

# Role of Transitional Care Measures in the Prevention of Readmission After Critical Illness

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Transitioning from the critical care unit to the medical-surgical care area is vital to patients' recovery and resolution of critical illness. Such transitions are necessary to optimize use of available hospital resources to meet patient care needs. One in 10 patients discharged from the intensive care unit are readmitted to the unit during their hospitalization. Critical care readmission is associated with significant increases in illness acuity, overall length of stay, and health care costs as well as a potential 4-fold increased risk of mortality. Patients with complex illness, multiple comorbid conditions, and a prolonged initial stay in the critical care unit are at an increased risk of being readmitted to the critical care unit and experiencing poor outcomes. Implementing nurse-driven measures that support continuity of care and consistent communication practices such as critical care outreach services, transitional communication tools, discharge planning, and transitional care units improves transitions of patients from the critical care environment and reduces readmission rates. (*Critical Care Nurse*. 2017;37[1]:e10-e17)

**T**he transfer of patient care from the critical care unit to the medical-surgical care area is a vulnerable period of health care delivery. During this time, the most complex patients within the health care organization are transitioned to different medical and direct care providers, a new physical environment, and an altered level of care and supervision. These transitions are vital to patients' recovery and resolution of critical illness, and they are necessary to optimize patients' care within the boundaries of hospital resources.<sup>1-3</sup> Survival after critical illness is often associated with a long trajectory of illness events and a potentially complicated recovery that affects the quality of life for patients and their caregivers<sup>4-6</sup> and can persist for years after hospitalization. One in 10 patients discharged from the intensive care unit (ICU) will be readmitted to the ICU during the same hospitalization.<sup>2,7-9</sup> This unpredictable journey often interferes with achieving optimal patient-centered outcomes and attaining the highest quality of life.

Several large multicenter studies<sup>4,5,9-12</sup> have demonstrated that readmission to the critical care unit is associated with a 4-fold increased risk of mortality. Readmission to a critical care unit during a hospitalization is also associated with significant increases in illness acuity, overall length of stay, and health care costs.<sup>2,5,7,8,13</sup> Prolonged hospitalization is associated with a diverse and complicated range of impairments that can persist, affect quality of life, and decrease patients' functional capacity for months to years following illness.<sup>4,13-15</sup> Several factors such as presence of intensivists on staff and performance of interdisciplinary discharge rounds have been associated with improved patient triage techniques<sup>2,8-10,16,17</sup>; premature discharge from and subsequent readmission to a critical care unit has also been correlated with availability of critical care beds and time of day when discharged from the critical care unit to the medical-surgical care area.<sup>4,6,9,17-19</sup> Patient indicators associated with increased risk of readmission (see Table) include advanced age at first admission, comorbid conditions at baseline, undergoing emergency versus elective procedures and interventions, higher illness severity scores, cognitive function, oxygen/perfusion ratios on admission and discharge from the critical care unit, and prolonged initial stay in the critical care unit.<sup>4,9,11,17,18,20</sup>

Early integration of critical care transitional services has demonstrated improved delivery of care and coordination among health team members.<sup>4,21,23,24</sup> This organized approach to institutional transition promotes positive experiences for patients, improves outcomes, provides caregiver support, and potentially decreases hospital length of stay.<sup>2,4,10,20,25,26</sup> Vital to the delivery of patient-centered care is the evaluation of the best methods based on the data available related to readmission and care coordination strategies during transitions in care for complex critically ill patients. These initiatives can provide the best level of continuity if implemented during the stay in the critical care unit.

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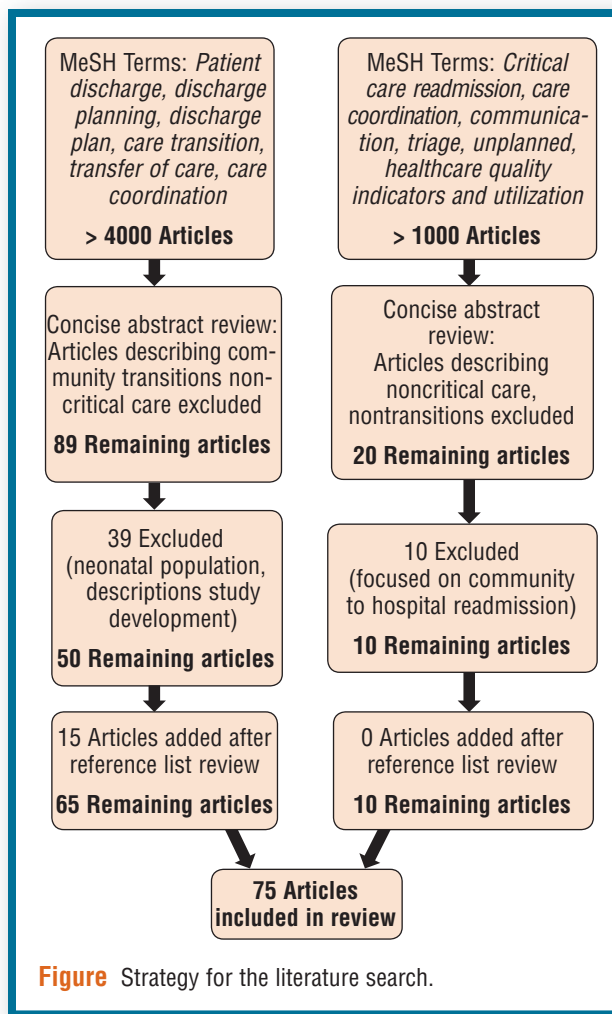
**Table** Initial critical care diagnoses and patients' physiological variables correlated with increased risk of readmission

Physiological parameter	Diagnosis
Increased heart rate > 100/min	Hypoxic/hypercapnia respiratory failure
Decreased heart rate < 60/min	Ventilation airway clearance difficulties
Hypoxia, > 1 point Hemoglobin alterations	Bleeding
Elevated respiratory rate > 24/min	Altered mental status
Decreased respiratory rate	New-onset arrhythmias
Febrile state	Congestive heart failure
Increased initial stay in intensive care unit > 48 h	Cardiac arrest
Advanced age > 65 y	Sepsis and bacteremia
Net positive fluid balance	Hemodynamic alterations
Elevated carbon dioxide levels, altered sodium levels	Metabolic/electrolyte alterations
Blood cultures showing growth	Unstable angina
Decreased score on Glasgow Coma Scale	Sepsis and bacteremia
Bacteremia and leukocytosis	

<sup>a</sup> Based on information from Badawi and Breslow,<sup>2</sup> Campbell et al,<sup>7</sup> Gajic et al,<sup>20</sup> Rosenberg and Watts,<sup>21</sup> and Elliott et al.<sup>22</sup>

## Methods

A literature review was focused on improving care coordination, alignment, and collaboration among interdisciplinary providers, throughout all levels of practice within the acute care setting and transitional care services. The electronic databases PubMed, CINAHL (Cumulative Index to Nursing and Allied Health), and the Cochrane Review were included within the search. MeSH terms implemented within the search included *patient discharge*, *discharge plan*, *discharge planning*, *care transition*, *transition of care*, and *care coordination*. Key words that were included in this search also included *ICU*, *intensive care units*, and *critical care*. The literature search returned more than 4000 articles initially. These abstracts were evaluated for publications focused solely on inner-hospital transitions of care from the critical care unit to the medical-surgical care area. Following this initial review, 89 articles remained that were focused on inner-hospital transitions in care (see Figure). Thirty-nine additional studies were excluded when further in-depth evaluation revealed that the focus was on



neonatal and specialty pediatric patient populations, or they were duplicate studies published in different journals, or they were descriptions of upcoming study design. A review of reference lists yielded an additional 15 studies for the literature review.

The initial literature search revealed that interventions directed toward care coordination, communication, and collaboration were often discussed in association with readmission to the critical care unit during hospitalization. Thus, a secondary literature search was undertaken to explore related factors surrounding critical care readmission and to identify patient-specific characteristics associated with increased risk of readmission to the critical care unit (see Figure). The MeSH terms used in the secondary search included *critical care unit*, *readmission*, and *care coordination*. Key words incorporated within this search include *communication*, *triage*, *unplanned readmission*, *healthcare quality indicators*, and *healthcare utilization*. This search added an additional 23 articles

for review. Following evaluation of abstracts, 10 of these 23 studies were also selected for inclusion. All evidence incorporated within the review was included provided that the focus was on adult and geriatric patients readmitted to the critical care unit within the same hospitalization period and descriptions of transitional care services implemented during hospitalization. Publications that were focused on transitions from the acute care setting to the community and pediatric populations were excluded because of the unique needs of those populations. All evidence included within the literature search was appraised by using the evidence and quality guide from the *Johns Hopkins Nursing Evidence-Based Practice: Models and Guidelines*<sup>27</sup> and was given an evidence level score of I, II, III, or IV. Level I evidence represents experimental studies, and level IV evidence represents expert opinion and consensus panels.<sup>27</sup> Evidence was also given an individual quality rating of high quality (A), good quality (B), or low quality (C).<sup>27</sup>

Ultimately, 75 articles were included in the literature review. The summation of both literature searches included diverse sources comprising a Cochrane review, several systematic reviews, and both experimental and qualitative studies. The majority of the evidence was given a quality rating of high or good. The evidence encompassed interventions aimed at improving communication patterns during care handoffs and interventions aimed at ongoing assessment of patients' physiological adjustment to transitions in care.

## Communication Interventions to Promote Care Continuity

### Nurse Handoff/Transfer Report

The nurse-to-nurse handoff that occurs between critical care nurses and nurses from the medical-surgical care area is often the most comprehensive communication regarding the patient's course and trajectory within the ICU.<sup>28,29</sup> Multiple studies have demonstrated that medical-surgical nurses and critical care nurses collectively aim for this process to remain patient centered<sup>28-31</sup>; however, both practice groups individually prioritize and emphasize different components and timing priorities of these transfers. Interestingly, most evidence surrounding the communication between critical care nurses and medical-surgical nurses is focused on the critical care nurses' observations, prioritization, and practice throughout the handoff process.<sup>15,29,31</sup> The

literature search yielded few studies focused exclusively on medical-surgical nurse's perceptions of the care transition. The studies that were available described the transition-of-care process as stressful, anxiety provoking, and labor intensive from the perspective of medical-surgical nurses.<sup>28,29,32,33</sup> The lack of focus on the medical-surgical nurses' perspective suggests that the transitional interventions in those studies may not have actually met the needs of providers and patients throughout the acute care spectrum.

Medical-surgical and critical care nurses identified different priorities to be included for effective handoff communication practices that ensure continuity of care. Several qualitative descriptive studies demonstrated that critical care nurses emphasized the following factors at handoff: a focus on patient acuity, in-depth descriptions of the severity of illness that the patient experienced within the critical care unit, practice concerns, and potential factors that would lead to the patient experiencing a deterioration in clinical status that would require readmission to the critical care unit.<sup>29,30</sup> In contrast, medical-surgical nurses emphasized the need for more practical information surrounding patient care including the timing of transfer, patient mobility factors, functional/hygiene independence, caregiver dynamics, and equipment and intervention needs.<sup>29,32,33</sup> Thus, the development and implementation of a standardized handoff tool must include extensive discussion about the immediate care needs of the patient in conjunction with discussion of the patient's clinical assessment that may indicate an alteration in clinical functioning and status. This discussion is especially important if these alterations are subtle and patient specific. The majority of the evidence surrounding communication and handoff practices is derived from qualitative data sources. Further investigation is needed to explore specific patient care practices and unique reportable physiological indicators that should be included in handoff communication in conjunction with appraisal of institutional systematic practices that reinforce a detachment between health care providers in the critical care unit and the medical-surgical care area.

### Implementation of Transfer Document

Rather than a team approach, it is often the critical care nurses who orchestrate the handoff process. Inconsistency regarding the content and prioritization of care

needs occurs during these handoffs. This inconsistency is due to the timing of handoffs, the lack of practice standardization between nurses, the extensiveness and complexity of the patients' critical care course, and the underlying important patient care needs.<sup>34-37</sup> This situation often leaves medical-surgical nurses and patients lacking the proper information required to ensure care coordination after transfer from the critical care unit. Several studies<sup>10,33,38</sup> demonstrated that fewer than half of critical care units implement specific criteria and policy for discharge from the unit. Standardization of handoff practices is recognized by The Joint Commission as a practice standard to promote patient safety and facilitate the delivery of consistent high-quality patient care.<sup>39</sup>

A multitude of studies<sup>39-41</sup> have demonstrated the effectiveness of implementing standardized verbal handoff practices to decrease omissions in patient care information. However, the development of electronic resources that are supportive and reflective of these communication and decision-making patterns is lagging behind practice.<sup>34,35,41</sup> Implementation of an electronic transfer tool that included descriptions of the patient's history, progress, and current status was useful for interdisciplinary care providers<sup>29,39</sup> and was an effective tool for medical-surgical nurses to reflect upon after the immediate transfer period.<sup>32</sup> Several studies explored the integration of an interdisciplinary standardized handoff tool<sup>34,36,37,40</sup>; however, the majority evaluated this measure from the perspective of alterations and effects on patient care activities, not from the perspective of care delivery outcomes.<sup>34</sup>

### Communication Interventions to Support Patients and Caregivers

Vital to successful care coordination is communication and integration of patients, patients' families, and caregivers in the process of care transfer. A critical supportive intervention presented within the literature emphasized that discussion and preparation provided for patients and caregivers should include descriptions of the change in care delivery that occurs upon transfer to the medical-surgical care area.<sup>29,30</sup> Interventions included visiting the care areas/having staff from the

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other area visit patients in the ICU before transfer,<sup>29</sup> and implementing written education material discussing the alteration in monitoring practices and nursing care expectations from the critical care unit to the general care area.<sup>42,43</sup> These methods were effective in decreasing the stress and anxiety scores of patients and their families. Patients and caregivers also reacted positively to continuous contact and follow-up with members of the critical care delivery team.<sup>29,42</sup>

### Discharge Planning Within the Critical Care Unit

Patients frequently experience a lack of functional independence at discharge, which often makes it necessary for family members to serve as caregivers.<sup>4,7,24</sup> In order to facilitate improved outcomes for critically ill patients, it is essential to initiate early, effective discharge planning and caregiver education within the critical care unit. Several qualitative studies<sup>44,45</sup> demonstrated that critical care nurses are often resistant to implementing discharge planning because of patients' acuity. Critical care nurses also cited time constraints as a limitation on their ability to initiate discharge planning effectively.<sup>46,47</sup>

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They often thought that these decisions were made

exclusively by other health care providers.<sup>44,46,47</sup> Interestingly, several studies<sup>45,46,48</sup> demonstrated that critical care clinicians were able to assess several elements effectively during critical illness that were vital to predicting self-care abilities at discharge, including prior and current functional status and availability of caregiver assistance. Although critical care practitioners were able to assess some aspects of care needs effectively while patients were in critical care, further research is needed to develop and evaluate care coordination tools, including standardized handoff and outreach services that are effective, adaptable, and easily used by critical care nurses.

### Care Delivery Practices Supporting Care Continuity

#### Critical Care Outreach Services

The goal of an outreach program is to facilitate patients' transition and decrease complications associated with patients' transfer from the critical care unit to the general medical-surgical care area.<sup>1,48,49</sup> The scope of care

support provided by critical care outreach models and activities that use outreach teams is diverse. Some models provide direct bedside clinical care after discharge from the critical care unit,<sup>49-53</sup> and some models are responsible for identifying early warning triggers so as to attempt to divert a critical care readmission.<sup>49-53</sup> Most nurse-led models incorporate educational initiatives for nurses in medical-surgical care areas,<sup>48,51-53</sup> and some focus on the psychosocial adjustment of patients and caregivers following transition from the critical care unit. Some models involve primarily critical care nurses called "lead or liaison" nurses,<sup>49,52,54,55</sup> whereas some models of delivery involve interdisciplinary models that incorporate intensivist physicians and critical care nurses.<sup>50,56</sup>

Most critical care outreach models use patient mortality, critical care readmission rates from the general care area, length of stay, and patient/caregiver satisfaction as measurements of effectiveness.<sup>1,48-53,56,57</sup> Collectively, studies have demonstrated that patients experienced improved outcomes after implementation of a critical care outreach program; following implementation, patients experienced decreased risk of readmission to the critical care unit<sup>49</sup> and/or shorter stays after readmission.<sup>49,50,52,54,56</sup> In contrast, several studies<sup>51,53,56,58</sup> did not show statistically significant alterations in readmission rates, hospital length of stay, patient anxiety, or hospital survival after implementation of outreach services.

The diversity of outreach care delivery models identified within the literature, coupled with patient complexity and multifactorial causality surrounding outcome measures used in effectiveness assessments, has ultimately led to conflicting results regarding the effectiveness of outreach services as a solitary transitional care intervention. However, overall implementation of outreach services was associated with both timely readmission to the critical care unit and improved survival rates. Further inquiry is needed regarding the effectiveness of the various models of outreach models in practice, and standardized evaluation measures are needed.

#### Transitional Care Units

Critical care is a finite resource in most institutions. Often patients have to be transitioned out of the critical care unit before their critical care needs have resolved. In order to bridge the ICU and the medical-surgical care area, institutions have developed transitional care units to better facilitate patients moving across care levels.

Frequently, these care units have a slightly higher nurse to patient ratio than critical care units have. Several studies<sup>14,53,58</sup> demonstrated that patients and their families who experienced a longer stay in the ICU felt that admission to a transitional care unit was associated with improved care and decreased anxiety with the transition process. Researchers also showed the potential for improved outcomes associated with improved streamlined care.<sup>1,31,59</sup> Although institutional space, staffing, and financial constraints may limit the development and implementation of transitional care units, it may be possible to include several aspects of transitional care within the confines of the critical care unit. Initiatives within the critical care unit that are directed toward increased patient autonomy in performing self-care and promoting functional independence and mobility are key milestones for transition from the critical care unit to the medical-surgical care area.<sup>47,60</sup>

### Medication Reconciliation Practices

More than 44% of medication errors occur during the transfer of care for patients within the acute care setting.<sup>61,62</sup> This significant finding necessitates that care coordination for complex critically ill patients incorporate methods that include stringent practices for medication reconciliation. Vital to the development of medication reconciliation initiatives is the inclusion of both the patient's baseline preadmission home medications and an ongoing assessment of the need for continuing medications.<sup>61,63</sup> Implementation of 1 measure by Pronovost et al<sup>63</sup> demonstrated that use of a simple safety check system comparing patient's current medications, home (preadmission) medications, and transfer medications revealed that initially more than 94% of ICU patients were leaving the unit with potential medication errors. Following implementation of the medication reconciliation process, this rate decreased to almost zero.<sup>61,62</sup> Vital to the implementation of medication reconciliation practices is the development of systems that are easily incorporated within the care plan and diminish the care burden of the critical care bedside nurse who is completing the reconciliation tool.<sup>61,63,64</sup> Computerized charting systems and patient data management systems have also been identified as effective and innovative methods to streamline medication reconciliation practices during transitions of care within the acute care setting and facilitate improved institutional compliance.<sup>39,63</sup>

### Conclusions Based on the Evidence

The literature review focused on hospital-based transitions of care includes a comprehensive discussion of the interventions focused on care provision and interdisciplinary communication initiatives, including evaluation measures from the perspectives of health care providers and of patients and their caregivers. However, several opportunities were identified to improve patient safety and quality of care because of identified gaps in the organizational process and system structure that affect the hospital-based patient care transition process. Despite search measures undertaken to include a more extensive discussion from the perspective of the nurses in medical-surgical care areas about what constitutes high-quality, supportive care to facilitate continuity, few data on this topic have been published. Most published evidence

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presents the perspective of critical care providers and their experiences performing triage, transferring, and coordinating transfers for critically ill patients,<sup>14,47</sup> with minimal discussion from the receiving providers.<sup>32</sup> Furthermore, the inconsistency in prioritization present between medical-surgical nurses and critical care nurses demonstrates the significant alterations in care level that patients experience as they transition from the critical care unit to the medical-surgical care area. Further exploration is needed to develop and implement interventions that support improved collaboration, communication, and care overlap between care locations.

Most outreach programs were evaluated by using patients' hospital length of stay and data on readmission to the critical care unit<sup>50,51,56</sup> to evaluate for effectiveness. Publications on critical care readmission and length of stay have demonstrated that both of these quality outcomes indicators are multifactorial in nature. Therefore, proving direct causality to ensure that the most sound interventions are translated from the literature is challenging.<sup>4,8,16</sup> Furthermore, the relatively recent implementation of critical care outreach programs has not allowed evaluation of the long-term effectiveness of implementing these services. Three of the studies reviewed<sup>49,52,55</sup> evaluated the effectiveness of critical care outreach on patients' outcomes for a year or more. Most of the studies<sup>50,51,56</sup> evaluated the effectiveness of interventions by

comparing 6-month periods before and after the institution implemented the outreach program.

Overall, the evidence suggests that continuity of care and consistent communication practices improve patients' transition from the critical care unit to the medical-surgical care area.<sup>1,7,8,20,29,52</sup> Ultimately, nurses need to play an instrumental role in the development and use of effective communication tools and documentation methods to ensure that tools developed are easy to use and translatable to the acute care setting. Advances in technology and incorporating standardized patient care initiatives allow patients to recover from critical illness. Critical care providers must initiate interventions and innovations to support patients beyond meeting their immediate critical care needs.

Although no single intervention for care coordination independently thwarts readmission, coupling communication interventions with collaborative practice initiatives is central to providing transitional care practices. The diversity of documentation tools and outreach services reviewed in the literature emphasizes the need for these services within an acute care organization. Ultimately, advances in care delivery have improved patients' survival after critical illness and called for critical care providers to view their practices as part of a continuum of care delivery. The translation of evidence surrounding care coordination to promote meaningful interventions will facilitate critically ill patients' recovery. Early recognition of deterioration in a patient's condition and changing health status that requires readmission to the critical care environment will affect the quality of long-term outcomes for a critically ill patient recovering from an acute life-threatening illness. Implementing transitional care initiatives for critical care patients throughout the hospital is well documented to decrease length of stay, decrease anxiety of patients and their families, and improve long-term survival and quality of life. **CCN**

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#### References

1. Niven D, Bastos J, Stelfox H. Critical care transition programs and the risk of readmission or death after discharge from ICU: a systematic review and meta-analysis. *Crit Care Med*. 2014;42(1):179-187.
2. Badawi, O, Breslow, MJ. Readmissions and death after ICU discharge: development and validation of two predictive models. *PLoS One*. 2012; 7(11):e48758.
3. Baker D, Pronovost P, Morlock L, et al. Patient flow variability and unplanned readmissions to an intensive care unit. *Crit Care Med*. 2009; 37(11):2882-2887.
4. Brown S, Ratcliffe S, Halpern S. An empirical comparison of key statistical attributes among potential ICU quality indicators. *Crit Care Med*. 2014;42(8):1821-1831.
5. Needham D, Davidson J, Cohen H, et al. Improving long term outcomes after discharge from intensive care unit: report from a stakeholders' conference. *Crit Care Med*. 2012;40(2):502-509.
6. Brown S, Ratcliff S, Kahn J, et al. The epidemiology of intensive care unit readmission in the United States. *Am J Respir Crit Care Med*. 2012; 185(9):955-964.
7. Campbell A, Cook J, Cuthbertson B. Predicting death and readmission after intensive care discharge. *Br J Anaesth*. 2008;100(5):656-662.
8. Desai S, Law T, Needham D. Long-term complications of critical care. *Crit Care Med*. 2011;39(2):371-379.
9. Frost S, Alexandrou E, Bogdanovski T, et al. Severity of illness and risk of readmission to the intensive care: a meta-analysis. *Resuscitation*. 2009;80:505-510.
10. Kastrup M, Powollik R, Balzer F, et al. Predictive ability of the stability and workload index for transfer score to predict unplanned readmissions after ICU discharge. *Crit Care Med*. 2013;41(7):1608-1615.
11. Town J, Churpek M, Yuen T, et al. Relationship between ICU bed availability, ICU readmission, and cardiac arrest in the general wards. *Crit Care Med*. 2014;42(9):2037-2041.
12. Kramer A, Higgins T, Zimmerman J. Intensive care unit readmissions in U.S. hospitals: patient characteristics, risk factors and outcomes. *Crit Care Med*. 2012;40(1):3-10.
13. Helling T, Martin L, Martin M, et al. Failure events in transition of care for surgical patients. *J Am Coll Surg*. 2014;28(4):723-731.
14. Stelfox H, Lane D, Boyd J, et al. A scoping review of patient discharge from intensive care: opportunities and tools to improve care. *Chest*. 2014; 10(13):2955-2965.
15. Haggstrom M, Backstrom B. Organizing safe transitions from intensive care. *Nurs Res*. 2014;11:1-11.
16. Hosein F, Bobrovitz N, Berthelot S, et al. A systematic review of tools for predicting severe adverse events following patient discharge from intensive care units. *Crit Care Med*. 2013;17:1-10.
17. Alban R, Nisim A, Ho J, et al. Readmission to surgical intensive care increases severity-adjusted patient mortality. *J Trauma*. 2006;60(5): 1027-1031.
18. Ho K, Dobb G, Lee K, et al. The effect of comorbidities on risk of intensive care readmission during the same hospitalization: a linked data cohort study. *J Crit Care*. 2009;24:101-107.
19. Oanes I, Schwebel C, Francois A, Bruel C, et al. A model to predict short-term death or readmission after intensive care unit discharge. *J Crit Care*. 2012;27:421-429.
20. Gajic O, Malinchoc M, Comfere T, et al. The stability and workload index for transfer score predicts unplanned intensive care unit patient readmission: initial development and validation. *Crit Care Med*. 2008;36(3):676-682.
21. Rosenberg A, Watts C. Patients readmitted to ICUs: a systematic review of risk factors and outcomes. *Chest*. 2000;118(2):492-502.
22. Elliott M, Worrall-Carter L, Page K. Intensive care readmission: a contemporary review of the literature. *Intensive Crit Care Nurs*. 2014;30:121-137.
23. Foust J. Discharge planning as part of daily nursing practice. *Appl Nurs Res*. 2007;20:72-77.
24. Soderstrom I, Saveman B, Hagberg M, et al. Family adaption in relation to a family member's stay in ICU. *Intensive Crit Care Nurs*. 2009;25:250-257.
25. Johnson P, Chaboyer W, Foster M, et al. Caregivers of ICU patients discharged home: what burden do they face. *Intensive Crit Care Nurs*. 2001; 17:219-227.
26. Brown S, Ratcliffe S, Halpern S. An empirical derivation of the optimal time interval for defining ICU readmissions. *Med Care*. 2013;51(8):706-714.
27. Dearholt S, Dang D. *Johns Hopkins Nursing Evidenced-Based Practice: Models and Guidelines*. Indianapolis, IN: Sigma Theta Tau; 2012.
28. McCaughey J, Alderdice F, Fowler R, et al. Outreach and early warning systems (EWS) for the prevention of intensive care admission and death of critically ill adult patients on general hospital wards. *Cochrane Database Syst Rev*. 2007;18(3):CD005529.
29. Chaboyer W, James H, Kendall M. Transitional care after the intensive care unit: current trends and future directions. *Crit Care Nurse*. 2005;25:16-28.
30. Lin F, Chaboyer W, Wallis M, et al. Factors contributing to the process of intensive care patient discharge: an ethnographic study informed by activity theory. *Int J Nurs Stud*. 2013;50:1054-1066.
31. Haggstrom M, Asplund K, Kristiansen L. How can nurses facilitate patients' transition from intensive care? A grounded theory of nursing. *Intensive Crit Care Nurs*. 2012;28:224-233.
32. Bench S, Day T. The user experience with critical care discharge: a meta-synthesis of qualitative research. *Int J Nurs Stud*. 2010;47:287-299.

33. James S, Quirke S, McBride-Henry K. Staff perception of patient discharge from ICU to ward-based care. *Nurs Crit Care*. 2013;18(6):297-306.
34. Horwitz L, Tannaz M, Krumholz H, et al. Consequences of inadequate sign-out for patient care. *Arch Intern Med*. 2008;168(16):1755-1760.
35. Collins S, Bakken S, Vawdrey D, et al. Model development for the interdisciplinary information exchange of ICU common goals. *Int J Med Inform*. 2011;80:141-149.
36. Benham-Hutchins M, Effken J. Multi-professional patterns and methods of communication during patient handoffs. *Int J Med Inform*. 2010;79:252-267.
37. Abraham J, Kannampallil T, Almoosa K, et al. Comparative evaluation of the content and structure of communication using two handoff tools: implications for patient safety. *J Crit Care*. 2014;31:1-7.
38. Whittaker J, Ball C. Discharge from intensive care: a view from the ward. *Intensive Crit Care Nurs*. 2000;16:135-145.
39. Heidegger C, Treggiari M, Romand J. A nationwide survey of intensive care unit discharge practices. *Intensive Care Med*. 2005;31:1676-1682.
40. Collins S, Hurley A, Chang F. Content and functional specifications for a standards-based multidisciplinary rounding tool to maintain continuity across acute and critical care. *J Am Med Inform Assoc*. 2014;21:438-447.
41. Arora V, Johnson J. A model for building a standardized hand-off protocol. *Jt Comm J Qual Patient Saf*. 2006;83:227-230.
42. Collins S, Stein D, Stetson P, et al. Content overlap in nurse and physician handoff artifacts and the potential role of electronic health records: a systematic review. *J Biomed Inform*. 2011;44:704-712.
43. Brooke J, Hasan N, Slark J, et al. Efficacy of information interventions in reducing transfer anxiety from a critical care setting to a general ward: a systematic review and meta-analysis. *J Crit Care*. 2012;27:429-443.
44. Bench S, Day T, Griffiths P. Involving users in the development of effective critical care discharge information: a focus group study. *Am J Crit Care*. 2011;20:443-452.
45. Watts R, Gardner H, Pierson J. Factors that enhance or impede critical care nurses' discharge planning practices. *Intensive Crit Care Nurs*. 2005;21:302-313.
46. Watts R, Pierson J, Gardner H. Critical care nurses beliefs about the discharge planning process: a questionnaire survey. *Int J Nurs Stud*. 2006;43:269-279.
47. Holland D, Rhudy L, Vanderboom C, et al. The feasibility of discharge planning in the intensive care unit: a pilot study. *Am J Crit Care*. 2013;21(4):10-18.
48. Chaboyer W, Foster M, Kendall E, et al. ICU nurses' perceptions of discharge planning: a preliminary study. *Intensive Crit Care Nurs*. 2002;18:90-95.
49. McDonnell A, Esmonde L, Morgan R, et al. The provision of critical care outreach services in England: findings from a national survey. *Am J Crit Care*. 2007;22:212-218.
50. Pirret A. The role and effectiveness of a nurse practitioner led critical care outreach service. *Intensive Crit Care Nurs*. 2008;24:375-382.
51. Pittard A. Out of reach? Assessing the impact of introducing a critical care outreach service. *Anaesthesia*. 2003;58:874-910.
52. Williams T, Leslie G, Finn J, et al. Clinical effectiveness of a critical care nursing outreach service in facilitating discharge from the intensive care unit. *Am J Crit Care*. 2010;19(5):63-72.
53. Ball C, Kirby M, Williams S. Effect of the critical care outreach team on patient survival to discharge from hospital and readmission to critical care: non-randomized population based study. *BMJ*. 2003;327:1-4.
54. Esmonde L, McDonnell A, Waskett C, et al. Investigating the effectiveness of critical care outreach services: a systematic review. *Intensive Care Med*. 2006;32:1713-1721.
55. Dea Moore C, Bernardini G, Hinerman R, et al. The effect of a family support intervention on physician, nurse, and family perceptions of care in the surgical, neurological, and medical intensive care units. *Crit Care Nurs Q*. 2012;35(4):378-387.
56. Green A, Edmonds L. Bridging the gap between the intensive care unit and general wards: the ICU liaison nurse. *Intensive Crit Care Nurs*. 2004;20:133-143.
57. Leary T, Ridley S. Impact of an outreach team on re-admissions to a critical care unit. *Anaesthesia*. 2003;58:328-332.
58. Cuthbertson B, Rattray J, Campbell M, et al. The practical study of nurse led, intensive care follow-up programmes for improving long term outcomes from critical illness: a pragmatic randomized controlled trial. *BMJ*. 2009;339:3723-3730.
59. Chaboyer W, Thalib L, Foster M. The effect of an ICU liaison nurse on patients and family's anxiety prior to transfer to the ward: an intervention study. *Intensive Crit Care Nurs*. 2007;23:362-369.
60. Linton S, Grant C, Pellegrini J. Supporting families through discharge from PICU to the ward: the development and evaluation of a discharge information brochure for families. *Intensive Crit Care Nurs*. 2008;24:329-337.
61. Capuzzo M, Volta C, Tassinati T, et al. Hospital mortality of adults admitted to intensive care units in hospitals with and without intermediate care units: a multicenter European cohort study. *Crit Care*. 2014;18:551-566.
62. Schwartz M, Wyskiel R. Medication reconciliation: developing and implementing a program. *Crit Care Nurs Clin North Am*. 2006;18(4):503-507.
63. Pronovost P, Weast B, Schwartz M. Medication reconciliation: a practical tool to reduce the risk for medication errors. *J Crit Care*. 2003;18(4):201-205.
64. Kopp B, Erstad B, Allen M. Medication errors and adverse drug events in an intensive care unit: direct observation approach for detection. *Crit Care Med*. 2006;34(4):415-425.