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# Reducing Sepsis Rates Through Nursing Staff Education

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
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Walden University
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Abstract

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## Abstract

Many hospitals fail to comply with sepsis treatment core measures. The purpose of this project was to educate nursing staff in a small rural emergency department in the Midwest United States about core measures that included 1-hour bundles for sepsis treatment. The project attempted to answer the practice-focused question: Does educating emergency department nursing staff in a small rural emergency department on the 1-hour sepsis bundle increase knowledge? Lewin's Change Theory and Kirkpatrick's Four-Level Training Evaluation Model served as the framework for the project. A 1-hour in-person education was developed using the Analyze, Design, Develop, Implement, and Evaluate model with input from experts. Thirty registered emergency department nurses participated in the education. Results from a paired *t* test indicated a significant difference between pretest results ($M = 54.3$, $SD = 14.8$) and posttest results ($M = 93.7$, $SD = 6.1$), $t(29) = 14.1$, $p < .001$, indicating an increase in knowledge. Educating staff may result in improved sepsis identification and intervention times.

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## Section 1: Nature of the Project

Sepsis is one of the leading causes of mortality in the United States and results in over 700,000 hospitalizations leading to over 200,000 deaths annually (Delawder & Hulton, 2019). This number continues to rise annually in the United States. Early identification and treatment of sepsis improves patient outcomes and saves lives (Delawder & Hulton, 2019). Sepsis also impacts health care because of the burdening costs. The United States spends an estimated 23 billion dollars annually on the treatment of sepsis (Whitfield et al., 2019).

The purpose of this doctor of nursing practice (DNP) project was to educate nursing staff in a small rural emergency department in the Midwest United States about core measures of sepsis identification and treatment that include the use of the 1-hour sepsis bundle. There are many hospitals around the United States that fall out of the timely treatment of sepsis and lead to poor patient outcomes (Delawder & Hulton, 2019). The 1-hour sepsis bundle consists of evidence-based treatment plans for all patients presenting to the hospital emergency department who have signs and symptoms of sepsis. The sepsis bundle is mandated by the Centers of Medicare and Medicaid Services in collaboration with the Surviving Sepsis Campaign (Society of Critical Care Medicine, 2021). The hospital where the project took place fell short in compliance with the 1-hour sepsis bundle (Emergency Department Director, personal communication, September 1, 2021).

Studies suggested that sepsis rates are increasing nationwide, but the mortality rates are declining due to the timely identification and treatment of sepsis in the emergency department setting (Rhee & Klompas, 2020), (Delawder & Hulton, 2019), and (Whitfield et al., 2019). This trend is directly related to the continued education of nursing staff within organizations on the importance of early identification and rapid response treatment of sepsis and septic shock (Rhee

& Klompas, 2020). Positive social change may occur through this project by the education of nursing staff on the 1-hour sepsis bundle. An increase in nursing staff knowledge in the emergency department may result in improved sepsis identification and improve sepsis intervention times. This could improve patient outcomes and increase national guideline compliance rates for the hospital.

## Problem Statement

The gap in practice that this doctoral project addressed was the lack of nursing staff education on the use of the 1-hour sepsis bundle in a small rural emergency department in the Midwest. The hospital where the project took place fell short in compliance with the 1-hour sepsis bundle (Emergency Department Director, personal communication, September 1, 2021). Nurses play a dynamic role in providing timely care to patients in the emergency department (Delawder & Hulton, 2019). Many hospitals fail to meet government standards of care for the patient presenting to the emergency department with signs and symptoms of sepsis (Rhee & Klompas, 2020). Failing to meet these standards costs hospitals millions of dollars annually and produces poor patient outcomes. Sepsis management continues to pose a major challenge for health care in the United States. There are over 970,000 cases of sepsis patients hospitalized every year in the United States (Paoli et al., 2018). Sepsis bundles are the core measures of the Centers of Medicare and Medicaid Services and Surviving Sepsis Campaign. Bundle elements are implemented collectively to achieve adequate perfusion of vital organs and maintain hemodynamic stability (Whitfield et al., 2019). Early identification of signs of sepsis through education is key to complying with national guidelines for the treatment of sepsis. Patient mortality with sepsis and advanced septic shock is reduced by 40% when early identification and treatment plans that include intravenous fluids and antibiotics are completed (Whitfield et al.,

2019). Nurse-initiated protocols set guidelines for nurses follow and often require education before implementation. Protocols and guidelines on the treatment and identification of sepsis have been shown to improve patient outcomes (Delawder & Hulton, 2019).

According to the project site hospital statistics, the number of patients that present with sepsis has been increasing in this small rural emergency department in the Midwest (Emergency Department Director, personal communication, September 1, 2021). The hospital staff currently recognizes and treats patients who are presenting to the emergency department with signs and symptoms of sepsis 40% of the time using the 1-hour sepsis bundle (Emergency Department Director, personal communication, September 1, 2021). This percentage does not meet the national core measures for the implementation of the 1-hour sepsis bundle (Society of Critical Care Medicine, 2021). Hospital protocols for the identification and treatment of sepsis have not been updated for many years. The hospital uses electronic medical records that aid in the identification of sepsis, but emergency department staff are not acting on the triggers that are emerging from the electronic health record (Emergency Department Director, personal communication, September 1, 2021). It is critical that the emergency department nursing staff know why it is important to use the sepsis identification tools that they are provided.

Many patients have comorbidities that contribute to high-risk factors in this rural community. Rural hospitals play an instrumental role in improving patient outcomes in sepsis treatments. Mohr et al. (2017) studied rural hospital roles in the treatment of patients presenting to the hospital with signs and symptoms of sepsis and found that there is a great need for rural hospital sepsis protocols to influence clinical outcomes. Not meeting the 1-hour sepsis bundle times and poor use of electronic health record identifiers and triggers are leading to poor patient outcomes at the project site facility (Emergency Department Director, personal communication,

September 1, 2021). Misidentification or delays in identification leads to delays in patient treatment. Education of nursing staff is key to early identification and treatment of patients. Education consisted of what the 1-hour sepsis bundle incorporates and how patient outcomes may be influenced by using the 1-hour bundle. This education provided a foundation for all nursing staff on up-to-date evidence-based practice guidelines in the treatment of sepsis.

This project holds significance for the field of nursing practice because providing nursing staff education on the early sepsis symptoms alerts may help with early identification and intervention. Delaney et al. (2015) found that nursing staff were more compliant and competent on the treatment of patients who present with sepsis after extensive education on the identification and treatment of sepsis. Research also showed great success when hospitals incorporated a team approach to the identification and treatment of patients suffering from sepsis. LaRosa et al. (2012) concluded that a code Sepsis Management Alert Response Team screening tool that was focused on the early identification of patients who presented with signs and symptoms of sepsis and septic shock worked well and made compliance with sepsis bundles easier for the organization. LaRosa et al. found that an early alert system that incorporated an early sepsis 1-hour bundle was easy to implement and did not require additional costs to the hospital. Education of the tool that included the sepsis bundle made staff feel more efficient and able to provide quality care for their patients (LaRosa et al., 2012).

## Purpose Statement

The purpose of this doctoral project was to improve the knowledge of emergency department nursing staff in a small rural emergency department in the Midwest regarding timely identification and treatment of patients presenting to the emergency department with signs and symptoms of sepsis. Emergency department nursing staff were educated on the 1-hour sepsis

bundle and the importance of using the sepsis bundle in the identification of sepsis. The practice-focused question was the following: Does educating emergency department nursing staff in a small rural emergency department in the Midwest on the 1-hour sepsis bundle increase knowledge? The treatment for sepsis in the emergency department is set by a collaboration between the Centers of Medicare and Medicaid Services and the Surviving Sepsis Campaign. These evidence-based treatment plans are for all patients presenting to the hospital emergency department with signs and symptoms of sepsis. Many hospitals in rural settings fail to comply with sepsis 1-hour bundles and other core measures set by the Centers of Medicare and Medicaid Services. These hospitals fall out of the timely treatment of sepsis leading to poor patient outcomes (Delawder & Hulton, 2019). This project narrowed the gap in nursing practice by providing emergency department nurses in a small rural emergency department in the Midwest with education on the 1-hour sepsis bundle and significance of using the bundle in everyday practice. Education of nursing staff is key to early identification and treatment of patients.

## Nature of the Doctoral Project

The use of multiple databases to find scholarly literature was essential in the development of the DNP project (Zaccagnini & White, 2017). The dates that were included in the DNP project ranged from 2012 to 2021. There were many key terms and databases that were used in the literature search for this project. Key terms pertaining to this project on sepsis education were *sepsis*, *nursing staff education*, *core measures of sepsis*, *sepsis one hour bundle*, and *sepsis risk factors*. Inclusions will include the English language. Exclusions included languages other than English. Top medical databases included in the search were PubMed, CINAHL Plus with Full Text, EMBASE: Excerpta Medica Database, and the Cochrane Library.

## Approach

The intended setting for the doctoral project was a small rural emergency department in the Midwest. The emergency department consists of a 14-bed closed unit. There are 30 registered nurses on staff in the emergency department. The emergency department is located within a rural farm community in the Midwest. The hospital is a short-term acute care hospital that consists of fewer than 90 beds. The hospital is a nonprofit organization. The hospital serves a 60-mile radius. The hospital currently falls out of the 1-hour sepsis bundle that is recommended by the Centers of Medicare and Medicaid Services and Surviving Sepsis Campaign. The facility staff that includes the director of the emergency department and the chief nursing officer (CNO) were supportive of the project.

I conducted an in-depth literature search and review for this project. Searching in databases was important to the literature search. The sources of evidence were extracted by synthesizing abstracts of multiple studies. Progress of the search results was logged to avoid duplicate results and unsuccessful searches (HPU Libraries, 2020). This doctoral project encompassed institutional approval and Institutional Review Board (IRB) approval from Walden University.

The curriculum for the project was developed using the Analyze, Design, Develop, Implement and Evaluate (ADDIE) model. Educators and training developers use the ADDIE design because having stages clearly defined facilitates the implementation of effective training tools (Educational Technology, 2018). I also incorporated input from experts at the project site.

I used a pretest and a posttest for comparison of knowledge gained. Participants received a pretest that consisted of 10 multiple choice questions on the current national sepsis recommendations and sepsis statistics. The education was provided using an in-person

PowerPoint presentation on the use of the 1-hour sepsis bundle and included national statistics on sepsis. Participants were then offered time for questions about the education. The length of the presentation consisted of 1 hour of in-person learning. There were 30 participants who were included in the learning. Participation for the education was voluntary. After the presentation, a 10-question posttest was administered to the nursing staff. Descriptive statistics were used to analyze the data from the DNP project. The test scores were then analyzed using a paired *t* test to compare the pretest and posttest results on the knowledge of the 1-hour sepsis bundle.

## Significance

The stakeholders in this DNP project included emergency department nursing staff, the CNO, and the director of the emergency department. All stakeholders had critical roles in the project. Nursing staff roles for the project included attendance of the sepsis education and taking part in the pretest/posttest. Staff nurses in the emergency department also implemented the project by incorporating the 1-hour sepsis bundle into patient care plans. Emergency department nursing staff became change agents and aided in the project's success. The CNO's role in the project was critical to the successful implementation of the sepsis education. The CNO is the primary spokesperson for the hospital's nursing staff. The CNO coordinated all of the daily nursing operations for the hospital during the project. She had the legitimate power to direct and guide the project.

The director of the emergency department's role in the project was to maintain leadership support in the health care facility. The emergency department director assumes 24-four-hour accountability for the emergency department. The director also provided education reinforcement. The emergency department director guided change within the emergency department. The director influenced and encouraged nursing staff to attend education sessions

The emergency department director also advocated for the project and was involved in the design and implementation of the education.

This project contributed to nursing practice by educating nursing staff on vital up-to-date evidence-based practice. The goal of the project was to improve patient outcomes in a rural hospital emergency department. The nursing profession benefits from the collaboration of practitioners and researchers in the generation of evidence-based practice (Moran et al., 2017). Because this project proved successful, the project can be transferred to other units within the hospital. Positive social change may occur through this project by the education of all hospital staff about the 1-hour sepsis bundle. An increase in nursing staff knowledge in the emergency department and on all units within the hospital could result in improved sepsis identification and improve sepsis intervention times. This could improve patient outcomes and increase national guideline compliance rates for the hospital.

## Summary

Section 1 provided an introduction to the nursing staff education project regarding evidence-based practice for sepsis treatment. The nature of the project was described, including what sepsis is and what the current problem was in the rural hospital emergency department. That information was followed by the purpose of the doctoral project the significance of the project for nursing practice. Section 2 covers the models that aligned with this project, the relevance of this project to nursing practice, the background and context of the doctoral project, and the role of the DNP student and the project team.

## Section 2: Background and Context

There had been high levels of misidentification of sepsis in the emergency department of a rural emergency department in the Midwest. This was leading to poor patient outcomes. Misidentification in many instances led to delayed treatment. I attempted to answer the practice-focused question: Does educating emergency department nursing staff on the 1-hour sepsis bundle increase knowledge? Education of nursing staff is key to the early identification and treatment of patients.

The purpose of this project was to educate nursing staff in a small rural emergency department in the Midwest about core measures that include the 1-hour bundles for sepsis treatment. Delaney et al. (2015) found that nursing staff were more compliant and competent on the treatment of patients who present with sepsis after extensive sepsis education. Many times, using a tool to help with learning can help with implementing sepsis guidelines. Providing nursing staff education on the early sepsis symptoms alerts can help with early identification and intervention (LaRosa et al., 2012). Section 2 covers the concepts, models, and theories that were used in this project. Section 2 also covers the relevance of the project to nursing practice, local background, the role of the project in health care improvement, and the role of the project team.

## Concepts, Models, and Theories

### Lewin's Model

There were multiple concepts, models, and theories used in this project. Change was needed in this facility to improve patient outcomes. This project was intended to facilitate change in practice in this organization. A change theory that had been shown to facilitate change in the health care setting was Lewin's change theory. Lewin's theory recognizes change as a constant fact of life that has a dynamic balance of opposing and driving forces. Lewin's theory focuses on

three stages: unfreezing, moving, and refreezing. The unfreezing stage involves assessment of the need and preparing members to move from the status quo to an improved level of practice. The movement phase in Lewin's model involves the addition of driving forces to motivate and empower members to adopt the improved perspective while limiting restraining forces that act as barriers to change. Finally, the improvement in practice must be secured and a refreeze must occur to maintain the new change (Zaccagnini & White, 2017).

**Kirkpatrick's Model**

Effective training is well received and provides relevant knowledge and skills to the participants and the confidence to apply them on the job. Project evaluation is key in implementing new practice guidelines (Kirkpatrick & Kirkpatrick, 2016). The Kirkpatrick model of training evaluation was used in this project. The Kirkpatrick model comprises four levels that include reaction, learning, behavior, and results (Kirkpatrick & Kirkpatrick, 2016).

In Level 1 of the Kirkpatrick model, if participants find the educational training favorable, they engage in the education and believe that the training will be relevant to their job. Level 2 of Kirkpatrick's model encourages participants to gain the knowledge, skills, confidence, and attitude based on their participation in the training. Level 3 of the training model allows participants to apply what they have learned during training sessions when they are back on the job. Finally, Level 4 of Kirkpatrick's model uses targeted outcomes as a result of the training and the support and accountability package (Kirkpatrick & Kirkpatrick, 2016).

**ADDIE Model**

Another model that was incorporated in the project was the ADDIE instructional design method. Educators and training developers use this design because having stages clearly defined facilitates the implementation of effective training tools (Educational Technology, 2018). The

analysis phase is considered the goal-setting stage. The focus is on the target audience. In this stage the program matches the level of skill and intelligence that each student shows (Educational Technology, 2018). The design stage determines all tools and goals that will gauge performance, subject matter analysis, tests, planning, and resources. In the design phase the focus is on learning objectives, lesson planning, and assessment instruments (Educational Technology, 2018).

The development stage begins with the production and testing of the methodology being used in the project. In the development stage, the designers make use of the data collected from the previous stages and use that information to create a program that will relay what needs to be taught to the project participants (Educational Technology, 2018). The next stage in the ADDIE model is the implementation phase.

The implementation stage includes redesign, update, and editing the course to ensure that it can be delivered effectively. The implementation phase allows program designers to gain feedback from participants (Educational Technology, 2018). The final stage of the ADDIE method is evaluation. The evaluation stage occurs when the project is being subjected to final testing. The what, when, why, and how are assessed. Assessment of the accomplishments and nonaccomplishments of the project are outlined. This phase is composed of two parts: summative and formative (Educational Technology, 2018).

**Key Terms**

*Core measures*: National standards of care and treatment processes for common conditions (Oxford University Press, 2020). Core measures processes have been shown to reduce complications and result in better patient outcomes (Johns Hopkins Medicine, 2020).

*Sepsis*: A serious condition resulting from the presence of harmful microorganisms in the blood or other tissues and the body's response to the bacteria's presence (Oxford University Press, 2020). Sepsis may lead to the malfunctioning of organs, shock, and death (Oxford University Press, 2020).

*Sepsis bundles*: Evidence-based interventions that when instituted provide maximum outcome and benefit to the patient (Divatia & Khan, 2010).

*Sepsis risk factors*: Adults over the age of 65 years, people with chronic medical conditions, people with weakened immune systems, children younger than 1 year of age, and people with a history of sepsis (Centers for Disease Control and Prevention, 2020).

## Relevance to Nursing Practice

The project site was not meeting current national guidelines for the identification and treatment of patient who are presenting to the emergency department with signs and symptoms of sepsis. Leadership at the project site stated that this was leading to poor patient outcomes within the origination (Emergency Department Director, personal communication, September 1, 2021). Standards of nursing care are set to benefit patient care and improve health outcomes. This project provided education on current sepsis guidelines on the 1-hour sepsis bundle that had been proven to improve patient outcomes (Society of Critical Care Medicine, 2021).

Coiner and Wingo (2021) and Delaney et al. (2015) concluded that once the need for education for nursing staff has been established, the best modes of education need to be implemented to maximize the effectiveness of the education. Coiner and Wingo found that it is critical to instill the highest standards of sepsis education in health care to fight one of the leading causes of death within the health care setting in the United States. Nurses play key roles

on the front line with the identification and treatment of sepsis and require education that is effective and appropriate for their practice setting (Coiner & Wingo, 2021).

Delaney et al. (2015) found that nursing staff were more compliant and competent on the treatment of patients who present with sepsis after extensive sepsis education. Many times, using a tool to help with learning can help with implementing sepsis guidelines. LaRosa et al. (2012) concluded that a code Sepsis Management Alert Response Team screening tool focused on the early identification of patients who present with signs and symptoms of sepsis and septic shock worked well and made compliance with sepsis bundles easier for the organization. LaRosa et al. found that an early alert system was easy to implement and did not require additional costs to the hospital. Education of the tool made staff feel more efficient and able to provide quality care for their patients (LaRosa et al., 2012). Providing nursing staff education on the early sepsis symptoms alerts can help with early identification and intervention (LaRosa et al., 2012).

The education of new and experienced nursing staff shows great value in practice. Experienced nurses have acquired skills, provide great clinical reasoning in practice, and lay the groundwork for improvement in health care (Simmons, 2010). The current education added to nursing staff's clinical reasoning skills. Clinical reasoning is a complex process that includes cognition, metacognition, and discipline-specific knowledge to gather and analyze patient information, evaluate the significance of the information, and weigh alternative actions (Simmons, 2010).

## Local Background and Context

The setting for the doctoral project was a small rural emergency department in the Midwest. The hospital has an on-site emergency department that consists of a 14-bed unit. There are 30 registered nurses who are on staff in the emergency department. This includes full-time

employees as well as part-time. The town is the largest city in the rural county. The population is just over 13,500. The town location is in farm country. The hospital is the only hospital in the county, and it serves a 60-mile radius. No public transportation is available throughout the county. The median household income of the town is $41,940, and the per capita income is $23,127. Over 22% of people in the city are living in or under the poverty level (United States Census Bureau, 2019). The health system is composed of a centrally located community-based hospital and six satellite clinics that are spread out over the county.

The treatment for sepsis in the emergency department is set by a collaboration between the Centers of Medicare and Medicaid Services and the Surviving Sepsis Campaign. Evidence-based treatment plans that include the 1-hour sepsis bundle are for all patients presenting to the hospital emergency department with signs and symptoms of sepsis (Society of Critical Care Medicine, 2021). Many hospitals in rural settings fail to comply with sepsis 1-hour bundles and other core measures set by the Centers of Medicare and Medicaid Services. These hospitals fall out of the timely treatment of sepsis leading to poor patient outcomes (Delawder & Hulton, 2019). The current project narrowed the gap in nursing practice by providing emergency department nurses with education on the 1-hour sepsis bundle and significance of using the bundle in everyday practice.

## Role of the DNP Student

My role as the DNP student was to provide education to the nursing staff in the emergency department on sepsis identification. I had seen a gap in practice where current practice did not resemble evidence-based practice. This was causing poor health outcomes and leading to a decrease in revenue for the hospital. Policies are outdated at the project site. The result of this is that nursing staff lacked the education that they need on the 1-hour sepsis bundle.

The American Association of Colleges of Nursing (2018) deemed many essentials of doctoral education for advanced nursing practice. Scientific underpinnings are essential for practice. The DNP graduate's education must reflect the complexity of practice at the doctoral level and be an example of the robust heritage that uses conceptual foundations of nursing (American Association of Colleges of Nursing, 2018). The current project reflected my education. DNP graduates are able to translate science into knowledge quickly and effectively to benefit patients and improve outcomes (American Association of Colleges of Nursing, 2018). In the current project, I transferred evidence-based education into the emergency department nursing staff's clinical practice. Terry (2018) reported that the DNP graduate is uniquely qualified to progress through the process of reformulating evidence into clinical practice.

Theory, knowledge, research, and evidence-based practice are interconnected with the thought process and practice of a DNP student/graduate. These elements are building blocks that must be there to turn research into theory, theory into knowledge, and knowledge into evidence-based practice (Zaccagnini & White, 2017). A DNP student/graduate is in a prime position to affect the delivery of care and to combine and translate evidence that can be published to improve care and clinical outcomes in practice (Zaccagnini & White, 2017).

## Role of the Project Team

The project team facilitated teaching of emergency department nursing staff on the 1-hour sepsis bundle. The team consisted of myself and the director of the emergency department. My role was the educator and facilitator of the project. The emergency department director provided input into the curriculum and assisted with promoting the education in the project site. Education was provided to the staff nurses in the hospital multiple times daily over a 7-day

period. This ensured that all nursing staff on every shift were provided the opportunity to receive the education.

A successful translation of any evidence-based clinical guideline requires system-level adaptations in addition to changes by individual health care professionals (Erickson et al., 2014). Examples of system-level adaptations that will support implementation of guidelines used by Erickson et al. (2014) included (a) designation of a person or department responsible for implementation and monitoring, (b) incorporation of quality improvement systems, (c) selection of a uniform protocol, (d) integration of staff into practice teams, (e), development of counseling skills, (f) utilization of an implementation process tailored to practice, and (g) adoption of a policy that supports health.

## Summary

The background of the project and context of the project were described in detail. Section 2 also covered concepts, models, and theories that were used in this project. This section also covered how this project was relevant to nursing practice as well as the local background and context. Section 2 addressed the role of the DNP student in the project as well as the role of the project team. In Section 3, I discuss the collection and analysis of the evidence, practice-focused question, and sources of evidence.

## Section 3: Collection and Analysis of Evidence

In this section, I discuss methods that were used to implement the doctoral project that include the sources of evidence used to design and evaluate the project. Collection and analysis of evidence is key to project implementation. There was a gap in nursing staff knowledge in a small rural hospital emergency department in the Midwest. This project was the education of all nursing staff in the emergency department on the importance of early identification of sepsis and treatments. Education consisted of what the Centers of for Medicare and Medicaid Services and Surviving Sepsis Campaign recommended, including evidence-based practice showing improved patient outcomes. Staff education also included systemic inflammatory response syndrome criteria. A pretest/posttest comparison of knowledge gained was conducted at the end of the project. The education addressed the need for the nursing staff to change their practice. Section 3 reiterates the practice-focused question and provides the sources of evidence that supported this project. The methods for data collection and analysis are also addressed.

### Practice-Focused Question

There was a gap in knowledge on use of the 1-hour sepsis bundle in a rural Midwest hospital. The emergency department nursing staff were not following the national guidelines that are included in the 1-hour sepsis bundle. This was leading to poor health outcomes for patients and generating less than optimal revenue for the hospital. Policies at the project site were outdated. There was little accountability for the nursing staff on the identification and subsequent treatment of the emergency department patient presenting with signs and symptoms of sepsis (Emergency Department Director, personal communication, September 1, 2021). The practice-focused question was the following: Does educating emergency department nursing staff on the 1-hour sepsis bundle increase knowledge? The emergency department nursing staff at the project

site lacked the education that they needed on the 1-hour sepsis bundle (Emergency Department Director, personal communication, September 1, 2021).

The purpose of this project was to educate nursing staff in a small rural emergency department in the Midwest about core measures of sepsis identification that include the 1-hour bundles for sepsis treatment. This project attempted to increase emergency department nurse's knowledge. Staff education consisted of visual and written education on the 1-hour sepsis bundle and national statistics. The 1-hour sepsis bundle consists of evidence-based treatment plans for all patients presenting to the hospital emergency department who have signs and symptoms of sepsis.

## Sources of Evidence

Sepsis is one of the leading causes of mortality in the United States and results in over 700,000 hospitalizations leading to over 200,000 deaths annually (Delawder & Hulton, 2019). New standards of care in emergency departments nationwide include the consistent use of the 1-hour sepsis bundle (Society of Critical Care Medicine, 2021). The sepsis 1-hour bundle may be initiated by the initial interaction of the triage nurse and the patient when the patient's initial vital signs are taken in the emergency department. The 1-hour sepsis bundle includes (a) measurement of lactate level and remeasure of lactate if initial lactate is elevated above 2 mmol/L, (b) blood cultures obtained before administering antibiotics, (c) broad spectrum antibiotics administered, (d) rapid administration of crystalloid fluids at 30 ml/kg for hypotension or a lactate equal or greater than 4 mmol/L, (e) use of vasopressors if patient is hypotensive during or after fluid resuscitation to maintain a mean arterial pressure equal to or greater than 65 mm Hg (Society of Critical Care Medicine, 2021).

Coiner and Wingo (2021) and Delaney et al. (2015) studied the effects of sepsis education on nursing staff and concluded that once the need for education for nursing staff has been established, the best modes of education need to be implemented to maximize the effectiveness of the education. Coiner and Wingo found that it is critical to instill the highest standards of sepsis education in health care to fight one of the leading causes of death in health care settings in the United States. Nurses play key roles on the front line with the identification and treatment of sepsis and require education that is effective and appropriate for their practice setting (Coiner & Wingo, 2021).

Studies by Rhee and Klompas, 2020, Delawder and Hulton, 2019, and Whitfield et al., 2019 suggested that sepsis rates are increasing nationwide, but the mortality rates are declining due to the timely identification and treatment of sepsis in the emergency department. The decrease in mortality rates of patients presenting to the emergency department is directly related to the continued education of nursing staff within organizations on the importance of early identification and rapid treatment of sepsis and septic shock (Rhee & Klompas, 2020).

**Participants of the Project**

Participants for this DNP project included all emergency department nursing staff. Participants included full-time and part-time emergency department nursing staff. Participants also included the CNO. The CNO acted as the primary spokesperson for the hospital's nursing staff. The CNO coordinates all of the daily nursing operations for the hospital. The CNO allowed nursing staff time to participate in the education. The last participant was the director of the emergency department. All participants played an essential role in the project.

**Procedures of the DNP Project**

Procedures for this project included education on the 1-hour sepsis bundle to the nursing staff in the emergency department in the Midwest. My practicum environment is a small rural hospital-based emergency department. This project provided education that was completed in small groups of emergency department nursing staff. Team training was the focus for this project. Training for teams to enhance functioning and communication had been proven effective. Developing the ability of nurses, physicians, and others to engage in patient-centered care is essential to improve collaboration, work environment, and the quality of care (White et al., 2016). Stakeholders at the project aligned with goals of the project.

The instrument used for evaluating the education was a 10-question pretest/posttest. The instrument was developed by incorporating the Society of Critical Care Medicine (2021) guidelines as well as the Centers for Disease Control and Prevention (2021) guidelines for health care providers. The instrument is available in the appendix of this project. Project site management were aware of the need for staff education and were anticipating good results from this project. Problems in the health care environment must be examined and approached from a systems, team, or organizational perspective (Agency for Healthcare Research and Quality, 2013).

**Protections of the DNP Project**

Protections for the project were in alignment with institutional approval and incorporated the IRB (05-24-22-0428573) approval guidelines. To ensure ethical protection for participants, I included a detailed consent process, safeguarding of privacy, data retention plans, and measures to permit participants to withdraw from participation. Respect for confidentiality and privacy was maintained by discussing the limits of confidentiality, knowing federal and state law, taking

practical security measures, limiting data sharing, and knowing ethical obligations (Smith, 2003). This doctoral project encompassed institutional approval and incorporated the IRB approval from Walden University.

To address the practice-focused question, I carried out an extensive literature review on the current evidence-based practice recommendations for treating patients with sepsis. There were many key terms and databases used in the literature search for this project. Databases used for purposes of this project included PubMed, CINAHL Plus with Full Text, EMBASE: Excerpta Medica Database, and the Cochrane Library. Key terms pertaining to this project on sepsis education included *sepsis*, *staff education*, *core measures of sepsis*, *sepsis bundles*, and *sepsis risk factors*. The search was conducted for the publication years 2011–2021. Inclusion criteria included studies from 2011 to present, sepsis core measures met, sepsis core measures not met, poor patient outcomes in sepsis treatment, nursing staff education, and full-text studies. Exclusion criteria included sepsis studies prior to 2011 and abstracts only studies.

## Analysis and Synthesis

There are many systems used for reporting, tracking, organizing, and analyzing the evidence. Key terms used with this project on sepsis education included *sepsis*, *core measures of sepsis*, *sepsis bundles*, *sepsis education*, and *sepsis risk factors*. Medical databases included in the project search included PubMed, CINAHL Plus with Full Text, EMBASE: Excerpta Medica Database, and the Cochrane Library.

Participants included all nursing staff in the emergency department within the facility. Participants included full-time, part-time, and as needed registered nurses. There were multiple education times that were offered to participants. Education was held over a 1-hour period on multiple shifts. The instrument used for evaluating the education was a 10-question

pretest/posttest. The instrument was developed by incorporating the Society of Critical Care Medicine (2021) guidelines as well as the Centers for Disease Control and Prevention (2021) guidelines for health care providers. The instrument is available in the appendix of this project.

Learning procedures included a PowerPoint presentation on current 1-hour sepsis bundle information. Included in the PowerPoint were new standards of care that are the consistent use of the 1-hour sepsis bundle and national statistics on sepsis. The emphasis of the education included the initiation of the 1-hour sepsis by the triage nurse when there is recognition of sepsis or septic shock. The education instrument for the DNP project incorporated the Surviving Sepsis Campaign 1-hour sepsis bundle. The bundle includes (a) measurement of lactate level and remeasure of lactate if initial lactate is elevated above 2 mmol/L, (b) blood cultures obtained before administering antibiotics, (c) broad spectrum antibiotics administered, (d) rapid administration of crystalloid fluids at 30 ml/kg for hypotension or a lactate equal or greater than 4 mmol/L, (e) use of vasopressors if patient is hypotensive during or after fluid resuscitation to maintain a mean arterial pressure equal to or greater than 65 mm Hg (Society of Critical Care Medicine, 2021).

I used a pretest and posttest for comparison of knowledge gained. Participants received a pretest that consisted of 10 multiple choice and true/false questions on the current national sepsis recommendations for the 1-hour sepsis bundle. The education was provided to the participants using an in-person PowerPoint presentation on the use of the 1-hour sepsis bundle. Participants were then offered time for questions about the education. After all presentation questions were answered, the 10-question posttest was administered.

The results of the project were analyzed using a paired *t* test to determine whether the difference in pretest and posttest results was statistically significant. The results were analyzed

by calculation of percentages for the answers provided for each question using an Excel spreadsheet and Microsoft software. The nursing education provided a base and continuation of knowledge for the improvement of sepsis identification and treatment in the rural emergency care setting.

There were procedures in place to ensure the integrity of the evidence, including approaches to managing outliers and missing information. Project effectiveness and value were reported and evaluated using three phases: planning, execution, and demonstration of value. I created plans to prepare managers and participants for training, posttraining support, accountability, and the evaluation tools that were used throughout the project to ensure success of the project (Kirkpatrick & Kirkpatrick, 2016). Many worthy training initiatives fail because something in the workplace environment sabotages application of the training or there are parts missing from the training (Kirkpatrick & Kirkpatrick, 2016). To limit sabotages in this project, I maximized program outcomes and my own contribution by positively influencing and continually reporting what happened throughout the project. During project implementation, plan modifications are likely and should be seen as an opportunity to keep the program on track and ensure that the project produces the intended results. Continuous improvement demands continuous evaluation (Kirkpatrick & Kirkpatrick, 2016).

## Summary

In this section, many aspects of the project were discussed. Section 3 included a description of the collection and analysis of the evidence. The practice-focused question was provided along with the sources of evidence. Section 3 also provided a description on how analysis and synthesis of the project were conducted. Section 4 covers the findings of the project,

implications of the findings, and recommendations from the data found in the implementation of the project.

## Section 4: Findings and Recommendations

There was a gap in knowledge on the use of the 1-hour sepsis bundle in a rural Midwest hospital. The emergency department nursing staff were not following the national guidelines that are included in the 1-hour sepsis bundle. This was leading to poor health outcomes for patients and generating less than optimal revenue for the hospital. Policies at the project site were outdated. Sepsis education was not included in the yearly education of the emergency department nursing staff. There was no accountability for the nursing staff on the identification and subsequent treatment of the emergency department patient who was presenting with signs and symptoms of sepsis. The practice-focused question of this project was the following: Does educating emergency department nursing staff on the 1-hour sepsis bundle increase knowledge?

The emergency department nursing staff lacked the knowledge they needed on the 1-hour sepsis bundle. The purpose of this project was to educate nursing staff in a small rural emergency department in the Midwest about core measures of sepsis identification that include the use of the 1-hour bundle for sepsis treatment. This project increased the emergency department nurse's knowledge on the 1-hour sepsis bundle.

New standards of care in emergency departments nationwide include the consistent use of the 1-hour sepsis bundle (Society of Critical Care Medicine, 2021). The sepsis 1-hour bundle may be initiated by the initial interaction of the triage nurse in the emergency department and the patient when the patient's initial vital signs are taken. Health care professionals who use the systemic inflammatory response syndrome criteria can identify the signs and symptoms of sepsis and implement the 1-hour sepsis bundle faster (Centers for Disease Control and Prevention,

2021). The 1-hour sepsis bundle includes (a) measurement of lactate level and remeasure of lactate if initial lactate is elevated above 2 mmol/L, (b) blood cultures obtained before administering antibiotics, (c) broad spectrum antibiotics administered, (d) rapid administration of crystalloid fluids at 30 ml/kg for hypotension or a lactate equal or greater than 4 mmol/L, (e) use of vasopressors if patient is hypotensive during or after fluid resuscitation to maintain a mean arterial pressure equal to or greater than 65 mm Hg (Society of Critical Care Medicine, 2021).

The project incorporated the use of a pretest and posttest for evaluation of knowledge gained. The instrument was well crafted and well thought out. Special care went into the design of the pretest/posttest questions The context validity for the pretest/posttest was maintained by ensuring that the test matched the learning objectives. Other areas that aided in determining the validity of the pretest/posttest included (a) test length, (b) clear direction on taking the test, (c) avoidance of poorly constructed test items, (d) no patterns of answers, (e) difficulty of the test matched with the difficulty of the tasks, (f) inclusion of experts in the development of test questions (Vector Solutions, 2020).

Participants completed a pretest that consisted of 10 multiple choice and true/false questions on the current national sepsis recommendations for the 1-hour sepsis bundle. The pretests/posttests were numbered Test 1 and Test 2. Test 1 was the pretest and Test 2 was the posttest. The nurses were instructed not to name themselves on the test but rather to use a letter or letters from the alphabet. Once a letter from the alphabet was used, it was taken off of the available list. This ensured that there were no duplicate tests. The education then was provided using an in-person PowerPoint presentation on the use of the 1-hour sepsis bundle and why it is so important for the triage nurse to use. The PowerPoint presentation took 25 minutes. Participants were then offered time for questions about the education that was provided. After all

of the questions about the training were answered, the 10-question posttest was completed by the nursing staff. The results of the tests were then interpreted by comparing pretest and posttest results using a paired *t* test. Date were analyzed by calculation of percentages for the answers provided for each question using an Excel spreadsheet and Microsoft software.

## Findings and Implications

The findings of the nursing staff education on the identification and use of the 1-hour sepsis bundle were significant. The pretest showed that the emergency department nursing staff had some knowledge of the 1-hour sepsis bundle but did not know the implications of the 1-hour sepsis bundle. The mean score of the pretest was 54%. This percentage showed a great need for sepsis knowledge within the emergency department nursing staff. The posttest was administered after the education on the 1-hour sepsis bundle. The scores increased to a mean of 94%. These findings showed that the project was a success in increasing emergency department nursing knowledge on the use and implementation of the 1-hour sepsis bundle (see Table 1).

### Findings

Results of the paired *t* test indicated that there was a significant difference between pretest results ($M = 54.3$, $SD = 14.8$) and posttest results ($M = 93.7$, $SD = 6.1$), $t(29) = 14.1$, $p < .001$.

**Table 1**

*Paired T-Test Nursing Education: 1-Hour Sepsis Bundle*

| Nurse | Pretest % | Posttest % | Difference |
|---|---|---|---|
| A | 50% | 100% | 50 |
| B | 50% | 100% | 50 |
| C | 80% | 90% | 10 |
| D | 60% | 100% | 40 |
| E | 70% | 90% | 20 |
| F | 20% | 100% | 80 |
| G | 50% | 90% | 40 |
| H | 40% | 80% | 40 |
| I | 50% | 90% | 40 |
| J | 60% | 90% | 30 |
| K | 70% | 100% | 30 |
| L | 70% | 90% | 20 |
| M | 30% | 90% | 60 |
| N | 50% | 100% | 50 |
| O | 40% | 90% | 50 |
| P | 60% | 90% | 30 |
| Q | 60% | 90% | 30 |
| R | 70% | 90% | 20 |
| S | 30% | 90% | 60 |
| T | 50% | 80% | 30 |
| U | 30% | 90% | 60 |
| V | 40% | 100% | 60 |
| W | 70% | 100% | 30 |
| X | 60% | 100% | 40 |
| Y | 70% | 100% | 30 |
| Z | 70% | 100% | 30 |
| AA | 50% | 100% | 50 |
| BB | 60% | 100% | 40 |
| CC | 60% | 90% | 30 |
| DD | 60% | 90% | 30 |

**Statistical Findings**

The two-tailed *p* value was less than 0.0001. The difference was considered to be statistically significant. The mean of the pretest minus posttest was -39.33. The 95% confidence interval of this difference was from -45.05 to -33.62. The intermediate values used in calculations were $t = 14.0829$ and $df = 29$ (see Table 2).

**Table 2**

*Statistical Findings*

| Group | Mean | *SD* | *SEM* | *N* |
|---|---|---|---|---|
| Pretest | 54.33% | 14.78 | 2.70 | 30 |
| Posttest | 93.67% | 6.15 | 1.12 | 30 |

## Limitations

One barrier that was unanticipated with the implementation of the project was time management of the nursing staff. The nursing staff were understaffed at the project site, and it was a busy time in the emergency department with the resurfacing of the pandemic. Staff needed education whenever they could fit it into their work life. This made education times challenging. I tailored the project education to include groups of nursing staff as small as three and provided education more frequently throughout the day and night. The education was tailored to on-demand versus large groups of nursing staff.

There were many implications that resulted from the findings in terms of individuals, communities, and institutions. This DNP project demonstrated that nursing staff have the ability to learn the 1-hour sepsis bundle and implement the education in their everyday practice. The project also revealed that the nursing staff want to learn about lifesaving procedures that include the 1-hour sepsis bundle. All of the emergency department nursing staff attended the education on a voluntary basis in hopes of increasing their knowledge of sepsis.

The hospital board of directors, CNO, CEO, and the emergency department director were impressed with the education and the results of the project. One of the most surprising findings to them was the mean scores of the pretest compared to the posttest. The hospital is now planning to use the education on the 1-hour sepsis bundle for their new hire nursing staff and for the yearly competencies.

## Implications for Positive Social Change

This DNP project showed many potential implications for positive social change in a small rural emergency department. Walden University (2021) defined positive social change as a deliberate process of creating and applying ideas, strategies, and actions to promote the worth, dignity, and development of individuals, communities, organizations, institutions, cultures, and societies. Sepsis is one of the leading causes of mortality in the United States and results in over 700,000 hospitalizations leading to over 200,000 deaths annually (Delawder & Hulton, 2019). Early identification and treatment of sepsis improves patient outcomes and saves lives (Delawder & Hulton, 2019). This project provided lifesaving education that was designed to increase nursing response times in using the 1-hour sepsis bundle. This project has the potential for saving many lives because of knowledge gained by frontline emergency department nursing staff.

## Recommendations

The gap in practice that was addressed in this project was a lack of knowledge among emergency department nursing staff on the use and implementation of the 1-hour sepsis bundle. Education on the 1-hour sepsis bundle should be used with all new nursing staff as well as with yearly nursing competencies in the hospital. The education should include the use of a PowerPoint presentation and an annual competency test to ensure learning has occurred. Protocols in the emergency department should also be updated to include the 1-hour sepsis bundle identifiers.

## Contribution of the Doctoral Project Team

The process of working with the doctoral project team was fluid thorough the implementation of the project. Team members knew their responsibilities and expectations. The project team helped facilitate teaching of emergency department nursing staff on the use of the 1-

hour sepsis bundle. The team included me and the director of the emergency department. My role was the educator and facilitator of the project. The emergency department director provided input on the curriculum and assisted with promoting the education within the project site.

The director of the emergency department aided in facilitation of the project. The director also assisted in developing the final recommendations that were provided to the CNO, CEO, and hospital board of directors. The hospital plans to extend the education that was provided in the DNP doctoral project by incorporating it into hospital education policy. The hospital will incorporate the sepsis education into the emergency department's yearly nursing competencies as well as their new hire nursing education.

## Strengths and Limitations of the Project

There were both strengths and limitations of the doctoral project. The pretest/posttest model was used for evaluation of the knowledge gained from the education. Advantages of the pretest/posttest model include multiple data points, accurate behavior measurement, and capture of factual information and skill set. The pretest/posttest model provides more information than a posttest only design because it is helpful in refocusing the information to be presented while providing a point of comparison (O'Leary & Israel, 2019). Limitations of the project included a small sample size of 30 participants. This sample proved adequate for a small rural hospital in the Midwest. Future studies may include a larger facility with more nursing staff to yield a larger sample.

## Section 5: Dissemination Plan

Dissemination plans for the project included sharing results of the project with the CNO, CEO, and hospital board of directors. This was done using a PowerPoint presentation on the education and results of the project. Handouts of the PowerPoint presentation and project results were also provided to the stakeholders.

### Analysis of Self

The DNP project proved to be a challenge. I had to manage home life, work two jobs as a nurse practitioner, and complete a doctoral degree. Time management was challenging. The implementation of the project also required me to become a project manager. The project took on a life of its own in the implementation phase.

There is a direct connection between this doctoral project experience, my present state, and my long-term professional goals. I currently practice as a nurse practitioner in an emergency department and a rural wound clinic. This project improved my practice as an educator to my nursing staff. The doctoral curriculum also improved my ability to recognize a practice problem and create solutions to the practice problem.

The completion of the project proved to be challenging. Solutions to the challenges included dedication of myself and family for gaining the highest degree in the nursing profession, gaining more time management skills, and developing raw determination to succeed. Insights gained on my scholarly journey included never giving up on myself, push myself past my abilities, and including my family in my journey for continued support.

### Summary

This project incorporated multiple aspects of cutting-edge nursing care that included delivering patient-centered care, delivering evidence-based medicine into everyday practice,

focusing on quality improvement, and working as part of interdisciplinary teams to increase practice knowledge. The nursing profession is expanding and maturing to meet the evolving needs of patients and health care delivery systems (Moran et al., 2017). This project proved to be an example that a doctoral project can benefit nursing knowledge and benefit patient-centered care.

## References

American Association of Colleges of Nursing. (2018). *The essentials of doctoral education for advanced nursing practice* [PDF]. https://www.aacnnursing.org/Portals/42/Publications/DNPEssentials.pdf

Centers for Disease Control and Prevention. (2020). *What is sepsis?* https://www.cdc.gov/sepsis/what-is-sepsis.html

Centers for Disease Control and Prevention. (2021, September 30). *Sepsis: Healthcare professional information*. https://www.cdc.gov/sepsis/education/hcp-resources.html

Coiner, S. E., & Wingo, N. P. (2021). Addressing gaps in nurses' knowledge of sepsis: A literature review. *The Journal of Continuing Education in Nursing*, *52*(1), 43–46. https://doi.org/10.3928/00220124-20201215-11

Delaney, M. M., Friedman, M. I., Dolansky, M. A., & Fitzpatrick, J. J. (2015). Impact of a sepsis educational program on nurse competence. *Journal of Continuing Education in Nursing*, *46*(4), 179–186. https://doi.org/10.3928/00220124-20150320-03

Delawder, J. M., & Hulton, L. (2019). An interdisciplinary code sepsis team to improve sepsis-bundle compliance: A quality improvement project. *Journal of Emergency Nursing*. https://doi.org/10.1016/j.jen.2019.07.001

Divatia, J., & Khan, P. (2010). Severe sepsis bundles. *Indian Journal of Critical Care Medicine*, *14*(1), 8. https://doi.org/10.4103/0972-5229.63028

Educational Technology. (2018). *ADDIE Model: Instructional design*. https://educationaltechnology.net/the-addie-model-instructional-design/

HPU Libraries. (2020). *Doctor of nursing practice (DNP): Literature review*. https://hpu.libguides.com/c.php?g=543891&p=3727230

Johns Hopkins Medicine. (2020). *Patient safety and quality*. https://www.hopkinsmedicine.org/patient_safety/core_measures.html

Kirkpatrick, J. D., & Kirkpatrick, W. K. (2016). *Kirkpatrick's four levels of training evaluation* (1st ed.). Association For Talent Development.

LaRosa, J. A., Ahmad, N., Feinberg, M., Shah, M., DiBrienza, R., & Studer, S. (2012). The use of an early alert system to improve compliance with sepsis bundles and to assess impact on mortality. *Critical Care Research & Practice*, *2012*(1), 1–8. https://doi.org/10.1155/2012/980369

Mohr, N. M., Harland, K. K., Shane, D. M., Ahmed, A., Fuller, B. M., Ward, M. M., & Torner, J. C. (2017). Rural patients with severe sepsis or septic shock who bypass rural hospitals have increased mortality. *Critical Care Medicine*, *45*(1), 85–93. https://doi.org/10.1097/ccm.0000000000002026

Moran, K., Burson, R., & Conrad, D. (2017). *The doctor of nursing practice scholarly project: A framework for success* (2nd ed.). Jones & Bartlett Learning.

O'Leary, J. L., & Israel, G. D. (2019, May 22). *Capturing change: Comparing pretest-posttest and retrospective evaluation methods*. University of Florida. https://edis.ifas.ufl.edu/publication/WC135

Oxford University Press. (2020). *Definition of sepsis*. https://www.lexico.com/en/definition/sepsis

Paoli, C. J., Reynolds, M. A., Sinha, M., Gitlin, M., & Crouser, E. (2018). Epidemiology and costs of sepsis in the united states—an analysis based on timing of diagnosis and severity level*. *Critical Care Medicine*, *46*(12), 1889–1897. https://doi.org/10.1097/ccm.0000000000003342

Rhee, C., & Klompas, M. (2020). Sepsis trends: increasing incidence and decreasing mortality, or changing denominator? *Journal of Thoracic Disease, 12*(1), S89–S100. https://doi.org/10.21037/jtd.2019.12.51

Simmons, B. (2010). Clinical reasoning: Concept analysis. *Journal of Advanced Nursing*, *66*(5), 1151–1158. https://doi.org/10.1111/j.1365-2648.2010.05262.x

Smith, D. (2003). Five principles for research ethics. *Monitor on Psychology*, *34*(1). http://www.apa.org/monitor/jan03/principles.html

Society of Critical Care Medicine. (2021). *Surviving sepsis campaign 2021 Adult guidelines*. Society of Critical Care Medicine (SCCM). https://www.sccm.org/SurvivingSepsisCampaign/Guidelines/Adult-Patients

Terry, A. J. (2018). *Clinical research for the doctor of nursing practice* (3rd ed.). Jones & Bartlett Learning.

United States Census Bureau. (2019). *Quick facts: Canton city, Illinois*. https://www.census.gov/quickfacts/cantoncityillinois

Vector Solutions. (2020, May 18). *Writing better test for job training: The issues of reliability and validity*. https://www.vectorsolutions.com/resources/blogs/writing-better-tests-for-job-training-reliability-validity/

Walden University. (2021). *Social Change.* https://www.waldenu.edu/why-walden/social-change

Whitfield, P. L., Ratliff, P. D., Lockhart, L. L., Andrews, D., Komyathy, K. L., Sloan, M. A., & Judd, W. R. (2019). Implementation of an adult code sepsis protocol and its impact on SEP-1 core measure perfect score attainment in the ED. *The American Journal of Emergency Medicine*. https://doi-org.ezp.waldenulibrary.org/10.1016/j.ajem.2019.07.002

Zaccagnini, M. E., & White, K. W. (2017). *The doctor of nursing practice essentials: A new model for advanced practice nursing* (3rd ed.). Jones & Bartlett.

# Appendix: 1-Hour Sepsis Bundle Pre/Posttest

1. What is sepsis?
    a. A medical condition that is treated in the hospital setting with diuretics and potassium if indicated
    b. A disease that does not have a cure
    c. The body's extreme response to an infection
    d. All of the above
2. What are the signs and symptoms of sepsis? (Select all that apply)
    a. High heart rate, shortness of breath, decreased blood pressure
    b. Disorientation, confusion
    c. Focal dystonia
    d. Sweaty, clammy skin
    e. Tinnitus, loss of hearing
    f. Fever, pain, discomfort
3. Sepsis is not a medical emergency. Initiation of the sepsis bundle by the emergency department team upon the recognition of sepsis is key to improving patient outcomes.
    a. True
    b. False
4. What are the key components to the one-hour sepsis bundle? (Select all that apply)
    a. Administer broad spectrum antibiotics
    b. Begin rapid administration of 30 mL/kg crystalloid for hypotension or lactate equal to or greater than 4 mmol/L
    c. Measure lactate level

d. Administration of pain medication

e. Obtain blood cultures before administration of antibiotics

f. Nitroglycerin drip at 5-10 mcg/min

g. Apply vasopressors if hypotension during or after fluid resuscitation to maintain a mean arterial pressure equal to or greater than 65 mm Hg

5. There is no need to remeasure the lactate level if the initial level is greater than 2mmol/L

   a. True

   b. False

6. 1 in 30 patients who die while in the hospital have sepsis.

   a. True

   b. False

7. How many adults in America develop sepsis each year?

   a. 200,000

   b. 25,000

   c. 1.7 million

   d. 175,000

8. How many Americans die as each year as a result of sepsis?

   a. 1.2 million

   b. 270,000

   c. 24,000

   d. 130,000

9. Sepsis, or the infection causing sepsis, starts outside of the hospital what percentage of the time?

a. 50%

b. 25%

c. 87%

d. 100%

10. Who is at risk for sepsis? (Select all that apply)

a. Pediatric patients age 2 or older

b. Adults 65 or older

c. Males between the ages of 18-55

d. People with a weakened immune system

e. People with chronic medical conditions