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Exploring Sepsis Bundle Compliance in the Medical-Surgical/Telemetry Unit

Kerry Rebecca Reinbold
University of San Francisco, krreinbold@usfca.edu

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Kerry Reinbold

University of San Francisco School of Nursing and Health Sciences

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

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Section I:

Abstract

Problem: Sepsis creates complications for patients and nursing staff. Increasing sepsis bundle compliance has been shown to decrease patient mortality. This quality improvement project utilized a self-administered questionnaire to better understand the opinions of nursing staff on the Medical-Surgical/Telemetry unit and explore ways to improve sepsis bundle compliance.

Context: The microsystem is a 32-bed Medical-Surgical/Telemetry unit at Hospital X, a 244-bed, not-for-profit hospital serving the Bay Area of California.

Interventions: A questionnaire distributed to nursing staff on the unit was the primary intervention. Through microsystem assessment, questionnaire results, and direct conversations with staff; active and passive data were obtained.

Measures: The self-administered questionnaire distributed aimed to understand if staff had received sepsis bundle training and what their opinions were regarding the bundle, Rapid Response Team, eCART, and suggestions for improvement. Self-administered questionnaires were distributed over a one-month period.

Results: This project achieved a 67% response rate. Of the nurses who responded, 16.7% of them indicated that they did not receive the sepsis bundle at any time during their employment at Hospital X. 50% of respondents rated the effectiveness of training between an 8 and 10, 36.1% rated is between 5 and 7, and 11.1% rated it between 0 and 4. 88.9% felt that rapid response was effective when managing the care of patients admitted with sepsis. Qualitative data was obtained from written responses that provided valuable insight into the lack of sepsis bundle compliance.

Conclusion: Qualitative and quantitative data were obtained from the self-administered questionnaires, microsystem assessment, and conversations with staff. High response rate

reflected staff willingness to improve their practice. Project findings contribute to improvements to be implemented by Hospital X. Results from the self-administered questionnaire support the need for repeat sepsis training, visual-aids, simplification of current sepsis protocol, and investigation into the transfer process beginning in the Emergency Department. Recommendations for improvement were provided to the leadership team for implementation. These recommendations are supported by the Nurses' responses to the self-administered questionnaires and research on the best evidence-based practices.

Keywords: sepsis, sepsis bundle compliance, mortality, eCART, quality improvement

Section II:

Introduction

Sepsis is a life-threatening medical emergency. Each year at least 1.7 million adults in the United States will develop sepsis and at least 350,000 of those who develop it will die or be discharged to hospice care (Centers for Disease Control and Prevention [CDC], 2022). Infections leading to sepsis can start anywhere from the lungs to the skin, and many populations have increased risk factors, including being aged 65 and up or children under one year, those with chronic conditions, those who have previously had sepsis, those recently hospitalized, and the immunosuppressed (CDC, 2022). Early recognition and treatment are essential to preventing sepsis related deaths. Mortality rises by 4% to 9% every hour that sepsis treatment is postponed, making it imperative to be aware of warning indicators during initial assessments (American Association of Critical Care Nurses [AACN], 2023). Additionally, the CDC informs that about 87% of sepsis cases begin before a patient can get to the hospital, making it all the more crucial that it be quickly recognized to initiate treatment (2022).

Unfortunately, identifying sepsis is not a simple task; however, there are many different screening tools available to healthcare professionals. There is not yet one single diagnostic tool for sepsis, and the tools and sepsis prevention methods employed vary from hospital to hospital. There are several markers that these diagnostic tools use to signify warning signs of sepsis such as having an infection, low blood pressure, high heart rate, increased respiratory rate, and certain blood culture results and lab values (Yale Medicine, 2022). When abnormal values are input into the electronic health record (EHR), the patient is flagged to be further assessed for sepsis.

One popular algorithm being used to detect patients at risk for sepsis is the electronic Cardiac Arrest Risk Triage (eCART). This algorithm uses vital signs, lab results, and demographic data in order to calculate the real-time risk of cardiac arrest, which is imminent with onset of sepsis, for each patient (Mitchum, 2017). Once a patient is flagged as a risk, rapid response teams are deployed to round on the patient and further assess, with the goal of quickly initiating treatment if needed. Studies demonstrate a reduction in patient mortality when paired with high sepsis bundle compliance by staff (Schinkel et al., 2022). It is important to strive for high levels of sepsis bundle compliance in order to optimize patient outcomes. Moreover, hospitals spend approximately $40,000 per patient who develops uncomplicated sepsis after admission, and that number rises to over $60,000 with major complications such as organ damage (Paoli et al., 2018). It is in the hospital's best interest to decrease sepsis cases and thereby reduce costs associated.

Problem Description

Hospital X is a 244 license-bed, not-for-profit hospital serving the Bay Area of California. The unit this project focuses on is a 32-bed, medical-surgical and telemetry unit that has been motivated to improve their sepsis bundle compliance amongst nurses. The hospital has

seen a large increase in new graduate nurses and leadership has expressed their desire to find areas where sepsis bundle compliance can be improved. The medical-surgical/telemetry unit typically sees a wide variety of patient diagnoses such as congestive heart failure, electrolyte imbalances, and substance withdrawal. Many of these patient diagnoses have the potential to lead to sepsis and increasing sepsis bundle compliance will improve patient outcomes. Adherence to sepsis management bundles is found to improve survival rates for patients (Milano et al., 2018). Providing optimal care and improving outcomes for their patients is a key goal for Hospital X. Currently, leadership has expressed that sepsis bundle training is provided to new-hires via an online, self-directed learning portal called Knowledge Center. While leadership from Hospital X have identified sepsis bundle compliance as necessitating improvement, further research was needed to pinpoint the precise areas that may best benefit from change.

<div align="center">**Available Knowledge**</div>

PICOT Question

The following PICOT question was used to guide research and synthesis of evidence. Does increased sepsis education provided to Registered Nurses improve sepsis bundle compliance and decrease sepsis-related morbidity/mortality rates for patients admitted to the medical-surgical/telemetry unit compared to no sepsis education in a three-month period?

Literature Review

A comprehensive review of literature was performed that focused on the relationship between sepsis bundle compliance and patient outcomes. Databases used to gather sources include Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, Elton B. Stephens Co. (EBSCO), and Ovid. Key phrases used in this search include: *nursing and sepsis bundles, sepsis and patient mortality, sepsis bundle compliance and patient mortality, improving*

sepsis outcomes, increasing sepsis bundle compliance. Searches were limited to the year 2015 and after. Of the research articles found, five were chosen for a more in-depth analysis due to their relevancy and potential applicability to the unit microsystem of Hospital X. The articles chosen include observational studies, systematic reviews, a retrospective study, and quantitative research (see Appendix A). The level of evidence was appraised using the Polit-Beck Evidence Hierarchy/Levels of Evidence Scale.

One article chosen, a systematic review and meta-analysis of 50 observational studies, by Damiani et al. (2015), reviewed the effect of performance improvement programs and how they relate to compliance with the sepsis bundle, and mortality. This review was able to find a positive connection between performance improvement programs and adherence to resuscitation and management sepsis bundles. Additionally, they found that the increase in compliance also was correlated to a reduction in mortality in patients diagnosed with sepsis, severe sepsis, or septic shock. This review included over 50 studies and supports the recommendation of providing staff with programs to improve education and performance.

A questionnaire administered by Edwards and Jones (2021) of nurses from 16 acute surgical and medical wards garnered 98 responses from nurses. The article attests that nurses are in a unique position through close and frequent patient interaction to identify sepsis early by screening patients. Despite this fact, sepsis bundle compliance often remains low. The results of this questionnaire demonstrated that nurses with sepsis training had a better knowledge of the national Early Warning Score 2 for sepsis screening, as well as the systemic inflammatory response syndrome (SIRS) criteria. They also had a more positive attitude towards sepsis screening and management, were more confident in screening patients for sepsis and were more likely to screen patients for sepsis. Edwards and Jones concluded that sepsis training improved

nurses' attitudes, knowledge, and confidence in regards to sepsis screens and management, and therefore should be mandatory for all staff in order to adhere to the best evidence-based care for patients.

In a multi-center, retrospective, observational study taking place in 3 Los Angeles County hospitals, by Milano et al (2018), it was discovered that mortality was lower among patients receiving bundle-adherent care. These patients were compared to patients who did not receive bundle-adherent care, and it was found that improving bundle adherence is associated with decreased mortality. The study went on to show that pneumonia was the most common source of sepsis, with bundle-adherent care in cases with pneumonia being associated with lower mortality. The number of sepsis cases remained stable over time while there was a decrease in absolute patient mortality. This supports the observation that improving bundle adherence is associated with decreased mortality.

A systematic review of 6 studies using modified sepsis protocols to recognize early warning signs of sepsis, by Taj et al. (2022) provided insight into resource restricted settings and the relationship between early sepsis screening and intervention with sepsis bundle. Studies reviewed reported increased protocol compliance with education on standardized protocols. While the primary issue in these cases was the restricted access to resources, it still concluded that simplified sepsis protocols are essential to improving sepsis mortality rates.

Lynn et al (2018) conducted a retrospective observational study with a random sample of 7,598 inpatients who were discharged with a diagnosis of severe sepsis. This study reported that of the 71.8% of those who received the 3-hour sepsis bundle, 15% died. Of the 28% who did not receive the bundle, 20% died. This leads to a 33.8% higher likelihood of survival for those who

received the bundle compared to those who did not. This supports the necessity of complying with the sepsis bundle to decrease patient mortality.

The literature supports a focus on sepsis bundle compliance to decrease patient mortality. Evidence also shows that supporting staff's ability to appropriately implement the bundle leads to increased confidence, increased screening, and better patient outcomes.

Rationale

This project aims to improve sepsis bundle compliance of nurses at Hospital X, and therefore patient mortality rates related to sepsis. The Surviving Sepsis Campaign (SSC) recommends, since sepsis and septic shock are medical emergencies, treatment and resuscitation must begin immediately (Rhodes et al., 2017). To understand the causal and contributing factors impacting nursing compliance and improve outcomes of care, the leadership team at hospital X collaborated with Clinical Nurse Leader (CNLs) Students from the University of San Francisco. . The Clinical Nurse Leader students are uniquely positioned to perform this analysis based on the unique training they receive. They will perform a thorough microsystem analysis, and the project will be guided by the Plan-Do-Study-Act (PDSA) method to streamline the steps necessary to implement change in the microsystem. A Gantt chart was created to better visualize the project timeline (see Appendix B).

Aim

This project aims to improve sepsis bundle compliance, thereby reducing septicemia-related mortality rates in the medical-surgical/telemetry unit at Hospital X. Sepsis education provided to nurses will be evaluated in order to determine the effectiveness of sepsis prevention on the unit. Information will be collected from questionnaires over a one-month period. These questionnaires will be provided to nurses on the medical-surgical/telemetry unit and will

demonstrate the gaps in knowledge present regarding sepsis prevention at Hospital X. Recommendations based off of feedback collected and evidence-based research will be presented to the leadership team.

Section III: Methods

Context

The context of the methods used can be understood through the 5 P's; purpose, patients, professionals, process, and patterns.

Purpose

The purpose of this study is to increase staff compliance with the sepsis bundle in order to ultimately improve patient care outcomes for those diagnosed with sepsis.

Patients

The medical-surgical/telemetry unit at Hospital X sees a wide variety of patient diagnoses. Some of these diagnoses include sepsis, congestive heart failure, electrolyte imbalance, and alcohol withdrawal. Patients admitted to this microsystem frequently face difficulty accessing treatment and housing.

Professionals

The interdisciplinary team handling care for patients in the medical-surgical/telemetry unit includes registered nurses, nursing assistants, nurse managers, unit secretaries, physicians assistants, physical therapists, respiratory therapists, phlebotomists, and rapid response team (RRT) nurses.

Process

Processes that occur in this unit include online new-hire sepsis training, eCART documentation, nursing assessments, and sepsis bundle protocol.

Patterns

Patterns include shift huddles, RRT rounds, physician rounds, nursing shift handoff reports, interdisciplinary communication, and electronic health record documentation.

Intervention

To better understand the needs of the medical-surgical/telemetry unit, a thorough assessment of the microsystem was performed. The assessment included active and passive observations made on-unit, conversations with staff, and attention to the processes utilized in the detection and treatment of sepsis. The main intervention employed was a self-administered questionnaire distributed to nursing staff on the medical-surgical/telemetry unit (see Appendix C). This questionnaire was available in paper-form and as a scannable QR code. CNL students were frequently on site during the one-month collection period to engage staff in conversation and encourage their participation in the survey as well as gain a better understanding of staff opinions on the sepsis bundle issue. Edible incentives were provided as additional inspiration for participation.

This CNL students performed an analysis of the strengths, weaknesses, opportunities, and threats (SWOT) to understand what the microsystem does well and what challenges exist (see Appendix D). Strengths included having sepsis bundles available as a resource on the unit and that eCART was easily accessible in the EHR. Opportunities to improve included increasing compliance with the sepsis protocol, reducing long-term hospital costs, increasing infection control, increasing efficiency and quality of care, and decreasing sepsis mortality rate. Weaknesses were that some staff had not received education on the sepsis bundle, there was no annual training for sepsis bundle compliance, ineffective communication was noted upon patient transfer, the sepsis bundle was lengthy, and there was resistance to change among staff nurses.

Finally, threats comprised time and cost allocated for re-education, documentation fatigue, and burden on staff.

A root-cause analysis was conducted to better visualize the possible foundational problems resulting in a lack of sepsis bundle compliance (see Appendix E). The concerns were organized into four major categories; *documentation, monitoring, people,* and *policies and procedures*. *Documentation* saw one major flaw; frequent charting adding to nurse workload, which lead to possible documentation fatigue. Concerns under *monitoring* that had the potential to lead to a lack of sepsis bundle compliance included asking eCART questions in the HER, abnormal eCART values being flagged but these were often explainable by patient disease, and floor nurses relying on RRT to check patients at risk for sepsis. *People* saw issues that included that many new grad nurses on the floor were present who were less confident in their assessments and less familiar with sepsis, and the RRT nurse only completes rounds once per shift on the flagged eCART patients. Finally, the most conflicts were seen under *policies and procedures*. This category included staff having not received bundle education, sepsis education only being given on the initial orientation, the sepsis screen not being a standard assessment, the sepsis bundle was not posted on the unit, and that rounding on at-risk sepsis patients is only done on those flagged by eCART.

Study of the Intervention

This project largely relied on feedback and written-responses from nursing staff in the microsystem. The questionnaire was available to staff for a one-month period. Data was collected anonymously. Data from paper copies were entered by CNL students. Active and passive observations, and feedback from questionnaires were presented to leadership team.

The Plan-Do-Study-Act (PDSA) cycle was used as the foundation to the strategy of this project (see Appendix F). The *plan* phase saw collaboration with leadership regarding sepsis among multiple medical-surgical units, and the development of an aim statement, PICOT question, and proposal to be approved. *Do* encompassed assessing the microsystem with the 5 P's, conducting the SWOT and root-cause analyses, collecting passive and active data in the microsystem, and administering the questionnaire. The *study* phase included analyzing data from the observations and questionnaires and reviewing data from results gathered. Finally, *act* involved the presentation of the developed evidence-based recommendations to the leadership at Hospital X.

Measures

This project sought to evaluate the potential causes leading to a lack of sepsis bundle compliance. The questionnaire distributed contained 9 questions designed to assess current nurse opinions and practice. Through a series of questions, several of these open-ended, it attempted to ascertain who had received the sepsis bundle, and if not, why? Additionally, nurses were asked to rank the effectiveness of the training method from 0 to 10, with 0 representing no knowledge and 10 being high knowledge, and an explanation for that rating. Nurses were asked how accessible they thought eCART is, what challenges or barriers prevent them from adhering to the bundle, and if they feel the rapid response process is effective when managing the care of patients with sepsis and why or why not,

Ethical Considerations

The American Nurses Association (ANA) Code of Ethics guided the work done by CNL students for Hospital X. The ANA Code of Ethics states, in Provision 4, that "the nurse has authority, accountability, and responsibility, for nursing practice; makes decision; and takes

action consistent with the obligation to promote health and to provide optimal patient care"

(ANA, 2015). This project's purpose was to identify ways to improve nursing practice and

thereby improve patient outcomes. There are no ethical implications or conflicts of interest

identified. This project is an evidence-based change of practice project and is not research based,

which can be confirmed by the statement of determination (see Appendix H).

Section IV: Results

Outcome Measure Results

Upon completion of the one-month survey distribution period, results were analyzed. The

staff roster of the medical-surgical/telemetry unit counted 55 nurses. Of these nurses, responses

from 36 were obtained, giving this project a 67% response rate. Of the nurses who responded,

16.7% of them indicated that they did not receive the sepsis bundle at any time during their

employment at Hospital X. 50% of respondents rated the effectiveness of training between an 8

and 10, 36.1% rated is between 5 and 7, and 11.1% rated it between 0 and 4. 88.9% felt that

rapid response was effective when managing the care of patients admitted with sepsis.

Qualitative data was also obtained from the questionnaire. Nursing staff provided many

suggestions for improvement as well as explanation for their ratings of the above quantitative

data. Some of the reasons for rating the training effectiveness poorly includes that they were not

trained, had not received repeat training, that they did not feel familiar with the steps in the

bundle, that they could use a refresher training, computer training proved difficult to pay

attention to, and that bundle training should be in person. Some nurses could not remember if

they had received sepsis bundle training and some received it at a different hospital. Nurses also

felt that eCART was very accessible and user friendly. For what challenges prevent staff from

adhering to the sepsis bundle, nurses answered that there were none, late documentation or being

short staffed can be issues, not having enough training, patient issues with fluid overload or allergies to antibiotics, there is a disconnect with sepsis protocol starting in the Emergency Department, a lack of knowledge, too many things to chart, a lack of support or guidance from leadership, heavy patient loads, difficulty getting ahold of the physician on night shift, difficulty getting blood cultures on certain patients, and no clear direction on where to access information from the sepsis bundle. Several nurses expressed that they believe it would be beneficial to have another RRT, but when the RRT is present that they are very helpful. Finally, recommendations from nurses included having a badge buddy for easy access to concise information, having posters on the unit, giving refresher training, training being hands on as opposed to on the computer and self-directed, simplifying the sepsis bundle, additional education on the signs and symptoms of sepsis, mentoring and increased accountability, more frequent rounding by the RRT, and having a hard stop when a certain value is reached by a patient in eCART. Recommendations took into consideration a cost-benefit analysis (see Appendix G). The cost to initiate several interventions were considered. Increasing signage on the unit, providing staff with a badge buddy, having a single additional sepsis refresher course for all nursing staff, and hiring an additional full-time RRT Nurse, leads to an estimated cost of $168,020. This is comparison to the average of sepsis care for a conservative estimation of 12 patients developing sepsis complications on the medical-surgical/telemetry unit each year, which is estimated to cost Hospital X approximately $480,000 per year. Based on the cost-benefit analysis, if interventions are able to effectively decrease sepsis complications from occurring for just 5 patients each year, the interventions are financially sustainable for Hospital X.

Summary

This project was able to obtain responses and suggestions from 67% of staff on the medical-surgical/telemetry unit. Through their responses this project was able to explore what barriers are currently present and preventing a higher rate of sepsis bundle compliance. Results and recommendations were presented to the leadership of Hospital X and were based off of the observations made by CNL students as well as quantitative and qualitative data obtained from the questionnaire. Recommendations included providing staff with visual-aids, such as posters or printouts, having refresher training, appointing sepsis champions, having more hands-on training, simplifying the sepsis bundle, providing staff with mentoring, and early intervention in the Emergency Department with enforcement of sepsis documentation prior to transfer. The next steps for Hospital X include implementing a recommendation and continuing the PDSA cycle, with additional rounds of staff interviews post-intervention to gauge effectiveness, and continuing evaluation of education retainment through supplementary questionnaires.

Conclusions

This quality improvement project was unique in its procurement of qualitative data. Direct statements of feedback from staff obtained from questionnaires can be used to guide the leadership of Hospital X in their improvement measures surrounding sepsis bundle compliance. Nursing staff on the unit demonstrated their willingness to improve their patient practice through high response rates and willingness to engage in direct conversation with CNL students. Key findings of this project contribute to further improvements to be implemented by Hospital X leadership. Questionnaire results revealed a desire for repeat sepsis training, the need for visual-aids, simplification of the current sepsis protocol, and investigation into the transfer process starting at the Emergency Department. Through continued efforts to implement recommendations, improvements in sepsis bundle compliance can reasonably be expected, and

in turn, an improvement in patient mortality due to sepsis. The CNL students have provided the leadership of Hospital X with a strong foundation to a project that can be continued sustainably and should be considered a successful endeavor.

References

American Nurses Association. (2015). Code of ethics for nurses.

    https://nursing.rutgers.edu/wpcontent/uploads/2019/06/ANA-Code-of-Ethics-for-

    Nurses.pdf

Damiani, E., Donati, A., Serafini, G., Rinaldi, L., Adrario, E., Pelaia, P., Busani, S., & Girardis,

    M. (2015). Effect of performance improvement programs on compliance with sepsis

    bundles and mortality: A systematic review and meta-analysis of observational studies.

    PLOS ONE, *10*(5), e0125827. https://doi.org/10.1371/journal.pone.0125827

Edwards, E., & Jones, L. (2021). Sepsis knowledge, skills and attitudes among ward-based

    nurses. *British Journal of Nursing*, *30*(15), 920–927.

    https://doi.org/10.12968/bjon.2021.30.15.920

Lynn, N., Gupta, C., Vaaler, M., Held, J., & Leon, L. (2018). Severe sepsis 3-hour bundle

    compliance and mortality. *American Journal of Infection Control*, *46*(11), 1299–1300.

    https://doi.org/10.1016/j.ajic.2018.04.228

Milano, P. M., Desai, S., Eiting, E., Hofmann, E., Lam, C. B. I., & Menchine, M. (2018). Sepsis

    bundle adherence is associated with improved survival in severe sepsis or septic shock.

    Western Journal of Emergency Medicine, *19*(5), 774–781.

    https://doi.org/10.5811/westjem.2018.7.37651

Mitchum, R. (2017). A statistical crystal ball. *UChicago Medicine*.

    https://www.uchicagomedicine.org/forefront/research-and-discoveries-articles/a-

    statistical-crystal-ball

Paoli, C. J., Reynolds, M., Sinha, M., Gitlin, M., & Crouser, E. D. (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

Polit, D. F., & Beck, C. T. (2018). *Essentials of Nursing Research* (9th ed.). Wolters Kluwer.

Rhodes, A., Evans, L., Alhazzani, W., Levy, M. M., Antonelli, M., Ferrer, R., Kumar, A.,

Sevransky, J. E., Sprung, C. L., Nunnally, M. E., Cook, D. J., Rubenfeld, G. D., Angus,

D. C., Annane, D., Beale, R., Bellinghan, G. J., Bernard, G. R., Chiche, J., Coopersmith,

C. M., . . . Dellinger, R. P. (2017). Surviving sepsis campaign: International guidelines

for management of sepsis and septic shock: 2016. *Intensive Care Medicine*, *43*(3), 304–

377. https://doi.org/10.1007/s00134-017-4683-6

Schinkel, M., Nanayakkara, P. W. B., & Wiersinga, W. J. (2022). Sepsis serformance

improvement programs: From evidence toward clinical implementation. *Critical Care*,

26(1). https://doi.org/10.1186/s13054-022-03917-1

Sepsis. (2022, August 29). Centers for Disease Control and Prevention. Retrieved February 4,

2023, from https://www.cdc.gov/sepsis/index.html

Sepsis. (2022, October 29). Yale Medicine. https://www.yalemedicine.org/conditions/sepsis

Taj, M., Brenner, M., Sulaiman, Z., & Pandian, V. (2022). Sepsis protocols to reduce mortality

in resource-restricted settings: A systematic review. *Intensive and Critical Care Nursing*,

72, 103255. https://doi.org/10.1016/j.iccn.2022.103255

Section VII: Appendices

Appendix A

Study Title	Design	Sample	Outcome	Level of Evidence
Effect of Performance Improvement Programs on Compliance with Sepsis Bundles and Mortality: A Systematic Review and Meta-Analysis of Observational Studies	Systematic Review and Meta-Analysis	50 studies included	Performance improvement programs are associated with increases in adherence to resuscitation and management sepsis bundles and also to reduced mortality in patients with sepsis, severe sepsis or septic shock.	IV
Sepsis knowledge, skills and attitudes among ward-based nurses	Quantitative, Questionnaire	Nurses from 16 acute surgical and medical wards, 98 responses	Conclusion that sepsis training improves nurses' attitudes, knowledge and confidence regarding sepsis screening and management and should be mandatory for all clinical staff	V
Sepsis Bundle Adherence Is Associated with Improved Survival in Severe Sepsis or Septic Shock.	Multi-center, retrospective, observational study	Adult patients with a hospital discharge of sepsis or septic shock. Taking place in 3 LA hospitals	Mortality was lower among patients receiving bundle-adherent care compared to those who did not. Improving bundle adherence is associated with decreased mortality.	V
Sepsis protocols to reduce mortality in resource-restricted settings: A systematic review	Systematic Review	Review of 6 studies using modified sepsis protocols to recognize early warning signs of sepsis	This review concluded that simplified sepsis protocols are essential to improving sepsis related mortality rates, and adequate training of clinicians and modified protocols are necessary for implementation	IV
Severe sepsis 3-hour bundle compliance and mortality	Retrospective observational study	Random sample of 7,598 charts of inpatients with severe sepsis discharged between January 2013 and May 2017	The study reported that of the 71.8% who received the bundle, 15% died. Of the 28% who did not receive it, 20% died. Receiving the bundle correlated to a 33.8% higher survival likelihood.	V

Appendix B

Gantt Chart

TASK TITLE	START DATE	DUE DATE	FEBRUARY WEEK				MARCH WEEK				APRIL WEEK				MAY WEEK			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Project Initiation																		
Literature Review	2/1/23	3/1/23	�	▪	▪	▪												
Project Initiation Meeting with Leadership	2/9/23	2/9/23		▪														
Project Planning																		
On-Site Walkthrough	2/15/23	2/15/23			▪													
Questionnaire Development	2/15/23	2/23/23			▪	▪												
Project Proposal to Leadership	2/23/23	2/23/23				▪												
Microsystem Assessment	2/28/23	2/28/23				▪												
Project Implementation																		
Questionnaire Administration	3/1/23	4/8/23					▪	▪	▪	▪	▪							
Passive and Active Microsystem Observation	3/1/23	4/8/23					▪	▪	▪	▪	▪							
Project Evaluation and Synthesis																		
Data Analysis	4/8/23	4/16/23									▪	▪						
Recommendation Presentation to Leadership	4/17/23	4/17/23											▪					
Project Poster Creation	4/17/23	4/25/23											▪	▪				
Project Poster Presentation	5/17/23	5/17/23															▪	

Appendix C

Sepsis Education Questionnaire

1. Have you received training on the sepsis bundle?

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

3. 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).

4. Explain your rating for the effectiveness of the training method.

5. How accessible is the eCART?

6. What challenges or barriers prevent nurses from adhering to the sepsis bundle?

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

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

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

Appendix D

SWOT Analysis

STRENGTHS
- Sepsis bundles are available as a resource on the unit
- Implementation of online sepsis education
- Easily accessible eCART in EPIC

OPPORTUNITIES
- Increased compliance with sepsis protocol
- Reduced long-term hospital costs
- Increased infection control
- Increased efficiency and quality of care
- Decreased sepsis mortality/morbidity rate

WEAKNESSES
- Some staff have not received education on the sepsis bundle
- Lack of annual sepsis bundle compliance re-training
- Ineffective communication upon patient transfer
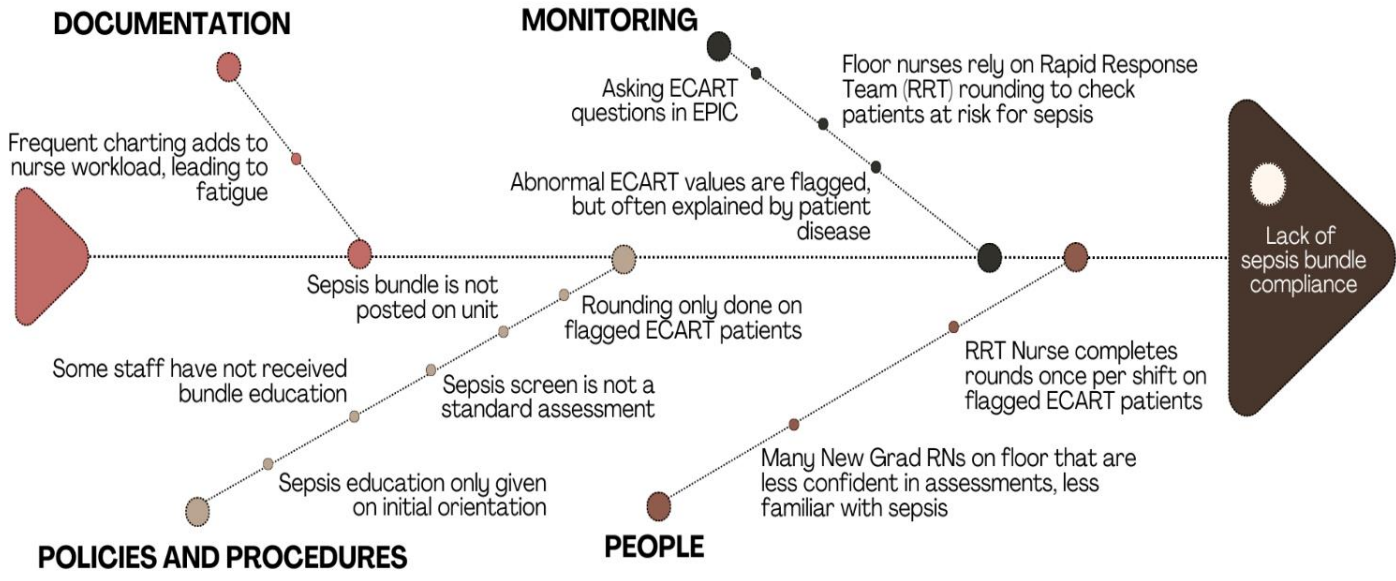- Resistance to change among staff nurses
- Lengthy sepsis bundle

THREATS
- Time and cost allocated for re-education
- Documentation fatigue
- Staff burdened

Appendix E

Root-Cause Analysis

DOCUMENTATION

Frequent charting adds to nurse workload, leading to fatigue

Sepsis bundle is not posted on unit

Some staff have not received bundle education

Sepsis education only given on initial orientation

POLICIES AND PROCEDURES

MONITORING

Asking ECART questions in EPIC

Abnormal ECART values are flagged, but often explained by patient disease

Rounding only done on flagged ECART patients

Sepsis screen is not a standard assessment

Floor nurses rely on Rapid Response Team (RRT) rounding to check patients at risk for sepsis

RRT Nurse completes rounds once per shift on flagged ECART patients

Many New Grad RNs on floor that are less confident in assessments, less familiar with sepsis

PEOPLE

Lack of sepsis bundle compliance

Appendix F

Plan-Do-Study-Act Cycle (PDSA)

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 on April 17, 2023

STUDY

- Analyzed data from observations and questionnaires
- Reviewed the results from the gathered data

Appendix G

Cost-Benefit Analysis

Estimated Intervention Expenses

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**

Appendix H

Statement of Determination

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:

Identify ways Hospital X can improve sepsis bundle compliance on the medical-surgical/telemetry unit. Questionnaire distribution to staff, analysis of quantitative + qualitative data, with final results and recommendations provided to staff

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.hhs.gov/ohrp/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 ___*[signature]*___ (date) *5/12/23*

EVIDENCE-BASED CHANGE OF PRACTICE PROJECT CHECKLIST * STUDENT

NAME: Kerry Reinbold   DATE: 5/12/23

SUPERVISING FACULTY: Dr. Nneka Chukwu

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

Project Title: Early Sepsis Recognition Saves Lives: Optimizing Sepsis Care in a Medical-Surgical/Telemetry Unit	YES	NO
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.	X	
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.	X	
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.	X	
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.	X	
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.	X	
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.	X	
The project has **NO** funding from federal agencies or research-focused organizations and is not receiving funding for implementation research.	X	
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.	X	
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.	X	