. Because patients may not seek help on their own, detection of patients at risk for PTSD after ICU discharge and before fully recognizable PTSD develops is important. Nurses can facilitate early detection and treatment of patients at risk for post-ICU PTSD, potentially helping these patients avoid the physical and psychological comorbid conditions mentioned earlier.

One strategy for early identification of patients at risk for post-ICU PTSD is an automated screening procedure based on elements in a patient’s electronic medical record. A study of electronic medical records of 878 trauma survivors revealed 10 data elements that helped in the prediction of PTSD in the survivors. Most of the data elements were based on the International Classification of Diseases, 9th Revision, Clinical Modification and included psychiatric disorders, substance use disorders, and positive tests for blood alcohol on hospital admission. Other data elements that increased the risk for PTSD were female sex, nonwhite ethnicity, admission to an ICU, previous trauma, and socioeconomic factors such as insurance status. The benefits of using electronic medical records to screen patients is that the screening can be done at a convenient time after a patient’s ICU stay and by any hospital staff member who is familiar with the electronic medical record system.

Nurses can advocate for a mental health consultation before discharge from the ICU or hospital for patients at risk for PTSD.

Nurses can advocate for a mental health consultation before discharge from the ICU or hospital for patients at risk for PTSD. In a large observational study of trauma ICU patients who received an extensive psychological intervention (education, stress management, psychological support, and coping strategies) to address anxiety, depression, fear, and hopelessness, the incidence of PTSD was 21% in the intervention group and 57% in the control group. Patients who required psychiatric medications 1 year after discharge were primarily from the control group (41%) rather than the intervention group (8%). Despite the positive outcome in this study, the intervention might not be feasible or cost-effective for hospitals without a psychology department.

Providing follow-up after discharge may be useful in early identification of patients at risk for PTSD so long as the follow-up is done within a few months after hospital discharge. In a study by Schandl et al., 61 post-ICU patients were invited to a multidisciplinary follow-up visit with a physical therapist, a nurse, and a physician to assess physical and psychological recovery. Those patients who attended the visits at 3 and 6 months after hospital discharge required little ongoing treatment 12 months after their ICU discharge. In addition, specific screening tools were helpful in detecting undiagnosed depression and PTSD in the post-ICU patients.
An example of a screening tool created specifically for ICU-related PTSD signs and symptoms is the Post-Traumatic Stress Syndrome 14-Questions Inventory. This tool is reliable at 3 times—4 to 14 days after discharge ($\alpha = 0.89$), 2 months after discharge ($\alpha = 0.86$), and 3 months after discharge ($\alpha = 0.84$)—and has good concurrent validity with the Posttraumatic Diagnostic Scale ($r = 0.86$) and the Impact of Events Scale ($r = 0.71$).

Adopting a screening process to identify ICU patients at risk for the signs and symptoms of PTSD would require the creation of a defined procedure detailing how patients whose results are positive for PTSD will receive follow-up and by whom. This process most likely would involve a multidisciplinary team. Currently, no strategy has been described for implementing an early screening program for ICU-related PTSD. Furthermore, no research has been done to test the effects of an early screening process in reducing the incidence of PTSD in critical care patients after discharge from the ICU.

### Nursing Implications for Managing Risk Factors

Unfortunately, many of the risk factors for PTSD in ICU patients, such as use of vasopressors and mechanical ventilation, cannot be eliminated because they are also the interventions used to save patients’ lives. However, by regularly assessing patients for the risk factors discussed earlier, during routine physical assessment and medication review, nurses can intervene directly or advocate for treatments to make the ICU environment less stressful and to promote recovery. The Table summarizes potential risk factors and nurse-initiated actions that may reduce ICU patients’ risk for PTSD. Reliable and valid tools are available that nurses can use to assess patients for risk factors such as sedation, agitation, and delirium. The Richmond Agitation-Sedation Scale is a valid and reliable 10-item scale with scores ranging from +4 (combative) to -5 (unarousable). ICU delirium can be closely monitored in many ICUs by using the Confusion Assessment Method for the ICU, which can reliably be administered by bedside nurses in about 5 minutes.

To address level and type of sedation, nurses can advocate for the use of either lighter target levels of sedation or the routine use of a daily-awakening protocol. For patients not experiencing alcohol or benzodiazepine withdrawal, nurses can discuss with physicians if the use of dexmedetomidine instead of benzodiazepines would be an appropriate type of sedation. Targeting lighter levels of sedation and

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**Table Nursing interventions for modifiable risk factors for posttraumatic stress disorder related to a stay in the intensive care unit**

<table>
<thead>
<tr>
<th>Modifiable risk factor</th>
<th>Targeted assessment</th>
<th>Nursing intervention</th>
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<tbody>
<tr>
<td>Use of vasopressors</td>
<td>Routinely assess duration and dosage of vasopressors</td>
<td>Titrate down dosages of vasopressors as soon as possible</td>
</tr>
<tr>
<td>Use of benzodiazepines and duration of sedation</td>
<td>Routinely assess duration, sedative dosage, sedation level of patient, and need for sedation</td>
<td>Maintain light levels of sedation, use daily awakening trials, consider nonbenzodiazepine sedation, titrate down dosage of sedative as soon as possible</td>
</tr>
<tr>
<td>Treatment with mechanical ventilation</td>
<td>Assess respiration and ventilation and wean patient from mechanical ventilation as patient tolerates</td>
<td>Use spontaneous breathing trials, use lighter levels of sedation, provide early mobilization</td>
</tr>
<tr>
<td>Delusional memories</td>
<td>Assess patient for delirium by using a valid and reliable tool every shift and as needed</td>
<td>Keep intensive care unit diaries for patients, use lighter levels of sedation, consider dexmedetomidine, promote rest (earplugs, eye mask, reduction in noise, cluster care, sleep hygiene, dim lights), reorient patient, provide early mobilization</td>
</tr>
<tr>
<td>Agitation</td>
<td>Assess patient for agitation by using a valid and reliable tool at least 4 times a shift and as needed</td>
<td>Treat pain, modify environment to reduce stimuli, assess need for physical restraints frequently, monitor communications with patients, limit use of benzodiazepines</td>
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considering dexmedetomidine versus benzodiazepines can reduce many of the risk factors for ICU-related PTSD, such as the number of days sedated, development of agitation, and duration of mechanical ventilation. Early mobilization protocols can also help mitigate delirium and agitation and expedite extubation. Detailed protocols have been developed that outline the recommended frequency, duration, and type of physical activity for critically ill patients. Guidance is also provided to help organize interdisciplinary teams, which should include nurses, physicians, physical therapists, and respiratory therapists. In addition, adequately managing a patient’s pain can both encourage the patient’s participation in early mobilization protocols and reduce agitation. Other nursing interventions to promote extubation include frequent communication with physicians and respiratory therapists to decrease the fraction of inspired oxygen and positive end-expiratory pressure to facilitate spontaneous breathing trial protocols in conjunction with daily-awakening trials.

The stress of the critical illness on a patient’s body, combined with organ failure, use of sedative medications, and the lack of sleep patients experience in the ICU, may contribute to delirium. Environmental modifications such as use of earplugs and eye masks may improve sleep quality and patients’ perceptions of sleep. Clustering care procedures and reducing noise levels by closing doors and managing alarm parameters are also cost-effective ways to promote sleep and reduce agitation and delirium. A comforting bedside manner and therapeutic communication are ingrained in nurses. A patient who is unable to interact with nurses can be easily ignored, or inappropriate conversations can occur in the patient’s room. However, patients may be able to unconsciously gauge a nurse’s intentions and sense if the nurse is stressed or is compassionate. Nurses who are stressed or hurried in their manner may not be taking sufficient time to explain to unconscious patients what is happening, thus increasing anxiety or fear in patients with unrecognized cognition of their surroundings.

Some evidence indicates that a diary of a patient’s ICU experience kept by nurses and the patient’s family members can help fill gaps in the patient’s memory of the ICU stay. A large multicenter, randomized study included use of ICU diaries in which a patient’s nurses and family members wrote daily entries and included photographs of the patient during the hospitalization. The incidence of PTSD was 5% in the group who had a diary kept for them and 13% in the group that did not receive a diary. These results suggested that giving patients this frame of reference helped the patients come to terms with their experiences and reinforced real memories rather than delusional memories. Likewise, in a smaller study in France, use of a similar diary led to a reduction in PTSD signs and symptoms 12 months after ICU discharge. Despite these encouraging findings, a literature review of 11 studies from 1950 through 2013 on the effectiveness of ICU diaries did not support incorporating diaries into routine clinical practice, citing inconsistent methods among studies and the lack of a theoretical underpinning and rationale being tested and articulated.

**Conclusion**

Early detection of PTSD may prevent physical and psychological comorbid conditions in critically ill patients. Currently, patients’ psychological health is not routinely being addressed during an ICU stay or after discharge from the ICU because of a lack of familiarity with the disorder in ICU patients. This review of current literature on the risk factors for and consequences of PTSD in patients during or after a stay in the ICU may increase awareness of critical care nurses of the factors that place their patients at high risk for PTSD. In addition, we provide potential strategies that may mitigate the risk. Nurses are in a unique position to help patients more effectively cope with the patients’ emotions during the hospitalization by educating patients and patients’ families about the risk for PTSD and offering anticipatory guidance. Research provides some evidence that early identification and interventions may reduce the risk of PTSD after a patient’s ICU stay. However, further research is needed to determine the most effective screening protocol for ICU-related PTSD and to examine the relationship between screening and signs and symptoms of ICU-related PTSD.

**Acknowledgments**

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**Financial Disclosures**

None reported.

References


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Posttraumatic Stress Syndrome Associated With Stays in the Intensive Care Unit: Importance of Nurses’ Involvement

Facts
Intensive care unit (ICU) patients are particularly at risk for posttraumatic stress disorder (PTSD) because of their experience of a life-threatening illness or trauma and because of treatments and interventions received in the ICU.
- Categories associated with the critical care environment for ICU-related PTSD include use of specific medications such as vasopressors and sedatives, treatment with mechanical ventilation, delusional memories of the ICU, and agitation.
- Two factors that may be major contributors to the development of PTSD in ICU patients are severity of illness and longer ICU stay.
- Possibly, a patient’s perceptions of the ICU experience rather than the length of ICU stay or severity of illness contribute to the signs and symptoms of PTSD.

Complications Associated With PTSD
- Cardiovascular complications due to activation of the hypothalamic-pituitary-adrenal axis and the sympathetic adrenal medullary axis lead to hypertension, tachycardia, dyslipidemia, diabetes, and endothelial dysfunction. If this upregulation of the stress response is prolonged, these cardiovascular changes cause endothelial damage to vessels and eventually atherosclerosis, which is associated with myocardial infarction and embolic stroke.
- PTSD may also be linked with metabolic syndrome, a known cluster of cardiovascular signs and symptoms that puts a person at risk for coronary artery disease, stroke, and type II diabetes mellitus.

Nursing Implications
- Because patients may not seek help on their own, detection of patients at risk for PTSD after ICU discharge and before fully recognizable PTSD develops is important.
- One strategy for early identification of patients at risk for post-ICU PTSD is an automated screening procedure based on elements in a patient’s electronic medical record.
- Nurses can advocate for a mental health consultation before discharge from the ICU or hospital for ICU patients at risk for PTSD.
- Providing follow-up after discharge may be useful in early identification of patients at risk for PTSD so long as the follow-up is done within a few months after hospital discharge.
- By regularly assessing patients for risk factors, during routine physical assessment and medication review, nurses can intervene directly or advocate for treatments to make the ICU environment less stressful and to promote recovery.
- Nurses can advocate for the use of lighter target levels of sedation or the routine use of a daily-awakening protocol.
- Early mobilization protocols can also help mitigate delirium and agitation and expedite extubation.
- Adequately managing a patient’s pain can both encourage the patient’s participation in early mobilization protocols and reduce agitation.
- A diary of a patient’s ICU experience kept by nurses and the patient’s family members can help fill gaps in the patient’s memory of the ICU stay.

1. Which of the following describes the prevalence of posttraumatic stress disorder (PTSD) for critically ill patients?
   a. 2%-7%
   b. 9%-27%
   c. 12%-50%
   d. 18%-60%

2. Which of the following patients is at the greatest risk for developing PTSD?
   a. 32-year-old female patient with a history of anxiety
   b. 48-year-old male patient with a history of gout
   c. 68-year-old male patient with a history of hyperthyroidism
   d. 82-year-old female patient with a history of glaucoma

3. Which of the following statements best describes the link between the use of vasopressors and PTSD?
   a. Using vasopressors can reduce the incidence of PTSD by delaying the stress response.
   b. Using vasopressors for an extended time can increase the risk of anxiety.
   c. Using vasopressors can reduce anxiety in patients who have a history of depression.
   d. Avoiding the use of vasopressors can inhibit fear conditioning by blocking receptors in the cerebral cortex.

4. In the authors' review of the literature related to sedation, they found which of the following statements to be true?
   a. The use of benzodiazepines was associated with signs and symptoms of PTSD.
   b. The duration of benzodiazepine had no effect on the occurrence of PTSD symptoms.
   c. The amnesia effect from benzodiazepines had no effect on the occurrence of PTSD.
   d. There is little research available related to the role of benzodiazepines in the development of PTSD.

5. Which of the following environmental modifications do the authors suggest to reduce delirium?
   a. Providing lighting that mimics daytime and nighttime.
   b. Using earplugs and eye masks.
   c. Playing soft music at night.
   d. Painting the room neutral colors.

6. Advantages of early detection of PTSD include which of the following?
   a. Reducing mechanical ventilation time
   b. Having the ability to prevent the occurrence during the intensive care unit (ICU) stay
   c. Creating opportunities for early intervention
   d. Improving patient satisfaction

7. Modifiable risk factors for the development of PTSD include which of the following?
   a. Use of antipsychotics
   b. Treatment with mechanical ventilation
   c. Administration of enteral feedings
   d. Use of antidepressants

8. Which of the following interventions are recommended for nurses to incorporate into practice to reduce the risk for the development of PTSD?
   a. Limiting visiting times between 8 PM and 6 AM
   b. Promoting the use of benzodiazepines for sedation
   c. Creating ICU diaries for patients
   d. Allowing only the immediate family to visit the patient in the critical care unit

9. Which of the following instruments is best for monitoring ICU delirium, according to the authors?
   a. Confusion Assessment Method for the ICU
   b. Glasgow Coma Scale
   c. Clinical Institute Withdrawal Assessment
   d. Patient Health Questionnaire

10. For a patient diagnosed with PTSD, which of the following conditions could increase risk for suicide?
    a. Anxiety
    b. Schizophrenia
    c. Anorexia nervosa
    d. Depression

11. Which of the following demographic data increase the risk for PTSD?
    a. Male gender
    b. White ethnicity
    c. Socioeconomic status
    d. Religious affiliation
One of the patient characteristics in the AACN Synergy Model is vulnerability. Vulnerability is defined in the model as the susceptibility to actual or potential stressors that may adversely affect patients' outcomes. The risk of vulnerability increases in older patients in critical care units. (Critical Care Nurse. 2015;35[3]:55-61)

By 2050, the percentage of the population more than 80 years old in North America will double and will account for 9% (35 813 000 persons) of the total population. These changes will lead to an increasing demand for health care resources, specifically intensive care. Bagshaw et al have predicted that by 2015 the rate of patients 80 years and older admitted to an intensive care unit (ICU) will increase by 72%, roughly 1 in 4 admissions to the unit. Vulnerability, 1 of the 8 patient characteristics identified in the AACN Synergy Model, will be present in many of these patients.

**Purpose**

The purpose of this article is to increase clinicians’ awareness of vulnerability relative to older patients and to explicate this patient characteristic as defined by the AACN Synergy Model. The AACN Synergy Model defines vulnerability as the susceptibility to actual or potential stressors that may adversely affect a patient’s outcome. According to the model, patients can be identified as highly vulnerable, moderately vulnerable, or minimally vulnerable. Patients who are highly vulnerable are susceptible to poor outcomes. In the AACN Synergy Model, vulnerability is considered a patient characteristic; although everyone is vulnerable to a degree, old age involves greater risk for vulnerability. Older adults are an increasing population of critical care patients who have more comorbid conditions and less physiological reserve than do younger patients. The AACN Synergy Model does not specifically discuss aspects associated with older patients that often increase vulnerability. In this article, I discuss the components of vulnerability for older patients. By understanding and measuring aspects of vulnerability, critical care nurses can identify high-risk older patients who are susceptible to complications. Identifying vulnerable older patients allows nurses to proactively enhance communication with health team members to design strategies to mitigate stressors and influence outcomes of these patients.
Vulnerability

Vulnerability is defined in a number of different ways and is used in the English language to indicate susceptibility. Vulnerability had its origin in the early 17th century from the Latin word vulnerabilis, from vulnerare, meaning “to wound,” and is defined as an adjective that means “susceptible to physical or emotional attack or harm.” Cambridge Dictionaries Online also defines vulnerable as an adjective; however, in contrast to the Oxford Dictionary definition of “susceptible to harm,” the Cambridge Dictionary refers more to possibility or potential as follows: “able to be easily hurt, influenced or attacked.”

Definitions of vulnerability are understood differently, depending on a person’s perception. In a study of older patients and health care providers, older people perceived vulnerability differently than did the health professionals. Older people thought that to be vulnerable was to be at the mercy of others. The inability to be independent was associated with vulnerability. Such feelings were characterized as an emotional response. Health care providers should consider an older adult vulnerable if he or she is mentally and physical frail, living alone, a victim of a crime, unable to manage his or her own risks, or abused or has a detrimental imbalance between care needs and care provided.

Nurses and members of the health care team should participate in the evaluation of older patients’ level of vulnerability. Ultimately, vulnerability indicates the possibility of an adverse outcome or injury. Poor outcomes are influenced by high levels of vulnerability even when all standards of care are met. Yet, health care reimbursement systems, legal systems, and patients’ families have not embraced the fact that highly vulnerable patients may require higher reimbursement levels because of resource utilization; for example, reimbursement from Medicare for a readmission within 30 days of discharge regardless of circumstances. Disability, comorbid conditions, and frailty increase the risk for poor outcomes.

Vulnerability is without doubt the outcome of complex interactions of discrete risks, namely, exposure to a threat, materialization of a threat, and a lack of the defenses or resources to deal with a threat. Although use of the terms disability, comorbid conditions, and frailty in the literature may overlap, each concept should be evaluated in identifying vulnerable critical care patients. Therefore, for this article, vulnerability among older patients is understood to occur when disability, comorbid conditions, and frailty exist.

Disability

Disability has a marked presence in society (1 in 6 Americans has a disability) and is defined as difficulty or dependency in carrying out activities essential to independent living. These activities include self-care, independent living, and carrying out essential roles. Disability consists of the functional limitations due to a variety of physiological and psychological impairments. Persons who are disabled are often unable to care for themselves because of physical limitations or mental decline. The US Census Bureau defines disability according to type, age of person, and severity. For persons 15 years old and older, disabilities are categorized into 3 domains: communication, mental, and physical. Table 1 lists the types of disabilities.

The World Health Organization in 2010 described disability as a term that covers impairments, activity limitations, and participation restrictions. An impairment is a problem in body function, an activity limitation is the difficulty encountered by a person in executing a task or action, and a participation restriction is a problem experienced by a person in involvement in life situations. Thus, disability is a complex phenomenon, reflecting an interaction between features of a person’s body and features of the society in which the person lives.

The many definitions and interpretations of the term disability led to the 2008 amendments of the Americans With Disabilities Act of 1990. The amendments focused primarily on the definition of the term disability and the rules regarding designation of the term. Disability came to be understood as an impairment...
that must “substantially limit” any major life activity. Chapter 126, Section 12101, of the ADA Amendments Act of 2008 states,

Congress finds that physical or mental disabilities in no way diminish a person’s right to fully participate in all aspects of society, to include, but are not limited to, caring for one’s self, performing manual tasks, seeing, hearing, eating, sleeping, walking, standing, lifting, bending, speaking, reading, learning, concentrating, thinking, communicating, and working.

Impairments are considered transitory and minor if their expected duration is 6 months or less. Other rules governing the definition of disability include “an impairment that substantially limits one major life activity need not limit the other major life activities in order to be considered a disability” and “an impairment that is episodic or in remission is a disability if it would substantially limit a major life activity when active.”

A person is considered disabled if he or she is unable to complete instrumental activities of daily living, such as mobility outside the home, financial management, meal preparation, housework, managing prescriptions, and telephone use, or activities of daily living, such as mobility inside the home, movement from bed to chair, bathing, dressing, eating, and toileting. Difficulty with specified functional activities may be experienced by persons classified as disabled, such as seeing words or letters in newsprint, hearing normal conversation, having speech understood, walking 3 city blocks, climbing a flight of stairs, grasping objects, and lifting or carrying 4.50 kg (10 lb).

Another approach to understanding classification of disability is through the International Classification of Functioning, Disability, and Health developed by the World Health Organization General Assembly. This classification system can be used to evaluate a person’s health status without regard to the disabling condition and includes consideration of how the environment may hinder use of assistive technology or facilitate the person’s activities. The system recognizes participation and inclusion in society as a critical part of a person’s health.

Comorbid Conditions

Comorbid conditions are disease processes resulting from biological changes that weaken persons. Comorbid conditions such as heart failure, diabetes, renal disease, and metastatic tumors can have a major impact on outcomes in hospitalized patients. In a study by Sachdev et al, the key comorbid conditions heart failure, peripheral vascular disease, cerebrovascular disease, hemiplegia, diabetes, liver and renal diseases, malignant neoplasm, and metastatic tumors were independent indicators of in-hospital mortality.

A helpful instrument for measuring comorbid conditions is the Charlson Comorbidity Index (CCI). This index was developed as a prognostic index of comorbid conditions for patients admitted to a general medical service with a variety of medical conditions that alone or in combination might alter the risk for short-term mortality for patients enrolled in longitudinal studies. The CCI uses a point system. History of myocardial infarction, heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic lung disease, connective tissue disease, peptic ulcer disease, mild liver disease, and diabetes are each worth 1 point. Comorbid conditions worth 2 points are diabetes with target-organ damage, hemiplegia, moderate to severe renal disease,
malignant neoplasm, leukemia, and lymphoma. Moderate to severe liver disease is worth 3 points, and metastatic solid tumor and AIDS (stage C) are worth 6 points. Therefore, patients with no comorbid conditions have a CCI of 0, patients with only 1 comorbid condition weighted as 1 have a CCI of 1, patients with 2 comorbid conditions of which both are weighted 1 or with 1 comorbid condition weighted 2 have a CCI of 2, and patients for whom the sum of the weighted points of comorbid conditions is 3 or greater have a CCI of 3 or greater and are considered at higher risk for death by 59%. The index was tested for the ability to predict risk for death due to comorbid disease. The CCI could easily be used in a critical care unit or preoperatively.

Frailty

Frailty is a clinical state that will make a patient more vulnerable to poor outcomes in a critical care unit. Often, frailty is either underdiagnosed or undiagnosed by the medical team. Although health care providers may think frailty exists as a clinical condition, this diagnosis rarely appears in a clinical note, progress note, or history and physical. Frailty is a medical syndrome with multiple causes and contributors. The syndrome is characterized by diminished strength, diminished endurance, and reduced physiological function that increase a person’s vulnerability for increased dependency, death, or both.\(^{17(p393)}\)

Frailty can be measured on the basis of attributes that are physiological, psychological, or a combination of the 2 components.\(^{17}\)

Historically, 2 approaches to defining physical frailty have been used by clinicians: the Frailty Index and the frail phenotype. The Frailty Index\(^{18}\) is determined by adding together the number of impairments and conditions a patient has. The score is based on a comprehensive geriatric assessment and is calculated as the number of deficits a patient has divided by the total number of deficits that were considered. This index includes up to 80 items and so can be overwhelming to use in a hospital environment. In the second approach, the frail phenotype is characterized by weakness, loss of endurance, slowness, low physical activity, and loss of weight.\(^{19}\)

Frailty phenotype scales have been developed by a number of researchers. Several of the scales can be administered quickly and thus provide nurses a quick understanding of whether an older patient is fit or severely frail. This information can be useful as an aspect in analyzing potential predictability of outcomes. The Frailty Trait Scale\(^{20}\) has 7 dimensions: energy balance and nutrition, activity, nervous system, vascular system, weakness, endurance, and slowness. The scores for the domains are determined via assessment of 12 items: unintentional weight loss, body mass index, waist circumference, serum albumin level, physical activity, verbal fluency, balance, brachial ankle index, grip strength, knee strength, chair test, and time needed for a 3-m (10 ft) walk. Typically, this type of scale could not be used for most critical care patients, unless implemented in the outpatient setting before an admission.

The Clinical Fragility Scale consists of 9 defined categories.\(^{21}\) The scores go from very fit to severely fragile. Very fit patients are robust, active, energetic, motivated, and commonly exercise regularly. They are among the fittest of persons their age. The second category is well; patients who are well have no signs or symptoms of active disease but are less fit than are the patients in category 1. Well patients exercise or are very active occasionally (eg, seasonally). The third category is managing well; the medical problems of patients in category 3 are well controlled, but the patients are not regularly active beyond routine walking. The fourth category is vulnerable. Vulnerable patients are not dependent on others for daily help, but signs or symptoms of medical problems limit their activities. Patients in category 4 may speak of being “slowed up” or of being tired during the day, or both. The fifth category is mildly frail. Mildly frail patients have more evident slowing and need help in high-order instrumental activities of daily living (eg, finances, transportation, heavy housework, medications). The sixth category is moderately frail. Moderately frail patients need help with all outside activities and with keeping house. The seventh category is severely frail. Severely frail patients are completely dependent for personal care due to whatever cause (physical or cognitive). Even so, they seem stable and not at high risk for death (within ~6 months). The eighth category is very severely frail. Patients in category 8 are completely dependent, are approaching the end of life, and would often not recover even from a minor illness.

Although frailty exists as a clinical condition, this diagnosis rarely appears in a clinical note, progress note, or history and physical.
The ninth category is terminally ill. Patients in category 9 are at the end of life. This category applies to patients with a life expectancy less than 6 months who are not otherwise evidently frail.\(^6\) The Clinical Fragility Scale can be quickly used in a critical care area by interviewing a patient’s family or significant other, who should easily be able to tell a nurse which category they would place the patient in.

Another frailty scale based on the Geriatric Status Scale can be used to rapidly assess older patients for functional status. The results can help identify patients who require specialized intervention.\(^{22}\) This scale is used to quickly assess 4 areas: activity, activities of daily living, continence, and cognition. Using a short scale would increase acceptability in a fast-paced environment such as a critical care unit.

Last, another tool that warrants attention is the Vulnerable Elders Survey,\(^{23}\) which can be administered by nonclinical personnel within 5 minutes and has been validated in outpatients and in patients in acute medical care settings. The Vulnerable Elders Survey is a 13-item survey that considers age, self-reported health condition, physical function, and ability to perform basic and instrumental activities of daily living. A score of 3 or greater signifies increased risk for functional decline and mortality at 2 and 5 years.

Overall, the criteria presented in the literature for frailty identify numerous items. Most criteria include some or all of the following as elements to be evaluated: weight loss, decrease in grip strength, exhaustion, low physical activity, and slow walking speed.\(^{24}\) Weight loss was defined as unintentional weight loss of more than 4.5 kg (10 lb) in the preceding year; decreased grip strength (weakness) was measured by having the patient squeeze a hand-held dynamometer; exhaustion was measured by responses to questions about effort and motivation; low physical activity was ascertained by inquiring about leisure time activities; and slowed walking speed was measured by the speed at which the patient could walk 4.5 m (15 ft). These items represent elements that would typically be consider in an evaluation of frailty.

**Nursing Implications**

Physiological assessment of a patient should include evaluation of deficits of the patient’s senses (eg, hearing and vision), level of mobility (previous falls), and chronic illnesses. Such assessments could be made through patients’ self-reporting or via patients’ family members. Psychological assessment of an older patient may include evaluation of cognitive impairment, psychiatric illness, dementia, and a lack of social support. Knowledge of deficits in a patient’s social support, such as living alone or in an unsafe home environment, are important in planning the patient’s care. Nurses must continue to

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**Table 2** Qualities of vulnerability affecting older adults in critical care

<table>
<thead>
<tr>
<th>Domain</th>
<th>Category</th>
<th>Effect</th>
<th>Critical care intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiological</td>
<td>Vision</td>
<td>Falls</td>
<td>Fall prevention</td>
</tr>
<tr>
<td></td>
<td>Mobility</td>
<td>Falls</td>
<td>Fall prevention</td>
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<tr>
<td></td>
<td>Frailty</td>
<td>Falls</td>
<td>Fall prevention</td>
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<tr>
<td></td>
<td>Frailty</td>
<td>Abuse</td>
<td>Social service referral</td>
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<tr>
<td></td>
<td>Hearing</td>
<td>Home safety</td>
<td>Home health assessment</td>
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<tr>
<td></td>
<td>Taste</td>
<td>Malnutrition</td>
<td>Nutritional consultation</td>
</tr>
<tr>
<td></td>
<td>Circulation</td>
<td>Hypothermia</td>
<td>Home health consultation</td>
</tr>
<tr>
<td></td>
<td>Chronic illness</td>
<td>Poor self-management</td>
<td>Home health consultation</td>
</tr>
<tr>
<td>Psychological</td>
<td>Dementia</td>
<td>Safety living alone</td>
<td>Case management</td>
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<tr>
<td></td>
<td>Cognitive impairment</td>
<td>Poor self-management</td>
<td>Case management</td>
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<tr>
<td></td>
<td>Cognitive impairment</td>
<td>Poor financial management</td>
<td>Case management</td>
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<tr>
<td></td>
<td>Bereavement</td>
<td>Depression</td>
<td>Case management</td>
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<td></td>
<td>Social isolation</td>
<td>Depression, loneliness</td>
<td>Case management</td>
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<tr>
<td></td>
<td>Phobia</td>
<td>Fear</td>
<td>Case management</td>
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<tr>
<td>Social</td>
<td>Ageism</td>
<td>Loss of autonomy</td>
<td>Nurse advocacy</td>
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<tr>
<td></td>
<td>Ageism</td>
<td>Discrimination</td>
<td>Nurse advocacy</td>
</tr>
<tr>
<td></td>
<td>Living arrangement</td>
<td>Living alone or with sick spouse</td>
<td>Case management</td>
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<tr>
<td></td>
<td>Ethnicity</td>
<td>Lack of health care literacy</td>
<td>Case management</td>
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<td></td>
<td>Safe environment</td>
<td>Lack of exercise</td>
<td>Case management</td>
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<tr>
<td></td>
<td>Safe environment</td>
<td>Fear</td>
<td>Case management</td>
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</tbody>
</table>

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advocate for older patients to ensure that autonomy is preserved. Table 2 lists qualities of vulnerability and various categories that require nursing assessment.

Evaluating older patients for vulnerability by measuring disability, comorbid conditions, and frailty is needed to predict hospital outcomes in critical care. The challenge remains because many older patients come into the critical care unit unexpectedly with an acute episode. In an integrated health care system, primary care providers could screen older patients on an annual basis to establish a baseline of vulnerability in the event a hospitalization occurs. Also presurgical patients should have a vulnerability screening so that outcomes can be better understood relative to vulnerability. Adverse outcomes during hospitalization, such as falls, injuries, institutionalization, and death, could be understood relative to measurement of vulnerability.

Once a patient is identified as fragile, the level of vigilance of the bedside nurse can be increased. The increase could include looking for subtle cues predictive of delirium or designing enhanced mobility programs. Interprofessional strategies to improve outcomes of frail older patients are needed. Few such strategies are described in the literature.

The intervention Acute Care for Elders25 is notable; it includes a homelike environment, disability prevention strategies that are individualized, and comprehensive discharge planning. Use of interdisciplinary teams can improve functional status, reduce length of stay, and lower mortality in frail older patients.26

Summary

Understanding aspects of vulnerability can help critical care nurses function with a higher level of vigilance in the care of older patients. Frailty is common in geriatric populations and has a clear association with increased vulnerability for risk of death and institutionalization. When frailty is combined with disability or comorbid conditions or both, the burden and potential modifying impact of frailty on the course and outcomes in critically ill patients is unknown. Although the notion is not yet clearly established in critically ill patients, frailty is clinically relevant and may be predictive of both short- and long-term outcomes.30 Nevertheless, the increasing vulnerability of critical care older patients has brought about numerous studies on the importance of early mobilization27 and physiotherapy28 to prevent physical deconditioning, and the psychological consequences of critical illness for both patients and the patients’ caregivers29 are being increasingly recognized in critical care. This level of intervention warrants an interdisciplinary team approach in which each member of the team considers the concepts of disability, comorbid conditions, and frailty a priority in the planning of care. CCN

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None reported.

References
Progressive Mobility
As a Team Effort in Transitional Care

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Jill W. Bloss, PT, MPH

With changing health care, progressive care nurses are working in diverse practice settings to meet patient care needs. Progressive care is practiced along the continuum from the intensive care unit to home. The benefits of early progressive mobility are examined with a focus on the interdisciplinary collaboration for care in a transitional care program of a skilled nursing facility. The program’s goals are improved functional status, self-care management, and home discharge with reduced risk for hospital readmission. The core culture of the program is interdisciplinary collaboration and team partnership for care of patients and their families. (Critical Care Nurse. 2015;35[3]:62-68)

In an ever-changing health system dedicated to patients’ outcomes and reduced readmissions, transitional models have emerged as a way to provide care for persons at high risk for readmission.\(^1\) Regaining the functional status one had before illness depends on physical capacity, cardiopulmonary reserve, cognition for safe discharge, and reduction of risk for hospital readmission.\(^2\) Critical care nurses engaging with early progressive mobility initiatives may be assisted in understanding how these actions help to achieve functional recovery faster in postacute care. This article, aimed at progressive care nurses in nontraditional settings, provides an overview of transitional care, reviews the hazards of immobility, and describes interdisciplinary team strategies for providing progressive mobility to residents in a transitional care nursing facility.

Transitional Care

The American Geriatrics Society defines transitional care for the older adult as a set of actions designed to ensure coordination and continuity of health care as patients transfer between locations.\(^2\) Rochester Regional Health System in western New York used this model to care for residents in one of its skilled nursing facilities. Hill Haven Skilled Nursing and Rehabilitation has a 90-bed transitional care facility dedicated to the care of high-risk cardiopulmonary patients recently discharged from the hospital. Actively participating residents, aged 50 years and older, include those with congestive heart failure, chronic obstructive pulmonary disease, pneumonia, and postoperative debility.
LG, 50 years old with severe peripheral arterial disease, underwent a left lower extremity amputation with application of an immediate postoperative prosthesis. Using the prosthesis, she was mobile out of bed 1 day after surgery with her pain managed and was learning movements with the addition of her new prosthetic. The acute care interdisciplinary team supported early mobility, reducing postoperative complications. She was discharged from the hospital to our transitional care unit. She had a goal of returning to her home and “getting back to walking” and to her “daily life activities.” On her 27th day in the transitional care unit, she returned home ambulatory and independent with her prosthesis. This short stay without hospital readmission is a credit to the planning and early mobility efforts of the acute care team and successful collaboration of the members of the interdisciplinary team providing transitional care (Table 1).

Table 1 Case study

<table>
<thead>
<tr>
<th>History</th>
<th>LG, 50 years old, was discharged from the hospital to our transitional care unit. She was referred with a goal of returning to her home and “getting back to walking” and to her “daily life activities.” She lived with her spouse in a multilevel home with 5 steps to enter and 13 steps to her bedroom and bathroom. She was independent with a rolling walker and activities of daily living. She had worked as a machine operator until she left on disability for her foot wound.</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of present illness</td>
<td>Patient was admitted to the hospital with acute deterioration of a surgical wound. She had several admissions for vascular interventions, spanning several months, including amputation of her toes, follow-up debridement, and treatment with intravenous antibiotics for osteomyelitis. After a failed vascular bypass of the left lower extremity, she had a left below-knee amputation and was fitted with an immediate postoperative prosthesis.</td>
</tr>
<tr>
<td>Medical history</td>
<td>Hypercholesterolemia, hypertension, type 2 diabetes mellitus, peripheral neuropathy, obesity</td>
</tr>
<tr>
<td>Transitional course</td>
<td>Our team quickly embraced learning about the prosthesis to continue mobility. During the initial assessment with the nurse practitioner, the senior physical therapist provided information and taught the correct application of the prosthesis with skin assessment and mobility. Nursing caregivers interacted while teaching one another and the resident physician became engaged and learned the concepts herself. Initially, LG was very withdrawn and afraid to look at her residual limb. The interaction with the team helped nurture her confidence and she became engaged. Over time, with the plan guided by occupational therapy, she initiated her own activities of daily living, caring for her stump and donning her prosthesis. The recreation therapist assessed her interests and engaged her in activities in group settings. Her visitors were many, and she had family social outings. When the prosthetist came in for a refit, he noted that she was outgoing and happy after a month. Pain management of the limb was achieved through vibration and massage. Nurses used teach-back to verify medication knowledge and advocacy. LG worked toward her goals of independence and self-care and navigated steps in the gym with crutches. A home evaluation by a physical therapist and an occupational therapist provided assessment and suggestions for safety. LG was discharged home after a busy 27-day stay. The social worker arranged for home care services providing teaching and therapy follow-up and also provided information to join a support group for amputees. LG returned to work with no future hospitalization anticipated.</td>
</tr>
</tbody>
</table>

The goals of our system’s transitional care are to target a length of stay of less than 100 days with attainment of highest functional independence in managing disease and medications for safe discharge to the least restrictive environment, while reducing risk for readmission to the hospital. The patient is referred to as a “resident” within the culture of the rehabilitation. Residents may have new airways (tracheostomy tubes), feeding tubes (gastrostomy or jejunostomy tubes), or devices and wounds that require self-management strategies (ostomies, self-sealing drainage tubes, prosthetics).
Table 2  Interdisciplinary team and roles

<table>
<thead>
<tr>
<th>Team member</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resident physician and patient’s family</td>
<td>Is actively involved in goal setting</td>
</tr>
<tr>
<td></td>
<td>Provides feedback to team on plan of care</td>
</tr>
<tr>
<td>Nursing team</td>
<td>Coordinates treatment plans with nursing care team</td>
</tr>
<tr>
<td>Registered nurse</td>
<td>Performs initial assessment and ongoing assessment and evaluation</td>
</tr>
<tr>
<td></td>
<td>Reconciles disease management teaching and medication teaching</td>
</tr>
<tr>
<td></td>
<td>Teaches wound care, airway and treatment skills</td>
</tr>
<tr>
<td>Licensed practical nurse</td>
<td>Implements the teaching plan, provides direct care, and reports changes</td>
</tr>
<tr>
<td></td>
<td>Administers medications and treatments</td>
</tr>
<tr>
<td>Unlicensed assistive personnel/</td>
<td>Perform direct care, mobility, and hygiene with mobility under the supervision of licensed staff and report changes</td>
</tr>
<tr>
<td>certified nursing assistant</td>
<td></td>
</tr>
<tr>
<td>Rehabilitation team</td>
<td></td>
</tr>
<tr>
<td>Physical therapist</td>
<td>Evaluates physical functioning and prescribes treatment therapy plans and establishes functional goals</td>
</tr>
<tr>
<td></td>
<td>Suggests mechanical means of pain management</td>
</tr>
<tr>
<td></td>
<td>Provides interventions that promote effective problem solving and sequencing, thus establishing a level of independence before discharge</td>
</tr>
<tr>
<td></td>
<td>Provides therapy and evaluates plans of care</td>
</tr>
<tr>
<td>Physical therapist assistant</td>
<td>Provides therapy under direction of physical therapist</td>
</tr>
<tr>
<td>Speech therapist</td>
<td>Evaluates swallowing and prescribes treatment plan to achieve effective swallowing and diet</td>
</tr>
<tr>
<td></td>
<td>Evaluates and develops effective speech and language skills</td>
</tr>
<tr>
<td></td>
<td>Evaluates cognitive function for executive skills such as problem solving</td>
</tr>
<tr>
<td>Occupational therapist</td>
<td>Evaluates and prescribes treatment plan for achieving goals for activities of daily living with upper body mobility</td>
</tr>
<tr>
<td></td>
<td>Suggests adapting the environment to enhance independence</td>
</tr>
<tr>
<td>Occupational therapist assistant</td>
<td>Provides therapy under the supervision of an occupational therapist</td>
</tr>
<tr>
<td>Dietitian</td>
<td>Assesses and plans for optimal energy needs and balances weight management options for best mobility</td>
</tr>
<tr>
<td></td>
<td>Teaches principles of medical diet to resident physicians and patients’ families</td>
</tr>
<tr>
<td>Respiratory therapist</td>
<td>Assesses respiratory status and provides inhalation therapies, airway care, bilevel ventilation, and oxygen delivery</td>
</tr>
<tr>
<td></td>
<td>Teaches self-management medications and treatments for pulmonary diseases</td>
</tr>
<tr>
<td></td>
<td>Coordinates equipment for safe mobility, supporting oxygen and airway needs</td>
</tr>
<tr>
<td></td>
<td>Provides treatments for airway patency</td>
</tr>
<tr>
<td>Social worker</td>
<td>Provides psychosocial evaluation and support and plans for emotional and discharge planning needs</td>
</tr>
<tr>
<td>Recreation therapist</td>
<td>Coordinates activities for quality of life and spiritual support and promotes social interaction among residents</td>
</tr>
<tr>
<td>Nurse practitioner</td>
<td>Performs advanced nursing assessment, diagnosis, and prescription of therapies and medications for rehabilitation</td>
</tr>
<tr>
<td></td>
<td>Coordinates discharge planning with medication reconciliation, summaries, and transitioning to primary care physician and specialist referrals</td>
</tr>
<tr>
<td>Attending physician</td>
<td>Provides the medical oversight with diagnosis and treatment of disease</td>
</tr>
</tbody>
</table>

Planning Care

The resident and the resident’s family establish goals with our interdisciplinary team members, providing discipline-specific assessments and coordinating plans of care. Table 2 outlines the team members and their collaborative roles. Interdisciplinary collaboration yields plans of care by consensus, thus supporting best practice. The resident’s functional baseline and home setting guide the treatment goals. Care conferences are conducted with the resident, the resident’s family, and members of the transitional care team. All aspects of the resident’s care, including progress and home-care
needs, are discussed at admission and reviewed throughout the stay.

One of the major aspects of the plan is mobility. Goal achievement depends on the level of mobility maintained throughout the course of illness. Progressive mobility optimally begins at the critical point of illness, considering hemodynamic stability, with a goal to minimize complications to achieve the highest functional recovery. Early mobility in the intensive care unit accelerates the return to premorbid functional status and reduces the duration of mechanical ventilation, the physical weakness associated with bed rest, and the neuromuscular effects of critical illness. Moving to transitional care, mobility is a key to achieve the goal of discharge home, as it is the key indicator for insurance coverage for the postacute stay at a transitional care facility.

The multisystem perils of immobility are many. Respiratory complications include atelectasis with the patient positioned supine. Secretion clearance is impaired as the function of cough and drainage are not optimal when the patient is supine, increasing risk for aspiration and pneumonia. Cardiovascular compromise results from supine positioning and lack of mobility. This compromise causes a shift of blood volume from the legs, primarily to the heart, which increases cardiovascular workload, elevates heart rate, and reduces stroke volume and cardiac output, resulting in orthostatic hypotension. Circulatory compromises include dependent edema, venothromboembolism, and pulmonary emboli. Integumentary issues result from prolonged pressure increasing the risk for skin breakdown with potential infection. Immobility leads to decreased protein synthesis in muscles, increased catabolism, and decreased muscle mass, especially in the lower limbs. Muscle groups that lose strength result in poor posture and balance. Contractures result from the shortening of muscles. Constipation, urinary incontinence and retention, and renal calculi may develop. Metabolic compromises include glucose intolerance and negative nitrogen balance. Delirium and altered sleep patterns may result from prolonged immobility.

Functional mobility is the combination of activities that promotes optimal skill attainment. Therapy is the planned sequencing of activities derived from the initial assessment, with exercises designed to achieve individualized resident goals related to a safe discharge. Therapeutic intervention can improve a resident’s flexibility and strength. To be effective, the therapy program is integrated into the plan of care to achieve functional skill attainment. The strength and endurance achieved in physical therapy extends to occupational therapy, where the focus is on the physical task of taking care of oneself. The team assists the resident in acquiring skills such as independent transfers, ambulation, stairs, dressing, and decision making. The resident requires stamina to complete the activities of daily living. If the resident will be living independently, cognitive potential to make safe decisions for optimal independent functioning is needed. One must have the mental acuity to balance a checkbook, communicate needs effectively, schedule appointments, manage medications and treatments, and determine whether a situation warrants emergency care. Knowledge about and management of medications are evaluated by the nurse. If the team deems the independence at home a safety risk, the social worker assists the resident and the resident’s family with strategies for supervision and support with home care services or alternative living settings.

The Culture of Mobility

Culture evolves with team members who are committed to a process of promoting mobility. Early mobility prevents complications and promotes faster healing and recovery. Leadership promotes a culture of team engagement. Coaching teams to this culture is a process. Our team retooled processes of a long-term residential unit to processes for a shorter-stay transitional unit (Table 3). Admissions were no longer for “residence” but for “rehabilitation.”

Mobility is an expectation for each day’s plan and a core component of the care. In a culture of progressive mobility, team members hold one another accountable for their roles in safe mobility. Documentation includes an up-to-date plan of care. During handoffs, teams identify mobility that gets woven into the fabric of daily activity, rounds, and plans of care. To cite examples: “Ms T will go to the recreation therapy activity of computer-simulated bowling today and work on...
her balance during that activity.” Or, “Mr B will be din-
ing in the community kitchen today as he works on his
chair mobility and sitting balance at the table.”

Team communication includes feedback, individ-
ually, at huddles and at care planning meetings. Dele-
gation, setting clear goals, and open discussion within
the team serve to clarify safe mobility with desig-
nated assistive devices. Health care providers evolve
into interdisciplinary teams when synergy is effective
within all professionals’ scope of practice. Successful
team functioning includes the ability to address opti-
mal programing and to discuss issues that arise as a
result of different treatment options with resolution by
consensus. Debriefing is ongoing, in an effort to strat-
egize how to deal with the challenges of therapy
times, residents’ schedules and preferences, activity
conflicts, equipment shortages, and pain management.

In a culture of progressive mobility, team
members hold one another accountable
for their roles in safe mobility.

An optimally functioning team in a safety culture uses
debriefing as an opportunity to learn and examine alternative strategies. Storytelling and documenting successes allows the team to own the process and to promote similar resident outcomes in the future.

### Table 3 Changing the culture of a unit

<table>
<thead>
<tr>
<th>Action</th>
<th>Implementation strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establishing a sense of urgency</td>
<td>Leaders clearly showing the need for the transition and the link to the system changes</td>
</tr>
<tr>
<td>Creating a powerful guiding coalition</td>
<td>What are the system values that the team rallies around that reflect the core value?</td>
</tr>
<tr>
<td>Creating a vision</td>
<td>What is the focus of the transitional unit?</td>
</tr>
<tr>
<td>Communicating the vision</td>
<td>Setting written standards to guide the process</td>
</tr>
<tr>
<td>Empowering others to act on the vision</td>
<td>Interdisciplinary team members are encouraged to contribute and have ownership of their contributions</td>
</tr>
<tr>
<td>Planning and creating short-term wins</td>
<td>Discussing successes at huddles and storytelling to celebrate achievements and discharges</td>
</tr>
<tr>
<td>Consolidating improvements and producing more change</td>
<td>Learning moments: taking examples of opportunities to improve and discussing new ways to achieve better processes</td>
</tr>
<tr>
<td>Evaluating and reevaluating team strategies for effectiveness</td>
<td>Choosing what metrics have meaning to determine success and reviewing them monthly</td>
</tr>
<tr>
<td>Institutionalizing new approaches</td>
<td>Sharing best practice among transitional care units and sharing best practice with acute care teams for handoffs and transitions</td>
</tr>
</tbody>
</table>

* Based on information from Hopkins et al and Bassett et al.

### Transitional Care Daily Routines

Many routines are used to create normalcy and promote functional mobility and independence. Nurses direct the nursing assistants in providing the direct care to promote independence. Daily dressing supports the wellness model and deemphasizes the preoccupation with illness. Washable attire includes loose-fitting, comfortable apparel that is easily donned and removed. Drawstring pants and elastic waist pants are good choices. Zippers and belts can frustrate res-
dents, but will be taught if the resident’s wardrobe warrants it. Developmentally, zippers and belts are more difficult to manage; therefore, easier tasks will precede this training. Depending on a resident’s diag-
nosis, a button-up top may be easier to manage than pullover tops. For example, a resident with hemiplegia has full use of 1 side of the body, thus allowing button-
ing with the uninvolved hand. However, larger pull-
over shirts may be easier for residents with limited shoulder range of motion who cannot reach behind their backs. An adaptive “dressing stick” provides the added leverage to get the shirt over the head. Thin layers allow for comfort with changing temperatures.

Socks and shoes are preferred for gait and balance. Promoting progressive mobility includes supporting dignity, especially with incontinence prevention.
using protective apparel. In the acute care setting, including patients in their routine daily care of donning apparel and toileting routines promotes an early emphasis on self-care and achieving independence.

Pain and anxiety are directly managed through resident instruction and reassurance, which aids attainment of goals. Pharmacological interventions are timed before activity sessions to promote optimal participation. Rest, including adequate nighttime rest, facilitates optimal performance. Residents may need scheduled rest periods between treatment sessions. Alternatively, they may perform better with two 30-minute sessions versus one 60-minute session. The resident’s sleep-wake cycle should always determine whether a morning or afternoon therapy appointment is scheduled. Knowing the resident’s circadian cycle, behaviors, and sleep preferences helps support successful therapy time. The therapy gym group environment promotes comradery within a prescribed structure. Successful mobility plans centralize the preparation for discharge for the resident and the resident’s family.

**Functional Mobility in Transitional Care**

Similar to acute care, the challenges of mobility for transitional care residents with cardiopulmonary issues include the safety of indwelling tubes and catheters. Mobility for residents with enteral feedings, drains, or airways requires team coordination so that the maximum distance and effort can be realized. If the resident requires oxygen, establishing the necessary liter flow and parameters along with the targeted range of oxygen saturation, heart rate, and blood pressure helps ensure safe mobility and meeting the needs of energy expenditure during activity. Coordinating the delivery of oxygen for trips off the unit for therapy is vital to safe mobility. Hemodynamic stability goals are clearly defined and communicated among all team members to ensure safety and maximal benefit from interventions. Acceptable ranges of exercise parameters are established by the nurse practitioner and followed by the rehabilitation therapist and nurse. Team communication strategies include providing team members with direct access to the nurse practitioner via electronic texting and reducing elapsed time between residents’ response and the nurse practitioner’s intervening orders.

Interdisciplinary collaboration includes planning and education to meet the needs of the team and residents’ safety. Planning for special equipment is conducted during the initial assessment and includes assessment of the resident’s weight, height, girth, skin integrity, and immediate mobility needs. Special consideration for accommodating physical characteristics of the residents determines their equipment needs during rehabilitation, such as properly fitting wheelchairs, bedside commodes, chairs, cushions, and walkers. Equipment rental, purchase, and availability allows safe mobility in achieving goals.

Interdisciplinary standards for safe patient handling and mobility support a culture of safety, with a structured program including education, assessment, and equipment. Our health system’s safe patient handling standard is 35 pounds (~16 kg) for lifting, promoting use of assistive devices for transfers. The rehabilitation therapists collaborating with the nursing team teach the staff who provide direct care to perform proper transfers. Teaching is often done concurrently with morning care, transfers from bed to chair for meals, showering, or measuring residents’ weights. This strategy supports time management and care coordination.

Fall prevention programs are a balance between promoting independence and ensuring safety. Care plans include use of assistive devices. Keeping residents’ space clear allows mobility without obstruction. Nursing team rounding programs promote caregiver visibility and anticipation of toileting needs. Standardized balance testing is routinely performed by physical therapists. Interventions can then be measured objectively by using serial testing at planned intervals to evaluate progress.

Infection prevention is the inevitable challenge of postacute rehabilitation residents. The difference between active infection and colonization can determine the best strategy to avoid limiting the resident’s rehabilitation efforts and socialization while concurrently promoting safety of all residents. It is important to teach residents, their families, and staff about modes of transmission, controlling the source of exposure, and the importance of hand washing as the first method of infection prevention.

**Summary**

Mobility and rehabilitation in a transitional facility are best managed by using interdisciplinary collaboration.
Focusing on the resident’s needs, using shared goals and decision making, achieves a successful discharge, and reduces readmissions to the hospital. As acute and critical care nurses realize the long-term benefits of early progressive mobility efforts, our shared patients benefit from this shared knowledge and advocacy for mobility across the care continuum. CCN

References
Summer Learning

Summer learning, it can be fun
You can pass the CCRN/PCCN
Yes, oh yes, we know you can
Summer days, learning away
Oh! I love the summer nights
Tell me more, tell me more
Like should I take a class?
Tell me more, tell me more
What’s the best way to pass?
Find a mentor, maybe a friend
That’s the method we recommend
Study hard, not day and night
Take some breaks, and focus with might
Summer days, learning away
Oh! I love the summer nights
Tell me more, tell me more
Like should we form a group?
Tell me more, tell me more
You have all of the scoop
In the end, you will be so glad
You’ll discover it’s not so bad
Use these questions and you’ll succeed
You will find here all that you need
Summer days, learning away
Oh, I love the summer nights

To be sung to the tune of “Summer Nights” from the musical Grease, written by John Jacobs and Warren Casey and sung by Olivia Newton-John and John Travolta.

CCRN Practice Questions

1. A patient is admitted with sepsis, blood pressure (BP) 104/52 mm Hg, heart rate (HR) 115/min, body temperature 37.9°C, respiratory rate (RR) 28/min, cyanotic fingers/toes, oozing of blood from the peripheral intravenous (IV) catheter sites, and the following laboratory findings:

Increase partial thromboplastin time
Increased prothrombin time
Decreased platelet count
Decreased fibrinogen level
Increased D-dimer level
Decreased hemoglobin level

Which of the following treatments would be high priority when caring for this patient?
A. Fluid restriction
B. Antibiotic administration
C. Blood product administration
D. Vasodilator medication administration

Test plan topic: Hematology, 2% of the CCRN questions

2. Which of the following clinical findings might be consistent with a diagnosis of hyperosmolar hyperglycemic state (HHS)?

A. Blood glucose 738 mg/dL, normal anion gap, serum bicarbonate of 25 mEq/L, arterial pH of 7.40
B. Blood glucose 358 mg/dL, high anion gap, serum bicarbonate of 17 mEq/L, arterial pH of 7.29
C. Blood glucose 189 mg/dL, high anion gap, serum bicarbonate of 20 mEq/L, arterial pH of 7.33
D. Blood glucose 298, normal anion gap, serum bicarbonate of 28 mEq/L, arterial pH of 7.49

Test plan topic: Endocrine, 5% of the CCRN questions

Contributors

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3. The admission vital signs of a patient with a traumatic brain injury include BP 188/32 mm Hg, HR 51/min, controlled ventilation at a rate of 14/min, body temperature of 36.5°C, and intracranial pressure (ICP) of 27 mm Hg. The nurse evaluates the cerebral perfusion pressure (CPP) to be
A. Normal
B. High
C. Low
D. Indeterminate

Test plan topic: Neurological, 12% of the CCRN questions

4. A patient is admitted with pneumonia, a body temperature of 95.7°F (35.4°C), blood pressure 82/43 mm Hg, mean arterial pressure (MAP) of 56 mm Hg, RR 28/min, HR 112/min, lactate 4.2 mmol/L. A fluid bolus of 30 mL/kg has been provided and a Levophed (norepinephrine) infusion started. The nurse anticipates the initial hemodynamic goals in the care of this patient to include
A. MAP greater than 75 mm Hg, central venous pressure (CVP) of 2 mm Hg, and central venous oxygen saturation (ScvO₂) of 50%
B. MAP greater than 60 mm Hg, CVP of 3 mm Hg, and ScvO₂ of 60%
C. MAP greater than 70 mm Hg, CVP of 5 mm Hg, and ScvO₂ of 65%
D. MAP greater than 65 mm Hg, CVP of 8 mm Hg, and ScvO₂ of 70%

Test plan topic: Multisystem, 8% of the CCRN questions

5. A nurse goes into the intensive care unit (ICU) waiting area to inform a family that their loved one has had a cardiac arrest and is receiving advanced life support measures. One of the family members starts yelling expletives and punches a wall. The appropriate action by the nurse would be to
A. Invite the family member into the ICU to be present during the code
B. Ask the family to escort the person out of the hospital
C. Call security and ensure safety of everyone in the room
D. Ignore the outburst and tell the rest of the family they will be kept informed

Test plan topic: Behavioral, 4% of the CCRN questions

Correct Answers and Rationales for CCRN Practice Questions

1. Correct Answer: C
Rationale
Disseminated intravascular coagulation (DIC) is a secondary complication of various conditions such as sepsis, trauma, or malignancy. Sepsis is the most common cause of DIC. The clinical presentation of a patient with DIC most commonly includes bleeding, acute renal dysfunction, acute liver dysfunction, acute respiratory dysfunction, peripheral ischemia, and shock. Treatment includes treating the cause, stopping the abnormal coagulation, and controlling bleeding. Interventions such as fluid therapy to correct hypotension, blood component therapy (packed red blood cells [PRBCs], platelets, fresh frozen platelets [FFP], cryoprecipitate) to treat bleeding and correct coagulation, and low-dose heparin may be used to prevent further clotting. Fluid restriction (A) and vasodilators (D) would lower blood pressure in a patient who is already in a hypovolemic state. If the cause of the DIC is sepsis, an antibiotic (B) might be indicated but acutely and with hemodynamic instability, the transfusion would have the highest priority.

Sources

2. Correct Answer: A
Rationale
HHS is an acute hyperglycemic condition that occurs with type 2 diabetics, typically from a precipitating event such as an infection. In insulin resistance, the cells do not produce ketones as a result of hyperglycemia with absence of insulin, so there is no acidosis development. The anion gap and the bicarbonate level will be normal because of the absence of ketone production.

Source
3. Correct Answer: C  
Rationale  
The vital signs are indicative of the Cushing triad: elevated systolic blood pressure, widened pulse pressure, low heart rate, and irregular respirations. Cushing triad is related to pressure on the medullary area of the brainstem and is a late finding indicative of increased ICP. The formula for CPP is MAP – ICP and the goal is typically greater than 60: 84 (MAP) – 27 (ICP) = 57, which is a low CPP reflecting the fact that perfusion to the brain is inadequate. MAP = (2[dia-stolic blood pressure] + systolic blood pressure)/3.

Source  

4. Correct Answer: D  
Rationale  
The 6-hour bundle for the Surviving Sepsis Campaign’s hemodynamic goals for initial septic shock resuscitation includes:
- To perfuse peripheral tissues: achieving MAP ≥ 65 mm Hg
- To ensure adequate preload: achieving CVP 8-12 mm Hg
- To ensure adequate global tissue perfusion: achieving ScvO₂ 70%
- To reverse lactic acidosis: normalizing lactate level. The other goals in the Surviving Sepsis Campaign guidelines include providing a 30 mL/kg crystalloid bolus, broad-spectrum antibiotics, and obtaining blood samples for cultures and lactate levels.

Source  

5. Correct Answer: C  
Rationale  
Violence and aggressive behavior are not to be tolerated. Care should be provided with the philosophy of “safety first.” Family presence during cardiopulmonary resuscitation (CPR) does not interfere with resuscitation efforts, increase negative legal action, or increase staff stress. Additionally, allowing families to be present during CPR decreases family members’ stress, post-traumatic stress disorder, and depression months after their experience. Each situation is unique, and the team must consider the family member’s behavior and potential response to being at the bedside of a patient in cardiac arrest.

Sources  

CMC Practice Questions

1. A patient was admitted 2 days ago for suspected sepsis. What trending measurement would be the best indicator that the patient needs further fluid intervention?  
A. CVP (central venous pressure)  
B. MAP (mean arterial pressure)  
C. CO (cardiac output)  
D. SV (stroke volume)

2. A 21-year-old patient has a 3-day history of anxiety, angina, palpitations, and shortness of breath. Vital signs have stabilized, symptoms have subsided, toxicology screen is negative, and telemetry shows atrial fibrillation (AF). The suspicion of a cardiac abnormality and plan of care has been shared with the patient’s family. The need for further education is anticipated on the following intervention:  
A. Amiodarone bolus and infusion  
B. Cardiac ablation  
C. Digoxin  
D. Synchronized cardioversion

3. A patient arrives from the catheterization laboratory fully conscious after emergent percutaneous coronary intervention (PCI) with stent placement in the right coronary artery (RCA) and circumflex artery and a myocardial infarction (MI). Heart rate has been decreasing and is now 51/min, BP 110/67 mm Hg, oxygen saturation by pulse oximetry (SpO₂) 98% on 2 L via nasal cannula (NC), normal sinus rhythm (NSR) with first-degree atrioventricular (AV) block, and denies chest pain. What intervention would the admitting nurse anticipate?
A. Prepare to administer atropine
B. Start transcutaneous pacing
C. Infuse normal saline bolus
D. Continue to monitor

4. A patient complains of pain in his left arm. Assessment reveals HR 42/min, BP 133/70 mm Hg, RR 20/min, oxygen saturation of 94%, and the following rhythm: Which intervention should be the highest priority?

A. A fluid bolus
B. IV atropine
C. Sublingual nitroglycerin
D. IV morphine

5. A patient receiving mechanical ventilation has an RR of 22/min and appears anxious; lung sounds are clear and arterial blood gas (ABG) results: pH 7.31, PaO₂ 59 mm Hg, Paco₂ 29 mm Hg, HCO₃⁻ 13 mEq/L. Sao₂ is 88%. RR of 22/min on a ventilator with settings of 40% fraction of inspired oxygen (FIO₂), assist-control (AC) setting with a rate of 12/min, tidal volume 750 mL, and positive end-expiratory pressure (PEEP) of 5 cm H₂O. What intervention could the nurse expect to be done to manage the patient’s respiratory distress?

A. Incremental FIO₂ test
B. Increase ventilator respiratory rate
C. Increase PEEP
D. Change mode from AC to synchronized intermittent mandatory ventilation (SIMV)

Correct Answers and Rationales for CMC Practice Questions

1. Correct Answer: D
Rationale
Stroke volume variance is the first indicator that a patient needs fluid. As stroke volume decreases, the heart rate increases to compensate. Cardiac output (C) variances occur after the heart rate increases. The same logic applies to the MAP (B), which is a later sign of fluid balance as compared with SV. CVP (A) is not an appropriate indicator of blood flow or fluid balance, as too many variables contribute to this measurement.

Sources

2. Correct Answer: B
Rationale
A young patient with a history of anxiety, angina, and palpitations, no history of drug abuse, and presenting with these signs and symptoms is likely to have Wolff-Parkinson-White syndrome (WPWS). In patients with WPWS and dysrhythmias like AF, amiodarone (A) and digoxin (C) can enhance transmission of impulses through accessory pathways, which may result in ventricular fibrillation. Synchronized cardioversion (D) is not recommended in any patient who has been in this rhythm for longer than 48 hours because of the potential for thrombus formation. Cardiac ablation (B) treats the underlying cause of the patient’s signs and symptoms with a high success rate.

Source

3. Correct Answer: D
Rationale
After an MI, the heart’s demand for oxygen is less when the heart rate slows down. If there are no symptoms of instability or inadequate cardiac output present, no intervention is needed.

Source

4. Correct Answer: C
Rationale
The patient is exhibiting signs of an ischemic infarction with pain in his left arm and bradycardia with ST-segment depression on this electrocardiogram (EKG). Although the patient is bradycardic, giving additional fluid (A) could overload the heart, and giving atropine (B) could increase the oxygen demand. Treating the cause of his pain is paramount. Although morphine (D)
produces coronary artery dilatation and analgesia, it can also mask the symptoms of the MI. Treating with the nitroglycerin (C) is the highest priority for its vasodilation effect and coronary selective properties.

Sources
Aehlert B. ECG’s Made Easy. 5th ed. St Louis, MO: Elsevier Mosby; 2013:64.

5. Correct Answer: A
Rationale
The \( \text{Pao}_2 \) and \( \text{Paco}_2 \) are both decreased, indicating a ventilation/perfusion (VQ) mismatch. Hypoxemia due to a VQ mismatch can be corrected with a simple incremental \( \text{FiO}_2 \) test. If the \( \text{Pao}_2 \) increases significantly in response to the \( \text{FiO}_2 \) change, the primary problem is low VQ. Increasing the RR on the ventilator (B) would be indicative of alveolar hypoventilation in which the \( \text{Pao}_2 \) would be low and the \( \text{Paco}_2 \) would increase.

Increasing PEEP (C) can improve oxygenation in some cases but there is an increased risk of barotrauma and it can impair venous return, which in turn decreases cardiac output and BP. There is not enough information to determine that this intervention would be needed at this stage of the patient’s respiratory distress. Changing the ventilator mode to SIMV (D) is inappropriate as the patient’s condition is worsening; this intervention could be done if the patient’s condition were improving and the patient were ready to wean from the ventilator.

Source

AACN Certcorp publishes a study bibliography that identifies the sources from which items are validated. The document may be found in the AACN Certification exam handbook. The contributor of each question written for this column has listed the source used in developing each item. CCN
Are there time frames related to the sepsis screening criteria? For example, what window of time would qualify to meet criteria for systemic inflammatory response syndrome? Would you expect increases in heart rate, respiratory rate, and body temperature measurements to occur simultaneously or within 2 to 4 hours? Would the change in white blood cell count be within 12 to 24 hours of elevated heart rate, respiratory rate, and body temperature? We are looking at using the electronic record to capture an alert for clinicians and wondered if there were any standards for this.

In the 2012 Surviving Sepsis Guidelines,¹ it is recommended to routinely screen potentially infected patients for sepsis. The sooner sepsis is diagnosed, the sooner the 3-hour bundle can be initiated. The guidelines further recommend the administration of appropriate antibiotics within the first hour of recognition of severe sepsis or septic shock. With the diagnosis of septic shock, each hour of delay in administering antibiotics increases the mortality rate.

Sawyer et al² used a real-time prediction tool to detect sepsis in patients who were not in the intensive care unit. In that prospective pilot study, they compared 2 groups of patients in general care areas; one group was automatically screened with the prediction tool and one group was not. The tool algorithm incorporated hemodynamic parameters that included the shock index (heart rate/systolic pressure) and the mean arterial pressure. Laboratory values monitored were white blood cell count; neutrophil count; bilirubin, albumin, sodium, and hemoglobin levels; and international normalized ratio. This computerized prediction tool would gather the data from the electronic medical record and the laboratory interface. The sample size was small, but the study did show an increase in the number of interventions and earlier transfer to a higher level of care for patients in whom the computerized prediction tool was used. Length of stay and hospital mortality were the same in the 2 groups.

Croft et al³ compared a computer versus a paper system for recognizing and managing sepsis. The hospital mortality rate was significantly lower in the group screened with the computer-based system than in the group screened with the paper system. Their computer sepsis application provided continuous recognition of sepsis onset based on the electronic medical record. The scoring system used...
for this application was the Modified Early Warning System–Sepsis Recognition Score (MEWS-SRS). The application was surveillance followed by diagnosis of sepsis and protocol orders. This system was used in a surgical intensive care unit.

Both of these studies mention “real time” and continuous surveillance, but not the time frames you asked for. The Sawyer study states patients present with a constellation of abnormal vital signs and laboratory findings (fever, hypothermia, tachycardia, tachypnea, abnormal white blood cell count, creatinine, liver function studies) and progression from a syndrome of abnormal vital signs and laboratory values to organ dysfunction and shock.

The inference here is that sepsis can be manifested in myriad ways and as yet no standard has been set for the time frames you seek.

The frequency of screening varies by each accepted hospital practice. When nurses need to manually input criteria into a computer screening tool, the screening is done anywhere from every 4 hours to every 12 hours. This screening and data entry increase the workload for the nurse. Early warning systems that are automated, continuously surveying the electronic medical record and laboratory interface, and provide an alert via e-mail, beeper page, text, or phone call would be the most advantageous for early identification of sepsis. Currently no set standards have been reported in publications or by the Surviving Sepsis Campaign.

Not to be deterred, I did consult with Donna Lee Armaignac, PhD, RN-CNS, CCNS, CCRN, Director of Best Practices for our Telehealth Department (written communication, March 9, 2015). She is active in our hospital system-wide sepsis team. She stated,

We are testing independent and combined contributions of various variables’ sensitivity, specificity, positive predictive value, and negative predictive value in real time. Answering her precise question of the time windows is what we are testing, the sweep is every 6 to 7 minutes, the vital signs (all that are available, including Spo2 [oxygen saturation shown by pulse oximetry] etc) will always bring the most recent in a live feed, also live data from lab, WBC/diff [white blood cell count/differential count], lactate, procalcitonin as it becomes available. The organ dysfunction criteria [are] almost useless, as the horse is out of the barn, so to speak. So we are focusing more on the signs and symptoms of infection with SIRS [systemic inflammatory response syndrome]. We are writing natural language processing for infection criteria, CXR [chest radiography], cultures, orders for antibiotics, and so on.

As you can see, more research is needed in this area so that standards can be developed. Perhaps your project could be developed into a research study and you could add to this body of knowledge.

Financial Disclosures
None reported.

References
Providing appropriate education for nurses working in the pediatric intensive care unit (PICU) to develop and update the skill sets and knowledge required to care for infants and children with congenital heart disease (CHD) is a challenge. We provide care to children with a variety of congenital heart defects that require medical care and surgical corrections. In the extreme circumstance, we provide extracorporeal membrane oxygenation to those children who require extracardiac support postoperatively. Our program deals with a mean of about 150 cases annually that require surgical correction, in addition to the medically managed patients with CHD.

The hospital-based simulation center opened in 2010. It provides high-fidelity simulation to enhance current medical and nursing education. Patient scenarios are created on the basis of real patient cases, maintaining the realistic details of the disease and injury processes essential to provide the pertinent learning points of each case. Shortly after the simulation center opened, the PICU educator inquired about the process to provide PICU nurses an opportunity to learn about pediatric open heart surgery patients at the simulation center. The inherent challenge within our PICU is that we have 32 nurses with various skills sets and experiences who must be able to provide care for all patients within our unit, including children with CHD.

At that time, 7 PICU nurses were ready to learn how to provide nursing care to children who have undergone open heart surgery. This state of readiness is detailed later. A classroom format was used to present the material, which addressed identification of defects, along with medical and nursing management. This classroom training was followed by a 4-hour simulation session, wherein these nurses participated in 2 patient scenarios. Clinical objectives (Table 1) were reviewed and reinforced to define what needed to be learned and to ensure that learning occurred. Following this simulation training, each nurse was assigned to admit a pediatric open heart patient with an experienced nurse present to reinforce the prior learning.

### Overview of the Literature

Few publications have addressed the process of training PICU nurses on how to care for pediatric open heart surgery patients in a simulation laboratory. Donoghue and colleagues\(^1\) used a high-fidelity simulation laboratory for Pediatric Advanced Life Support training of pediatric residents. Anesthesiologists have been using simulation laboratories to train their residents for a number of years, and published reports\(^2\) validate the positive learning outcomes within that environment. Kane and colleagues\(^3\)

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**Author**

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explained the process of preparing and implementing an educational activity addressing pediatric codes for the pediatric cardiac ICU staff that included the simulation laboratory. The PICU staff’s levels of knowledge, skill, and comfort with resuscitation improved significantly after the simulation education was completed. Certainly, learning does occur within the simulation environment. Those participants surveyed agreed that the experience did provide an opportunity to learn.\textsuperscript{1,2,4-6}

Both medical and nursing arenas have begun to integrate this option into training in an effort to better mimic real-life clinical experiences.

### Table 1 Simulation scenarios

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Evaluations/actions/expectations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario 1 Admission, 5-kg newborn with tetralogy of Fallot, after placement of Blalock-Taussig shunt</td>
<td>2 nurses will admit the patient from the operating room, meeting all stated objectives</td>
</tr>
<tr>
<td>Learner will: 1. Perform a quick initial assessment upon arrival to the pediatric intensive care unit, followed by a comprehensive assessment of the patient; all should be documented in the electronic medical record</td>
<td>❑ Met ❑ Not met Notes: ____________________________</td>
</tr>
<tr>
<td>2. Demonstrate/verbalize the ability to prioritize patient care, on the basis of initial and subsequent serial assessments</td>
<td>❑ Met ❑ Not met Notes: ____________________________</td>
</tr>
<tr>
<td>3. Demonstrate/verbalize the ability to delegate required tasks to appropriate staff, includes coordinating care with other disciplines (eg, coordinating collection of blood samples with respiratory therapist)</td>
<td>❑ Met ❑ Not met Notes: ____________________________</td>
</tr>
<tr>
<td>4. Demonstrate/verbalize the ability to communicate with all appropriate physicians and other care providers involved with patient (pediatric intensivists, pediatric cardiologists, pediatric residents, respiratory therapists)</td>
<td>❑ Met ❑ Not met Notes: ____________________________</td>
</tr>
<tr>
<td>5. Demonstrate/verbalize the ability to identify appropriate resources pertaining to patient care (fellow nurses, physicians, respiratory therapist)</td>
<td>❑ Met ❑ Not met Notes: ____________________________</td>
</tr>
<tr>
<td>Scenario 2 Postoperative bleeding: 5-kg newborn with tetralogy of Fallot, after Blalock-Taussig shunt, begins to bleed 1 hour after admission to pediatric intensive care unit</td>
<td>Hemodynamic and physical changes are identified, including: increased chest tube drainage, low blood pressure, increased heart rate, serum laboratory values reviewed</td>
</tr>
<tr>
<td>Learner will: 1. Reassess the patient and identify increased bleeding, including verbalizing critical thinking process of assessment</td>
<td>❑ Met ❑ Not met Notes: ____________________________</td>
</tr>
<tr>
<td>2. Demonstrate/verbalize the ability to notify the cardiac surgeon of changes in patient status and report all findings, including laboratory values</td>
<td>❑ Met ❑ Not met Notes: ____________________________</td>
</tr>
<tr>
<td>3. Demonstrate/verbalize the ability to delegate required tasks to appropriate staff in preparation for return to the operating room</td>
<td>❑ Met ❑ Not met Notes: ____________________________</td>
</tr>
<tr>
<td>4. Demonstrate/verbalize the ability to communicate with all appropriate physicians and other care providers involved with patient (pediatric intensivists, pediatric cardiologists, pediatric residents, respiratory therapist, phlebotomist) the need to return to the operating room</td>
<td>❑ Met ❑ Not met Notes: ____________________________</td>
</tr>
<tr>
<td>5. Demonstrate process of preparing patient for return to operating room</td>
<td>❑ Met ❑ Not met Notes: ____________________________</td>
</tr>
</tbody>
</table>

www.ccnonline.org CriticalCareNurse Vol 35, No. 3, JUNE 2015 77
In a different arena, review of rapid response data led to concern about the deterioration of patients’ respiratory status among staff and managers on step-down cardiac units. Need for nurse education was identified by Disher and colleagues, which led to an evaluation of the process and identification of the need for specific nurse education. They provided a unit-based educational pilot study to address this issue. Knowledge deficits were identified, education through simulation was provided, and follow-up was evaluated. Nurses’ knowledge and self-confidence improved significantly from before to after simulation education. The study by Disher et al is another example of observing the participants’ own perceived self-evaluations. In our project, our initial evaluations relied on anecdotal clinical reports after the simulation experience. Over the course of 3 years, we were also observing participants for their perceived knowledge and self-confidence before and after the simulations.

**Developing a Simulation Educational Program**

The educational process within our PICU is representative of our unique population and staffing. Our 10-bed PICU resides within our 32-bed special care unit. Because our pediatric population is so varied in terms of diagnoses and census, when there are empty pediatric beds, we admit adults as well. Therefore, our PICU nurses provide critical care nursing to all populations. Although each nurse who is new to our unit arrives with variable knowledge and skill sets, the general expectation of competency is that each nurse learn to care for the adult patients first. Once that competency is established, then the nurse is oriented to the pediatric population, starting with the 10- to 18-year-olds, then the infants through 9-year-olds. Generally, within 6 to 12 months, new nurses are oriented to the CHD patients, as described here. All new nurses are evaluated for their previous clinical skills and given appropriate patient assignments. Those nurses with pediatric skills who are not familiar with the adult population will be trained to provide care for adults, so that they can meet our expectation that we all provide care to all populations within our unit.

Education within our PICU is individualized for each new nurse, with the ultimate intention that we provide care for all patient populations. Our 10-bed PICU has a staff of 32 nurses. Given this, the CHD educational program is taught annually, with a varying attendance of 3 to 7 nurses. Although our focus is to educate the PICU nurses to manage these patients, nurses from the neonatal ICU and pediatric care areas also are invited to these classes. The neonatal ICU sometimes provides preoperative nursing care of critically ill patients, and the pediatric care area manages children with CHD once they are transferred from the PICU. Therefore, a cohesive transition is the goal, as the nursing care for children recovering from open heart surgery is sometimes managed on different nursing units.

To meet the educational needs of our staff, a classroom format was used to teach CHD embryology, medical and surgical interventions, and appropriate postoperative nursing care. Appropriate assessments and treatments of potential complications were included. Once the classroom training was completed, the participants were scheduled to attend the simulation component.

The PICU educator and 3 PICU nurses each with more than 20 years of PICU experience met to develop clinical scenarios. These scenarios were based on typical postoperative cardiac patients. The first 2 scenarios we developed met the initial clinical expectations of this group: the ability to admit a postoperative cardiothoracic patient from the operating room, and the ability to identify noncoagulopathic bleeding postoperatively that requires return to the operating room (Table 1). Simulation training of these experienced PICU nurses was provided by the simulation nurse educator to facilitate the development of the case scenarios.

**Simulation Experience**

The simulation experience is described in Table 2. Participants were preselected for each scenario, depending on the composition of the scenario and the individual strengths and learning needs of each PICU nurse. The learning needs assessment was
an informal evaluation based on each learner nurse’s previous clinical experiences and current clinical competence at the bedside. As the simulation day unfolded, participants were escorted from the classroom to the simulation ICU room and back, in an effort to maintain a mindset of the scenario and learning process as it evolved and to avoid distractions.

The simulation staff used a Gaumard newborn simulator for these 2 scenarios. Whenever possible, exact equipment that is used in the PICU was used on the mannequin, such as the same blood pressure cuffs, intravenous equipment, ventilators, and the like. The mannequin’s chest was prepared with similar surgical equipment to replicate the postoperative dressing placed by the surgeon, including mediastinal chest tubes.

After a number of the PICU nursing staff were invited to the simulation laboratory to experience these 2 scenarios, we created more complex scenarios for our more experienced PICU nursing staff. In the past 3 years, most nurses on our staff have attended the 6 scenarios that we have created thus far.

Simulation Scenarios

Two simulation scenarios are described in Table 1. Identified objectives to be met are based on the American Association of Critical-Care Nurses practice standards9 for the pediatric open heart population. Once the stated objectives had been reached, the scenario was ended. Everyone (participants and nurses providing the simulation experience) attended the debriefing immediately after each scenario. The debriefing is an opportunity to learn by reflecting on the scenario. A review of the participants’ perceptions of the scenario, any discrepancies from the actual scenario, and the learning objectives are discussed. The intention is for sharing of knowledge, learning, and clarification of questions. Simulation literature consistently reiterates how important it is that this process provide a safe environment to learn, seek clarification, and practice in a nonjudgmental arena.10 The intention is that participant learners will always feel welcome within this learning environment without feeling judged. Given the novelty of this learning experience for many staff, the wish is that learning be positive, not punitive. The evaluation tool included in Table 1 was used to determine whether or not the stated objectives were met. We found this approach to be clear and concise for everyone.

---

Table 2 Simulation process for 1 pediatric congenital open heart scenario

<table>
<thead>
<tr>
<th>Agenda of simulation laboratory</th>
<th>Action by educator and participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation to simulation facility (15 minutes)</td>
<td>Participants were greeted upon arrival</td>
</tr>
<tr>
<td>• Limited tour of facility</td>
<td>Tour of facility was provided</td>
</tr>
<tr>
<td>• Introduction to high-fidelity mannequins</td>
<td>Participants changed into scrubs (standard uniforms)</td>
</tr>
<tr>
<td></td>
<td>Simulation technicians presented mannequins and demonstrated high-fidelity performance</td>
</tr>
<tr>
<td>Participant groups identified (3 minutes)</td>
<td>Participants were separated into preassigned groups</td>
</tr>
<tr>
<td>Scenario introduction (5 minutes)</td>
<td>Presented just before the start of each scenario</td>
</tr>
<tr>
<td>Participants (10 minutes)</td>
<td>Those not participating were able to view the scenario, which facilitated participation in debriefings</td>
</tr>
<tr>
<td>• Scenario participant</td>
<td></td>
</tr>
<tr>
<td>• Scenario observer (watched scenario via live video feed)</td>
<td></td>
</tr>
<tr>
<td>Scenario initiated (30 minutes)</td>
<td>Educator:</td>
</tr>
<tr>
<td></td>
<td>• Escorted participants to simulation room</td>
</tr>
<tr>
<td></td>
<td>• Presented a brief patient report</td>
</tr>
<tr>
<td></td>
<td>• Encouraged participants to assess patient</td>
</tr>
<tr>
<td>Scenario completion (2 minutes)</td>
<td>Educators facilitating scenarios escorted participants back to classroom in an effort to suspend disbelief</td>
</tr>
<tr>
<td>Debriefing (1 hour)</td>
<td>Educator-facilitated process</td>
</tr>
</tbody>
</table>
**Nurse Participants' Experiences**

The simulation allowed the PICU nurses an opportunity to discuss any concerns or fears they had. As the scenarios evolved, each participant was able to ask any question. Reinforcement was provided as indicated for each action taken by the nurses. As well, it allowed them to begin developing some “muscle memory” required to build a skill set foundation. The skill sets needed to react in critical and stressful situations correctly are developed through practiced experiences such as those described in this article. The nurse’s experiences were positive, and they stated that they would return to the simulation center for more case scenarios. They appreciated the safe environment in which to learn and practice. Collectively this group of nurses stated that they now have a real sense of what to expect and what is expected of them. Months later, some of the nurse participants expressed appreciation for this simulation experience. They explained that the simulation cases reinforced what they had learned in the classes. One nurse stated, “I knew what to do when I admitted my first open heart patient.” Another nurse stated “I was not frightened when I had to call the cardiac surgeon with my patient’s labs and vital signs.” We used the simulation laboratory to facilitate an opportunity to practice with a new syringe pump that had been recently purchased and that the nursing staff had received in-service training to use. An experienced nurse had participated in a complex scenario where the patient needed prostaglandins to be initiated. The learning process of doing this on a new intravenous syringe pump during a simulation scenario proved very beneficial. A few weeks later, this same experienced nurse stated that she had admitted an infant with a very similar clinical course as the simulation case in which she had participated and that she was able to start the prostaglandins very efficiently as a direct result of her learning experience during the simulation scenario.

**Discussion**

Creating the scenarios was both exciting and challenging. In general, we used lived experiences in the PICU and adapted them for the simulation laboratory, while keeping the nuances of the scenario as realistic as possible. The PICU educator and 3 very experienced PICU staff nurses created these scenarios, learned the process of simulation, and provided this experience to the nurses who were learning to care for pediatric open heart surgery patients. The learners expressed great apprehension in anticipation of the simulation experience. The simulation laboratory was very new to the hospital. In fact, we were the first group of nurses to use this avenue to provide education to staff nurses. After the experience, all 7 nurse participants stated that this was the most realistic way to learn patient care and that they most definitely believed that they could more readily admit a pediatric open heart patient to the PICU and that they could identify a bleeding pediatric open heart patient and confidently provide care, including returning the patient to the operating room. Because our PICU is small, this education is provided only annually. As well, our patient volume is low, with a mean of 150 surgical cases annually. Because these factors truly limit our ability to conduct a quantitative study, we elected for this initial exploratory and descriptive study. Anecdotal accounts have provided feedback on the value of this new learning experience.

This venture has led to the creation of more complicated case scenarios. In an effort to provide time-efficient learning, the 3 classes have been converted into voice-over PowerPoint learning modules, to be reviewed independently. Following this, we provide a 3-hour review class, which entails review of the material, and case reviews. We have developed a number of other pediatric open heart scenarios for our PICU nurses. As our PICU nursing staff continues to change, our educational process to facilitate learning about this complex population of patients will continue to evolve. Recently the institutional review board granted approval so that we can use a survey questionnaire for simulation participants to identify their level of perceived skill, knowledge, and comfort when caring for a variety of patient populations. This survey will be used with future nurse learners.
The simulation center has provided another dimension to the ever-challenging process of educating nursing staff about such a diverse PICU population. This pediatric open heart simulation education program has provided a cornerstone for the development of future simulation-based nursing education at this tertiary care facility.

Acknowledgments
The author thanks Callie Chase, RN, Theresa McKay, RN, BSN, and Anne Boehm, RN, BSN, for their collaboration in creating and implementing these simulation scenarios. Ms. Campbell also thanks Kristiina Hyrkas, RN, MN, RN, PhD, and Lynda Macken, RN, PhD, for their guidance and expertise with this article.

Financial Disclosures
None reported.

References

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The skill to heal. The spirit to care.
Person and Family Centered Care


Reviewed by Linda Bell, RN, MSN

Person- (or patient-) and family-centered care (PFCC) has become the latest buzzword in the world of health care. We chase patient satisfaction scores that will boost reimbursement. New initiatives are started without consulting those who are at the bedside with patients and families. Many times the patients and families do not understand what their role in “participating in their care” means.

This book is for anyone in health care who wants to understand what PFCC is and how it is different from the care we have historically provided. Currently, there is no universal definition of PFCC; however, Barnsteiner et al have included a chapter describing the different definitions, as well as research developments of the concepts that should be included in PFCC. They point out, though, that most of the definitions and research have been done within the Western culture and may not be universally applicable.

Person and Family Centered Care is divided into 3 main sections. The first section sets the scene: the authors provide the history and issues related to PFCC. One chapter in particular describes how to avoid the “dark sides” of PFCC, including sections on leadership, patient/family partnership, staff engagement, and patient-centered data use. This is a particularly telling chapter of how things can go wrong even when you are trying to do the right thing.

The second section covers models for PFCC and addresses special issues related to PFCC such as patient engagement and cultivating connections, family systems, ethical dilemmas, cultural conflict, and age-related issues with both children and older adults. The issues explored clearly highlight the fact that “one size does not fit all.”

The third section focuses on strategies to promote PFCC. Topics include advocacy, use of mediation, ethics consults, working in high-intensity situations, and working with abusive, bullying, or violent patients and families. Additional focus is directed to use of stories; dealing with compassion fatigue, burnout, and moral distress; the interprofessional team; and the systems that must be in place to support a focus on PFCC, including leadership and change agents.

The format of this book has a wonderful logical flow for any health care professional. It does not focus specifically on the “where” of health care but rather on the “how” of PFCC. This type of care requires a huge change in thought processes and perceptions, and there will be roadblocks to implementation. The big question is, How would I want care provided for me or my family? Barnsteiner et al have gone a long way to help us answer this question in their book.

Linda Bell is a clinical practice specialist at the American Association of Critical-Care Nurses in Aliso Viejo, California.

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My Journey on Becoming a Nurse: Contribution to the Nursing Profession


One of the accountabilities of professional nursing is to give back to the profession. Verlia Brown has given back by telling her story as an immigrant, a student, a critical care nurse, and a leader. She gives us a bird’s eye view of change over 40 years of health care that allows us to follow her experiences in nursing school, her role as an intensive care unit nurse and head nurse, and her activities at the state and national level. This book is a quick read and an engaging story.

To Comfort Always: A Nurse’s Guide to End-of-Life Care, 2nd edition


To Comfort Always is an excellent book for the nurse who wants to learn and understand the aspects of end-of-life care. While experience is an excellent teacher, having knowledge and tools available helps the nurse to provide the best care for patients and families and to be fully engaged in the process. Norlander views the roles of the nurse as skilled clinician, advocate, and guide. Each chapter provides insight into specific patient issues through these 3 lenses and provides tools that are of benefit in practice. Providing end-of-life care is stressful for everyone; knowledge and resources can help.

Privileged Presence: Personal Stories of Connections in Health Care, 2nd edition


From our earliest years, we have learned through storytelling. These are the stories told from the perspective of patients, families, and health care workers in different settings across the continuum. These stories illustrate how we learn, grow, and change by listening to each other. The authors describe these stories as a “support group in a book,” helping each reader to understand that they are not alone and they have a voice. Although we all think our own situation is unique, there is much we can learn from each other.

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I Am a Critical Care Nurse

Kevin Xuereb, RN, is a staff nurse in the burn intensive care unit at New York Presbyterian-Weill Cornell Hospital in New York.

Why did you become a nurse?
I was working for the American Red Cross, where I came in contact with dozens of nurses who were volunteer instructors. I spoke to them about their work and I was amazed to find how diverse the nursing profession could be. All the nurses I talked to loved what they did, and they all mentioned that they were never bored with learning. I was impressed and inspired.

What about your job as a nurse makes you happy?
Working in a burn unit is physically demanding and exhausting, but it means so much when a patient squeezes my hand and thanks me for helping him or her. Or when the mother of a pediatric patient hugs me at a follow-up appointment because her child survived, in large part due to the care the child received from me and my fellow nurses, that means a lot.

Tell us about an extraordinary experience you’ve had as a critical care nurse.
I cared for a young woman who had 3 children. She had been in a plane crash and suffered major burns and inhalation injury. The patient had been severely ill and we were not sure if she would survive. Miraculously she did. We decannulated her one morning and her family (who lived in another state) was unaware of her tremendous progress. She immediately asked for a phone to call her kids. Her mother answered the phone and the patient said, “Hey mom, it’s me! I’m going to be OK. Can I speak to the kids?” I could hear her mother crying on the other end, the patient started crying, and her children spoke to her through tears of joy. Then I started crying. Looking in from outside the room, it must have looked ridiculous, but inside the room, it was my greatest moment in nursing.

What are the challenges you encounter and how do you overcome them?
My biggest challenge is caring for people who, regardless of how you treat them, will always be angry. I am reminded that I cannot change who they are. I have to meet patients as the people they are.

What has your journey as a nurse been like?
Overall my journey as a nurse has been wonderful. No 2 days are the same, and I keep learning because my education is never complete. As I develop as a nurse, so must my skills and knowledge base. It is not always easy, but as nurses we must evolve and change with the times.

At the end of a busy day, how do you find balance in your life?
I love spending time with my wife and 3 kids. I love going to the zoo with them or watching one of their favorite movies while lying on the floor, with my children using me as a pillow.

What would we be surprised to know about you?
I can recite both the Sound of Music and Disney’s Frozen. “Kurt, that’s the one I left out! God bless Kurt.”

How has AACN played a role in your career?
As a new nurse in the intensive care unit, I felt like I was pushing a boulder up a hill. Every night at work I felt like I was going to drown during the entire shift. I thought the residents were so smart and knew everything. I felt like I needed some support. Then I heard about AACN. I used my goal of getting my CCRN as a motivator to learn everything I could about critical care. For example, if I had a patient with a chest tube, I would look up articles about that topic. I made this process into a game. “What could stump AACN?” The answer: nothing. CCN

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