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## **Streamlining Sepsis Care and Enhancing Antibiotic Administration Efficiency Through Emergency Department Staff Nurse Education**

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# Walden University

College of Nursing

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Dafina Jamillah Skinner

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2025

Executive Summary: Staff Education Project  
Streamlining Sepsis Care and Enhancing Antibiotic Administration Efficiency Through  
Emergency Department Staff Nurse Education

by

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MS, Walden University, 2018

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Executive Summary Submitted in Partial Fulfillment  
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## Summary

Sepsis is a life-threatening medical emergency that requires rapid identification and treatment. Delays in administering antibiotics are directly associated with increased mortality, longer hospital stays, and higher complication rates. Without intervention, patients faced preventable harm, and the organization risked continued non-compliance with federal quality measures. This Doctor of Nursing Practice (DNP) project implemented a structured educational program for emergency department (ED) nurses to improve knowledge of evidence-based sepsis protocols. The practice-focused question asked: For nurses in the ED, will an educational intervention on sepsis recognition and antibiotic stewardship improve knowledge of timely antibiotic administration and blood culture acquisition? Twenty ED nurses completed the program. Pre-test scores averaged 80%, whereas post-test scores increased to 99%, demonstrating a 19-percentage point gain in knowledge scores.

This gain represents more than academic progress, it reflects potentially the capacity for nurses to identify sepsis earlier, administer antibiotics promptly, and prevent deterioration. The findings confirm that staff education is a powerful and sustainable intervention for increasing staff knowledge, leading to reducing treatment delays and improving patient outcomes. Standardized education has potential to ensure that all patients, regardless of background or socioeconomic status, receive equitable, high-quality treatment, while also equipping a diverse nursing workforce with the skills needed to provide culturally competent and inclusive care.

## **Background**

Sepsis is among the leading causes of death worldwide, accounting for one in five deaths annually (Rudd et al., 2020). Evidence demonstrates that for every hour of delay in antibiotic administration, mortality risk increases significantly (Hatozaki et al., 2021). At the project site, Severe Sepsis Bundle (SEP-1) compliance was only 35.42%. SEP-1 is a CMS-mandated quality measure requiring hospitals to complete a series of time-sensitive interventions for sepsis patients, including early lactate measurement, timely blood cultures, prompt administration of broad-spectrum antibiotics, and fluid resuscitation within 3 hours. Compliance at 35.42% meant that in nearly two thirds of cases, patients were not receiving the full evidence-based standard of care within the critical timeframe, placing them at substantially higher risk of deterioration and death.

Project site leaders had expressed concern that this low compliance rate was based on staff knowledge on the importance of using approved sepsis protocols within the SEP bundle. Literature supports the effectiveness of structured education in improving bundle adherence and reducing mortality (Chen et al., 2025). Conversely, when education and protocols are absent, patients often experience harmful delays due to ED overcrowding, workflow inefficiencies, or staff uncertainty (Filbin et al., 2020). By targeting nurses, the clinicians most often responsible for timely cultures and antibiotic administration, this project directly addressed a high-impact leverage point in the care pathway.

### **Staff Education Project Development**

This project was guided by the Johns Hopkins Evidence-Based Practice (JHNEBP) model and the Plan-Do-Study-Act (PDSA) framework, chosen for their ability to systematically translate evidence into practice and test changes in dynamic clinical

environments (Dang & Dearholt, 2022). Preliminary input was obtained from key stakeholders, including nursing leadership, the pharmacy director, and ED leadership, to ensure alignment with organizational priorities. The project targeted an ED in Mississippi and implemented an evidence-based, asynchronous educational intervention via a structured PowerPoint (see Appendix A). Nurses were given 2 weeks to complete the training, accommodating all rotations, including day and night shifts. Content emphasized early sepsis recognition, SEP-1 bundle adherence, proper sequencing of blood cultures before antibiotics, transitioning from broad- to narrow-spectrum antibiotics, and the use of electronic health record prompts to support clinical decision-making.

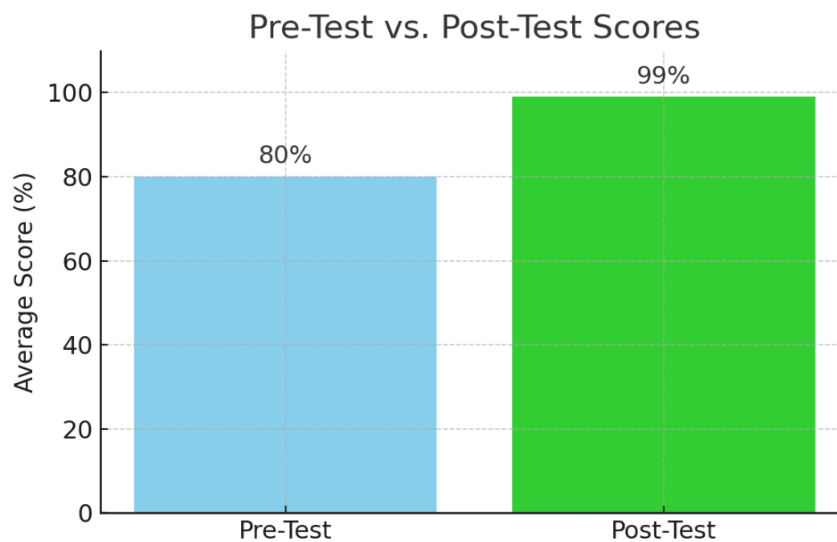
Pre- and post-test questions were developed based on a thorough review of evidence-based literature and input from ED leadership and facility infection control and quality personnel. Following site approval, stakeholder consultation, and acknowledgment of the Walden University Ethics Pledge, 20 targeted ED staff nurses were invited via email, with learning objectives and materials presented through the PowerPoint presentation. Nurses anonymously completed a 15-question multiple-choice pre-test (see Appendix B), provided in labeled envelopes for collection by the project leader, prior to starting the training. Upon completion, the ED staff nurses again anonymously completed the same 15 questions in the form of the multiple-choice post-test (see Appendix B) and returned it in the labeled envelope. The PDSA cycle guided evaluation, with pre- and post-tests assessing knowledge acquisition, allowing measurement of the program's educational effectiveness.

## Results

The project yielded a notable increase in nursing knowledge, with average scores rising from 80% correct total score on the pre-test to 99% on the post-test, representing a 19% percentage point gain in mean score. This improvement exceeds the 10%–15% gains commonly reported in similar sepsis education studies (Rechter et al., 2022). Nurses also reported enhanced confidence in recognizing early signs of sepsis and accurately sequencing blood cultures, both of which are critical for timely clinical intervention. Evidence indicates that improved nursing knowledge in these areas contributes directly to faster initiation of treatment and a reduction in sepsis-related mortality (Gomez et al., 2025). Figure 1 illustrates these data, comparing the pre- and post-test results.

**Figure 1**

*ED Nurse Knowledge Scores*



*Note.* ED staff nurses' knowledge scores: pre- vs. post-test comparison.

The intervention addressed previously identified gaps in the hospital's SEP-1 compliance metrics, specifically targeting delays in lactate measurement, culture sequencing, and antibiotic administration. By delivering structured, evidence-based education, the project strengthened nurses' clinical competencies and provided the ED with a replicable model for improving sepsis care. Through increasing education, this approach may reinforce adherence to SEP-1 bundles and support consistent application of evidence-based practices, ultimately promoting better patient outcomes.

### **Limitations and Their Impact on Results**

This project had some limitations that should be considered when interpreting the results. It was conducted within a single ED with a limited sample size, which could affect the applicability of findings in different contexts. The fast-paced and unpredictable nature of the ED environment, along with varying shift schedules, occasionally affected staff participation and engagement during the educational sessions. The limited timeframe of the project restricted the evaluation of long-term knowledge retention and ongoing changes in practice. Additionally, the pre- and post-test design may have introduced testing bias, as participants could recall content from the initial assessment. Differences in staff experience levels and workload demands may also have influenced individual learning outcomes.

Beyond the local clinical setting, the project has broader implications. It demonstrates that structured, evidence-based asynchronous education can meaningfully enhance both knowledge and confidence among nurses managing sepsis. This framework offers a scalable strategy for other hospitals and EDs seeking to improve SEP-1 compliance, strengthen clinical decision-making, and reduce preventable sepsis-related

mortality. By bridging knowledge gaps and reinforcing best practices, the project highlights the potential for targeted staff education to effect measurable, sustainable improvements in patient care at both institutional and systemic levels.

### **Significance Beyond the Local Site**

Beyond the immediate project site, this initiative illustrates how evidence-based nursing education can have far-reaching implications for social change. Timely, standardized care reduces preventable deaths, minimizes disparities in emergency care delivery, and decreases the financial burden associated with prolonged hospitalizations (Lane et al., 2024). By promoting adherence to evidence-based practices, the project supports diversity, equity, and inclusion, ensuring that all patients—regardless of race, ethnicity, age, or socioeconomic status—receive prompt and effective interventions.

### **Conclusions**

This DNP project demonstrates the significant impact of targeted staff education in closing practice gaps in sepsis care. The marked improvement in ED nurses' knowledge confirms that structured educational interventions are both feasible and effective for enhancing patient safety. Without such initiatives, delays in sepsis recognition and treatment would likely have persisted, negatively affecting patient outcomes and potentially undermining the organization's quality of care and reputation. The project highlights that educational interventions are not merely supportive but central to maintaining high standards of clinical practice and ensuring that evidence-based protocols are consistently applied.

### **Recommendations for Further Action**

Recommendations include integrating sepsis education into nurse orientation programs and annual competency requirements, reinforcing adherence through electronic health record prompts, and tracking sepsis-related metrics within organizational quality dashboards. Specific clinical measures, such as time to first antibiotic administration, completion of sepsis bundles within 1 hour, and early recognition of organ dysfunction, require strong leadership engagement, interdisciplinary collaboration among nursing, pharmacy, and physician teams, and regular audits of outcomes to ensure that knowledge gains translate into measurable clinical improvements (Nauc er et al., 2021).

### **Implications for Nursing Practice and Social Change**

This project underscores the professional benefits of knowledge-driven practice improvements. Empowering nurses with enhanced clinical skills and confidence fosters professional growth, improves job satisfaction, and strengthens the culture of patient safety within the organization. It also reinforces the role of nurses as change agents who can lead practice improvements, advocate for vulnerable populations, and model evidence-based care across clinical settings. Structured education initiatives such as this one create a sustainable approach to quality improvement that can be adapted to other units or institutions facing similar care challenges. This project demonstrates that education is not optional but essential for improving patient outcomes, promoting equity in care, and advancing systemic improvements in healthcare delivery. By closing knowledge gaps and applying evidence-based practices, healthcare organizations can deliver safer, more equitable care and enable nurses to help shape high-quality, patient-centered health systems.

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**Appendix A: PowerPoint Presentation**

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**STREAMLINING SEPSIS CARE: ENHANCING ANTIBIOTIC  
ADMINISTRATION EFFICIENCY IN THE EMERGENCY  
DEPARTMENT**

PROJECT LEAD: DAFINA SKINNER, MSN, APRN

DNP CANDIDATE WALDEN UNIVERSITY

PROJECT EDUCATION DATA

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**SEPSIS EDUCATION FOR  
HEALTHCARE PROVIDERS**





**BEST PRACTICES: INCREASING STAFF KNOWLEDGE THROUGH SEPSIS EDUCATION**

**THE CRITICAL NEED FOR SEPSIS STEWARDSHIP IN THE EMERGENCY DEPARTMENT:**

- Sepsis is a leading cause of morbidity and mortality in hospitals.
- Timely recognition and treatment of sepsis can significantly improve patient outcomes.
- Our hospital has experienced challenges with sepsis management , resulting in adverse patient outcomes and increased length of stay.



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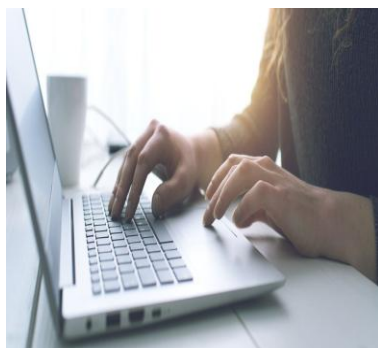
## INTRODUCTION:

- Sepsis is a medical emergency that demands swift recognition and treatment. This lifethreatening condition can arise from an infection, triggering a chain reaction that can lead to organ failure, shock, and even death. The stakes are high, and every minute counts. Early antibiotic administration is crucial in halting the progression of sepsis and improving patient outcomes. As healthcare providers, you are on the frontlines of this battle, and your prompt action can mean the difference between life and death.



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## BENEFITS OF 1-HOUR BUNDLE COMPLIANCE



### Benefits of Bundle Compliance

- Improved patient outcomes
- Reduced mortality and morbidity
- Enhanced Quality of Care : Bundles promote evidence-based quality of care.
- Improved communication: Bundle compliance fosters effective communication among healthcare teams, reducing errors and miscommunication.
- Increased patient safety: minimization of the risk of adverse events and ensure patient safety.



## SIGNS AND SYMPTOMS OF SEPSIS

- **Hallmark Presentations**
  - Fever
  - Tachycardia
  - Hypotension
- **Other signs and Symptoms:**
  - Altered Mental Status
  - Skin Signs: Mottling
  - Increased oxygen requirements: tachypnea
  - Decreased Urine Output

## **BLOOD CULTURES BEFORE ANTIBIOTICS**

### **Obtaining Blood Cultures Before Antibiotics**



- Blood cultures should be obtained before administering antibiotics whenever possible.
- Administering antibiotics before drawing blood cultures can lead to false-negative results.
- Blood culture results allow clinicians to target therapy and reduce antimicrobial resistance.
- Nursing staff is responsible for proper collection of blood cultures.
- Collect two samples from two different sites.

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## ANTIBIOTIC ADMINISTRATION BY ED NURSING STAFF

### Timely Antibiotic Administration

- Administer antibiotics as soon as possible after sepsis recognition.
- Use broad-spectrum (i.e. Piperacillin) antibiotics initially and once culture results are available and interpreted by the Provider de-escalate to narrow spectrum ( i.e. Vancomycin) antibiotics as ordered.
- Monitor for adverse reactions and adjust therapy as needed.



## MEAN ARTERIAL PRESSURE (MAP)

### **The Importance of MAP in Sepsis Management**

- MAP is a critical component of Sepsis Management
- A MAP of  $\geq$  65mmHg is recommended to ensure adequate organ perfusion
- Vasopressors may be necessary to maintain MAP goals.

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## **LACTATE LEVELS IN SEPSIS**

- Lactate levels can be used to monitor the effectiveness of treatment
- Elevated lactate levels can indicate tissue hypoxia.
- Lactate levels can be used to guide fluid resuscitation and other therapies

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## **TIMELY ANTIBIOTIC ADMINISTRATION IN THE ED**

### **ADMINISTERING ANTIBIOTICS IN THE ED: A CRITICAL COMPONENT OF SEPSIS CARE**

ADMINISTERING ANTIBIOTICS AS SOON AS POSSIBLE AFTER SEPSIS RECOGNITION IS CRITICAL TO IMPROVING PATIENT OUTCOMES IN THE ED

\*\* ANTIBIOTICS SHOULD BE BROUGHT TO THE PATIENT'S BEDSIDE, EVEN IF THE PATIENT IS UNDERGOING IMAGING STUDIES (E.G., CT SCAN)

**- TIMELY ANTIBIOTIC ADMINISTRATION CAN REDUCE MORTALITY AND MORBIDITY IN PATIENTS WITH SEPSIS**

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## SEPSIS CARE SUMMARY

### Recognizing Sepsis

Timely recognition of sepsis involves knowing and reporting the signs and symptoms, including changes in vitals.

### Sepsis Bundles

Adhering to sepsis bundles is essential for improving patient outcomes and involves following a standardized set of procedures.

### Timely Antibiotic Administration

Administering antibiotics promptly upon suspicion of sepsis is critical to treat the underlying infection effectively.

### Fluid Resuscitation and MAP Management

Fluid resuscitation and managing mean arterial pressure (MAP) are key components in stabilizing sepsis patients.



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## SEPSIS STEWARDSHIP

### Importance of Staff Education

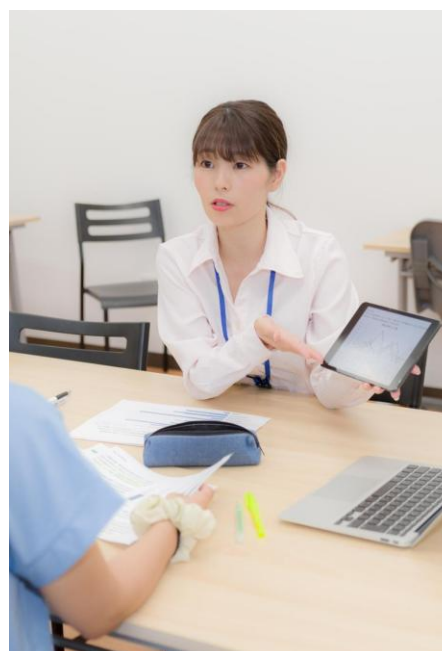
Equipping nursing staff with essential knowledge is vital to address sepsis stewardship gaps in emergency departments.

### Adherence to Guidelines

Staff education enhances adherence to evidence-based sepsis guidelines, driving effective change in emergency care.

### Continuous Training

Ongoing training and reinforcement of recommended practices are crucial for improving sepsis care standards.



## **Appendix B: Teaching Materials and Deliverables**

### **Pre and Post-Tests**

Streamlining Sepsis Care and Enhancing Antibiotic Administration Efficiency Through  
Emergency Department Staff Nurse Education

#### **Sepsis Care and Antibiotic Administration Knowledge Assessment**

Introduction:

Thank you for participating in this survey. Your responses will help us understand your current knowledge and practices regarding sepsis care and antibiotic administration.

All responses will be kept confidential.

#### **Pre and Post Tests**

1. What is the primary goal of sepsis stewardship in the emergency department?
  - a) To reduce hospital-acquired infections
  - b) To improve patient satisfaction
  - c) To promptly recognize and treat sepsis
  - d) To reduce hospital costs
  
2. Which of the following is a hallmark presentation of sepsis?
  - a) Bradycardia
  - b) Hypertension
  - c) Fever and tachycardia
  - d) Hypothermia and bradypnea
  
3. According to the Surviving Sepsis Campaign guidelines, what is the recommended time frame for administering antibiotics in patients with sepsis?
  - a) Within 1 hour of recognition
  - b) Within 2 hours of recognition
  - c) Within 3 hours of recognition
  - d) Within 6 hours of recognition

4. What is the purpose of obtaining blood cultures before administering antibiotics in patients with sepsis?

- a) To determine the effectiveness of antibiotics
- b) To identify the causative pathogen and target therapy
- c) To monitor for antibiotic resistance
- d) To assess the severity of sepsis

5. Which of the following is a key component of the CMS SEP-1 measure for sepsis?

- a) Administering antibiotics within 1 hour of recognition
- b) Obtaining blood cultures before antibiotics
- c) Providing fluid resuscitation
- d) All of the above

6. What is the definition of sepsis according to the Sepsis-3 definition?

- a) A suspected or confirmed infection with organ dysfunction
- b) A suspected or confirmed infection without organ dysfunction
- c) A confirmed infection with organ failure
- d) A suspected infection without organ dysfunction

7. Which of the following vital signs is most indicative of sepsis?

- a) Temperature  $> 38^{\circ}\text{C}$
- b) Heart rate  $> 90$  beats per minute
- c) Respiratory rate  $> 20$  breaths per minute
- d) All of the above

8. What is the recommended initial treatment for patients with sepsis?

- a) Broad-spectrum antibiotics
- b) Narrow-spectrum antibiotics
- c) Fluid resuscitation alone
- d) Vasopressor therapy

9. How often should blood cultures be obtained in patients with sepsis?

- a) Once daily
- b) Every 12 hours
- c) At least two sets from different sites
- d) Only if the patient is not responding to treatment

10. What is the benefit of de-escalating antibiotics in patients with sepsis?

- a) Reduced risk of antibiotic resistance
- b) Increased risk of clostridium difficile infection
- c) Improved patient outcomes
- d) Reduced cost of care

11. Which of the following is a sign of organ dysfunction in sepsis?

- a) Increased urine output
- b) Decreased creatinine levels
- c) Increased lactate levels
- d) Normal blood pressure

12. What is the role of lactate levels in sepsis management?

- a) To diagnose sepsis
- b) To monitor the effectiveness of treatment
- c) To predict patient outcomes
- d) To guide fluid resuscitation

13. According to the Surviving Sepsis Campaign guidelines, what is the recommended target for mean arterial pressure (MAP) in patients with sepsis?

- a) > 60 mmHg
- b) > 65 mmHg
- c) > 70 mmHg
- d) > 75 mmHg

14. Which of the following is a potential consequence of delayed antibiotic administration in patients with sepsis?

- a) Improved patient outcomes
- b) Reduced risk of organ dysfunction
- c) Increased risk of mortality
- d) Reduced length of stay

15. What is the primary benefit of sepsis stewardship programs in hospitals?

- a) Reduced hospital costs
- b) Improved patient satisfaction
- c) Reduced morbidity and mortality
- d) Increased use of antibiotics