Dual Component Educational Program to Improve Medical-Surgical Nurses’ Knowledge and Self-Efficacy of Severe Sepsis and Septic Shock

Duska S. Bethel

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REVIEW, APPROVAL AND ACCEPTANCE

The document mentioned above has been reviewed and accepted by the student's advisor, on behalf of the advisory committee, and by the Assistant Dean for MSN and DNP Studies, on behalf of the program; we verify that this is the final, approved version of the student's DNP Project including all changes required by the advisory committee. The undersigned agree to abide by the statements above.

Duska S. Bethel, Student

Dr. Melanie Hardin-Pierce, Advisor
Final DNP Capstone Report

Dual Component Educational Program to Improve Medical-Surgical Nurses’ Knowledge and Self-Efficacy of Severe Sepsis and Septic Shock

Duska Bethel, BSN, RN

University of Kentucky
College of Nursing
Fall 2015

Melanie Hardin-Pierce, DNP, RN, APRN, ACNP-BC—Committee Chair
Karen Butler, DNP, MSN, RN—Committee Member
Kevin Williams, MD—Clinical Mentor
Dedication

This capstone project is dedicated to my husband and my children. Wesley, thank you for always knowing my worth even when I did not. Miles and Elliot, I hope my actions in life are strong enough that you can one day say that I led by example.

♫♪ “Always remember there was nothing worth sharing like the love that let us share our name.” ♫♪

Who I am today is a direct reflection of the love my late grandfather, Charles Henry, gave me. The meaningful conversations and experiences we shared throughout my childhood provided me with resilience, a desire to do good, and the understanding that one should “step out” of their person to fully embrace others and achieve a better understanding of the world.
I would like to acknowledge and thank Dr. Melanie Hardin-Pierce, my advisor and committee chair, for all your involvement in my educational and professional growth—you are my guru. Special attention to Dr. Karen Butler, my committee member, for making me feel significant on the first day we met as well as your enthusiasm when I asked you to assist me with my project. I want to specifically recognize and thank Dr. Kevin Williams, my clinical mentor. Your presence throughout my professional career will have a lasting impact—your candor has always and will always be appreciated. Thank you Dr. Lynn Jenson for lending me your ear and providing your expertise as I developed my simulation. I wouldn’t have been able to do it without you. To Whitney Kurtz-Oglive, thank you for your comments and suggestions as my first manuscript was developed—what an amazing gift you possess. Thanks to Amanda Wiggins for helping with the organization of the statistical section of this capstone. To those women I look up to the most in nursing: Teresa Lynn—I’ll never be able to articulate how meaningful your guidance was for me as I developed my own nursing knowledge and skills; Corey Keith—you’ve supported me professionally as I grew as a nurse and had faith in my abilities; Christy Littrell, you helped me become strong and confident in my actions. I want to thank Mike King, Phillip Knight, Shawnell Toler, Stacey Glick, Jeri Winstead and Erica Fields for helping me carry out this project. Much thanks to all the employees at Baptist Health Madisonville who supported me as I wore every emotion on my sleeves. Darah, thanks for supporting me emotionally and providing me both friendship and coffee. Final thanks to Maryann Lancaster for all the experiences we’ve shared. You know just how real the DNP struggle is, and you should know that The Inn was just not the same without you.
Table of Contents

Acknowledgements ........................................................................................................... iii
List of Tables...................................................................................................................... vi
List of Figures .................................................................................................................... vii
Introduction/DNP Practice Inquiry Project ................................................................. 1
Manuscript 1:

Integrative Literature Review: High Fidelity Simulation Impact on Acute Care
Registered Nurses in the Medical-Surgical Setting ................................................. 5

Manuscript 2:

Analysis of Clinical Guideline: Surviving Sepsis Campaign: International
Guidelines for Management of Severe Sepsis and Septic Shock: 2012 ............ 24

Manuscript 3:

Dual Component Educational Program to Improve Medical-Surgical Nurses’
Knowledge and Self-Efficacy of Severe Sepsis and Septic Shock ................. 43
Practice Inquiry Conclusion ....................................................................................... 74
Appendix A ..................................................................................................................... 77
Appendix B ..................................................................................................................... 79
Appendix C ..................................................................................................................... 84
Appendix D ..................................................................................................................... 87
Appendix E ..................................................................................................................... 88
Appendix F ..................................................................................................................... 92
Appendix G ..................................................................................................................... 93

iv
List of Tables

Manuscript 1:

Table 1: Results of high-fidelity simulation education in the acute care setting........................................12

Table 2: Evidence Grading Schema........................................22

Table 3: Level of Evidence Synthesis....................................23

Manuscript 2:

Table 1: Evaluator score results using the AGREE II Instrument for the Surviving Sepsis Campaign Guidelines........................................30

Table 2: Standardized domain scores using the AGREE II Instrument for the Surviving Sepsis Campaign Guidelines........................................40

Manuscript 3:

Table 1: Demographic characteristics of sample ................................58

Table 2: Pre and post education knowledge and self-efficacy scores ............59
List of Figures

Manuscript 3:

Figure 1: Procedure for implementing the dual component educational intervention ..................................................... 51
Introduction to Final DNP Practice Inquiry Project

Duska S. Bethel, BSN, RN

University of Kentucky
Sepsis is manifested by a spectrum of clinical signs and symptoms that are produced by an immune response to an infection. The continuum of sepsis ranges from simple sepsis to septic shock and without timely and appropriate intervention leads to death. Although patients with sepsis can deteriorate rapidly, they usually exhibit early warning signs with fever being the primary initial change (Gauer, 2013). Important for patients whose health status is guarded is the need for close monitoring through multiple observations, identification of deterioration, and timely, appropriate interventions (Luettel, Beaumon & Healy, 2007).

Poor knowledge, skill, and self-efficacy levels have been correlated with nurse failure to identify and respond to patient deterioration (Luettel, Beaumon & Healy, 2007). Staff development is the process by which registered nurses are formally educated to update and maintain clinical competency. Choosing which educational modality that is utilized in the acute care setting is dependent on the organization’s resources and time available to educate nurses. There is little research that focuses on identifying which educational modality is superior in terms of cost benefit and utility, effectiveness, and preference.

Registered nurses need more than didactic education in order to maximize their clinical competence so that they can independently and sufficiently function (Cook et al., 2001). Evidence supports designing educational programs that offer interactive experience so that knowledge, skills, and self-efficacy levels can be improved (Brannon et al, 2008; Cant & Cooper, 2010, Cook et al. 2011; Rosen et al., 2012). Simulation-based education has been shown to be a particularly effective means of promoting clinical competency and critical thinking skills (McGaghie et al., 2010; Rosen et al., 2012). Although simulation
itself can vary in complexity and level of fidelity, educational experiences that include feedback, debriefing, or guided reflection have demonstrated an ability to facilitate the link between theory and practice, increase knowledge synthesis, and promotes insight (Decker, 2008). Increased exposure time to simulation has been identified as a dominating factor that offer advantages in learner outcomes (Cant & Cooper, 2010; McGaghie et al., 2010).

The overall purpose of this practice inquiry project is to implement a dual component educational program at Baptist Health Madisonville, a hospital part of the Baptist Healthcare System in Madisonville, Kentucky, and evaluate the changes in nurse knowledge and self-efficacy levels after they receive didactic and interactive education. The first manuscript is an integrative literature review of studies published between 2005 and 2014 that have implemented educational interventions utilizing simulation in the acute care setting specifically on medical-surgical units. The findings from this review revealed a surprising knowledge gap in the use of high fidelity simulation outside the academic setting and whether this level of fidelity is cost effective or superior to lower levels of fidelity. The study recommends healthcare organizations utilize low to medium fidelity simulation in an effort to increase the engaging experiences of staff nurses. The second manuscript serves to analyze the Surviving Sepsis Campaign (SSC) Guidelines for management of severe sepsis and septic shock using the Appraisal of Guidelines for Research and Evaluation (AGREE) II Instrument. Using the Agree II Instrument facilitates a quality guideline assessment in terms of scope and purpose, stakeholder involvement, rigor of development, clarity of presentation, applicability, and editorial independence. The final manuscript is a write up of the results of implementing a pilot educational program that includes both didactic and simulation experiences in an attempt to improve
the knowledge and self-efficacy levels of medical-surgical registered nurses so that they may better recognize patient deterioration, specifically from sepsis, and respond appropriately and expediently.
Manuscript 1

Integrative Literature Review: High Fidelity Simulation Impact on Acute Care Registered Nurses in the Medical-Surgical Setting

Duska S. Bethel
University of Kentucky
Fall 2015
Abstract

The purpose of this review is to understand the impact of programs that use high fidelity simulation as their interactive method on a nurse’s knowledge, skill, and self-efficacy levels in the acute care setting and to specifically research if high-fidelity simulation is the superior educational modality. Typically, it is the medical-surgical nurses who are with a patient during acute changes in condition, and who manage a patient in a guarded, but not critical, health status. It is important for the nurses to provide appropriate care, meaning adequate assessment and timely interventions since sepsis usually exhibits early warning signs. Staff development is necessary for nurses to build knowledge, skills and self-efficacy so that are able to independently and effectively function. In the current hospital setting many educational modalities are used for staff development of registered nurses and include didactic methods with interactive methods, including simulation. High fidelity simulation has shown to be effective at training bedside nurses when the intent is to improve knowledge, skills, and/or perceived self-efficacy. It has the potential to meet learning needs for new nurses in orientation as well as experienced staff nurses during clinical development. A literature search was conducted in CINAHL and PUBMED for original research studies with available full text published between 2005 and 2014. Nine articles met inclusion criteria and the results imply there is not enough evidence to support a practice change at this time with regard to supporting the utilization of high fidelity simulation as the best way to influence the nurse’s knowledge, skills and attitudes in the acute care setting.

Keywords: knowledge, skills, self-efficacy, simulation, high fidelity, medical-surgical nurse, education
Introduction

Background Information

Jeffries (2005) defines simulation as “activities that mimic the reality of a clinical environment and are designed to demonstrate procedures, decision-making, and critical thinking through techniques such as role playing and the use of devices such as interactive videos or mannequins.” Simulation varies in the level of fidelity ranging from low to high. Low fidelity simulations are case studies or basic mannequins. High fidelity simulation utilizes standardize patients or computer-based mannequins. The goal of simulation is to improve the existing knowledge of the learner so that the learner gains the confidence needed to apply the information gained in the clinical setting (Jeffries, 2005). High fidelity simulations are primarily used in academia, and most of the research regarding high fidelity simulation experiences has focused on the impact of simulation in the college/university setting and its effect on nursing students (Sharp et al., 2014).

There is validity in using simulation because it encourages full engagement of the learner and that educational programs that focus on learner engagement, decision making and realistic patient responses might be more useful when learning complex content as well as identifying the needs of the learner (Brannan et al., 2008; Rosen et al., 2012). Simulated experiences offer the opportunity for gains in knowledge, critical thinking ability, satisfaction, and confidence.

Focus of the Problem

Research suggests that educational interventions that are designed to actively engage the learner positively influence knowledge, skill, and/or self-efficacy levels (Brannan et al., 2008; Cant & Cooper, 2010, Cook et al., 2011). Didactic methods cannot
maximize new or inexperienced nurses’ clinical competence so that they can independently and sufficiently function during their transition from the student nurse to the licensed registered nurse (Cook et al., 2001). There is ample evidence that educational programs which offer interactive experiences are consistently associated with large effects for outcomes of knowledge, skills, and self-efficacy levels (Brannon et al, 2008; Cant & Cooper, 2010, Cook et al. 2011; Rosen et al., 2012).

Simulation-based education has been shown to be a particularly effective means of promoting clinical competency and critical thinking skills (McGaghie et al., 2010; Rosen et al., 2012). Although simulation itself can vary in complexity and level of fidelity, educational experiences that include feedback, debriefing, or guided reflection have demonstrated an ability to facilitate the link between theory and practice, increase knowledge synthesis, and promotes insight (Decker, 2008). Those educational interventions that increase exposure time to simulations have been identified as a dominating factor that offer advantages that result in improved learner outcomes (Cant & Cooper, 2010; McGaghie et al., 2010).

Hospitals and organizations, especially those not considered “teaching” facilities, are probably unlikely to use simulation as a means to educate staff or maintain their clinical competence. This could be due to the fact that there is, although growing, limited research that supports the correlation between high fidelity simulations with a proven increase in skills and knowledge. Whether engaging in these particular simulation experiences correlates with safer care and improved patient outcomes is uncertain (Hallenbeck, 2012; Lucas, 2014).
It was suggested that technology-enhanced simulations are associated with better outcomes in knowledge and confidence for the learner than didactic education alone (Cant & Cooper, 2010; Cook et al., 2011; Gordon & Buckley, 2009). Simulated learning needs to include a method that allows the learner to understand the link between theory and practice; it is this primary element of simulated experiences that some researchers are identifying as the unique feature that is the reason for the positive impact reported and why these researchers are calling for broader use of simulation-based education (Brannan et al., 2008; Decker et al., 2008; McGaghie et al., 2010). This concept was also presented when Disher and colleagues (2014) and Gordon and Buckley (2009) reported that debriefing after simulation allows the learner to review performance and clinical pearls, which are defined as “small bits of free standing, clinically relevant information based on experience or observation” (Lorin et al., 2008).

High fidelity simulations may offer advantages over lower fidelity simulations and that repetitive practices involving simulations have been associated with improved learner outcomes, suggesting a “dose-response” relationship in that “more practice yields better results” (Cant & Cooper, 2010). It is implied that high fidelity simulation is effective at training bedside nurses because knowledge scores improve after training, and it has the potential to meet learning needs for new nurses in orientation as well as experienced staff nurses during clinical development (Disher et al., 2014; Gordon & Buckley, 2009; Lucas, 2014).

**Purpose of the Review**

The rationale for this inquiry is to conduct an integrative review pertaining to the impact of interactive educational programs for registered nurses as they continue their
education in the professional setting. The goal of this review is to understand the impact of programs that use high fidelity simulation as their interactive method on a nurse’s knowledge, skill, and self-efficacy levels in the acute care setting. The area of interest is in acute care setting, and the primary nurse population of interest is medical, surgical, and/or telemetry nurses, either new or experienced. This integrative review should add a better understanding of the current use of high fidelity simulation in the acute care setting among registered nurses working in the medical, surgical, or telemetry setting. The PICOT question which guided this inquiry was “among registered nurses working in the acute care setting, does the use of high fidelity simulation improve clinical knowledge, skills, or confidence self-efficacy?”

Methods

Through the University of Kentucky’s Medical Center Library, an integrative literature search was performed using the U.S. National Library of Medicine National Institutes of Health (PubMed) and Cumulative Index to Nursing and Allied Health Literature (CINAHL) databases. Various combinations of the keywords effect, impact, outcome, nurse education, instruction, fidelity, simulation, knowledge, skills, attitude, confidence, and competence were used. The following MeSH terms were used: impact OR effect OR outcome AND nurse OR nursing NOT breast AND education OR educational OR interactive OR fidelity OR simulation AND knowledge OR competence AND skills OR behavior AND attitude OR confidence. This produced a search that was too broad and therefore the search was simplified using the keywords high, fidelity, simulation, and nursing with the MeSH term used as follows: high AND fidelity AND simulation AND
nursing. This produced a more manageable search that was also more specific to the PICOT question.

General inclusion criteria were studies published between 2006 and 2014, in the English language, peer reviewed articles, studies conducted in western countries including Australia, Canada, UK, and the USA. Studies met the inclusion criteria if: the setting focused on medical-surgical environments in the acute care setting and educated registered nurses about deteriorating patients using high fidelity simulation experiences; if studies focused on registered nurses engaging in educational programs geared toward healthcare professionals and not nursing students. Studies were excluded if the setting was obstetrics, pediatrics, end-of-life care, home care, the operating room, or intensive care, if the educational programs were designed for nursing students and not registered nurses, and if the study measured impact on patients as the sole outcome.

**Results**

The search produced 274 articles. The title of each article was reviewed for potential relevance resulting in 27 articles selected. All abstracts were retrieved and their relevance to the aim of this review assessed. This resulted in 18 articles which were screened at the full text stage. A total of 9 articles met inclusion criteria and were used in the integrative review (see Table 1). The breakdown of the articles include a randomized control trial (n=1), non-randomized control trial (n=1), retrospective descriptive studies (n=3), expert opinion articles (n=2), and quasi-experimental pre-test/post-test studies (n=2).
<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Design</th>
<th>Sample</th>
<th>Purpose</th>
<th>Findings</th>
<th>Implications</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ackermann, Kenny, &amp; Walker, 2007</td>
<td>Descriptive study</td>
<td>21 new RNs</td>
<td>Impact on nurse confidence; implementation of the use of HFS for new registered nurses</td>
<td>Increased confidence in dealing with emergencies; improved socialization to the setting.</td>
<td>HFS provides enhanced educational experiences for new RNs to develop critical thinking, decision making, and confidence.</td>
<td>VI</td>
</tr>
<tr>
<td>Beyea, Slattery, &amp; von Keyn, 2010</td>
<td>Descriptive study; pretest and posttest</td>
<td>260 RNs at an academic medical center</td>
<td>Measure global confidence, competence, and readiness for independent practice using the Readiness for Entry-Into-Practice (self-efficacy) instrument.</td>
<td>HPS and simulated scenarios rapidly increased new RN competencies, confidence, and self-assessed readiness to provide care to patients (p &lt; .001). Decreased length of orientation, turnover rate.</td>
<td>Integrating simulation to nurse residency programs offer consistent, replicable orientation processes and supports the ability to evaluate competency development, provides standardized experiences and evaluations, and detects learning needs.</td>
<td>VI</td>
</tr>
<tr>
<td>Decker, Sportsman, Puetz, &amp; Billings, 2008</td>
<td>Expert opinion</td>
<td>N/A</td>
<td>To educators on the evolution of simulation</td>
<td>Simulation can both teach and evaluate individuals or groups of individuals</td>
<td>Additional research is needed to provide the evidence to support integrating simulation in RN competency testing.</td>
<td>VII</td>
</tr>
<tr>
<td>Disher, Burgum, Desai, Fallon, Hart, Auddell, 2014</td>
<td>Quasi experimental. Pre-post on knowledge, self-confidence</td>
<td>23 cardiac step-down unit nurses</td>
<td>The effects of a unit-based, HFS on a cardiac step-down unit RN’s ability to identify and manage deteriorating patients</td>
<td>Significantly higher knowledge, skill, and attitude levels</td>
<td>Unit-based, high-fidelity simulation an effective training approach for bedside nursing.</td>
<td>III</td>
</tr>
<tr>
<td>Gordon &amp; Buckley, 2009</td>
<td>Non-randomized control trial</td>
<td>50 medical-surgical RNs</td>
<td>The effect of simulation on medical-surgical nurses’ perceived ability and confidence in responding to patient clinical emergencies</td>
<td>Medical-surgical nurses’ confidence, perceived skills during patient clinical emergencies enhanced following simulations.</td>
<td>RN ability to transfer the increased confidence, perceived advanced skills following simulation to clinical environment needs investigation.</td>
<td>III</td>
</tr>
<tr>
<td>Lucas, 2014</td>
<td>Expert opinion</td>
<td>N/A</td>
<td>Identifies opportunities for employers to use high-fidelity simulation-based learning in continuing competency and staff development for practicing RNs.</td>
<td>Quality of care – HFS meets quality needs. System flow &amp; access: competent, confident nurses avoid crisis. Return on investment = $864 per learner (3-days of HFS); avoidance of additional hospital days save $1,600 – $8,000.</td>
<td>Practicing nurses are expected to maintain competency in the face of increased workload and patient acuity. Little literature on the use of HFS to develop competence, confidence in practicing nurses.</td>
<td>VII</td>
</tr>
<tr>
<td>Scherer, Bruce, &amp; Runkawatt, 2007</td>
<td>Quasi-experiment; pre/post-test; convenience sample randomly assigned.</td>
<td>23 RNs; experimental group (n=13) or control group (n=10)</td>
<td>Study to compare efficacy of HFS vs case study on knowledge and confidence in managing a cardiac event.</td>
<td>No significant difference in knowledge test scores; case study (control) group felt significantly more confident (p = .040).</td>
<td>Simulation and case study presentation had similar outcomes; both groups felt their experience was valuable.</td>
<td>III</td>
</tr>
<tr>
<td>Shepard, Kelly, Skene, &amp; White, 2007</td>
<td>Randomized controlled trial</td>
<td>74 RNs. 3 groups (SDL), SDL plus PowerPoint, SDL plus low fidelity simulation</td>
<td>Study to determine if knowledge of RNs who completed a simulation learning activity would be superior to those who completed traditional learning activities.</td>
<td>Simulation group had significantly higher (p &lt; .001) knowledge test results than those with SDL and PowerPoint groups.</td>
<td>Simulation effective educational tool for teaching patient assessment, improving knowledge, skills to RNs. May decrease time required to become clinically proficient and improve nurse confidence.</td>
<td>II</td>
</tr>
<tr>
<td>Williams &amp; Chong, 2010</td>
<td>Single descriptive study</td>
<td>9 RNs from a healthcare facility in Australia</td>
<td>Discussion of the implementation of a program to train RNs to recognize deteriorating patients and appropriately calling an early response team alert</td>
<td>Staff satisfied with the education. Improvement in patient outcomes in post-critical events. Increased nursing confidence and increased confidence of medical staff nurse.</td>
<td>Educational programs can increase nurse confidence and are therefore useful for staff development.</td>
<td>Level VI</td>
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**Table 1.** Results of High-Fidelity Simulation Education in the Acute Care Setting
Synthesis

Overall, most of the included articles were able to demonstrate improvement in nurses’ knowledge, skill, and self-efficacy levels through the utilization of high fidelity simulation (Beyea et al., 2010; Disher et al., 2014; Gordon & Buckley, 2009; Sheperd et al., 2007). Expert opinion also supports the use of simulation as a teaching and evaluation strategy although it is acknowledged that there is little literature on the use of simulation as an effective means to develop knowledge, skill, and self-efficacy levels in practicing nurses (Decker, 2008; Lucas, 2014). Both Decker and colleagues (2008) and Lucas and colleagues (2014) report that how advantageous high fidelity simulation is dependent on the topic, context, and method of simulation. This inconsistency in validity and reliability reflect a possible explanation as to why healthcare organizations have been hesitant to embrace this educational innovation as readily as academia has.

Williams and Chong (2010) described providing an educational program that serves to train registered nurses on how to appropriately recognize deteriorating patients and respond in a time appropriate manner with adequate nursing interventions. This study resulted in increased staff nurse self-efficacy, satisfaction with the educational program, and improved patient outcomes, all of which support the usefulness of topic-specific educational programs in staff development. Hospitals have recently been implementing educational programs for new nurse graduates as a means to decrease orientation time and improve new nurse competency and self-efficacy levels (Ackermann et al., 2007; Beyea et al., 2010; Sheperd et al., 2007; Williams & Chong, 2010).

Healthcare organizations must consider the impact on patient safety and quality of care provided when choosing their investments that affect system flow, access to services,
and return (Lucas, 2014). Based on the limited number articles found in this review, there seems to be a lack of evidence that supports high fidelity simulation as being the best tool to refine skills, confidence, and/or knowledge, either as nursing students or among nurses in the acute care setting.

Only two studies sought to compare high fidelity simulation to low or moderate-fidelity simulation or to didactic intervention alone. Sheperd and colleagues (2007) compared three interventions: self-directed learning (SDL), SDL with PowerPoint presentation, and low fidelity simulation to determine if the simulated learning activity was superior to the traditional educational interventions. The result of this study showed that the simulation group had a significant increase in knowledge compared to both the SDL group and the PowerPoint groups. The second study compared the efficacy of high fidelity simulation with case studies on nurse knowledge and self-efficacy levels in managing a cardiac event (Scherer et al., 2007); this study showed no significant difference in knowledge levels and in fact reported an increase in confidence level in the nurses who took part in the case study control group.

**Appraisal of Evidence**

The hierarchical evidence in this integrative review varies from level II to level VII (see Table 2 and Table 3). These articles clearly point out that interactive educational programs, specifically those which offer simulated experiences, are consistently associated with large effects for outcomes of knowledge, skills, and confidence levels. Limiting factors common to these studies included the studies being largely inconsistent. However, the variation among learners, instructional design, simulation mode, and outcome measurement resulted in heterogeneity, which implies that simulated education can be
provided to nurses as learners and can include a variety of topics. The Institute of Medicine (2001) identified simulation as a strategy to improve knowledge and skills of healthcare professionals which indicates that nurses at all levels may benefit from interactive educational experiences. A gap in this analysis is that it is not generalizable. Separate research would need to be carried out to make implications for student nurses and registered nurses outside of the medical-surgical setting. Major gaps to this analysis include lack of generalizability of the information to student nurses in the college setting.

Although some articles discuss the level of simulation or the length of time exposed to simulation, no study identifies what simulation mode is most effective at influencing the outcome on knowledge, skills, or confidence levels. There is a lack of evidence to support the claim that high fidelity simulation is the best tool to refine skills and knowledge. Future studies should focus on the possible correlation between the quality of education provided and impact on the learner’s knowledge and skill level (Hallenbeck, 2012).

**Implications**

**Knowledge Gaps**

There is a surprising knowledge gap in whether high fidelity simulations are cost effective for healthcare organizations. Healthcare organizations must know if high fidelity simulation can be tailored to help the acute care nurse identify and communicate patient needs, meet quality needs, promote the competence and confidence needed so that nurses improve system flow and access by avoiding crisis, and avoid additional hospital days to improve patient flow (Lucas, 2014). Healthcare organizations would benefit from cost-utility analyses to compare the varying fidelity levels of simulation to determine if the extra
costs associated with high fidelity simulation justifies the differences, if any, of knowledge, skill, and/or self-efficacy scores of low or medium-fidelity simulation. From efficiency and quality improvement perspectives it is important to remember that just because an intervention increases nurses’ confidence in their ability to do something doesn’t mean that those nurses actually get any better at the task. Sometimes an educational intervention will increase confidence without increasing actual ability. Research is needed to understand the relationship between high fidelity simulation and whether an increase in knowledge, skills, and self-efficacy correlates with improved efficiency, better patient outcomes, and/or increased compliance to policies and protocols.

**Evidence to Support Practice Change**

There is not enough evidence to support a practice change at this time with regard to supporting the utilization of high fidelity simulation as the best way to influence the nurse’s knowledge, skills and attitudes in the acute care setting. Research has yet to identify where high fidelity simulation may be best suited. The current suggests it is dependent on topic, context, and method, and educators within healthcare organizations must be fully competent and prepared to implement simulated programs so that this educational strategy can be used at its highest capacity (Beyea et al., 2010; Decker et al., 2008). The variability in the results of two of the studies that sought to compare high fidelity simulation with lower levels of fidelity indicate that more evidence is needed to solidify a call to change educational modalities for staff development in the acute care setting (Scherer et al., 2007; Sheperd et al., 2007).

Overall, the quality of simulated experiences for healthcare professionals is low (McGaghie et al., 2010; Rosen et al., 2012). Not only is the number of studies small but
there is little literature on the use of high fidelity simulation to develop practicing nurses’ competence, confidence, or satisfaction (Lucas, 2014; Sharp et al., 2014).

**Recommendations**

In an effort to embrace the innovative technology that has been proven thus far to improve the knowledge, skills, and attitudes of nurses, at least in the educational setting, a possible solution that can be logically recommended for healthcare organizations is for them to utilize simulated programs that offer low to medium fidelity and to increase the time involved in simulated experiences on the nurse both in orientation and in the clinical competence-building environment. This will allow for pioneering technology to be used while large knowledge gaps exist to the point of not being able to justify such a huge financial investment or potential expenses (Decker et al., 2008; Lucas, 2014). Educational hospitals should focus their research on the impact on high fidelity simulators among nurses in the acute care setting. There is currently little research on deteriorating patient conditions based on cardiovascular, respiratory, or neurologic dysfunction, and this would be a promising area for future research in the acute care setting.

**Conclusion**

It is often the staff nurses who are present and manage a patient in a guarded status before care is escalated and provided in the intensive or critical care setting. It is because of this that future research and simulated educational experiences should focus on the medical-surgical nurse and the deteriorating patient, specifically how the staff nurse can be educated to differentiate early versus late signs of deterioration as well as establishing trends in changes (Disher et al., 2014). It is imperative for practicing nurses in the acute care setting to maintain clinical competency despite challenges such as increased task load
and a higher level of patient acuity. The reality is that simulation does indeed seem to be a unique method for teaching and evaluating a nurses technical abilities (Decker et al., 2008; Lucas, 2014).
References


Scherer, Y., Bruce, S., & Runkawatt, V. (2007). A comparison of clinical simulation and case study presentation on nurse practitioner students' knowledge and confidence
in managing a cardiac event. *International Journal of Nursing Education Scholarship*, 4(1), article 22.


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<th>Level</th>
<th>Description</th>
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<tbody>
<tr>
<td>Level I</td>
<td>Evidence from a systematic review or meta-analyses of all relevant RCTs</td>
</tr>
<tr>
<td>Level II</td>
<td>Evidence obtained from well-designed RCTs</td>
</tr>
<tr>
<td>Level III</td>
<td>Evidence obtained from well-designed controlled trials without randomization</td>
</tr>
<tr>
<td>Level IV</td>
<td>Evidence from well-designed case-control and cohort studies</td>
</tr>
<tr>
<td>Level V</td>
<td>Evidence from systematic reviews of descriptive and qualitative studies</td>
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<tr>
<td>Level VI</td>
<td>Evidence from a single descriptive or qualitative study</td>
</tr>
<tr>
<td>Level VII</td>
<td>Evidence from the option of authorities and/or reports of expert committees</td>
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</table>

Table 2. Evidence grading schema (Melnyk & Fineout-Overholt, 2011).
<table>
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<td>Level V: Systematic review of qualitative or descriptive studies</td>
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<tr>
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**LEGEND**


*Table 3. Level of Evidence Synthesis Table*
Manuscript 2


Duska S. Bethel, BSN, RN

University of Kentucky

Fall 2015
Abstract

Sepsis is manifested by a spectrum of clinical signs and symptoms that are produced by an immune response to an infection, which is characterized by systemic inflammation and coagulation. Sepsis is a continuum that ranges from systemic inflammatory response syndrome (SIRS) to septic shock. Sepsis can progress to multiple organ dysfunction syndrome and, without timely and appropriate intervention, to death. The incidence and prevalence of sepsis is rising and the mortality rate is high, equal to that of myocardial infarction. Sepsis is the most expensive condition treated in the acute care setting and also a mysterious one since the pathogen responsible for over half the cases of sepsis goes unidentified. The Surviving Sepsis Campaign Guidelines was first published in 2004 in an attempt to reduce the mortality rate associated with sepsis through a comprehensive literature review which subsequently led to recommendations for best practice in the management and treatment of severe sepsis and septic shock.

The purpose of this manuscript is to use the Appraisal of Guidelines for Research and Evaluation (AGREE) II Instrument to analyze the Surviving Sepsis Campaign (SSC) Guidelines for management of severe sepsis and septic shock. The use of the AGREE II Instrument facilitates a quality guideline assessment in terms of the tool’s 6 domains which are scope and purpose, stakeholder involvement, rigor of development, clarity of presentation, applicability, and editorial independence.

Keywords: sepsis, severe sepsis, septic shock, bundles, surviving sepsis campaign
Introduction

Definitions

The American College of Chest Physicians developed the following four definitions relevant to sepsis over twenty years ago as a way to standardize the approach to these clinical conditions, and these terms are still being used today: *systemic inflammatory response syndrome, sepsis, severe sepsis, and septic shock* (Bone et al., 1992).

**Systemic Inflammatory Response Syndrome**

Systemic inflammatory response syndrome (SIRS) is an inflammatory response from a non-specific insult and must include at least two of the following signs and/or symptoms: core body temperature greater than 38 degrees Celsius or less than 36 degrees Celsius, heart rate greater than 90 beats per minutes, respiratory rate greater than 20 per minute or PaCO2 less than 32 mmHg, a white blood cell count greater than 12,000 mm3 or less than 4,000 mm3, acute mental status changes, or hyperglycemia defined as a glucose level higher than 140mg/dL in the absence of previous diagnosed diabetes mellitus (Bone et al., 1992; Dellinger et al., 2013).

**Sepsis and severe sepsis**

Sepsis includes the SIRS response with a presumed or confirmed infection. Severe sepsis is defined as sepsis that is associated with organ dysfunction manifested by hypoperfusion and organ dysfunction signs. Hypoperfusion is indicated by a systolic blood pressure reading of less than 90 mmHg, mean arterial pressure less than 65 mmHg, or a
drop in systolic blood pressure of at least 40 mmHg. Organ dysfunction signs include decreased perfusion: capillary refill greater than 3 seconds, skin mottling, cold extremities, and/or lactate greater than 2 mmol/L; respiratory: SpO2 less than 90 percent on room air, PaO2 less than 70 mmHg; hepatic: jaundice, total bilirubin greater than 2 mg/dL, increased liver function tests, and/or increased prothrombin time; renal: creatinine greater than 2.0 mg/dL, urine output less than 0.5 mL/kg/hour for at least two hours; central nervous system: altered consciousness, confusion, or psychosis; coagulopathy: international normalized ratio greater than 1.5 or aPTT greater than 60 seconds, thrombocytopenia where platelets are less than 100,000 mm3; or splanchnic circulation: absent bowel sounds (Dellinger et al., 2013).

**Septic shock**

Septic shock includes the signs of severe sepsis only hypotension persists despite adequate fluid resuscitation; the systolic blood pressure is less than 90 mmHg or mean arterial pressure is less than 65 mmHg and serum lactate level is higher than 4.0 mmol/L (Bone et al., 1992; Dellinger et al., 2013).

**Incidence and Prevalence**

One out of every 23 patients in the hospital is diagnosed with sepsis and 4,600 patients are diagnosed each day making it the sixth most common reason for hospitalization (Elixhauser, Friedman, & Stranges, 2011). The number of patients diagnosed with sepsis has more than doubled between 1993 and 2009 (Elixhauser, Friedman, & Stranges, 2011).

**Mortality Rate**

SIRS rapidly progress into sepsis, and without appropriate and adequate treatment, is life threatening. The mortality rates of severe sepsis and septic shock are high:
approximately 35% of patients with severe sepsis and 50% of those diagnosed with septic shock will die (Bone et al., 2003). Sepsis is the primary cause of 20% of the annual in-hospital deaths which is the same as the annual mortality rate from acute myocardial infarction (Martin et al., 2003). Morality rates in the United States have increased 5.6% from 1993 to 2003 (Dombrovskiy et al., 2007). Mortality rate is time-dependent: early resuscitation, which means interventions within the first 6 hours of sepsis recognition, decreases mortality rate by 25% compared to late resuscitation (Jones et al., 2008).

**Financial Impact**

According to Torio and Andrews (2013), the cost to treat sepsis in 2011 was more than $20 billion. Sepsis is the most expensive reason for hospitalization: it costs $33,000 on average to treat sepsis (Eber et al., 2009). Between 1993 and 2009, scientists identified a 153% increase in hospital length of stay associated with sepsis (Elixhauser, Friedman, & Stranges, 2009). Patients with sepsis have hospital stays 11 days longer than patients without sepsis (Eber et al., 2009).

**Infection Sources**

More than half of sepsis cases have an unknown source of infection (Elixhauser, Friedman, & Stranges, 2011). Escherichia. Coli is the most common organism identified in patients with a primary diagnosis of sepsis, and Methicillin-resistant staphylococcus aureus or MRSA is the most common organism identified in patients with a secondary diagnosis of sepsis (Elixhauser, Friedman, & Stranges, 2011).

**Surviving Sepsis Campaign**

Dellinger and colleagues (2013) defined sepsis and septic shock and discussed its significance offering an introduction to support the need for change. In 2012 international
guidelines from the Society of Critical Care Medicine and the European Society of Intensive Care Medicine were published which recommends the screening and management of sepsis, severe sepsis, and septic shock for adult inpatients through the implementation of a “sepsis bundle” that follows evidenced based practice known as the Surviving Sepsis Campaign (SSC) (Dellinger et al., 2013).

**The AGREE II Instrument**

The AGREE II instrument was published in 2010 as a replacement to the original AGREE Instrument and is now comprised of 6 quality domains covering 23-items. The tool itself has been endorsed by the Canadian Institute of Health and the Canadian Medical Association Journal as well as several other health care organizations. Utilization of the AGREE II instrument will facilitate a quality assessment of the SSC Guidelines. The 6 AGREE II Instrument domains and items include the following: the scope and purpose which ask about the guideline’s aim, health questions, and target population; stakeholder involvement which asks whether the appropriate stakeholders developed the guideline as well as if the guideline represents the intended users’ view; rigor of development helps the evaluator identify the process and methods to formulate and update the guideline; clarity of presentation is concerned with the guideline’s language, structure and format; applicability poses questions related to barriers and facilitators to implementation, uptake strategies, and resources accompanied with the guideline; and editorial independence allows for the evaluator to, as unbiasedly as possible, given an overall recommendation regarding the guideline’s use. The instrument also concludes with a rating of the guideline overall (Brouwers et al., 2010) (see Table 1).
<table>
<thead>
<tr>
<th>Domain</th>
<th>Item</th>
<th>Evaluator 1</th>
<th>Evaluator 2</th>
<th>Evaluator 3</th>
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Table 1. Evaluator Score Results
Scope and Purpose

The framework provided from the AGREE II Instrument will be utilized to assess the quality of the SSC Guidelines. The purpose of this paper is to analyze the SSC Guidelines for management of severe sepsis and septic shock using the Appraisal of Guidelines for Research and Evaluation (AGREE) II Instrument (Brouwers et al., 2010).

The objectives of the “Surviving Sepsis Campaign Guidelines for Management of Severe Sepsis and Septic Shock: 2012” is to provide an update to the previous guidelines which were last published in 2008 (Dellinger et al., 2013). The health intents of the SSC Guideline are to screen, diagnose, and treat the target population of those patients with severe sepsis and septic shock (Dellinger et al., 2013). The expected benefit of applying the evidence-based recommendations is the improved outcomes, specifically decreased mortality rate for critically ill patients with severe sepsis or septic shock as well as the positive influence on bedside healthcare practitioner behavior so that the burden of sepsis is reduced worldwide (Dellinger et al., 2013, p. 583).

The health problem addressed by the guideline is the management of severe sepsis and septic shock. First, initial resuscitation and infection issues are introduced and includes the screening for sepsis, diagnosis of sepsis, antimicrobial therapy, source control, and infection prevention. Second, hemodynamic support and adjunctive therapy is discussed and include fluid therapy of severe sepsis as well as the use of vasopressors, inotropic therapy, and corticosteroids. Next, support therapy of severe sepsis is included in regards to blood product administration, the use of immunoglobulins and selenium, and the history of recommendations regarding the use of recombinant Activated Protein C. The SSC Guideline also addresses mechanical ventilation of sepsis-induced respiratory distress
syndrome, glucose control, renal replacement therapy, bicarbonate therapy, deep vein thrombosis (DVT) prophylaxis, stress ulcer prophylaxis, and nutrition. Setting goals of care are recommended and pediatric differences are also considered.

The SSC Guideline is meant to apply to clinicians who are responsible for identifying, managing and treating sepsis in the acute care setting. The SSC Guidelines are pertinent to many members of the healthcare team in the intensive care unit and non-intensive care unit settings.

**Stakeholder Involvement**

The SSC guidelines were originally published in 2004. The 2004 SSC guidelines incorporated evidence available through 2003. The 2008 SSC guidelines searched literature through the end of 2007, and the 2012 guidelines included the evidence available up until fall of 2012. Members of the consensus committee were selected by the two main sponsoring organizations, the Society of Critical Care Medicine and European Society of Intensive Care Medicine. These two governing bodies appointed the two co-chairs, Dr. R. Phillip Dellinger and Dr. Rui Moreno. There were a total of 68 international experts who represented 30 international organizations.

Members of the 2012 SSC Guidelines Committee are listed in the first appendices at the end of the article. The 30 international organizations who had representation on the consensus committee and endorse the SSC guidelines include the American Association of Critical-Care Nurses, American College of Chest Physicians, American College of Emergency Physicians, American Thoracic Society, Asia Pacific Association of Critical Care Medicine, Australian and New Zealand Intensive Care Society, Brazilian Society of Critical Care, Canadian Critical Care Society, Chinese Society of Critical Care Medicine,
Chinese Society of Critical Care Medicine–China Medical Association, Emirates Intensive Care Society, European Respiratory Society, European Society of Clinical Microbiology and Infectious Diseases, European Society of Intensive Care Medicine, European Society of Pediatric and Neonatal Intensive Care, Infectious Diseases Society of America, Indian Society of Critical Care Medicine, International Pan Arabian Critical Care Medicine Society, Japanese Association for Acute Medicine, Japanese Society of Intensive Care Medicine, Pediatric Acute Lung Injury and Sepsis Investigators, Society for Academic Emergency Medicine, Society of Critical Care Medicine, Society of Hospital Medicine, Surgical Infection Society, World Federation of Critical Care Nurses, World Federation of Pediatric Intensive and Critical Care Societies, World Federation of Societies of Intensive and Critical Care Medicine. The German Sepsis Society and the Latin American Sepsis Institute also participated in the development and endorsement of the guidelines.

The name of each member, expertise discipline, institution, geographical location and a description of the member’s role in the guideline’s development are included on the third page of the article. The members of the committee were appointed either by their sponsoring organization because of their sepsis expertise or by the co-chairs to address content needs during the development process. Group heads were first selected then group members were selected based on the specific area of expertise—each group was assigned the task of drafting the initial update of the 2008 guidelines. Four clinicians with Grading of Recommendations Assessment, Development and Evaluation (GRADE) process application expertise created the GRADE group also known as the Evidence-Based Medicine (EBM) group and were responsible for developing the SSC guideline. All the
groups met either in person, via teleconferences, or electronic-based discussions. The final draft of the 2012 guideline was constructed via a meeting of all group heads.

The development process of the guidelines was a formal review of the literature for each clearly defined question. The committee members worked in subgroups to carefully identify and input the search terms. It is made clear that external review was conducted to get views, experiences and evidence of, not only experts, but the target stakeholders and therefore, can assume that providers of acute care and those involved in the care of patients with sepsis will find these guidelines relevant: physicians, nurse practitioners, and nurses. The SSC Guidelines Committee hopes to influence the behavior of bedside healthcare practitioners who manage and treat severe sepsis and septic shock (Dellinger et al., 2013).

**Rigor of Development**

The EBM group led the first consensus meeting where the procedures for literature review and table development for analysis were dictated. Separate literature searches were performed for each question, either previously used in the 2004 guideline or newly generated for general-topic searches or recent trial results. The time period searched for new literature was January 2008 until the fall of 2012. Specific search terms used included sepsis, severe sepsis, septic shock, and sepsis syndrome, but also included each group’s general topic area as well as key words specific to each question posed.

The reviewers searched for pertinent meta-analyses, systematic reviews, and randomized controlled trials and were required to use at least one general database such as MEDLINE or EMBASE as well as the Cochrane Library. The use of additional databases were optional. The evidence was assessed using the GRADE system which assessed
quality that ranges from high (A) to very low (D) and the strength of each recommendation from strong (1) to weak (2).

Recommendations were divided into three groups: those targeting severe sepsis; those targeting care of the critically ill patient that is considered high priority in severe sepsis; and pediatric considerations. The GRADE system was used as a way to consider clinical importance in the quality of evidence obtained so that a direct comparison of desired effects versus undesired effects could be made. Desired effects included beneficial health outcomes, a lesser burden on staff and patients, and cost savings. Undesired effects include harm to health, more burden on staff and patients, and greater costs. The committee’s strong recommendation of an intervention implies that the benefits outweigh the risks.

The committee was discouraged from making strong recommendations unless the quality of evidence was strong. When the guideline states “we recommend” then it is implied that the quality of evidence was strong. The committee used weak recommendations when evidence was of low quality and the benefits should outweigh the risks. When the guideline states “we suggest” then it is implied that the committee has a lack of confidence in the intervention’s ability to result in benefits over harm. The revision process was funded through a Gordon and Betty Irene Moore Foundation grant. Deborah McBride was acknowledged for externally reviewing and editing the manuscript.

The SSC consensus committee summarize that the guidelines will be updated regularly to reflect new interventions published and as current interventions are modified. The future for the guidelines include its adjustments to ensure certainty of
recommendations and reflection of the dynamic and evolving process of optimally treating severe sepsis and septic shock.

**Clarity of Presentation**

The SSC Guidelines have recommendations that are specific and unambiguous for the initial resuscitation and infection issues of severe sepsis and septic shock, hemodynamic support and adjunctive therapy in severe sepsis and septic shock, supportive therapy of severe sepsis, and pediatric considerations in severe sepsis. Different options for management of severe sepsis and septic shock are presented due to the fact that these recommendations, although some strong, are not yet standards of care as verified by practice data. The flow of the guidelines are clear and work as an efficient reference to key stakeholders.

The recommendations are easily found and answer the questions that have been addressed by the guidelines. Under each section is the recommendations which are numbered. After the recommendations a rationale follows that includes the referenced article along with the quality and strength via the GRADE system structured. Key recommendations are provided in tables or figures. The tables included in the guidelines include the following: diagnostic criteria for sepsis; diagnostic criteria for severe sepsis; determination of the quality of evidence; factors determining strong versus weak recommendation; recommendations for initial resuscitation and infection issues; recommendations for hemodynamic support and adjunctive therapy; norepinephrine compared with dopamine in severe sepsis summary of evidence; recommendations for other supportive therapies of severe sepsis; and recommendations regarding special considerations in pediatrics. Two figures are present in the articles which are the SSC
bundles and the algorithm for time sensitive, goal-directed stepwise management of hemodynamic support in infants and children.

**Application**

The SSC guidelines are meant to provide a source of guidance to clinicians caring for patients with severe sepsis or septic shock in both the intensive care unit and non-intensive care unit settings. The application of these interventions in the management and treatment of severe sepsis and septic shock are meant to be best practice since these interventions do not yet represent standards of care.

The SSC, supported by the Society of Critical Care Medicine, has a website that gives advice and provides tools to put the SSC Guidelines into practice. The website has a complete implementation and improvement guide. There are also sections on the website that provide access to bundle resources, data collection tips, implementation tools, and improvement monitoring. A resource tab is present as well to provided upcoming events with sepsis experts, web-based education, literature that influences sepsis care, and techniques to implement the SSC Guidelines all in an attempt to reduce the mortality rate associated with sepsis (survivingsepsis.org). The website from the Society of Critical Care Medicine offer posters, brochures, phone applications, and algorithms as clinician resources.

It is acknowledged that limited resources in some institutions or countries might prevent clinicians from carrying out all the interventions. Data collection and analysis of compliance to the SSC bundles are necessary when implementing improvement efforts in the care of patients with severe sepsis and septic shock. The SSC has provided an electronic data collection tool as well as paper screening tools (survivingsepsis.org).
Editorial Independence

The entire guideline process was achieved without industry funding to the committee members, industry input was not accepted during the guidelines development, and industry representation was not present at any of the meetings. The committee members have not received honoraria for their role in the guidelines process. The development of a formal conflict of interest policy was developed at the beginning and enforced throughout the process. The entire conflict of interest process was outlined and described in Appendix B. Each committee member was required to disclose any conflict of interest at the beginning of the process and annually by answering nine specific questions. Members were either prohibited from participation or permitted to participate. If the member’s disclosure was not able to provide a conclusion then they were sent to a conflict review committee where a participation or prohibition decision was made. If permitted it was either because the member’s disclosure was deemed not a source of bias or the member was placed in a group to preclude bias or provide disclosure. Nine members had conflict of interests that were resolved by prohibiting them from heading a group and assigning them to groups where the least conflict of interest was possible.

Recommendation

The SSC consensus committee feels the guidelines outlined and discussed in the article will be useful in the emergency department, medical/telemetry units, or the intensive care unit (ICU) settings. The SSC specifically states that the “greatest improvement can be made through education and process change for those caring for severe sepsis patients in the non-ICU setting and across the spectrum of acute care” (Dellinger et al., 2013, p. 583). This statement can be supported by the abundance of resources that have concluded
that the speed and appropriateness of therapy administered within the initial hours after severe sepsis development are likely to influence outcome. If healthcare providers can identify patients with sepsis early and intervene in a timely and adequate manner then the patients’ chance of dying from the continuum of sepsis is reduced—this forms the theoretical basis for the development of the bundles associated with the SSC Guidelines.

The third, updated 2012 SSC Guidelines provide more certainty to their recommendations due to the additional evidence that has been published since the second Guidelines’ release in 2008. The bulk of SSC Guidelines provide recommendations for management and treatment of severe sepsis and septic shock. Both of these terms are used to describe a point on the sepsis continuum. Without proper and timely treatment, death from the inflammatory response to infection is highly likely. That being said, although the SSC Guidelines specifically recommends the screening for sepsis, the article itself is targets clinicians responsible for the treatment and management of severe sepsis and septic shock, and the bundles include diagnostic and initial resuscitation strategies. These bundles have major implications for the nurses who carry out the orders included in the sepsis bundles. Assuming knowledge level correlates to performance level then future efforts should be made to improve knowledge of severe sepsis and septic shock to all pertinent members of the healthcare team. This includes educational strategies in settings beyond the emergency department and the ICU. The SSC website has education which is geared toward quality improvement strategies and data collection techniques, but does not provide educational information that targets the medical/telemetry nurse.

The SSC Guidelines should be used as a consensus for best practice in the management and treatment of severe sepsis and septic shock. The majority of the
interventions carry the weight of strong recommendations and where lower quality evidence-based suggestions are present, the guidelines provide a concrete rationale and transparency to the potential debate among those interventions. Using the AGREE II instrument, the SSC Guidelines have been analyzed and determined to originate from a solid literature review by sepsis experts and will be helpful to healthcare providers (see Table 2).

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Standardized domain score = (obtained score – min. possible score) ÷ (max. possible score – min. possible score)

Table 2. Standardized domain scores
References

Bone, R., Balk, R., Cerra, F., Dellinger, R., Fein, A., Knaus, W.,


Dual Component Educational Program to Improve Medical-Surgical Nurses’ Knowledge and Self-Efficacy of Severe Sepsis and Septic Shock

Duska S. Bethel, BSN RN

University of Kentucky

Fall 2015
Abstract

Typically, it is the medical-surgical nurses who are with a patient during acute changes in condition, and who manage a patient in a guarded health status. The National Patient Safety Agency (2007) identified many factors as reasons for nurses’ failure to respond to patient deterioration; these included a lack in knowledge and skills, lack of self-efficacy, inadequate monitoring of vital signs, failure to seek assistance for patient deterioration, communication failures, and role responsibility confusion (Luettel, Beaumon & Healy, 2007). It is important for the nurses to provided appropriate care, meaning adequate assessment and timely interventions, since sepsis usually exhibits early warning signs (Disher et al., 2012). The intent of this study is to provide an educational intervention that is sufficient enough to increase nurse knowledge, skill, and self-efficacy level so that they recognize patient deterioration and respond appropriately and expediently.

**Keywords:** medical-surgical, patient deterioration, sepsis, septic shock, knowledge, psychomotor skills, self-efficacy, education, structured clinical instruction module
Dual Component Educational Program to Improve Medical-Surgical Nurses’ Knowledge and Self-Efficacy of Severe Sepsis and Septic Shock

Introduction

The American College of Chest Physicians developed the following four definitions relevant to sepsis over twenty years ago as a way to standardize the approach to these clinical conditions, and these terms are still being used today: systemic inflammatory response syndrome, sepsis, severe sepsis, and septic shock (Bone et al., 1992). Systemic inflammatory response syndrome (SIRS) is an inflammatory response from a non-specific insult and must include at least two of the following signs and/or symptoms: temperature greater than 38 degrees Celsius or less than 36 degrees Celsius, heart rate greater than 90 beats per minutes, respiratory rate greater than 20 per minute or PaCO2 less than 32 mmHg, and a white blood cell count greater than 12,000 mm3 or less than 4,000 mm3 (Bone et al., 1992). Sepsis includes the SIRS response with a presumed or confirmed infection. Severe sepsis is associated with organ dysfunction manifested by altered mental status, lactic acidosis, oliguria or hypoperfusion indicated by systolic blood pressure measurements less than 90 mmHg or a drop in systolic blood pressure of at least 40 mmHg. Septic shock includes the signs of severe sepsis only hypotension persists despite adequate fluid resuscitation (Bone et al., 1992).

One out of every 23 patients in the hospital is diagnosed with sepsis and 4,600 patients are diagnosed each day making it the 6th most common reason for hospitalization (Elixhauser, Friedman, & Stranges, 2011). The number of patients diagnosed with sepsis has more than doubled between 1993 and 2009 and the costs associated with sepsis
treatment is more than any other diagnosis, accounting for over $15 billion dollars annually (Elixhauser, Friedman, & Stranges, 2011, p. 2).

SIRS rapidly progresses into sepsis, and without appropriate and adequate treatment, is life threatening. The morality rates for severe sepsis and septic shock are high; approximately 35% of patients with severe sepsis and 50% of those diagnosed with septic shock will die (Bone et al., 2003). Sepsis is the primary cause of 20% of the annual in-hospital deaths which is the same as the annual mortality rate from acute myocardial infarction (Martin et al., 2003).

In 2012 international guidelines from the Society of Critical Care Medicine and the European Society of Intensive Care Medicine were updated which recommends the screening and management of severe sepsis and septic shock for adult inpatients through the implementation of a “sepsis bundle” that follows evidenced based practice known as the Surviving Sepsis Campaign (Dellinger et al., 2013). Dellinger and colleagues (2013) defined sepsis and septic shock and discussed its significance offering an introduction to support the need for change. The incidence of severe sepsis is has more than doubled from 2000 through 2008 (Hall et al., 2011) and mortality rates in the United States have increased 5.6% from 1993 to 2003 (Dombrovskiy et al., 2007). Mortality rate is time-dependent: early resuscitation, which means interventions within the first 6 hours of sepsis recognition, decreases mortality rate by 25% compared to late resuscitation (Jones et al., 2008).

**Literature Review**

Research findings suggested that didactic methods alone are not sufficient to maximize a new or inexperienced nurse’s knowledge, skills, or self-efficacy necessary to
apply the new information in a clinical setting, so that nurses independently and sufficiently function (Cook et al., 2011). Educational interventions which are designed to actively engage the learner increase knowledge, skill, and self-efficacy levels (Brannan et al., 2008; Cant & Cooper 2010).

It is often the staff nurses who are present and manage a patient in a guarded status before care is escalated and provided in the intensive or critical care setting. It is because of this that simulated educational experiences should focus on the medical-surgical nurse and the deteriorating patient, specifically how the staff nurse can be educated to differentiate early versus late signs of deterioration as well as establishing trends in changes (Disher et al., 2014). It is imperative for practicing nurses in the acute care setting to maintain clinical competency despite challenges such as increased task load and a higher level of patient acuity. Simulation seems to be a unique method for teaching and evaluating a nurses technical abilities (Decker et al., 2008; Lucas, 2014).

**Background**

The Structured Clinical Instruction Module (SCIM) had its origin in a pilot program that served to provide education in a format that is called the Observed Structured Clinical Examination (OSCE) (Sloan et al., 1995). The OSCE was introduced in 1979 with the primary purpose of assessing skill level using a standardized checklist (Harden & Gleeson, 1979). OSCE and SCIM use in academia have risen in recent years (Rushforth, 2007). The SCIM provides a detailed interactive, educational program that contains all the important elements for clinical competence, provides consistent teaching skills, provides a learning opportunity in a safe environment, and provides an opportunity for the learner to show what they do not know which allows for constructive feedback (Sloan et al., 1995).
Blueprinting is the first step in OSCE and SCIM development: the learning objectives are first identified, competencies are identified, and then the module outcomes are matched to competencies (Newble, 2004; Jones, 2010). Standardized patients are then used to provide a simulated experience—these people are trained to, as realistically as possible, role play as patients. Research suggests that this interactive standardized patient-based simulation experience is an effective means to enhance clinical skills (Blue et al., 1998; Endacott et al., 2011; O’Sullivan et al., 2008).

Structured Clinical Instruction Modules (SCIMs) are interactive educational experiences that are designed to educate participants in a hands-on manner so that the learner can work through clinical scenarios; SCIMs allow the participants to engage in clinical reasoning and decision making and to receive immediate feedback from a real person, trained as a standardized patient (Auret & Starmer, 2008). Using standardized patients resulted in knowledge gains as evidenced by a 7 point increase on knowledge test scores in a 2014 study at the University of California (Shinnick & Woo, 2015). On average, knowledge test scores increase 11% after the use of human simulation experiences, such as SCIMs (Cant & Cooper, 2010). Research findings suggest that self-efficacy levels improve as does skill level when nurses are actively engaged in the learning of new skills or subject content (Disher et al., 2014).

Method

Purpose

The purpose of this project is to test a dual component educational intervention about sepsis identification and management and determine whether this strategy increases
knowledge and self-efficacy in registered nurses who practice nursing on medical-surgical units at Baptist Health Madisonville.

Study Design

This is a one group, pretest-posttest quasi experiment. Measurements include a pre and post education knowledge test, psychomotor skill measurement carried out during the interactive experience, and a survey on nurse participants’ self-efficacy level in dealing with patients who are severely septic or in septic shock before/after the educational interventions.

Participants

A convenience sample of 71 registered nurses employed at Baptist Health Madisonville who practice nursing on the medical-surgical units known as “3West” and “4West” of the facility which are medical/telemetry and medical/oncology units, respectively. Nurses were excluded who were in administrative positions for these units, as this indicates they will not have direct patient care responsibility.

Setting

In November 2014 Baptist Health Madisonville implemented a sepsis bundle protocol to adhere to the 2012 Surviving Sepsis Campaign Guidelines for the consistent screening and timely management of patients who screened positive for sepsis and septic shock. This protocol includes a nursing screening tool for adult inpatients as well as a sepsis bundle that includes interventions as suggested by the Surviving Sepsis Campaign. Registered nurses who practice on the inpatient medical-surgical units were educated about the sepsis screening tool and associated sepsis bundle protocol in November of 2014 and all nurses newly hired are offered the same education during orientation. Information
regarding the sepsis screening tool and the current sepsis bundle protocol will be provided again annually during mandatory nurse competency week at Baptist Health Madisonville.

To date, all nurses at Baptist Health Madisonville are required to attend annual nurse competency day at which time information on the sepsis screen tool and associated sepsis bundle protocol will be provided. No formal education on SIRS, sepsis, severe sepsis, and septic shock has been provided to nurses prior to this intervention. The dual component education was provided to the 3W and 4W nurses during this competency day.

**Procedure**

First, approval was obtained from the institutional review board (IRB) at Baptist Health Madisonville (see Appendix L) and a collaborative agreement was established between Baptist Health Madisonville’s IRB and the University of Kentucky’s IRB. Next, an intervention packet was provided to participants that included a cover letter and pre-assessment instruments; all questions were answered concerning the project; completion of the test instruments implied consent (see Figure 1). A coding system was used that gave each participating nurse an identification code unique to each nurse; the participant identification was coded using the first letter of given first name, two-digit day of birth, and two-digit month of birth. An Excel spreadsheet was then created and served as a master list that contained nurse name and identification number. A demographic questionnaire was then provided to the nurses. Next, a knowledge test and a self-efficacy tool was administered prior to nurses receiving didactic educational material. The educational information was provided to nurses prior to annual competency day.

During competency day, a PowerPoint was presented to nurse participants that reiterates the written education. After this presentation, nurses then receive a scripted
orientation to the simulation experience and participants were provided with simulation patient information that included the patient history and presentation; this served as the prebriefing session. Nurses then took part in the simulated experience where psychomotor skills were assessed by the trained standardized patient. After this interactive learning experience, a scripted debriefing session focused on the following: recognizing the signs and symptoms of SIRS, sepsis, severe sepsis; interpreting vital signs; prompt intervening to avoid further deterioration; and evaluating interventions based on the participants’ performance. The knowledge test and self-efficacy tool was administered again to the nurse participants as well as the modified simulator effectiveness tool and program satisfaction survey.

Figure 1. Procedure for implementing the dual component educational intervention

Didactic Education

The didactic education was provided in newsletter format and consisted of 4 pages (see Appendix A). A definition and criteria for SIRS, sepsis, severe sepsis, and septic shock was presented. Emphasis was placed on the incidence, prevalence, mortality rate, and financial costs of severe sepsis and septic shock in an effort to show the impact of this disease process. Sepsis sources were identified and site specific signs and symptoms were provided. Management of the sepsis continuum was introduced and targeted the goals and nursing process of medical-surgical RNs. Baptist Health Madisonville’s policy and protocols for the screening and implementation of sepsis bundles were described. The final
page was a step by step approach to identifying and managing a patient who had sepsis at any point at the continuum. It was an almost identical replica of the SCIM scoring checklist—it was felt that since the ultimate goal of the SCIM is to provide education as opposed to measuring skills for an evaluation, or grade, then providing the checklist would assist them in taking on an organized approach to patient deterioration. The nurses were not told that the last page was what tasks would be measured during the SCIM.

For prebriefing, a PowerPoint was presented prior to the SCIM scenario and reiterated the main points of the newsletter (See Appendix B). The PowerPoint introduced the main objective of the educational program which was to provide awareness and improve knowledge, skills, and self-efficacy. First presented was the most common signs/symptoms of sepsis as well as how timely and appropriate identification and management of sepsis decreases the chance of mortality. Second, a step-by-step approach was encouraged when entering the standardized patient’s room: step 1: measure vital signs and determine Glasgow Coma Scale score; step 2: full body assessment using the primary survey approach; step 3: obtain a history from the patient and inform them of anticipated interventions that are physician ordered asking them to consider using the “BOXES” mnemonic; and step 4: intervene as appropriate. Third, the primary survey approach was presented over multiple slides. Next, the hospital’s policy regarding the screening of sepsis and implementation of the sepsis bundles was presented along with a visual of the sepsis screening tool—this provided detailed information on the need to initiate an intravenous catheter and carry out primary ordered interventions (intravenous fluids, blood cultures prior to antibiotics, and antibiotics within 1 hour of sepsis identification).
Interactive Education

The SCIM was designed to be relevant to medical-surgical nurses (see Appendix C). The SCIM used the primary survey approach with the “ABCDE” mnemonic for “a proactive evidence-based patient safety approach to assessment” (Considine & Currey, 2014). The “ABCDE” approach to assessment and treatment is beneficial to know because most healthcare professionals encounter critically ill patients (Thim et al., 2012). It is because of this that this approach was introduced to medical-surgical nurses. The SCIM itself took less than 15 minutes, and it was made clear that nursing actions were the main goal of the scenario along with communicating with the standardized patient first, to understand his/her history, and second, to provide information on anticipated provider orders using the “BOXES” mnemonic to investigations: “B” for “blood” includes arterial blood gas, complete blood count, liver function tests, coagulation studies, blood cultures, and lactate level; “O” for orifice testing includes urine, wound, and respiratory cultures, “X” for “x-ray” which includes imaging such as chest films, CT scans, and/or ultrasounds; “E” for electrocardiography monitoring; and “S” for special for sepsis interventions that include intravenous initiation and fluids and blood cultures prior to antibiotics which are initiated within 1 hour of sepsis diagnosis.

Data Collection Procedures

Instruments

A demographic questionnaire, knowledge instrument, self-efficacy scale, SCIM scoring checklist, simulation effectiveness tool, and program satisfaction survey comprised the instruments for the study.
Demographic questionnaire

The demographic questionnaire (see Appendix D) included questions related to the following characteristics: the medical-surgical unit employed; gender; age; length of employment at Baptist Health Madisonville; years practicing as a registered nurse; highest level of education; and holdings of any specialty certifications.

Knowledge instrument

The knowledge instruments that were used were developed by the principal investigator (see Appendix E). Both the preintervention and postintervention knowledge tests were 10-item multiple-choice and true/false questionnaires that sought to measure general knowledge of sepsis (SIRS, sepsis, severe sepsis, and septic shock), the hospital and system wide sepsis bundles and protocol, and knowledge acquisition and retention from the educational program. Face and content validity was assessed by a group of clinical experts with a range of experience. Members of the advisory committee served as clinical experts since they have current experience in managing and treating sepsis in its various stages of severity in the clinical setting. Other expert raters included a clinical professor, whose focus is on simulated learning, who has experience in developing and implementing knowledge instruments, and a member of the Sepsis Team, both hospital and system-wide, who brings expertise in quality improvement and staff development regarding the sepsis bundles and associated hospital and system wide protocols and screening tools. Reliability of the preintervention and postintervention knowledge instruments was assessed by internal consistency through parallel forms with Pearson’s Product Moment Correlation where the reliability coefficient was 0.769. Example
questions were “SIRS criteria include all of the following except:” and “Which of the following does not meet SIRS criteria ranges?”

**Self-efficacy scale**

The General Self-Efficacy Scale (GSES) is a 10-item instrument that measures an individuals’ self-efficacy at accomplishing specific tasks, with each item having a 1-4 point Likert scale (see Appendix F). Criterion-related validity is documented in numerous correlation studies. In samples from 23 nations, Cronbach’s alphas ranged from .76 to .90, with the majority in the high .80s. The scale is unidimensional. Explicit permission not necessary since appropriate recognition of the source of the scale is made in the write-up per the tool creator (Schwarzer & Jerusalem, 1995).

**Structured clinical instruction module scoring checklist**

The 30-item scoring checklist that guided the standardized patients in psychomotor skill assessment was developed by the researcher (see Appendix G). The scoring checklist was constructed to mimic the nursing actions necessary to assess patients using a vital signs and primary survey approach. The primary survey approach to assessing patients who are potentially deteriorating clinically is inherently valid and reliable due to its widespread use (Considine & Currey, 2014). For validity, the SCIM topic was blueprinted to fit learning objectives and 9 RNs trialed the SCIM to ensure it resembled their own clinical practice. Face and content validity was assessed by the clinical expert group. Construct, predictive, and consequential validity was deemed preclusive due to the pilot nature of the SCIM. Six registered nurses on a non-associated medical-surgical unit volunteered to act as the standardized patients. Their training was extensive and included explanations of the following: the goals, structure, and content of the SCIM station; how to use and score skills
using the scoring checklist; the organization of the SCIM, types of questions asked, developing rapport, pacing the SCIM, and debriefing after the interactive experience.

Simulation effectiveness tool

The simulation effectiveness tool-modified (SET-M) was modified from the Simulation Effectiveness Tool (SET) and is a validated 19 item instrument used to evaluate the effectiveness of simulation exercises (see Appendix H). There is also a place for comments to allow participants the chance to respond in an open ended method to describe the perceived strengths and weaknesses of the program. Face and content validity was assessed through Devry Medical International and the reliability of the instrument had a Cronbach’s alpha of 0.936 (Elfrink-Cordi, Leighton, Ryan-Wenger, Doyle, & Ravert, 2015).

Program satisfaction survey

The program satisfaction survey is a 6-item qualitative tool utilized in the study to better understand the perception of the participants in regards to what part of the program was the most enjoyable, what seemed to be key learning activities, content that caused confusion, and comments that would lead to insight on improving the educational program (see Appendix I).

Data Analysis

Frequencies were used to describe the demographic information on experience in years as a registered nurse (1 year or less, 2 years, 3 years, 4 years, 5 years, or greater than 5 years), gender (male or female), age (18 to 24, 25 to 29, 30 to 34, 35 to 39, 40 to 44, or 45 and older), highest level of education (Associate Degree, Bachelor of Science Degree),
certification status (yes or no), and employment length at BHM (less than 6 months or more than 6 months).

Paired $t$ tests were used to compare mean scores for the knowledge and self-efficacy measures before and after the educational intervention. The outcome variables included scores of written knowledge, self-efficacy, and the indicators of clinical performance with standardized patient scenarios. All values were represented as mean, standard deviation, and mean differences. Values were considered significant for a $P$ value less than 0.05.

Independent-samples $t$-tests were conducted to compare the difference in pre/post knowledge scores as well as self-efficacy scores for males and females, certification status, and highest level of education. Pearson product-moment coefficient was used to analyze the correlation between the following: length of employment and pre self-efficacy, post knowledge, and post self-efficacy scores; years of nursing experience and pre self-efficacy and knowledge scores.

**Results**

**Sample Description**

Seventy-one medical-surgical unit registered nurses participated in the pilot study (see Table 1). The majority of the nurses were female (78.9%) and were less than 30 years old (47.9%). Years experienced as a registered nurse ranged from 1 to 27 years ($M = 4.83$ years, SD 6.07 years). Most nurses held an Associate degree in nursing (73.2%) while the remainder held a baccalaureate degree. Less than half the nurses held a specialty certification (47.9%) with the primary certifications identified as medical (21.1%) or telemetry (11.3%). Seven (77.7%) of the 9 nurses who reported being newly employed at
the hospital identified themselves as being new graduates with 1 year or less of nursing experience.

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**Table 1.** Demographic characteristics of sample

**Nursing Knowledge**

A paired-samples t-test was conducted to evaluate the impact of the dual component educational program on students’ knowledge (see Table 2). There was a statistically significant increase in scores from the knowledge test before the intervention (M = 61.83, SD = 16.50) to after the intervention (M = 85.35, SD = 11.06), \( t(70) = 13.53, p <.000 \) (two-
tailed). The mean increase in scores was 23.52 with a 95% confidence interval ranging from 20.05 to 26.99. The eta squared statistic (0.72) indicated a large effect, with a substantial difference in knowledge scores obtained before and after the intervention.

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<th>Pretest: M(SD)</th>
<th>Posttest: M (SD)</th>
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<td>85.35 (11.062)</td>
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<td>Self-Efficacy</td>
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<td>3.39 (0.437)</td>
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* *p < 0.0005

Table 2. Pre and post education knowledge and self-efficacy scores

Self-Efficacy

Paired-samples t-test analysis was also conducted to evaluate the impact of the dual component educational program on students’ self-efficacy score (See Table 2). There was a statistically significant increase in self-efficacy before the intervention (M = 3.07, SD = 0.44) to after the intervention (M = 3.39, SD = 0.44), t (70) = 6.81, p <.000 (two-tailed). The mean increase in scores was 0.31 with a 95% confidence interval ranging from 0.22 to 0.40. The eta squared statistic (0.40) indicated a large effect, with a substantial difference in self-efficacy scores obtained before and after the intervention.

Impact of Demographic Characteristics on Scores

There were no significant difference for males (M=28.00; SD=16.56) and females (M=22.32 SD=14.01; t(69)=1.34; p =.18) in knowledge score difference pre/post education. The magnitude of the differences in the means was very small (eta squared=0.03) which indicates that 3 per cent of the variance in knowledge score before and after the educational intervention was explained by gender. There was no significant
difference for males (M=0.42; SD=0.46) and females (M=0.28; SD=0.37; \( t(69)=1.21; p=.23 \)) in self-efficacy score difference pre/post education, but the magnitude of the differences in the means was moderate (eta squared=0.59) indicating the 59 per cent of the variance in self-esteem was explained by gender.

There was not a significant difference in holding a certification (M=25.00; SD=15.23) versus not holding a certification (M=22.16; SD=14.17; \( t(69)=0.81; p=.42 \)) in knowledge score difference pre and post intervention. The magnitude of the differences in the means was small (eta squared=0.01) indicating that 1 per cent of the variance in knowledge score difference pre/post education was explained by certification status. There was not a significant difference for holding a certification (M=0.38; SD=0.41) versus not holding a certification (M=0.25; SD=0.36; \( t(69)=1.34; p=0.19 \)) in the difference in self-efficacy score before and after the intervention. The magnitude of the differences in the means was small (eta squared=0.03) which indicates that 3 per cent of the variance in self-efficacy scores pre/post intervention was explained by certification status.

There was not a significant difference in Associate Degree (M=21.73; SD=13.96) versus Bachelor Degree (M=28.42; SD=15.73; \( t(69)=1.73; p=0.28 \)) in knowledge score difference pre/post intervention. The magnitude of the differences in the means was small (eta squared=0.04) which indicates that 4 per cent of the variance in knowledge scores pre/post intervention was explained by education level. There was not a significant difference in Associate (M=0.25; SD=0.35) Degree versus Bachelor Degree (M=0.47; SD=0.44; \( t(69)=2.18 \)) in the difference in self-efficacy score before and after the intervention. The magnitude of the differences in the means was small (eta squared=0.06)
which indicates that 6 per cent of the variance in self-efficacy scores pre and post intervention was explained by education level.

**Correlation Studies**

The relationship between several variables was investigated using the Pearson product-moment correlation coefficient (see Table 3).

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<td>EMPLOY LENGTH</td>
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<td>.301*</td>
<td>.280*</td>
<td>.300*</td>
<td>.221</td>
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<td>Sig. (2-tailed)</td>
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<td>.011</td>
<td>.018</td>
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<tr>
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</table>

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

**Table 3.** Correlation between pre/post knowledge and self-efficacy, RN years, and employment length.

The relationship between self-efficacy scores and knowledge scores post intervention was investigated using the Pearson product-moment correlation coefficient. There was a moderate, positive correlation between the two variables (r=0.34; n=71;
There was a strong, positive correlation between pre and post self-efficacy levels (r=0.61; n=71; p < 0.01). There was a moderate, positive correlation between pre and post knowledge scores (r=0.49; n=71; p<0.01).

The relationship between years of experience as a registered nurse and pre self-efficacy scores was investigated and showed a moderate correlation between the two variables (r=0.39; n=71; p=0.001) with more years of RN experience associated with higher pre self-efficacy scores.

The relationship between employment length at BHM and pre/post self-efficacy and knowledge scores was investigated. There was a moderate, positive correlation between length of employment and pre self-efficacy (r=0.30; n=71; p=0.02), post self-efficacy (r=0.30; n=71; p=0.01) and post knowledge scores(r=0.30; n=71; p=0.01)—higher levels of pre self-efficacy, post self-efficacy and post knowledge scores were seen in nurses who had an employment status of more than 6 months.

**SCIM**

The mean score for the SCIM scoring checklist was 27.75 out of 30 possible points (92.73%) and the standard deviation was 2.05 points (6.87%). The nursing actions that were most often not performed during the SCIM were items 15, 14, 17, and 20. Item 15 was “checks glucose level to ensure glucose level is not 140 mg/dL or higher in non-diabetic patients” and was not performed by 35.2 per cent of the nurses. Item 14 was “examines pupils for size and reactions to ensure pupils are equal, round, reactive to light and accommodation” and was not performed by 26.8 per cent of the nurses. Item 17 was
“asks about pain with VAS score acceptable” and was not performed by 26.8 percent of the nurses. Item 20 was “Asks about at least 2 of the following: a productive cough, shortness of air, change in breathing pattern, feelings of tiredness/weakness/fatigue, recent upper respiratory illness, other recent illness (i.e. UTI)” and was not performed by 23.9 percent of the nurses.

Actions that needed to be performed by the RN included items 29 and 30 which were “applies oxygen supplementation via nasal cannula when SpO2 falls below 92%” and “engages the rapid response team (calls 5777 and pushes staff assist button when patient deteriorates at the end of the simulation” and were not performed by 6 (8.50%) and 7 (9.90%) respectively. The 9 items that were never missed by the RNs during the SCIM included measuring vital signs (body temperature, heart rate, respiratory rate, blood pressure, and oxygen saturation level) and auscultating breath sounds and assessing breathing pattern and depth (Appendix G).

**SET-M**

The mean score on the SET-M was 55.42 (SD=4.12). The lowest scored items were items 1 and 6 with mean scores of 2.85 and 2.87 respectively. Regarding prebriefing, item 1 stated, “Prebriefing increased my confidence.” Regarding the scenario, item 6 stated, “I felt empowered to make clinical decisions.” In the debriefing section of the tool, item 16 had the lowest mean score of 2.90 and stated “debriefing allowed me to verbalize my feelings before focusing on the scenario.” A total of 10 nurses commented in the qualitative section of this tool with all comments being of a positive nature regarding the simulated clinical experience (Appendix K).
Satisfaction Survey

The program satisfaction survey (see Appendix I) resulted in 43 nurses responding (see Appendix J). The nurses’ unique code was not placed on these surveys as a way to maintain anonymity and improve the likelihood of honest and transparent responses. 16 of the respondents (37.2%) identified the SCIM as the most enjoyed part of the educational program. Assessment technique was the key learning concept from the educational program. Two nurses stated that knowing when to call a rapid response or notify a charge nurse was confusing to them. The nurses identified several valuable points from the educational program: the continuum of sepsis, patient deterioration, and the importance of timely and appropriate identification and management of sepsis. Some of the nurses requested more scenarios and more time for the educational program. Most of the respondents verbalized the educational program provided a positive and quality learning experience.

Discussion

Knowledge scores rose more than 20 per cent and self-efficacy scores increased 8 per cent after the educational intervention which were both significant. Higher pre and post knowledge and self-efficacy scores were strongly associated with one another. Gender, holding a certification, or education level did not significantly impact the changes seen in pre/post knowledge and self-efficacy scores. Registered nurses who had more years of experience had higher levels of self-efficacy before the intervention. Nurses who had higher levels of pre self-efficacy were more likely to have higher post self-efficacy and knowledge scores.
The results of this study imply that providing an educational intervention that includes didactic and interactive modalities increases knowledge and self-efficacy levels. It also suggests that nurses who have higher baseline self-efficacy scores are more likely to improve their knowledge and may become more confident after dual component educational interventions. Based on this study, knowledge and self-efficacy are two qualities that nurses build with experience.

Being employed at the hospital longer than 6 months was correlated with higher pre self-efficacy scores as well as post knowledge and self-efficacy scores. The majority of the nurses newly employed at the hospital over the past 6 months (77.7%) were also new graduate nurses with less than 1 year of nursing experience and therefore, conclusions regarding whether knowledge or self-efficacy levels are associated with employment length at an acute care facility could not be made.

**Limitations**

The study had several limitations. The timing of the annual competency days, and therefore, didactic education was varied between units. The medical/telemetry unit, “3West”, received their didactic education up to 2 weeks prior to their competency days which took place in September of 2015 while the medical/oncology unit, “4W,” received their didactic education up to 2 weeks prior to competency day which took place in October of 2015. Although all nurses were observed when completing the pre and post intervention material, there was potential for 4W nurses having seen the sepsis newsletter or discussed the knowledge questions prior to taking the preintervention knowledge test. This could have skewed the results had the nurses read or discussed the material since this would have provided knowledge prior to take the pre-test. It was also possible for nurses to discuss the
structure and information obtained during the SCIM which could have affected individual SCIM score (i.e. skill) performance.

The sepsis protocol and associated bundles were implemented in November of 2014 at Baptist Health Madisonville. Formal education during annual competencies was required which made reading the newsletter, sitting in on the PowerPoint presentation, and participating in the SCIM were all mandatory components of competency day. The pre/post-study instruments (knowledge tests, self-efficacy scale, SET-M, and program satisfaction survey) were considered voluntary. Participants chose to complete the test instruments and no comparisons were made with a control group. Confounding variables such as pre-existing knowledge, level of experience, interest in severe sepsis and septic shock prevention, etc. could explain why nurses chose to participate or decline participation in completion of the test instruments. To introduce research control which would strengthen the study, it is recommended using a control group that would complete the pre/post instruments with didactic education alone; this would provide a means to compare whether or not the simulation intervention provided a superior means in increasing knowledge, skill, or self-efficacy. A better understanding of changes in knowledge or self-efficacy could be realized if these measurements were taken again using a time-series approach at 1 month, 3 months, and/or 6 months after the SCIM since this approach can trend knowledge and self-efficacy scores which may correlate with long term knowledge acquisition.

This study described a convenience sample of nurses who completed a didactic and interactive educational program then observed for changes in nursing knowledge or self-efficacy. The impact of these changes on quality improvement and/or patient outcome was
not measured. Neither the impact of adherence in utilizing the Sepsis Screening Tool at least once per shift or any time there is a patient change was measured nor was measuring the number of rapid response teams calls and/or transfers to the intensive care unit in relation to positive sepsis screens. These findings cannot provide contributory effectiveness of the screening tool in identifying patients who screen positive for sepsis.

The convenience sample of nurses included those who worked on medical-surgical units. This limited the sample size of the study. Also, nurses that worked on other units who manage patients with a higher acuity level (i.e. emergency department, post-anesthesia care, and the intensive care unit) were excluded and therefore this study does not represent acute care nurses in general. It was assumed that the excluded nurses had a higher baseline knowledge in identifying and managing shock which is why education was not offered to those units.

The findings of this study may not be generalizable to other facilities or populations outside the acute care medical-surgical settings.

**Implications to Clinical Practice**

It is clear that education can improve knowledge and self-efficacy in identifying and managing patients with severe sepsis and septic shock, but program sustainability is a requirement for long term impacts to be seen. Support from unit directors and the educational staff is needed to sustain the program. Perhaps offering the program to new graduates and newly hired employees as well as to all nurses during annual competency day will result in guaranteed exposure as well as long term sustainability of the educational program.
Positive changes were observed in both knowledge and self-efficacy after the implementation of this dual component educational program and implies that there is benefit from educational staff utilizing standardized patients, a higher fidelity simulation, when educating medical-surgical nurses as part of staff development. This educational program also included information on the hospital’s policy and protocols for sepsis, severe sepsis, and septic shock. Problem and protocol-specific educational activities may prove an effective strategy for keeping bedside nurses current on what policies are guiding their practice.

**Implications to Future Research**

Costs were contained during the SCIM by having nurses employed at the hospital volunteer to act as standardized patients. This practice alone made carrying out the interactive education very cost effective. Future research needs to include studies that seek to compare simulation experiences based on fidelity level in terms of cost and effectiveness. A cost benefit and/or a cost utility analysis might be able to shed light on which level of fidelity simulation is most useful to a hospital or organization. Ultimately, hospitals and organizations should be prepared to invest in educational programs that seek to effectively maintain nurse competence.

Expanding the volume of studies that measure changes in knowledge, skill, and/or self-efficacy levels in nurses engaging in interactive learning experiences is necessary to fully understand the impact of simulation in the acute care setting. Replicating this study could result in generalizability of dual component educational staff development programs. It is also important to focus future research studies on the correlation between knowledge/self-efficacy scores after education with documentation adherence rate, sepsis
identification rate, rate at which sepsis-related rapid response team calls are made, and the rate at which sepsis-related transfers to the intensive unit are ordered.

**Conclusion**

Knowledge, skill and self-efficacy levels are factors that potentially impact the time and appropriateness at which nurses identify and respond to deteriorating patients (Luettel, Beaumon & Healy, 2007). It is essential for medical-surgical registered nurses to possess these qualities in high enough capacities to effectively function in the clinical setting so that time dependent conditions can be recognized early enough and improved patient outcomes can be realized (Dellinger et al., 2012). Working with acute care nurses to improve knowledge, skill, and self-efficacy levels in the educational setting is a necessary staff development objective. Simulation experiences are considered to be the superior modality of nursing education (Cant & Cooper, 2010) and therefore should be an educational technique that crosses over from the academic setting to the acute care setting. Experience is a key component that strengthens nurse knowledge and self-efficacy levels, but this study showed that interacting and engaging the staff nurse in educational opportunities benefits not only the new nurse, but the more experienced ones as well.
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Capstone Conclusion

Duska S. Bethel, BSN, RN

University of Kentucky
Sepsis is manifested by a spectrum of clinical signs and symptoms that are produced by an immune response to an infection, and the severity of sepsis ranges from simple sepsis to septic shock. Without timely and appropriate intervention sepsis leads to death. A septic patient has a guarded health status and therefore must be assessed and monitored closely. It is possible for medical-surgical nurses to identify and respond to patient deterioration through sufficient knowledge, skill, and self-efficacy levels. Nurses who closely monitor their patients, provide frequent observations, and identify signs and symptoms of deterioration are more likely to appropriately intervene in a timely manner so that their patients’ risk of mortality is reduced (Luettel, Beaumon & Healy, 2007).

The literature review in this capstone supports the use of simulation as the best modality to improve knowledge and self-efficacy levels because it offers interaction in a way that engages the nurse and promotes clinical reasoning in a safe environment. It was suggested that the more a nurse knows about a particular topic the more confident that nurse feels in their actions—whether that translates into improved patient outcomes was not measured. In an effort to maximize a nurses’ knowledge and self-efficacy levels staff development in healthcare organizations should focus on providing education that is effective at improving nurse knowledge, skill, and self-efficacy levels.

Since high-fidelity simulation has not been proven to be superior over lower fidelity simulation hospitals should focus on providing the highest level of fidelity simulation within the confines of the staff and resource available to them for educational development. The educational program presented in the third manuscript describes a pilot program that used standardized patients in a structured clinical instruction module (SCIM) in an effort
to improve knowledge and self-efficacy of sepsis, severe sepsis, and septic shock.
Knowledge and self-efficacy scores increased significantly.
Appendix A: Newsletter

What can I do as a medical-surgical nurse?

1. Use the sepsis screen at least once per shift (2.5 hour periods) or anytime there is a change.
   SCREEN THE PATIENT FOR SEPSIS THE FIRST HOUR OF YOUR SHIFT
2. Use the ABCDE format when assessing patient deterioration.

Airway
- Assess breath sounds
- Question: Does your patient have a compromised airway (decreased or loss of consciousness)
- Call 911 if you get help from the RTT. Call a CODE BLUE if your patient is not breathing.

Breathing
- Assess breathing rate, pattern, depth
- Measure oxygen saturation level—apply oxygen if needed

Circulation
- Observe skin color (palmar, mottling)
- Feel skin temperature (cold, extremities)
- Palpate pulses
- Measure capillary refill (3 seconds)
- Measure heart rate
- Measure blood pressure
- Measure body temperature
- Check urine output

Disability
- Level of consciousness using the Glasgow Coma Scale
- Examine pupils for size and reactions (PERRLA present?)
- Glucose level > 140 even though the patient isn’t diabetic

Exposure
- Examine body looking for wounds, rashes
- Ask about Pain
- Examine chart and electronic record for patient progress and pertinent information

Interventions
- ASAP without MD order
  - Perform sepsis screening tool
  - Notify clinical leader and call MD with positive sepsis screen or initiate RRT if indicated
- ASAP with MD order
  - Follow up with the following that may be ordered (remember BOXES)
    - Bloods – ABG, CBC, CMP, LFTs, coagulation studies
    - Urinalysis - urine, urofilm, respiratory cultures
    - X-rays, CT, ultrasound
    - ECG telemetry monitoring
    - Special tests – depending on cause
      - Start IV
      - IV fluids
      - Blood cultures – before antibiotics are administered
      - Antibiotics – within a hour of sepsis diagnosis
    - Prevent hospital acquired infections
      - Hand hygiene
      - Barrier precautions
      - Catheter care

Remember... The chance of a patient dying from sepsis decreases if sepsis is recognized early and treated early.
You, as a medical-surgical registered nurse, play a crucial role because you provide evidence-based care that can prevent, identify, and treat promptly sepsis.

References
http://www.cdc.gov/sepsis/
http://www.cdc.gov/sepsis/
http://www.cdc.gov/sepsis/

THE CONTINUUM OF SEPSIS

What FOUR TERMS are relevant to sepsis?

Sepsis is manifested by a spectrum of clinical signs and symptoms that are produced by an immune response to an infection, which is characterized by systemic inflammation and coagulation. This includes a variety of responses that range from a systemic inflammatory response syndrome (SIRS) to multiple organ dysfunction syndrome and septic shock (Figure 1).

Systemic Inflammatory Response Syndrome (SIRS) is an inflammatory response to a non-specific insult. SIRS can also be due to an infection or a non-infective cause, such as from surgery, trauma, pancreatitis, cancer, hemorrhage, etc.

In addition to the insult or infection, at least two of the following conditions must be present to meet criteria for SIRS:
- Core body temperature higher than 38.0 degrees Fahrenheit or less than 36.0 degrees Fahrenheit
- Heart rate faster than 90 beats per minute
- Respiratory rate > 20 breaths per minute
- White blood cell (WBC) count > 14,000 cells/mm³ or < 4,000 cells/mm³
- Acute mental status changes

Hypoperfusion (glucose higher than 140 mg/dl in the absence of previously diagnosed diabetes mellitus)

Sepsis: includes the SIRS response in the presence of a presumed or confirmed infection.

Severe Sepsis: sepsis that is associated with organ dysfunction manifested by:

- Hypoperfusion indicated by systolic blood pressure reading less than 90 mmHg or a drop in systolic blood pressure of at least 40 mmHg.
- Organ dysfunction signs
  - Decreased perfusion (capillary refill > 3 seconds, skin mottling, cold extremities, lactate > 2 mmol/L)
  - Circulatory (SBP < 90 mmHg, MAP < 65 mmHg, decrease in SBP greater than 40 mmHg)
  - Respiratory (SpO2 < 90% on room air)
  - Hepatic (jaundice, total bilirubin > 2 mg/dL increased LFTs, increased PT)
  - Renal (creatinine > 2.0 mg/dL, urine output less than 0.5 ml/kg/hour for at least 2 hours)
  - Central nervous system (altered consciousness, confusion, psychosis)
  - Coagulopathy (INR greater than 1.5 or PT < 60 seconds, thrombocytopenia (platelets < 100,000/mm³)
  - Splenic circulation (abnormal bowel sounds)

Septic Shock: includes the signs of severe sepsis, however, hypotension persists despite recommended fluid resuscitation

- SEP is less than 60 mmHg or MAP is less than 65 mmHg
- Serum lactate levels higher than 4.0 mmol/L

Death

SIRS = Infection
SIRS + First Organ Damage
SIRS + Second Organ Damage
SIRS + Third Organ Damage
SIRS + Fourth Organ Damage
SIRS + Fifth Organ Damage
SIRS + Sixth Organ Damage
SIRS + Seventh Organ Damage
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SIRS + Eighty-sixth Organ Damage
SIRS + Eighty-seventh Organ Damage
SIRS + Eighty-eighth Organ Damage
SIRS + Eighty-ninth Organ Damage
SIRS + Ninetieth Organ Damage
What are the risk factors for Sepsis?
Sepsis can develop in anyone, but risk factors for the development of sepsis include being 65 or older, having a compromised immune system (chronic steroid therapy or chemotherapy), surgery or trauma, substance abuse (drugs or alcohol), and/or the presence of invasive devices that include intravenous and urinary catheters.

The Incidence and prevalence of sepsis is INCREASING!
The proposed reasons for increased prevalence of sepsis are:
- Advances in medicine and technology associated with treatments have a more invasive nature
- The increased population of elderly, debilitated, and individuals with multiple comorbid conditions
- The widespread and often inappropriate use of all classes of antibiotics and resistant drug resistance.

What is the mortality rate associated with sepsis?
- The OVERALL mortality rate for sepsis is 16%
- Hospital mortality ranges from 20 to 53% for severe sepsis and 48 to 60% for septic shock

What is the financial impact of a sepsis diagnosis?
- Sepsis costs in 2009 were $18.4 billion
- Sepsis is the most expensive reason for hospitalization. It costs $13,400 on average to treat sepsis
- Between 1993 and 2003, scientists identified a 55% increase in hospital length of stay associated with sepsis.
- Patients with sepsis has hospital stay 21 days longer than patients without sepsis

What are the most common sources of sepsis and their specific signs/symptoms?
- 30% of sepsis cases have an unknown source of infection
- Escherichia. Cult most common organism identified in patients with a primary diagnosis of sepsis
- Methicillin-resistant Staphylococcus aureus or MRSA is the most common organism identified in patients with a secondary diagnosis of sepsis

<table>
<thead>
<tr>
<th>System</th>
<th>Site-Specific Signs &amp; Symptoms</th>
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<td>Respiratory</td>
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<tr>
<td>Cardiovascular</td>
<td>Endocarditis</td>
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<td>Urinary Tract</td>
<td>Cystitis, Pyelonephritis</td>
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<td>Catheter-associated UTIs</td>
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<tr>
<td>Abdominal</td>
<td>Appendicitis, Cholecystitis, Peritonitis</td>
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<tr>
<td>Bone</td>
<td>Infection of the bone &amp; bone marrow, Sinuses</td>
</tr>
<tr>
<td>Central nervous system</td>
<td>Meningitis, Spinal cord infections</td>
</tr>
<tr>
<td>Integumentary</td>
<td>Wound Infection, Cellulitis</td>
</tr>
</tbody>
</table>

Shortness of breath/dyspnea, cough that produces purulent sputum, pleuritic chest pain, abnormal breath sounds (especially bronchial or localized rales), dullness on percussion, pulmonary infiltrates on chest x-ray, ABG alterations.

Dysuria, urinary frequency, urgency, malodorous urine, changes in urine color and clarity, pelvic pain, flank pain, suprapubic pain, urinalysis that may be positive for leukocytes, nitrites, and blood. Also, urogenital discharge.

Abdominal pain, abdominal distraction, constipation or diarrhea, guarding or rebound tenderness, rectal tenderness or swelling.

Swollen joint, crepitus in necrotizing infections, joint effusions.

Severe headache, light sensitivity, stiff neck, altered mental status

Localized limb pain or tenderness, focal erythema, edema, erythema, ulceration, bullous formation, fluctuance.

How is sepsis treated on a medical-surgical floor?
- Fluids: Initial fluid challenge in patients with sepsis-induced tissue hypoperfusion with suspicion of hypovolemia to achieve a minimum of 30 mL/kg of crystalloids (some may need more than this).
- Antibiotics: Broad-spectrum at first until cultures are back and then the doctors may alter therapy. Should be started within 6 hours of diagnosis of severe sepsis or septic shock, but not before blood cultures are drawn.
- Oxygen support
- Controlling infection source through percutaneous or surgical drainage of an abscess, wound debridement, removal of devices that may be cause of the infection (vascular access, Foley catheter, etc.)

What is the goal of sepsis treatments?
The main goal is to improve perfusion. The signs of IMPROVED perfusion that a MEDICAL-SURGICAL nurse can measure include:
- Urine output > 0.5 mL/kg per hour
- Mean arterial pressure (MAP) > 65 mmHg

What can be done to improve the treatment of a septic patient?
Mortality rate is time-dependent: early resuscitation, which means interventions within the first 6 hours of sepsis recognition, decreases mortality rate by 25% compared to late resuscitation.

- Careful clinical examination
- Identify the source the infection if at all possible through diagnostics
- Chest x-ray, CT scan, ultrasound
- Collecting specimens – wound swabs, sputum samples, urine specimens, blood cultures – these can help identify the type of microorganism causing the infection.

- Treating with the appropriate antibiotics
- "Empiric" antibiotics given to kill a large range of germs called "broad-spectrum" treatment given initially.
- Therapy can be tailored to the specific microorganism once it is identified.
- This can provide the most effective treatment against the bacterial.
- This "tailoring" can also help prevent multi-drug resistance.

What is Baptist Health Madisonville’s Policy about screening for sepsis?
BHM has an initiative to reduce deaths from sepsis by adherence to the Surviving Sepsis Guidelines. The protocol includes sepsis screening for all patients, a fast-track work-up to confirm sepsis, and protocol for treatment of sepsis. This protocol is available on the INTRANET.

- Nurses will assess and screen all in-patients for sepsis and severe sepsis every 12 hours using the nursing electronic sepsis screening tool.
- The practitioner is notified for all new patients meeting the sepsis and/or severe sepsis criteria.
- If the patient previously screened positive, the date will be noted on the screening tool and the patient should not be screened again. The nurse should review if the sepsis protocol was initiated and/or not indicated.
- The rapid response team may be initiated as appropriate and per the rapid response team orders.
- For sepsis, the practitioner is notified of the positive screen, and the three-hour sepsis bundle is initiated as warranted.
- If the patient screens positive for severe sepsis, the practitioner and supervisor are notified immediately and the severe sepsis bundle is initiated as directed by the physician as warranted (Sepsis Bundle Screening).

What are the “treatment bundles” that Baptist Health Madisonville physicians initiate?
- The "3 Hour Resuscitation Bundle" includes the following 4 actions that are initiated within the first 3 hours of initial sepsis recognition:
  - Serum lactate level drawn
  - Blood cultures obtained before antibiotic administration
  - Broad-spectrum antibiotic administration
  - Crystalloid fluid (or colloidal equivalent) administration of 30 mL/kg for hypotension or lactate level greater than 4 mmol/L.
- The "6 Hour Resuscitation Bundle" includes all of the actions in the 3 Hour Bundle along with:
  - Vasopressor therapy for persistent hypotension (MAP < 65 in adults) despite initial fluid administration
  - Measurement of central venous pressure and oxygen saturations with target goals of 8.5 mm Hg and >90%, respectively
  - Remeasurement of lactate level is initial level was elevated
Appendix B

Prebriefing PowerPoint

Identify and Respond to Sepsis
Using the Primary Survey Approach to Patient Deterioration

SIRS → Sepsis → Severe Sepsis → Septic Shock → Death

- Think sepsis when patient has
  - Decline in mental status
  - Tachypnea
  - Tachycardia
  - High Temperature
  - High WBC
  - Glucose > 140

- A PATIENT’S CHANCE OF MORTALITY DECREASES with
  - Early recognition
  - Treatment of sepsis for hospitalized patients
- GOAL: Increase awareness, improve knowledge, skills, & confidence
Airway & Breathing

- Listen to breath sounds
  - Presence (equal)
  - Pattern
  - Depth
- Respiratory rate
- Oxygen saturation level
**Circulation**

- Observe skin color
  - Mottling
  - Jaundice
- Feel skin temperature
  - Cold extremities
- Palpate pulses
  - Weak, thready vs. bounding
- Measure capillary refill
  - > 3 seconds
- Measure heart rate
  - > 90 beats per minute
- Measure blood pressure
  - SBP < 90 mmHg
  - SBP drop of > 40 mmHg
- Measure temperature
  - < 96.8
  - > 100.9
- **Check URINE OUTPUT!!!**
  - How much, how often
  - Color, clarity, odor

**Disability**

- Use Glasgow Coma Scale
- Level of consciousness
  - Decreased from baseline?
  - New confusion present?
- Example pupil size and reaction
  - PERRLA not present?
- **CHECK GLUCOSE LEVEL**
  - > 140 mg/dL in NON-diabetic patient

**Examine**

- Examine body
  - Surgical site
  - Wounds
  - Rashes
  - Invasive devices
- Ask about pain
- Examine chart/electronic record
  - MD orders
SCREEN FOR SEPSIS

- First hour of shift
- Any patient changes

Investigate

- ASK
  - Productive cough
  - Shortness of air
  - Change in breathing pattern
  - Feelings of tiredness/weakness/fatigue
  - Recent upper respiratory infection (ear, sinuses, sore throat, bronchitis)
  - Other recent infections (UTI, kidney infection)
BOXES

- Blood
  - ABGs
  - CBC
  - CMP
  - Liver function &
    - Coag studies
  - LACTATE level
  - BLOOD CULTURES
- ORIFICE TESTS
  - Urine
  - Wound
  - Respiratory
- X-rays
  - Chest
  - CT
  - Ultrasound
- ECG, tele monitoring

SPECIAL FOR SEPSIS

- IV initiation
- IV fluids
- Blood cultures before antibiotics
- Antibiotics within 1 hour

Intervene

- Start Oxygen supplementation if SpO2 falls below 92%
- Tell CL and MD and/or Engage the Rapid Response Team PRN

Rapid Response Teams
Appendix C

Structured Clinical Instruction Module

Part One: Nurse Instructions

Patient name/gender/age/DOB: Jane Doe, female, age 68, born on December 25, 1947

Presenting complaints: Ms. Jane Doe is a direct admit from Dr. Henry’s office with an admitting diagnosis of *dyspnea* and *hypoxia*. When she arrives to your unit she has no IV access and has not had any lab work or diagnostic testing done. The transfer from wheelchair to bed makes Ms. Doe short of air; Ms. Doe is on room air and has no oxygen supplementation at this time.

Clinical tasks:

1. Measure vital signs and Glasgow Coma Scale
2. Complete assessment using ABCDE format
3. Obtain pertinent history in relation to presenting complaint
4. Discuss plan of care using BOXES format
5. Carry out any nursing intervention based on your assessment and vital sign measurements

Part Five: Description of Room Set-up and Props

- The room will be set up to look as realistically as possible to a common medical-surgical room at Baptist Health Madisonville
- Bed, IV pump, pole, Dynamap
- A stethoscope will be present
- Requisitions for chest x-ray, UA/urine culture, respiratory gram stain/culture
- Specimen cup for urine and respiratory secretions
- Phlebotomy tubes (red, lavender, blue, grey in ice, green)
- IV fluids/tubing
- Antibiotics
- ECG Strip versus tele leads
Part Two: Scripted SCIM

Goal: The nurse participant will apply didactic knowledge of SIRS, sepsis, severe sepsis, and septic shock

Behavioral Objective: The nurse participant will:

- Assess the patient for sepsis through history, full body assessment, and vital sign measurement using ABCDE mnemonic (“airway, breathing, circulation, disability, expose/examine”).
- Identify the source of infection, utilizing the Sepsis Screening Tool from Baptist Health Madisonville
- Tell the patient what orders and interventions are commonly carried out when a diagnosis of sepsis is suspected or confirmed using the BOXES mnemonic
- Identify sepsis complications including organ dysfunction.
- Intervene adequately when patient deterioration is clinically recognized by applying oxygen supplementation and initiating the rapid response team (RRT)

Skills Nurses Need to Perform:

- Check vital signs: temperature, heart rate, blood pressure, respiratory rate, oxygen saturation level, VAS score
- Assess patient using ABCDE format:
  - Airway: auscultates breath sounds
  - Breathing: breathing (pattern, rate, depth)
  - Circulation: skin color (mottling, jaundice); skin temperature (cold extremities); palpate pulses; capillary refill (> 3 seconds); check urine output
  - Disability: level of consciousness (LOC) using the Glasgow Coma Scale (GCS); pupils for size and reactions; glucose levels
  - Expose/Examine: Examine body for surgical sites, wounds, rash, invasive devices; chart for MD orders
- Inquire about possible infection sources: Asks about a productive cough, shortness of air, change in breathing pattern, feelings of tiredness/weakness/fatigue, recent upper respiratory illness, other recent illnesses (UTI).
- Utilize the Sepsis Screening Tool for initial patient assessment
- Tell the patient what the provider might order and what interventions will or may take place to find the source of sepsis and to look for signs of complications/organ dysfunction (BOXES):
  - Bloods – ABGs, CBC, CMP, LFTs, coagulation studies, LACTATE, blood cultures
  - Orifice tests – urine, sputum, respiratory analysis/gram stains/cultures
  - X-rays, CT, ultrasound
  - ECG telemetry monitoring
  - Special (For sepsis): IV, IV fluids, blood cultures before antibiotics, antibiotics within 1 hour, oxygen to keep O2 level > 92% (90% COPD)
- Engages the RRT when patient condition deteriorates and needs ICU care
Part Four: Information for the Standardized Patient

Name: John Doe  Age: 67
Gender: Male      DOB: December 25th, 1947

Presenting Information:
Mr. John Doe is a direct admit from Dr. Henry’s office with an admitting diagnosis of dyspnea and hypostasis. When he arrives to the unit he has no IV access and has not had any lab work or diagnostic testing done. The transfer from wheelchair to bed makes Mr. Doe short of air; Mr. Doe is on room air and has no oxygen supplementation at this time.

What the NURSE needs to know: 3 day history of increasing shortness of air, worse with activity. Cough since that time that is now producing green sputum. You’ve been tired for the last few days. Have been followed by Dr. Henry the week when you were treated for a sinus infection.

PMH: sinus infection last week

PSH: none

APPEARANCE: ill, mild distress, stated age

AFFECT: that of a concerned, ill patient whose condition deteriorates over the course of the scenario

Vitals/Output:
Temperature: 101.7 F oral
Heart rate: 106 per minute
RR: 17 per minute
BP: 110/70 mmHg
Oxygen Saturation: 89% on room air
VAS: “2” all over body aches
Output: 120 mL if asks you to void

1st set of CARDS (A, B, C, D, E)
Airway: breath sounds are diminished bilaterally and crackles present in the RLL.
Breathing: breathing tachypnea, shallow, even
Circulation: skin color pale. You do not have mottling or jaundice present. Your skin temperature is warm (you do NOT have cold extremities). Your pulses are equal/strong/pulsable. Capillary refill is delayed (5 seconds). You last urinated about 5 hours ago and don’t feel the urge to urinate at this time.
Disability: GCS will be normal (answer all questions appropriately). Your pupils are equal, round, reactive to light and accommodation. Your glucose level is 145mg/dL.
Exposure: You have no surgical sites, wounds, rashes, or invasive devices.

2nd set of cards:
“My breathing is worse.” Vitals again taken by RN. HAND CARD (new vials showing HR 110, SBP < 90 and SpO2 of 82% on 4L, respiratory rate of 24).
Oxygen should be increased and RRT called.
Appendix D
Demographic Questionnaire

Demographic Questionnaire
Please fill out today’s date on question 1, create your code as in the example in question 2, and mark the check box that best describes you in questions 3 through 9.

1. Today’s date (dd/mm/yyyy):
   
2. Code: your first initial/day of birth/month of birth
   (Jane Smith born 3 December would be J/03/12)
   
   Your code:   /

3. On which medical-surgical unit do you currently work?
   □ 3W
   □ 4W

4. What is your gender?
   □ Male
   □ Female

5. What is your age?
   □ 18-24
   □ 25-29
   □ 30-34
   □ 35-39
   □ 40-44
   □ 45-49
   □ 50 or older

6. How long have you been employed as a registered nurse (RN) at Baptist Health Madisonville?
   □ Less than 6 months
   □ More than 6 months

7. Please provide the exact number of years you have been practicing as a nurse.
   
8. What is your highest level of nursing education?
   □ Associate Degree
   □ Bachelor of Science
   □ Master’s Degree
   □ Doctoral Degree

9. Do you hold any specialty certifications?
   □ No
   □ Yes
   If yes, please tell us which one:
   □ Medical Surgical
   □ Critical Care
   □ Emergency Care
   □ Oncology
   □ Orthopaedic
   □ Surgery Services or Perioperative Services
   □ Long-term/Inpatient Rehabilitation/Transitional
   □ Telemetry
   □ Psychiatric Care
   □ Other: ____________________
Appendix E: Knowledge Instruments: Pre and post intervention

Knowledge Pre Test on SIRS, Sepsis, Severe Sepsis and Septic Shock

Please answer questions 1, 2, 3, and 4 to assess your general knowledge of SIRS, sepsis, severe sepsis, and septic shock.

1. SIRS criteria include all of the following except:
   a. Temperature > 38.3°C or < 36°C
   b. Heart rate > 90 beats per minute
   c. Respiratory rate > 20 breaths/minute
   d. WBC > 14,000 cells/mm³ or < 4,000 cells/mm³
   e. Systolic blood pressure < 90 mmHg

2. Antibiotics should be administered with _____ of the presumptive diagnosis of severe sepsis.
   a. 30 minutes
   b. 1 hour
   c. 3 hours
   d. 6 hours

3. Please choose the answer that most accurately defines septic shock.
   a. An inflammatory response from a non-specific insult, meaning infection sources OR non-infection sources.
   b. The SIRS response with a presumed or confirmed infection.
   c. Sepsis that shows signs of possible organ dysfunction: lactate > 2, urine output < 0.5 ml/kg/hour for 2 hours with adequate fluids, hypoxia (O2 Sat < 90% on room air), creatinine > 2.0 mg/dL, bilirubin > 2, platelets < 100,000, INR > 1.5, hyperglycemia without history of diabetes and hypotension (a systolic blood pressure reading less than 90 mmHg or a drop in systolic blood pressure of at least 40 mmHg
   d. The information in answer c, except hypotension persists despite adequate fluid resuscitation.

4. Who has a greater risk of sepsis?
   a. A 50-year-old male who was admitted for dehydration and syncope.
   b. A 70-year-old female admitted with pneumonia with a urinary catheter in place for 7 days.
   c. A 70-year-old male/female admitted for status epilepticus.
   d. A 20-year-old male for removal of non-perforated appendectomy.

Questions 5, 6, 7, and 8 refer to the following case:

A 68-year-old man is directly admitted to your unit with a 3-day history of fever, chills, cough, and right-sided pleuritic chest pain. His family reported that he was more tired than usual and had fallen earlier today. Measured vital signs are: temperature, 101.7°F, heart rate 115 bpm; respiratory rate 24 breaths/min; blood pressure 96 mmHg/50 mmHg; and pulse oximetry oxygen saturation 88% (room air). There is a right lower lobe infiltrate observed on chest radiograph. After a 1 liter normal saline fluid bolus his blood pressure is now 96 mmHg/60 mmHg.

5. Identify the most probable sepsis diagnosis for this patient.
   a. sepsis
   b. severe sepsis
   c. Systemic inflammatory response syndrome (SIRS)
   d. septic shock

6. What is your initial action for this patient?
   a. Antibiotic therapy
   b. Intravenous (IV) fluid resuscitation
   c. Supplemental oxygen and airway management
   d. Vasopressor therapy with dopamine
7. You complete the electronic sepsis screen. Which of the following is your next action?
   a. This patient meets criteria for severe sepsis. Notify the provider of care and your clinical leader now OR call the rapid response team so your patient can be transferred to the ICU.
   b. Attempt to reduce the patient’s temperature with ice packs and removal of blankets.
   c. This patient meets criteria for septic shock. Notify the provider of care and your clinical leader. A treatment bundle will more than likely be initiated.
   d. Darken the room and ask the patient to relax in an effort to reduce his heart rate.

8. The physician prescribes the “3-Hour Resuscitation Bundle.” What is included in this bundle?
   a. Complete blood count (CBC), serum lactate level, blood cultures, and antibiotic administration.
   b. Serum lactate level, blood cultures, sputum culture, and broad spectrum antibiotic administration after blood cultures.
   c. Serum lactate level, blood cultures, broad spectrum antibiotic administration after blood cultures, and crystalloid fluid administration of 30mL/kg for hypotension (indicated by systolic blood pressure reading less than 90 mmHg or a drop in systolic blood pressure of at least 40 mmHg).
   d. Blood cultures, broad spectrum antibiotics administration after blood cultures, crystalloid fluid administration of 50mL/kg for hypotension (indicated by systolic blood pressure reading less than 90 mmHg or a drop in systolic blood pressure of at least 40 mmHg).

Questions 9 and 10 refer to the following case.

An 82-year-old female is admitted from a nursing home to your unit with altered mental status. Her family reported increasing urinary incontinence episodes over the last 3 days. Vital signs measured included: heart rate 88 beats/minute, respiratory rate 19 breaths/minute, temperature 97.4 taken orally, and blood pressure 108 mmHg/64 mmHg; normally her blood pressure is measured as 120 mmHg/70 mmHg. Her chest x-ray and CT of the abdomen were normal, urinalysis was identified the presence of nitrites and leukocytes, and serum WBC was 10,000 cells/mm³.

9. Would you determine that this patient likely had sepsis based on this information?
   a. Yes, it is likely this patient has sepsis because she has a known source of infection.
   b. No, because although she has altered mental status, her vital signs and WBC are normal. It is not likely she has sepsis despite having a known source of infection.
   c. Yes, it is likely this patient has sepsis because she is altered mental status and a known source of infection.
   d. No, because a source of infection is unknown.

10. The next morning you are assigned to care for the same patient. How would you screen your patient again for sepsis?
   a. Assess your patient, view any new lab results, view the most recent set of vital signs, and screen for sepsis again as if it was the first time.
   b. Assess your patient and screen the patient negative as you did yesterday without looking for new labs or at her vitals—she appears stable as she did yesterday.
   c. Assess your patient, view any new lab results, and view the most recent set of vitals. If screened negative for sepsis on admission then you don’t have to screen again.
   d. You realize that she screened positive yesterday for sepsis and you did not call the provider. You go to the clinical leader and page the physician updating them both.
Knowledge Post Test on SIRS, Sepsis, Severe Sepsis, and Septic Shock

Please answer questions 1, 2, 3, and 4 to assess your general knowledge of SIRS, sepsis, severe sepsis, septic shock, and the screening policy at Baptist Health Madisonville.

1. Which of the following does not meet SIRS criteria ranges:
   a. Temperature >100.9 or <96.8
   b. Heart rate < 80 beats per minute
   c. Respiratory rate >20 breaths/minutes
   d. WBC >12,000 cell/mm³ or <4,000 cell/mm³
   e. Systolic blood pressure >90 mmHg

2. How often should a nurse utilize the sepsis screening tool?
   a. Once per shift or anytime there is a change in patient condition
   b. Once per shift only.
   c. Once per 24 hours.
   d. Once per shift unless the patient has screened “positive” already and then you don’t have to address the screening tool at all (not even to document a previously positive screen).

3. Please choose the answer that most accurately defines sepsis.
   a. An inflammatory response from a non-specific insult, from infection sources or non-infection sources.
   b. The SIRS response with a presumed or confirmed infection
   c. Infection that is associated with organ dysfunction manifested by perfusion abnormalities (altered mental status, lactate acidosis, oliguria) and hypoperfusion (a systolic blood pressure reading less than 90 mmHg or a drop in systolic blood pressure of at least 40 mmHg).
   d. The information in answer c, except signs of hypoperfusion and hypotension persists despite adequate fluid resuscitation.

4. Which of the following is NOT a risk factor for sepsis?
   a. Compromised immune system (i.e. chronic steroid therapy or chemotherapy)
   b. Presence of volume depletion from vomiting and/or diarrhea
   c. Surgery or trauma
   d. Presence of invasive devices (i.e. intravenous catheters, urinary catheters, etc.)

Questions 5, 6, 7, and 8 refer to the following case:

A 72-year-old woman is directly admitted to your unit with a 2-day history of fever, chills, cough, and shortness of air. Her family reported that she was more tired than usual. Measured vital signs are: temperature, 102.1°F; heart rate 114 bpm; respiratory rate 22 breaths/min; blood pressure 88 mmHg/52 mmHg; and pulse oximetry oxygen saturation of 94% with 3 liters/minute of oxygen supplementation via nasal cannula. There is a right lower lobe infiltrate observed on chest radiograph. After a 1 liter normal saline bolus the blood pressure is now 100 mmHg/60 mmHg and oxygen saturation is 89% on 3 liters/min via nasal cannula.

5. What is the most likely inflammatory condition the patient has?
   a. Systemic inflammatory response syndrome (SIRS)
   b. Severe sepsis
   c. Sepsis
   d. Septic shock

6. What is initial action for this patient?
   a. Quickly perform a physical assessment on the patient
b. Quickly call the physician or initiate the rapid response team—time is an issue and a bundle needs to be activated.

c. Attempt to reduce temperature through cooling the room and the patient.

d. Give Tylenol to the patient, if ordered—preventing further rise in the patient’s temperature is a priority.

7. You complete the electronic sepsis screen and the patient meets criteria for severe sepsis. You will need to notify the provider and the clinical leader so physician ordered interventions can be initiated.
   a. True
   b. False
   c. There is too little information to answer the question.

8. The physician prescribes the “3-Hour Resuscitation Bundle.” What is included in this bundle?
   a. A complete blood count (CBC), serum lactate level, blood cultures, and antibiotic administration.
   b. Serum lactate level, blood cultures, broad spectrum antibiotic administration after blood cultures, and crystalloid fluid administration of 30mL/kg for hypotension (indicated by systolic blood pressure reading less than 90 mmHg or a drop in systolic blood pressure of at least 40 mmHg).
   c. Serum lactate level, blood cultures, sputum culture, and broad spectrum antibiotic administration after blood cultures.
   d. Blood cultures, broad spectrum antibiotics administration after blood cultures, crystalloid fluid administration of 50mL/kg for hypotension (indicated by systolic blood pressure reading less than 90 mmHg or a drop in systolic blood pressure of at least 40 mmHg).

Questions 9 and 10 refer to the following case:

A 70-year-old male is admitted from a nursing home to your unit with altered mental status. His family reports malodorous urine from his suprapubic catheter tube over the last 3 days as well as worsening abdominal pain. Vital signs measures included: heart rate 94 beats/minute, respiratory rate 18 breaths/minute, temperature 98.0 taken orally, and blood pressure 108 mmHg/66 mmHg; normally his blood pressure is measured as 130 mmHg/70 mmHg. His chest x-ray and CT of the abdomen are normal, urinalysis was identified the presence of nitrites and leukocytes, WBC was 15,000 cells/mm³

9. Would you determine that this patient likely had sepsis based on this information?
   a. No, because the patient has a normal blood pressure reading and no fever.
   b. Yes, it is likely this patient has sepsis because he has a known source of infection along with altered mental status, a heart rate greater than 90 beats per minute, and leukocytosis.
   c. Yes, it is likely this patient has sepsis because his systolic blood pressure is more than 20 mmHg lower than it is normally.
   d. No, it is not likely this patient has sepsis because his suprapubic catheter tube is chronic. His urinalysis is probably inaccurate.

10. You are assigned the same patient the following morning. How would you screen your patient again for sepsis?
   a. Use the screening tool as if it were your first time screening the patient.
   b. Since the patient screened positive yesterday, you check the box that reads “Previous Screen Positive.”
   c. The patient screened negative the first time on admission. You do not have to screen again.
   d. The patient screened positive yesterday. Complete all sections of the screening tool to see if the patient screens more positive than yesterday—this will indicate if the patient’s condition is worsening.
Appendix F

Modified General Self-Efficacy Scale

<table>
<thead>
<tr>
<th>MODIFIED VERSION OF GENERAL SELF EFFICACY SCALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Directions: Please indicate your agreement or disagreement with the statement using the following scale by circling the appropriate number:</td>
</tr>
<tr>
<td>1 = Not at all true  2 = Hardly true  3 = Moderately true  4 = Exactly true</td>
</tr>
</tbody>
</table>

1. I can always select the proper treatment (volume resuscitation, antibiotics, transfer to ICU, rapid response team initiation) for sepsis in the medical-surgical patient.  
   1 2 3 4

2. I can gather and organize supplies necessary treating sepsis in the medical-surgical patient.  
   1 2 3 4

3. I can focus on the patient and anticipate the proper treatment (volume resuscitation, antibiotics) for sepsis.  
   1 2 3 4

4. I can deal effectively with unexpected events while treating sepsis in the medical-surgical patient.  
   1 2 3 4

5. I can handle unforeseen situations while treating sepsis in the medical-surgical patient.  
   1 2 3 4

6. I can solve most sepsis-related problems in the medical-surgical patient.  
   1 2 3 4

7. I can remain calm when facing difficulties while treating sepsis in the medical-surgical patient.  
   1 2 3 4

8. When I am confronted with a problem when treating sepsis in the medical-surgical patient, I can think of several solutions.  
   1 2 3 4

9. If I am in trouble while treating sepsis I can solve the problem.  
   1 2 3 4

10. I can handle whatever happens when treating sepsis in the medical-surgical patient.  
    1 2 3 4

This scale was modified from the General Self-Efficacy (GSE):

## Appendix G

### SCIM Scoring Checklist

### Part Three: Scoring Instrument to Measure Psychomotor Skills

<table>
<thead>
<tr>
<th>Category</th>
<th>Activity</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Airway</strong></td>
<td>Auscultates breath sounds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breathing</td>
<td>Assesses breathing pattern, depth</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Assesses respiratory rate</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Measures oxygen saturation level</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Circulation</strong></td>
<td>Observes skin color (mottling, jaundice)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Feels skin temperature (cold extremities)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Palpates pulses</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Measures capillary refill (&lt;3 seconds)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Measures heart rate (&lt;90 beats per minute)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Measures blood pressure (SBP &lt;90 mmHg or SBP drop of &gt;40 mmHg)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Measures body temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Checks urine output, asks patient to void, last time voiding, measures specimen</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Disability</strong></td>
<td><strong>Assesses level of consciousness using GCS (decreased from baseline, new confusion present)</strong></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Examines pupils for size and reactions (PERRLA present?)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Checks glucose level (&lt; 140mg/dL in non-diabetic patients)</strong></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td><strong>Expose/Examine</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Examines body looking for surgical sites, wounds, rashes, invasive devices</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Examines chart/electronic record for MD orders</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>Interventions &amp; Investigation</strong></td>
<td>Performs sepsis screen using tool</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td><strong>Asks:</strong> Asks about a productive cough, shortness of air, change in breathing pattern, feelings of tiredness/weakness/fatigue, recent upper respiratory illness, other recent illnesses (UTI) – at least 2</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Verbalizes that the following may be ordered:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Bloods</strong> – ABGs, CBC, LFTs, coagulation studies, LACTATE level</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td><strong>Orifice tests</strong> – urine, wound, RESPIRATORY cultures</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td><strong>X-rays</strong> (CHEST), CT, ultrasound, etc.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td><strong>ECG, telemetry monitoring</strong></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Special for SEPSIS:</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td><strong>Initiates IV</strong></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Administers IV fluids</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Ensures blood cultures before antibiotics</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Administers antibiotics within 1 hour</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td><strong>Applies oxygen supplementation via nasal cannula when SpO2 falls below 92%</strong></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td><strong>Engages the RRT (calls 5777 and pushes staff assist button when patient deteriorates at end of simulation)</strong></td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
Appendix H
Simulator Effectiveness Tool-Modified

Simulation Effectiveness Tool - Modified (SET-M)

After completing a simulated clinical experience, please respond to the following statements by circling your response.

<table>
<thead>
<tr>
<th>PREBRIEFING:</th>
<th>Strongly Agree</th>
<th>Somewhat Agree</th>
<th>Do Not Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prebriefing increased my confidence.</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Prebriefing was beneficial to my learning.</td>
<td>5</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SCENARIO:</th>
<th>Strongly Agree</th>
<th>Somewhat Agree</th>
<th>Do Not Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am better prepared to respond to changes in my patient’s condition.</td>
<td>5</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>I developed a better understanding of the pathophysiology.</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>I am more confident in my nursing assessment skills.</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>I felt empowered to make clinical decisions.</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>I developed a better understanding of medications. (Leave blank if no medications in scenario)</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>I had the opportunity to practice my clinical decision making skills.</td>
<td>5</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>I am more confident in my ability to prioritize care and interventions.</td>
<td>5</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>I am more confident in communicating with my patient.</td>
<td>5</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>I am more confident in my ability to teach patients about their illness and interventions.</td>
<td>5</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>I am more confident in my ability to report information to health care team.</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>I am more confident in providing interventions that foster patient safety.</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>I am more confident in using evidence-based practice to provide nursing care.</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DEBRIEFING:</th>
<th>Strongly Agree</th>
<th>Somewhat Agree</th>
<th>Do Not Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debriefing contributed to my learning.</td>
<td>9</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Debriefing allowed me to verbalize my feelings before focusing on the scenario</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Debriefing was valuable in helping me improve my clinical judgment.</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Debriefing provided opportunities to self-reflect on my performance during simulation.</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Debriefing was a constructive evaluation of the simulation.</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

What else would you like to say about today's simulated clinical experience?
Appendix I
Program Satisfaction Survey

Satisfaction Survey

Please answer the following questions about the educational program on SIRS, Sepsis, Severe Sepsis, Septic Shock & Baptist Health Madisonville’s Sepsis Screening Tool and Policy on Sepsis. Do not put your name or code on this survey so the results will be anonymous.

1. What did you enjoy most about the educational program?


2. Please list 2-3 key learnings from the educational program, and how you anticipate applying them to your work in the future.


3. Was there any subject matter that you found confusing? If so, please provide specific examples.


4. What is the most valuable thing you learned today (knowledge or skills)?

5. Overall, how can we improve this training?

6. Any additional comments you wish to share?

Thank You!
Appendix J

Comments from Program Satisfaction Survey

<table>
<thead>
<tr>
<th>Question 1: What did you enjoy most about the educational program?</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Learning more about the differences in sepsis.</td>
</tr>
<tr>
<td>• The handouts.</td>
</tr>
<tr>
<td>• I liked the patient scenario in skills day and the handout.</td>
</tr>
<tr>
<td>• Love the handout... very educational.</td>
</tr>
<tr>
<td>• I am a hands on learner. This was a very good learning</td>
</tr>
<tr>
<td>experience for me.</td>
</tr>
<tr>
<td>• Reviewer.</td>
</tr>
<tr>
<td>• The information given.</td>
</tr>
<tr>
<td>• Phillip helped present the mock patient experience in such</td>
</tr>
<tr>
<td>a way that I had fun while learning.</td>
</tr>
<tr>
<td>• The interaction. I believe people learn more when you</td>
</tr>
<tr>
<td>have to interact with a scenario. Just reading the</td>
</tr>
<tr>
<td>material it goes in one way and then out.</td>
</tr>
<tr>
<td>• Learning different ways of looking at sepsis.</td>
</tr>
<tr>
<td>• The learning station and the educational sheets.</td>
</tr>
<tr>
<td>• Scenario.</td>
</tr>
<tr>
<td>• Handouts.</td>
</tr>
<tr>
<td>• I liked that it was a hands on learning experience.</td>
</tr>
<tr>
<td>• SCIM.</td>
</tr>
<tr>
<td>• The simulated clinical experience.</td>
</tr>
<tr>
<td>• Good reviewer.</td>
</tr>
<tr>
<td>• The live case study.</td>
</tr>
<tr>
<td>• I enjoyed learning through the case presented after the</td>
</tr>
<tr>
<td>PowerPoint.</td>
</tr>
<tr>
<td>• The simulation experience.</td>
</tr>
<tr>
<td>• Case study.</td>
</tr>
<tr>
<td>• Easy to understand.</td>
</tr>
<tr>
<td>• Helped me to better understand the process and feel more</td>
</tr>
<tr>
<td>comfortable with it.</td>
</tr>
<tr>
<td>• The scenario was a beneficial way to use tools from</td>
</tr>
<tr>
<td>debriefing.</td>
</tr>
<tr>
<td>• Sepsis slideshow.</td>
</tr>
<tr>
<td>• Realistic scenario.</td>
</tr>
<tr>
<td>• Learning more about sepsis.</td>
</tr>
<tr>
<td>• I enjoyed being well prepared through the PowerPoint</td>
</tr>
<tr>
<td>before I took part in the SCIM.</td>
</tr>
<tr>
<td>• Hands on.</td>
</tr>
<tr>
<td>• Reviewed information I didn’t have fully covered in school.</td>
</tr>
<tr>
<td>• Given a scenario.</td>
</tr>
<tr>
<td>• Scenario provided opportunity to evaluate my nursing</td>
</tr>
<tr>
<td>knowledge.</td>
</tr>
<tr>
<td>• PowerPoint.</td>
</tr>
<tr>
<td>• Hands on will be good for new grad.</td>
</tr>
<tr>
<td>• Learning insights to do my job with a higher level of</td>
</tr>
<tr>
<td>competency.</td>
</tr>
<tr>
<td>• The simulation helped me put the assessment process in a</td>
</tr>
<tr>
<td>practical order.</td>
</tr>
<tr>
<td>• Explanation of sepsis.</td>
</tr>
<tr>
<td>• Debriefing.</td>
</tr>
<tr>
<td>• The hands on experience.</td>
</tr>
<tr>
<td>• Actually, the simulation. The process was great in my</td>
</tr>
<tr>
<td>experience.</td>
</tr>
<tr>
<td>• Patient scenario.</td>
</tr>
<tr>
<td>• The simulation station helped to apply the information.</td>
</tr>
<tr>
<td>• I am not regularly “on the floor” at this time and this</td>
</tr>
<tr>
<td>increased my knowledge and ability to identify possible</td>
</tr>
<tr>
<td>sepsis.</td>
</tr>
</tbody>
</table>
Question 2: Please list 2-3 key learnings from the educational program and how you anticipate applying them to your work in the future.

- Make sure cultures drawn before meds.
- Assessments I am more confident in my assessment skills. Interventions: I feel I am capable of anticipating what the doctor may order.
- Knowing how to better take care of my patients
- Recognizing sepsis sooner. Acting quicker to prevent death.
- Policies on charting sepsis. Differences between SIRS, sepsis, severe sepsis
- The pre and post test was beneficial. I felt much more confident in my answers with the post-test.
- <96.8 temp is an indicator of SIRS response. Better screening of patients. Nurses are empowered by our facility to think critically and screen for sepsis. Earlier detection of sepsis/prevention of septic shock.
- Treatment of sepsis. 1st signs of sepsis.
- Assessment. Screening.
- Helped me to be able to quickly recall the information needed to adequately treat my patient.
- When to keep assessing the patient. Most nurses think you only do once then stop. The don’t continue to re-assess to see if sepsis is getting more severe.
- How to assess better. Way of looking at sepsis.
- Assessment. The signs to look for each problem.
- Bundles. Different levels of sepsis.
- Difference in sepsis and septic shock. My confidence in assessment.
- ABCDE: this will help me to assess my patient more closely when sepsis is suspected. Placing the patient who is septic on code.
- Stepwise approach to evaluating for sepsis.
- Initiating care, anticipating next step, and reassessing.
- Difference between severe sepsis and septic shock, how often to screen.
- One EBS allowed without MD order, helps determine disability screening of sepsis, decreased UOP helps define later changes in reduced circulation.
- The definitions/differences in SIRS, sepsis, shock.
- Sepsis awareness.
- What orders to expect from the physician. Order of importance of assessment.
- Difference between SIRS, sepsis, severe sepsis, septic shock. How to quickly identify risk factors.
- Antibiotics must be started within 1 hour of positive sepsis.
- Seeing the BOXES that MD/ARNs look at was helpful.
- Glucose increases above 140. Antibiotic within 1 hour. Sepsis screen at beginning of shift.
- Importance of strict I&O’s when treating patients with sepsis. Importance of sepsis screen done early in shift.
- Signs and symptoms to look for. Labs to look for.
- I will apply all to future sepsis pt.
- How various vital signs and lab values point to different degrees of sepsis. Better anticipate what the physician will order.
- Using the sepsis tool every time. It will help me evaluate better and quicker. Identifying symptoms even if they are small. It helps me not to look over them.
- Learned about BOXES, antibiotics within 1 hour of screen.
- Recognizing, monitoring urine output, calling rapid response.
- Remember blood cultures, then antibiotics within 1 hours.
- Assess each patient within 1 hour of my shift. And documentation that I can refer back to.
- Screen for sepsis in first hour. Antibiotics within 1 hour, blood cultures before.
- Paying closer attention to vital signs and the sepsis screening tool.
- The ABCDE method to stay on track. The encouragement to seek higher level of care when indicated and the RRT.
Question 3: Was there any subject matter that you found confusing? If so, please provide specific examples.

- No.
- No.
- N/A
- No.
- Nothing.
- No.
- No.
- None.
- None.
- N/A
- No.
- No.
- When to call rapid response or clinical leader.
- No.
- N/A
- No.
- None.
- No.
- When to call RRT is cloudy to me at times.
- No.
- No.
- No.
- Some questions on the knowledge test were confusing.
- No.
- No.
- N/A
- None.
- No.
- No.
- No.
- This was not confusing. It is helping me identify the difference in SIRS, sepsis, septic shock, etc.
Question 4: What is the most valuable thing you learned today (knowledge or skills)?

- BOXES acronym
- Skills and knowledge. The assessment tool.
- Sepsis is very serious.
- Knowledge: I feel I can anticipate what treatments the doctor may order.
- How to take steps to save my patient before they go into septic shock.
- How sepsis progresses
- Importance of sepsis
- How quickly things can change.
- It helped me to quickly respond with appropriate treatment options.
- It was just a reinforcement, really. You always need to keep reassessing your patient.
- How assessment is put together to form treatments.
- The ABCDE format used to screen sepsis.
- Timing is everything.
- Related to sepsis screening.
- Just understanding the process in general.
- Increased knowledge.
- Sepsis mortality rate
- How to tell the difference between each types of sepsis.
- How to handle and improve patient outcomes.
- Difference between SIRS, sepsis, severe sepsis, and septic shock.
- Sepsis mortality rate equal to MI.
- Being confident in my ability to assess and act early.
- Signs and symptoms.
- There are so many stages of sepsis.
- Better understanding of sepsis and why the screening is done every shift.
- What symptoms are most important...
- BOXES
- Both knowledge and skills
- Confidence in skills
- The checklist that I can use on a daily basis as a nurse.
- BOXES. Think more about sepsis when assessing my patient.
- The different types of sepsis.
- The importance of timely treatment in sepsis.
Question 5: Overall, how can we improve this training?

- More visual aids.
- ?
- Shorter worksheet.
- Make it one educational session.
- No suggestions.
- N/A
- Everything was great.
- Don't know of anything.
- I found it adequate.
- More review time.
- I thought it was great.
- Good presentation.
- None.
- N/A
- Increase time for a sit down setting for education.
- Spend a little more time walking through the case study.
- N/A
- A little disorganized on the front end. Some of us filled out the pre-test twice.
- N/A
- Nothing. Great job.
- Have more scenarios.
- Teach CNAs why vital signs and urine output are important and when to notify nurse.
- No recommendations.
- Slow down for less experienced nurses.
Question 6: Any additional comments you wish to share?

- Thank you.
- N/A
- I enjoyed the experience.
- N/A
- None
- very good
- I enjoyed this training. Thanks!
- This was a fabulous training experience. One of the best I’ve seen in a long while.
- It is needed education especially for new nurses. I liked the info sheet and the review process.
- Training was great—interactive. Thank you. Enjoyed the experience.
- N/A
- No improvements. Very informative and interactive. Thank you. 😊
- Excellent presentation
- Very interesting and can be applied to everyday practice.
- It was a good learning experience.
- No.
- N/A
- Very needed subject.
- I thought it was great.
- It was great.
- Great presentation and handouts.
Appendix K

Simulation Effectiveness Tool-Modified (SET-M) Nurse Comments

- "Excellent learning experience."
- "Good job."
- "Great."
- "I do better in the patient setting. I did appreciate the time and effort put forth by my pretend patient."
- "Increased both knowledge and confidence!"
- "It was a great learning experience to make me more cognitive of assessing for sepsis in my patient."
- "Makes you think. Will help new nurses."
- "Really found it beneficial and a great teaching tool for a visual learner."
- "This really helped me better understand sepsis."
- "Very good simulation. Very helpful in helping me retain the information."
Appendix L

IRB Approval

August 10, 2016

Duska Bethel, BSN, RN
DNP Candidate, Acute Care Nurse Practitioner Program
University of Kentucky

RE: Dual Competent Educational Program to Improve Medical-Surgical Nurse Knowledge, Skill, and Self-Efficacy and Septic Shock

Dear Ms. Bethel,

On August 10, 2016 Baptist Health Madisonville Institutional Review Board reviewed the following items in reference to the listed study:
- New Research Study Proposal
- Consent to Participate in a Research Study
- Demographic Questionnaire
- Structured Clinical Instruction (SCI/M)
- Self-Efficacy Tool
- Recruitment Flyer – New to Annual Nurse Competencies
- Educational Newsletter Information
- Knowledge PreTest on SIRS, Sepsis, Severe Sepsis, and Septic Shock
- Knowledge PostTest on SIRS, Sepsis, Severe Sepsis, and Septic Shock
- Baptist Health Madisonville IRB Financial Disclosure

The Board noted that the purpose of the study was to educate medical-surgical nurses, specifically on 3W and 4W at Baptist Health Madisonville, on sepsis and septic shock.

Baptist Health Madisonville IRB determined that, this study is exempt of IRB oversight based on 45 CFR 46.101(b)(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects’ responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects’ financial standing, employability, or reputation.

As written, no further IRB involvement/oversight by the IRB is needed. Should you have any questions, please contact the IRB Coordinator at 270-824-3735.

Sincerely,

William McCann, M.Div., Chairman
Baptist Health Madisonville Institutional Review Board

BaptistHealthMadisonville.com
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