Increasing Sepsis-Bundle Adherence on a Medical-Surgical/Telemetry Unit: A Quality Improvement Project

Tiffany Liu

University of San Francisco, tiffanyliu61@gmail.com

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Increasing Sepsis-Bundle Adherence on a Medical-Surgical/Telemetry Unit: A Quality Improvement Project

Tiffany Liu, RN

University of San Francisco, School of Nursing and Health Professions

N653: Quality Improvement Internship

Nneka Chukwu, DNP-HCSL, MBA, RN, CLNC

May 16, 2023
Table of Contents

Section I: Abstract .......................................................................................................................... 4

Section II: Introduction .................................................................................................................. 6

  Problem Description .................................................................................................................. 7
  Literature Review ....................................................................................................................... 8
  Rationale ..................................................................................................................................... 10
  Specific Project Aim ................................................................................................................. 11

Section III: Methods .................................................................................................................... 11

  5 P’s Assessment .................................................................................................................. 12
  Root Cause Analysis ............................................................................................................. 12
  Strengths, Weaknesses, Opportunities, and Threats Analysis ............................................. 13
  Action Plan: PDSA Cycle and Gantt Chart ........................................................................ 14
  Intervention ............................................................................................................................ 15
  Study of the Intervention and Measures .......................................................................... 16
  Ethical Considerations ......................................................................................................... 16

Section IV: Results ....................................................................................................................... 17

Section V: Discussion .................................................................................................................. 19

  Summary .................................................................................................................................. 19
  Conclusion ............................................................................................................................... 20

Section VI: References ................................................................................................................. 21

Section VII: Appendices ............................................................................................................... 24

  Appendix A: 5 P’s Assessment ............................................................................................... 24
Appendix B: Root Cause Analysis/Fishbone Diagram .................................................. 25
Appendix C: Strengths, Weaknesses, Opportunities, and Threats Analysis ............... 26
Appendix D: Plan-Do-Study-Act Cycle ....................................................................... 27
Appendix E: Gantt Chart ............................................................................................. 28
Appendix F: Sepsis Education Questionnaire ............................................................. 29
Appendix G: Statement of Determination .................................................................... 31
Appendix H: Evidence-based Change of Practice Project Checklist ......................... 32
Appendix I: Questionnaire Quantitative Results ......................................................... 33
Appendix J: Cost-Benefit Analysis .............................................................................. 34
Abstract

**Problem:** Sepsis is a life-threatening complication of infection that can lead to tissue damage, organ dysfunction, and death. Early recognition and intervention are crucial in the management of sepsis. Delays in sepsis care can lead to adverse health outcomes and even death. Sepsis bundles are guided by evidence-based practice. They serve as guidelines for effective and timely management of sepsis. Adherence to these sepsis bundles is associated with overall improved morbidity and mortality.

**Context:** This quality improvement project was led by Clinical Nurse Leader (CNL) students from the University of San Francisco. It was implemented at a 244-bed not-for-profit hospital located in the San Francisco Bay Area, focusing on the medical-surgical/telemetry unit. The patient population within this microsystem consists of adults over the age of 18, commonly diagnosed with conditions such as sepsis, congestive heart failure (CHF), electrolyte imbalance, and alcohol withdrawal.

**Intervention:** The primary intervention involves administering a questionnaire on sepsis education and identifying gaps in sepsis intervention implementation. This initiative aims to enhance comprehension of the effectiveness of sepsis education among nurses, serving as the foundation for recommended future changes that are anticipated to increase nurse sepsis-bundle compliance.

**Measures:** Measures encompassed sepsis education/bundle training and its effectiveness, accessibility of the electronic Cardiac Arrest Risk Triage (eCART), barriers to sepsis-bundle compliance, the effectiveness of the rapid response process, and recommendations for enhancing sepsis-bundle compliance.
Results: With 36 responses, the questionnaire had a 67% response rate. Key findings included: 17% of nurses have not received sepsis training, 50% of nurses that did receive training found that the training method was effective, 89% of nurses felt that rapid response is effective when managing the care of sepsis patients, all nurses found the eCART to be easily accessible, and many nurses reported a need for refresher training courses as well as visual aids of the sepsis protocol available on the floor.

Conclusions: Increased sepsis-bundle compliance is a priority for this microsystem given the various gaps in sepsis care discovered. Bundle adherence can significantly decrease in-hospital mortality. The questionnaires administered to the nursing staff revealed a need for annual sepsis training, visual aids, and a simplified sepsis protocol. Data analysis and research in evidence-based practices provided the foundation for recommendations on how this microsystem can improve sepsis-bundle compliance and patient outcomes.

Keywords: sepsis, septic shock, eCART, guideline bundle adherence, sepsis therapy, nursing protocol, quality improvement
Increasing Sepsis-Bundle Adherence on a Medical-Surgical/Telemetry Unit: A Quality Improvement Project

Sepsis is a life-threatening complication of infection that can cause tissue damage and organ dysfunction. In severe cases, sepsis can cause failure in multiple organ systems, leading to death. The onset of sepsis can be unpredictable and progress rapidly (Gyawali et al., 2029). As a result, it is one of the leading causes of death in hospitals among patients worldwide (Schlapbach et al., 2020). According to the Centers for Disease Control and Prevention (CDC), over 1.7 million adults in the United States develop sepsis every year, and 1 in 3 deaths during hospitalization is attributed to sepsis (Centers for Disease Control and Prevention [CDC], 2022). The World Health Organization (WHO) recognizes sepsis as a global health priority due to the massive burden sepsis has imposed on global health (Chua et al., 2022).

Sepsis is a serious medical emergency. However, it can be treatable and preventable with early diagnosis and timely appropriate treatment. Extensive literature on sepsis management demonstrates that prompt recognition and treatment of sepsis within three hours and septic shock within one hour leads to a significantly increased likelihood of survival from sepsis and better patient outcomes. (Schlapbach et al, 2020). Delaying treatment for patients with sepsis can be detrimental, potentially leading to further deterioration. Each hour delay in sepsis treatment can increase mortality risk by an additional 4-9% (American Association of Critical-Care Nurses, 2023).

Sepsis can devastate patients and is a significant challenge for healthcare systems. It is a critical condition associated with a range of adverse health outcomes. Length of stay, readmission, and mortality are all higher among septic patients compared to patients treated for other conditions. In a comprehensive review conducted by Hajj et al. (2018), researchers found
that the average length of stay for sepsis patients was 75% longer than patients hospitalized with other conditions. Additionally, a study investigating the readmission rate among sepsis survivors revealed a high readmission rate of 18-26% (Goodwin & Ford, 2018). The mortality rate for sepsis patients is remarkably high. Sepsis patients were found to be eight times more likely to die during hospitalization compared to patients without sepsis (Hajj et al., 2018). Survivors of severe sepsis or septic shock are also at risk of developing post-sepsis syndrome which is characterized by cognitive and functional disabilities that decrease quality of life (Goodwin & Ford, 2018). Furthermore, sepsis is relatively expensive to treat, surpassing the costs of treatment for patients with congestive heart failure and acute myocardial infarction. When examining sepsis data, researchers found that the estimated admission cost of severe sepsis was $45,000 and the estimated total outpatient and pharmacy costs for sepsis survivors was $1,300 (Goodwin & Ford, 2018). These findings highlight the importance for hospitals to implement strategies aimed at improving prevention, sepsis recognition, and timely intervention to significantly reduce morbidity, mortality, and costs associated with this critical condition.

**Problem Description**

Hospital Z is a large not-for-profit healthcare system serving two San Francisco Bay Area counties. This institution is a 244-licensed bed hospital specializing in cardiovascular care, including open heart surgery and interventional cardiology. Administrative stakeholders at Hospital Z have identified that the current mortality rate surpasses established benchmarks, and this has been attributed to gaps in sepsis intervention. Gaps in sepsis intervention included lack of repeated serum lactate testing, delays in administering appropriate fluid volume, and incomplete blood culture tests prior to antibiotic administration. Furthermore, over the past 18 months, the hospital has hired 80 new graduate nurses who may have limited experience with
Increasing Sepsis-Bundle Adherence

sepsis protocol, potentially contributing to inappropriate sepsis care. As a result, administrative stakeholders have identified increased sepsis-bundle compliance as an organizational priority in 2023.

Hospital Z has implemented its sepsis bundle for early identification of sepsis and post sepsis complications based on guidelines from the Surviving Sepsis Campaign. The electronic cardiac arrest risk triage (eCART) scoring system is employed as the criteria for suspecting infection. It is a machine learning model/early warning system with currently the highest accuracy in identifying high-risk patients with sepsis (Churpek et al., 2017). The eCART scoring system is integrated into the electronic health record (EHR) system where nursing assessments and documentation are completed. A rapid response team is available when deteriorating septic patients require stabilizing interventions. During initial orientation, an online education program on this sepsis bundle is provided to nursing staff. This quality improvement project was conducted within the 32-bed medical-surgical/telemetry unit. After assessing multiple units in the hospital, it was concluded that the medical-surgical/telemetry unit presented the most significant potential for change, considering the identified unit-specific gaps. Thus, this quality improvement project is dedicated to optimizing sepsis interventions and limiting morbidity and mortality among patients in the medical-surgical/telemetry unit that are diagnosed with or at risk of sepsis.

Literature Review

The PICOT question used to guide the literature search and synthesis of evidence for this sepsis bundle project asks: Does increased sepsis education provided to registered nurses (I) improve sepsis bundle compliance and decrease sepsis-related morbidity/mortality rates (O) for
Increasing Sepsis-Bundle Adherence

patients admitted to the medical-surgical/telemetry unit (P) compared to no sepsis education (C) in three months (T)?

A comprehensive literature review was conducted to examine the effect of sepsis-bundle compliance on patient outcomes as well as strategies to increase bundle compliance. The databases searched included the Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, and Google Scholar. Inclusion criteria for the search included the keywords: sepsis, septic shock, sepsis mortality, early warning score, eCART, bundle adherence, sepsis therapy, nursing protocol, quality improvement, and patient outcomes. The exclusion criteria for the search were studies that were published before 2016.

Sepsis fluid resuscitation and treatment bundles are often used to improve sepsis outcomes systematically. To address the global impact of sepsis, the international Surviving Sepsis Campaign (SSC), led by the Society of Critical Care Medicine (SCCM) and the European Society of Intensive Care Medicine (ESICM) was established in 2002 to reduce sepsis-related mortality and morbidity worldwide. Since 2004, the SSC has provided evidence-based guidelines for standards of care to improve time recognition and treatment of sepsis and septic shock. These bundles have been widely implemented across healthcare facilities (Levy et al., 2018).

According to Milano et al. (2018), in a multi-center, retrospective, observational study on discharged patients that were diagnosed with sepsis, sepsis/septic shock management bundles adherence was found to be associated with improved survival. When examining data for 4,582 patients who met the criteria for sepsis, the overall mortality was significantly lower among patients that received bundle-adherent care (17.9%) compared to patients that did not (20.4%). In the ICU, bundle adherence decreased mortality by 7%. Similarly, increased sepsis bundle
Increasing Sepsis-Bundle Adherence

adherence was also associated with reduced mortality among pediatric patients and lower lengths of stay (Fernández-Sarmiento et al., 2018).

Lasater et al. (2021) conducted a cross-sectional study that evaluated the effect of hospital adherence to the SEP-1 evidence-based care bundle on patient outcomes. They found that patients in hospitals with greater adherence to the SEP-1 sepsis bundle have significantly lower in-hospital mortality and shorter lengths of stay. A 10% increase in SEP-1 adherence is associated with a 5% decrease in in-hospital mortality. A notable finding in their study was that nurse staff and workload have an even more significant effect on sepsis patient outcomes than sepsis-bundle adherence. Sepsis care and bundle interventions, such as monitoring abnormal values, obtaining blood cultures, administering antibiotics, and fluid resuscitation, are time-demanding for nurses. In addition to their workload for other patients, nurses are responsible for close monitoring, titration of fluids, and repeating laboratory tests, which results in decreased sepsis-bundle adherence.

A review of literature also found that implementing a multifaceted approach that focuses on optimizing workflows and tools with emphasis on ergonomics can significantly improve sepsis-bundle adherence. Kiser, M. (2023) conducted a quasi-experimental study focused on designing processes and tools with physicians and nurses in mind to minimize variation in sepsis screening, increase knowledge, and increase bundle compliance. The study revealed that increased data transparency, awareness of sepsis, visual cues, and flagging of incomplete sepsis screening in the electronic health record, and sepsis escape room education lead to improved bundle adherence. The results showed increased sepsis bundle adherence from 44.9% to 68.3% and a decreased mortality rate from 7.2% to 3.6%.

Rationale
Kurt Lewin’s Three-Step Model for Change was adopted as a framework for implementing change in this action plan. In this theory, the individuals are influenced by obstacles that maintain the status quo and driving forces that push against the status quo for change to happen. Lewin’s change model includes three stages: unfreezing, change, and refreezing (Wojciechowski et al., 2016). The first stage is unfreezing, which involves challenging the status quo by creating problem awareness. In this quality improvement project, the unfreezing stage is acknowledging the high mortality rate and gaps in sepsis care. The changing stage occurs during the planning and implementation of the change. A questionnaire on sepsis education and barriers to sepsis-bundle adherence is conducted in this stage. Lastly, in the refreezing stage, the change is integrated and stabilized in the microsystem. After the intervention, data were analyzed and evidence-based recommendations were provided. Following this change theory, this project progresses through the three unfreezing, change, and refreezing stages.

**Specific Project Aim**

This project aimed to optimize sepsis care by identifying and addressing gaps in ideal clinical practice. The aim was to improve patient outcomes by increasing sepsis-bundle adherence to reduce the rate of sepsis and sepsis-related mortality within the medical-surgical/telemetry unit of Hospital Z. Sepsis education initially provided to nurses through the institution was evaluated for effectiveness. A questionnaire was distributed among nursing staff to determine sepsis education and protocol gaps. Recommendations based on analyses of the data collected and evidence-based practice were presented to the leadership team for future implementation.

**Methods**
5 P's Microsystem Assessment

An initial microsystem assessment was conducted using the “5 P’s microsystem assessment” framework tool to better understand the purpose, patients, professionals, processes, and patterns of the clinical unit in relevance to the project (Appendix A). The purpose was to improve patient outcomes through increased sepsis bundle adherence among nursing staff. The demographic of patients in this microsystem is typically older adults over 65 years old. Common diagnoses among these patients include sepsis, congestive heart failure (CHF), electrolyte imbalance, and alcohol withdrawal. Some of these patients are individuals who commonly face difficulty accessing treatment and housing. Professionals that provide care for patients in this unit include an interdisciplinary team comprising registered nurses, nursing assistants, nurse managers, unit secretaries, physicians, physical therapists, respiratory therapists, phlebotomists, and rapid response team (RRT) nurses. Processes in this microsystem relevant to this project encompass online new-hire sepsis training, nursing assessments, eCART documentation, and the sepsis protocol. Patterns observed are nurse shift handoff reports, shift huddles, RRT rounds, physician rounds, interdisciplinary communication, and electronic health record documentation.

Root Cause Analysis

To identify the underlying factors contributing to the lack of sepsis-bundle adherence, a root cause analysis (RCA) was conducted (Appendix B). These factors can be categorized into four categories: documentation, monitoring, policies and procedures, and people. Key findings in the RCA are derived from information collected from observations on the unit, meetings with Hospital Z’s leadership team, informal interviews with staff, and staff questionnaires.

The team found that documentation was a contributor to low sepsis-bundle adherence. Frequent charting adds to the nurses’ workload and contributes to documentation fatigue. The
nursing staff has verbalized that having a high workload affected their ability to complete prompt sepsis documentation in the eCART. During the monitoring of sepsis using eCART, there was also an issue regarding flagged abnormal values. In many cases, these flagged abnormal values were expected and attributed to the patient's underlying disease, rather than being a cause for concern. In addition, due to the demanding workload, the floor nurses depended on the rounding conducted by the rapid response team to identify patients at risk of sepsis, diverting their attention from recognizing early signs of sepsis themselves. This, however, poses another issue. The rapid response nurses only complete rounds once per shift on flagged eCART patients and are not always an available resource.

Additionally, new graduate nurses had less experience and were generally not confident in sepsis assessment and sepsis protocols. Lastly, policies and procedures were a significant contributor to low sepsis-bundle adherence. Sepsis education was only provided to nurses upon initial orientation without re-training. Some nurses have verbalized not receiving any sepsis education from the institution. It was found that there were no copies or visual aids of the sepsis protocol available as a readily accessible resource on the unit, causing challenges when needing to refer to it. In addition, rounding was solely conducted on patients who had flagged abnormal values on eCART.

**SWOT Analysis**

A comprehensive analysis of the microsystem and the project was also performed using the Strengths, Weaknesses, Opportunities, and Threats (SWOT) framework (Appendix C). There were many strengths in this project. A significant advantage of Hospital Z is the existing implementation of a sepsis bundle and an online sepsis education program. This provides a framework and standard for sepsis care throughout the hospital. Another strength is that the
hospital uses eCART, a highly accurate early warning system, which is easily accessible in the electronic health record (EHR). Several weaknesses were identified, including the recruitment of around 80 new graduate nurses within the past 18 months. The limited experience of these nurses in the sepsis protocol could potentially contribute to the low sepsis-bundle adherence and increased mortality rates observed in the microsystem. Furthermore, not all staff members have received education on the institution's specific sepsis bundle. Another weakness is the absence of annual sepsis bundle training, despite sepsis being a frequently diagnosed condition among patients in this unit, where early intervention is crucial. There also seems to be ineffective communication during patient transfer between the emergency department and the medical-surgical/telemetry unit that would allow more efficient sepsis management. Hospital Z’s existing sepsis bundle is another weakness. The sepsis bundle is excessively lengthy and lacks clarity, which can impede effective implementation. Lastly, there is an anticipated resistance to change among the staff nurses, posing a further challenge to improving sepsis care practices.

There are many opportunities for change including increased compliance with sepsis protocol, reduced long-term hospital costs, increased infection control, increased efficiency and quality of care, and most importantly, decreased sepsis morbidity and mortality rate. Threats to this project include the increased time and cost used to allocate staff re-education, documentation fatigue, and staff burden.

**Action Plan: PDSA Cycle and Gantt Chart**

After thorough assessments and analyses of the microsystem, this quality improvement project utilized a four-month Plan-Do-Study-Act (PDSA) cycle (Appendix D) along with a detailed timeline (Appendix E) to guide its implementation. The PDSA cycle is a four-stage
model that provides a structured framework for effectively implementing and evaluating changes within the system.

The planning phase is the first stage of the cycle and occurred during weeks one to four. It began with a project initiation meeting with Hospital Z’s leadership team on the goals of the organization in regards to sepsis. A literature review was also conducted to gather information on sepsis, sepsis screening tools, and current treatments. In Week three, an onsite walkthrough was conducted across various units in Hospital Z. During the fourth week, a comprehensive microsystem assessment was completed, and a questionnaire focused on sepsis education and protocol was developed. Additionally, the project proposal was presented and successfully approved during this time. The do phase lasted from weeks five to nine. During this phase, the anonymous questionnaire was distributed to registered nurses in the microsystem. This self-administered questionnaire utilized both paper and online formats, and consisted of nine questions with a five to ten minute completion time. Passive and active observations on the microsystem were also documented during this phase. The study phase involved analysis of the data collected after the questionnaire was administered. In the final act phase of the PDSA cycle, the questionnaire results and recommendations were presented to the hospital’s leadership team for future implementation. Due to the limited duration of this quality improvement project, the CNL students were unable to implement the recommendations to improve sepsis-bundle adherence. The suggestions and findings were presented to the hospital's leadership and professional development team for implementation and follow up.

**Intervention**

Hospital Z utilizes its own sepsis bundle and sepsis education that is provided to nurses via an online learning module. The sepsis bundle combines various components of sepsis care,
including the eCART early warning system, a detailed sepsis pathway to guide treatment, fluid resuscitation at 30ml/kg, blood cultures, timely and appropriate antibiotics within one hour after blood cultures, the use of repeated serum lactate levels, and ventilation/oxygenation.

The primary intervention was an anonymous self-administered questionnaire distributed to registered nurses in the medical-surgical/telemetry unit. The questionnaire aimed to evaluate the nurses’ perspective on sepsis education and to identify barriers to sepsis-bundle adherence. The questionnaire was distributed during day and night shifts throughout the week, spanning five weeks. It was administered in two formats, a paper questionnaire and an online questionnaire accessed by scanning a QR code which directed participants to a Google Form. To motivate participants to complete the questionnaire, non-financial incentives were provided. Data gathered by observation and informal interviews with nursing staff and leaders were also documented.

Study of the Intervention and Measures

The questionnaire design incorporated quantitative and qualitative data collection methods with nine questions (see Appendix F). It consisted of both closed-ended and open-ended questions. The questions covered various topics, including the effectiveness of sepsis education/bundle training, accessibility of the electronic Cardiac Arrest Risk Triage (eCART), barriers to sepsis-bundle compliance, the efficiency of the rapid response process, and recommendations for enhancing sepsis-bundle compliance.

Ethical Considerations

The American Nurses Association's Code of Ethics Provision 4 is the foundation of this quality improvement project. The Code of Ethics states that nurses have an “authority, accountability and responsibility for nursing practice; makes decisions; and takes action consistent with the obligation to provide optimal patient care” (American Nurses Association
Increasing Sepsis-Bundle Adherence

[ANA], 2015). Nurses have a responsibility to implement and maintain standards of professional nursing practice. Optimizing sepsis interventions decreases patients’ risk of adverse health outcomes and mortality. This was a non-research quality improvement project. It was not subject to IRB oversight (Appendix G) and used the University of San Francisco's Change Project Checklist (Appendix H). This quality improvement project was conducted with the full approval of the hospital. There were no conflicts of interest in this quality improvement initiative.

**Results**

Significant data was gathered from the questionnaire administered to the medical-surgical/telemetry unit with 55 registered nurses in the nursing roster. The response rate, with 36 participants completing the questionnaire, reached a 67% response rate, exceeding the initial goal of achieving a 60% response rate. Quantitative results are illustrated in Appendix I. Individual questionnaire responses are not included to protect the privacy and confidentiality of the participants.

Questions 1 and 2 pertained to receiving sepsis bundle training. Nurses were asked if they received training on the sepsis bundle. Thirty nurses (83.3%) responded that they had received training, while six (16.7%) stated that they had not. When asked about the reasons for not receiving training, some nurses indicated that they were unaware of any training offered at this institution. In contrast, others mentioned receiving informal training from the charge nurse and rapid response team. Additional respondents indicated uncertainty about the reasons or stated they could not recall whether they had undergone sepsis bundle training.

Questions 3 and 4 asked about the effectiveness of the training method. According to the responses, a significant majority of 88.5% of participants rated the training’s effectiveness as five or higher on a scale ranging from 1 to 10. 50% of respondents rated the effectiveness as eight or
higher, and 11% rated the effectiveness as 1-4 on a scale of 1-10. When asked to elaborate on their ratings, nurses offered diverse explanations. Some indicated that they did not receive any training during their orientation. Others mentioned that although they received online education, they found recalling the sepsis bundle details challenging. On the other hand, several nurses expressed that the training received through the online module was effective, applicable, and contributed to their understanding of sepsis. Still, they believed they could benefit from a refresher course. Additionally, a few nurses shared that they had received training several years ago, but could recall the sepsis bundle based on their experience in other healthcare facilities.

Questions 5 and 6 were open-ended questions about the accessibility of the eCART and the challenges that prevent nurses on this unit from adhering to the sepsis bundle. All respondents answered that the eCART is easily accessible in Hospital Z’s electronic health record and feel comfortable using this sepsis screening tool. The nurses highlighted various factors when asked about the challenges they encounter in adhering to sepsis-bundle protocols. Several nurses mentioned that the heavy workload and inadequate staffing create difficulties in managing time effectively, leading to delays in sepsis documentation. Some of the concerns expressed by many nurses were time constraints, excessive documentation, and monitoring. In addition, some nurses have attributed the lack of compliance to insufficient knowledge of sepsis. Another notable response was that the sepsis pathway was too lengthy and complex.

Questions 7, 8, and 9 concern the rapid response process and nurse recommendations for improved bundle compliance. In the questionnaire, 88.9% of nurses responded that the rapid response process is effective when managing the care of patients that meet the criteria for sepsis. In comparison, 11.1% of nurses responded that the process was ineffective. Nurses who indicated the rapid response was ineffective explained that the response team is not consistently available
when needed. Often, only one rapid response nurse is assigned to the entire facility. One respondent stated there is a need for more nurse-driven order sets for sepsis. When asked about their recommendations for the unit, nurses emphasized the need for visual aids posted on the unit, refresher training courses, providing hands-on training and simulations, simplifying the complex sepsis bundle, providing a badge buddy with information on the sepsis protocol, appointing sepsis champions, and earlier intervention in the emergency department before patient transfer to the medical-surgical/telemetry unit. A Cost-Benefit analysis was conducted on these recommendations in Appendix J.

**Discussion**

**Summary**

After literature research, developing a PICOT question, formulating a specific aim statement, and conducting microsystem assessments, a 4-month PDSA cycle was implemented, guided by Kurt Lewin's three-stage change model. A questionnaire was administered to nursing staff to identify and address the gaps in sepsis intervention practices within the medical-surgical/telemetry unit. Key findings from this questionnaire included effective sepsis education and rapid response process. However, there were a small number of nurses that did not receive any training. There was also a need for visual aids and sepsis refresher training courses. Based on the findings and literature on evidence-based practice, recommendations presented to the leadership team include the use of visual aids such as posters and signs, annual refresher training, adding hands-on training/simulations in the sepsis education, simplifying the sepsis bundle, providing a badge buddy for the sepsis protocol, and appointing sepsis champions. These recommendations were presented to the leadership and professional development team at
Hospital Z. Next steps include the implementation of these recommendations by Hospital Z using a PDSA cycle to evaluate their impact on sepsis morbidity and mortality.

Conclusion

This quality improvement project was aimed to improve patient outcomes for patients diagnosed with sepsis. Given their extensive contact hours with patients, nurses play an essential role in optimizing patient care. Increasing sepsis-bundle adherence among nursing staff can significantly reduce the risks of adverse health outcomes in sepsis patients. By addressing the challenges and implementing the recommended changes specific to the microsystem, it is anticipated that sepsis-bundle adherence will improve patient outcomes and reduce morbidity and mortality rates associated with sepsis. This quality improvement project serves as a foundation for ongoing efforts to optimize sepsis care.
Increasing Sepsis-Bundle Adherence

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https://doi.org/10.1097/pcc.000000000001536

https://doi.org/10.1097/cpm.000000000000254
Increasing Sepsis-Bundle Adherence


## Appendix A

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<th>PATIENTS</th>
<th>PROFESSIONALS</th>
<th>PROCESS</th>
<th>PATTERNS</th>
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| To improve staff compliance with the sepsis bundle and ultimately enhance the overall outcomes of care for patients with diagnosed sepsis | Patients in the Medical-Surgical/Telemetry unit, typically diagnosed with sepsis, congestive heart failure (CHF), electrolyte imbalance, and alcohol withdrawal | • Registered nurses  
• Nursing assistants  
• Nurse managers  
• Unit secretaries  
• Physicians  
• Physical therapists  
• Respiratory therapists  
• Phlebotomists  
• Rapid response team (RRT) nurses | • Online new-hire sepsis training  
• Nursing assessments  
• eCART documentation  
• Sepsis protocol | • Nurse shift handoff report  
• Shift huddles  
• RRT rounds  
• Physician rounds  
• Interdisciplinary communication  
• Electronic health record (EHR) documentation |
### Appendix C

## SWOT Analysis

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<th>Strengths</th>
<th>Weaknesses</th>
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| *Sepsis bundles are available as a resource on the unit*  
*Implementation of online sepsis education*  
*Easily accessible eCART in EPIC* | *Some staff have not received education on the sepsis bundle*  
*Lack of annual sepsis bundle compliance re-training*  
*Ineffective communication upon patient transfer*  
*Resistance to change among staff nurses*  
*Lengthy sepsis bundle* |

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
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| *Increased compliance with sepsis protocol*  
*Reduced long-term hospital costs*  
*Increased infection control*  
*Increased efficiency and quality of care*  
*Decreased sepsis mortality/morbidity rate* | *Time and cost allocated for re-education*  
*Documentation fatigue*  
*Staff burdened* |
**Appendix D**

**PLAN**
- Collaborated with the leadership team regarding sepsis among multiple medical-surgical units
- Developed a specific aim statement on the unit of choice
- Generated a PICOT question
- Produced a proposal for approval
- Created data collection questionnaires

**DO**
- Assessed the microsystem using the 5 Ps
- Conducted a SWOT analysis
- Ran a root cause analysis
- Collected data on the Medical-Surgical/Telemetry unit
  - Passive and active observational data in the microsystem
  - Administered questionnaires to the nurses

**ACT**
- Developed and presented evidence-based recommendations to the leadership team on April 17, 2023

**STUDY**
- Analyzed data from observations and questionnaires
- Reviewed the results from the gathered data
## GANTT CHART

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<td>Project Proposal to Leadership</td>
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<td>4/8/23</td>
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<td>4/16/23</td>
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<td>Project Poster Creation</td>
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<td>Project Poster Presentation</td>
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Appendix F

Sepsis Education Questionnaire
Hospital X QI Project 2023

Sign in to Google to save your progress. Learn more

Have you received training on the sepsis bundle?
- Yes
- No

If you answered "no" to receiving training on the sepsis bundle, why not?
Your answer

On a scale of 0-10, how would you rate the effectiveness of the training method? (0 indicating no knowledge, 10 indicating a high level of knowledge).

0 1 2 3 4 5 6 7 8 9 10

Explain your rating for the effectiveness of the training method.
Your answer

How accessible is the eCART?
Your answer
What challenges or barriers prevent nurses from adhering to the sepsis bundle?

Your answer

Do you feel the rapid response process is effective when managing the care of patients admitted with sepsis?

☐ Yes
☐ No

If you answered "no" to effective rapid response process for sepsis; what actions can be implemented to improve the process?

Your answer

What recommendations do you have for improving bundle compliance in your unit?

Your answer

Thank you!
Appendix G

Student Project Approval: Statement of Determination

Title of Project: Early Sepsis Recognition Saves Lives: Optimizing Sepsis Care in a Medical-Surgical/Telemetry Unit.

Brief Description of Project:

This project involves identifying gaps in sepsis education and improve sepsis bundle compliance. An anonymous questionnaire will be distributed to nursing staff. Analysis of the data collected will be used to create recommendations presented to hospital administrators.

To qualify as an Evidence-based Change in Practice Project, rather than a Research Project, the criteria outlined in federal guidelines will be used:
(http://answers.bhs.gov/obrp/categories/1569)

This project meets the guidelines for an Evidence-based Change in Practice Project as outlined in the Project Checklist (attached). Students may proceed with implementation.

Comments:

Signature of Supervising Faculty ___________________________ (date)________________________

Signature of Student ___________________________ (date) 5/12/23
EVIDENCE-BASED CHANGE OF PRACTICE PROJECT CHECKLIST *STUDENT*

**NAME:** Tiffany Lin  
**DATE:** 5/12/23  
**SUPERVISING FACULTY:** Nneka Chukwu

Instructions: Answer YES or NO to each of the following statements:

<table>
<thead>
<tr>
<th>Project Title: Early Sepsis Recognition Saves Lives: Optimizing Sepsis care in a Medical-Surgical/Telemetry Unit</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>The aim of the project is to improve the process or delivery of care with established/accepted standards, or to implement evidence-based change. There is no intention of using the data for research purposes.</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>The specific aim is to improve performance on a specific service or program and is a part of usual care. ALL participants will receive standard of care.</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>The project is NOT designed to follow a research design, e.g., hypothesis testing or group comparison, randomization, control groups, prospective comparison groups, cross-sectional, case control. The project does NOT follow a protocol that overrides clinical decision-making.</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>The project involves implementation of established and tested quality standards and/or systematic monitoring, assessment or evaluation of the organization to ensure that existing quality standards are being met. The project does NOT develop paradigms or untested methods or new untested standards.</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>The project involves implementation of care practices and interventions that are consensus-based or evidence-based. The project does NOT seek to test an intervention that is beyond current science and experience.</td>
<td>YES</td>
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</tr>
<tr>
<td>The project is conducted by staff where the project will take place and involves staff who are working at an agency that has an agreement with USF SONHP.</td>
<td>YES</td>
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<tr>
<td>The project has NO funding from federal agencies or research-focused organizations and is not receiving funding for implementation research.</td>
<td>YES</td>
<td></td>
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<tr>
<td>The agency or clinical practice unit agrees that this is a project that will be implemented to improve the process or delivery of care, i.e., not a personal research project that is dependent upon the voluntary participation of colleagues, students and/or patients.</td>
<td>YES</td>
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<tr>
<td>If there is an intent to, or possibility of publishing your work, you and supervising faculty and agency oversight committee are comfortable with the following statement in your methods section.</td>
<td>YES</td>
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</tbody>
</table>
Appendix I

1. Have you received training on the sepsis bundle?

- Yes: 30 (83.3%)
- No: 6 (16.7%)

2. On a scale of 0-10, how would you rate the effectiveness of the training method? (0 indicating no knowledge, 10 indicating a high level of knowledge).

- 0: 0 (0%)
- 1: 0 (0%)
- 2: 1 (2.9%)
- 3: 1 (2.9%)
- 4: 0 (0%)
- 5: 7 (20%)
- 6: 5 (14.3%)
- 7: 10 (28.6%)
- 8: 2 (5.7%)
- 9: 6 (17.1%)
- 10: 1 (2.9%)

3. Do you feel the rapid response process is effective when managing the care of patients admitted with sepsis?

- Yes: 32 (88.9%)
- No: 4 (11.1%)
Appendix J

Estimated Cost of a Badge Buddy
$300 per year

Estimated Cost of Sepsis Bundle Signage
$20 per year

Estimated Cost of Sepsis Knowledge Center Education Refresher Course (at $70/hr)
$7,700 per year

Estimated Cost of an Additional RRT Nurse (Full-Time at $85/hr)
$160,000 per year

Total Estimated Cost: $168,020 per year

Compared To:

Total Average Cost of Sepsis Care for an estimated 12 instances of Patients with Sepsis-Related Complications: $480,000 per year