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Optimizing Sepsis Management Through Enhanced Protocol Compliance in the Emergency Department

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NURS-653-33: Internship

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December 10, 2023

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Abstract

Problem: This quality improvement project aims to enhance early sepsis management and sepsis bundle compliance among Emergency Department nurses to reduce the risk of sepsis-related deaths as well as hospital length of stays.

Context: A microsystem assessment, in the emergency department (ED) unit, was performed in Hospital A located in the Greater San Francisco Bay area by Clinical Nurse Leader (CNL) students. This ED unit cares for a variety of critical care patients ranging from urgent to life-threatening conditions.

Intervention: An intervention was not implemented in the ED unit due to time constraints and limitations; however, CNL students provided recommendations so stakeholders could further investigate and implement them. The recommended interventions include increasing sepsis bundle training frequency, refining intravenous placement skills through training and readily available resources, establishing a standardized sepsis protocol, providing nurses badge buddies, and revising the current charting system.

Measures: CNL students collected data to evaluate current sepsis care management and the rates of sepsis-related complications at the ED. The pre-intervention survey highlighted areas of improvement where proposed recommendations could help nurses utilize and adhere to sepsis bundle care more effectively.

Results: The most relevant pre-intervention questionnaire results revealed that 42% of ED nursing staff recommend protocol revision, 24.4% claim to not have attended any sepsis training with another 4.9% reporting rarely attending, and 46.3% reported there is no debriefing, or follow-up training, when sepsis bundle compliance is failed to be met. In addition, nurses

identified barriers to meeting compliance such as difficult IV access or “hard sticks”, standing orders, and knowledge gaps.

Conclusions: A pre-intervention questionnaire given to ED nurses at Hospital A reveals gaps in knowledge and barriers to current sepsis management. Implementing a standardized sepsis protocol and offering nurses’ frequent sepsis bundles and intravenous training is recommended. The implementation of these recommended resources will hopefully improve nurses’ sepsis care management, improving patient outcomes and care quality.

Keywords: Sepsis, Emergency Department, Sepsis Bundle Compliance, Sepsis Management, Quality Improvement Project, Microsystem, Sepsis Training

Introduction

Sepsis is a life-threatening condition that causes organ dysfunction secondary to infection and in the United States accounts for 1.7 million hospitalized patients and 350,000 deaths (*CDC*, 2023). Additionally, sepsis among hospitalized patients continues to increase by 8.7% annually, accounting for over 50% of hospital deaths (Paoli et al., 2018). The Surviving Sepsis Campaign (SSC) established international guidelines for the management of patients with severe sepsis or septic shock and whose guidelines are incorporated into bundles used by hospitals. These bundles are a combination of components needed for sepsis care that include a variety of critical care interventions ranging from medication to blood tests (Milano et al., 2018). Research has shown proper adherence to sepsis bundles is associated with lower mortality rates and improved survival (Milano et al., 2018). However, bundle compliance has been challenging for many healthcare teams with rates under 50% (Townsend et al., 2022). Early recognition and treatment can substantially improve care outcomes regarding safety, quality, and cost (Dellinger et al., 2023). Sepsis protocol compliance is associated with lower mortality rates and improved survival (Milano et al., 2018).

Problem Description

The nursing staff has been facing many challenges regarding early sepsis management and compliance with sepsis bundle guidelines and protocols. Hospital A, a level II adult trauma hospital, in the greater Bay Area has 554 beds with 44 of those being treatment rooms at the ED with over 100 skilled registered nurses ready to treat and care for patients. Sepsis coordinators and ED leadership identified areas of improvement in sepsis management, some of those being the administration of the sepsis bundle within the allotted time and meeting all components for managing sepsis on a patient. Therefore a Quality Improvement (QI) project was designed and

conducted by CNL students at the ED to address knowledge and implementation gaps. The result is a series of recommendations that address the opportunities and aim to enhance ED sepsis management while improving adherence of the sepsis bundle.

PICOT Question

Does providing nursing staff support, accountability, and ongoing education (I) enhance the timely implementation of sepsis bundle and compliance (O) compared to current practices (C) in the Emergency Department (P) within four months (T)?

Rationale

The ADKAR Change Management Model is utilized to implement the necessary changes to improve sepsis management in the emergency department. This change model of change uses five goals that help develop effective communication methods with stakeholders to implement change within an organization (Malhotra, G., 2023). The first goal, awareness, will focus on informing nurse managers, directors, nursing staff, and sepsis coordinators of the problems with how sepsis management is being followed. During the goal of desire, stakeholders will become involved with the planned recommended strategies to improve sepsis adherence. Next, knowledge of IV training, ED sepsis protocol, sepsis champions, and sepsis badge reel will be given to all nursing staff, so they understand how to utilize all resources being provided to them to improve septic patient outcomes. During the goal of ability, nursing staff will be transitioning into adapting all suggested interventions and proper training will be given to reinforce new behaviors. Additionally, the goal of reinforcement serves to sustain the change given to the nurses on how to manage sepsis effectively and timely in the emergency department.

Search Strategy

The search strategy includes a literature review with a time frame of one month, September-October of 2023, with several databases being accessed such as PubMed, Scopus, CINAHL, and MEDLINE. The Johns Hopkins Research Evidence Appraisal Tool was utilized to grade the evidence levels from Level I to V of the studies used for evidence (Dang et al., 2022). In addition, keywords such as sepsis, emergency department, sepsis bundle compliance, sepsis management, sepsis training, and fluid resuscitation efforts were used to find specific information to identify and form the best evidence-based recommendations.

Available Knowledge

A comprehensive literature review was constructed for this QI project study to identify the most innovative and evidence-based practices for early sepsis detection and care management. The articles utilized were evaluated using the Johns Hopkins Evidence-Based Practice for Nurses and Healthcare Professionals: Model and Guidelines (See Appendix B) (Dang et al., 2022). The studies included in the literature review have shown that early detection of sepsis, sepsis bundle compliance, and specific sepsis protocols are essential to manage and improve patient outcomes (Milano et al., 2018; Townsend et al., 2022).

In addition, it is critical to monitor and improve the management of sepsis by developing a multi-disciplinary hospital sepsis program to provide nurses with specific guidelines to follow. The Centers for Disease Control and Prevention (CDC) published the Hospital Sepsis Program Core Elements to provide hospitals with evidence-based and efficient sepsis management guidelines that improve survival rates (CDC, 2023). Studies have shown that quality improvement programs focusing on sepsis can reduce in-hospital mortality, length of stay, and healthcare costs (CDC, 2023). Sepsis programs can be hospital-specific or can cover a healthcare

system and they should aid in recognizing sepsis, help facilitate sepsis management through evidence-based practices, support recovery, and monitor the outcomes (CDC, 2023). The core elements include seven areas to help identify, track, and report sepsis cases (CDC, 2023). Hospital A will benefit from developing a specific ED protocol by utilizing the guidelines provided by the CDC.

A challenge that nurses and healthcare professionals have faced is not having the necessary knowledge to implement sepsis protocols. More than 50% of registered nurses (RNs) and physicians report a lack of knowledge of the signs and symptoms of severe sepsis as well as inadequate staffing and delays in care (Gripp et al., 2021). Additionally, nurses should implement a one-hour sepsis bundle that includes collecting blood cultures, lactate measures, fluid resuscitation, and administering antibiotics and vasopressors all within an hour of recognizing sepsis in a patient (Gripp et al., 2021). It is crucial to administer sepsis care, such as antibiotics, promptly and not doing so can increase mortality risks by up to 22% (Kim et al., 2018). To improve this knowledge gap, Hospital A was recommended to offer more frequent online modules that provide resources and education on sepsis protocols and how to identify them properly.

Taking the proper interventions to identify sepsis correctly can decrease the number of cases and sepsis costs in the U.S. (Paoli et al., 2018). Hospitals need to design and implement interventions that will improve sepsis management by using a structured quality improvement process and promoting the proper usage of the interventions. Compliance rates should increase to over 50% by analyzing and finding areas of improvement in the sepsis program (Paoli et al., 2018). The recommendations given to Hospital A aim to provide the ED with evidence-based interventions that target the barriers nursing staff report having. Additionally, proper charting of

sepsis can increase compliance with the bundle by 40% and help identify gaps in practice or improvement opportunities (Warstadt et al., 2022).

Hospitals need to establish and develop proper interventions to guide nurses in sepsis management and care as found in the reviewed literature. Early sepsis detection and treatment can help improve the outcomes of septic patients and facilitate standardized care in the ED. Providing nurses with the knowledge and resources can not only prevent patient complications but can help nurses provide optimal care.

Specific Project Aim

The quality improvement project was designed to help nursing staff adhere to sepsis bundle in the Emergency Department at Hospital A. First, CNL students created and administered a 9-survey questionnaire to identify barriers to sepsis bundle compliance from a nursing point of view. This quality improvement study will conclude with the creation of best evidence-based practice recommendations that will increase compliance and utilization of the bundle by 60% or better. It is crucial to address this issue accordingly because sepsis is still considered the leading cause of hospital-related deaths and significant financial burdens. CNL students anticipate improving the current bundle compliance rate, leading to increased timely sepsis management, reducing hospital length-of-stay, decreasing the risk of sepsis-related mortality, and decreasing readmission rates among this population.

Methods

Project Overview

At Hospital A, stakeholders consisting of CNL students, sepsis coordinators, unit managers, and directors met for a group debriefing to share essential quantitative and qualitative

data. CNL students utilized the data provided to formulate a PICOT question, a specific aim statement, and pre-intervention questionnaire (see Appendix F). A comprehensive literature review focusing on sepsis care, bundle compliance, and evidence-based interventions, was created to help guide recommended interventions that ED stakeholders may implement in the unit, as desired. The CNL students utilized the 5 Ps for the initial microsystem. Other quality improvement tools used for this project include a Root Cause Analysis (RCA) (Appendix D), and a Strengths, Weaknesses, Opportunities and Threats (SWOT) Analysis (Appendix E). Also, Hospital A can have savings on costs related to sepsis and it's shown in a Cost-Benefit Analysis (CBA) (Appendix G) and a timeline of the project as well as its objectives are illustrated using a Gantt Chart (Appendix H).

Microsystem Assessment

Eight CNL students assessed the microsystem at Hospital A by using the 5P's assessment tool, encompassing purpose, patients, professionals, process, and patterns. This quality improvement project aimed to improve nursing staff bundle compliance and provide resources to manage sepsis at an early stage. These improvements can have significant patient health outcomes that can help bridge knowledge gaps among nursing staff at Hospital A's nursing staff and standardize the sepsis management nursing process. The target population in the ED at Hospital A are septic patients. Additionally, data acquired showed that patients with specific comorbidities, such as chronic obstructive pulmonary disease (COPD), could result in fluid restrictions that lead to cautious treatment that complicates sepsis treatment and care. Healthcare professionals in the interdisciplinary team are registered nurses, physicians, laboratory staff, respiratory therapists, and the rapid response team (RRT). Nursing staff are responsible for conducting a screening for Systemic Inflammatory Response Syndrome (SIRS) and Sequential

Organ Failure (SOFA), Cardiac Arrest Risk Triage (eCART) documentation, and sepsis bundle compliance. In the ED, nurses are involved in routine shift huddles, staff reporting, and charting in patients' electronic health records, resulting in enhanced communication.

Plan, Do, Study, Act (PDSA) Cycle

Another tool utilized by CNL students in this study was the Plan, Do, Study, Act (PDSA) cycle. During the planning process, in the first phase, CNL students collaborated with Hospital A's leadership team to identify gaps in knowledge at the ED's sepsis management and bundle compliance. Next, a PICOT question was formulated along with a specific aim statement for the ED and a proposal for the study consisting of a pre-intervention questionnaire. The "Do" phase consisted of conducting the quality improvement study over five weeks and collecting questionnaire responses from nursing staff by covering both morning and night shifts. Additionally, an RCA was created by using the 5 P assessment tool which revealed issues related to poor sepsis management and low bundle compliance. The next phase was "Study", students used the collected data from the questionnaire to investigate evidence-based interventions to recommend to Hospital A stakeholders on December 4, 2023. The last stage was, "Act", consisted of presenting the recommendations to ED stakeholders to implement interventions that will help improve early sepsis management and bundled care compliance. Due to time constraints and limitations, the CNL students were unable to implement the proposed recommendations; however, possible solutions to the interventions were identified and students are optimistic about the positive outcomes from this project.

Root Cause Analysis (RCA)

The ED at Hospital A has 44 treatment rooms with over 100 skilled nurses equipped to care for and treat patients with various conditions ranging from mild to severe. Stakeholders from this unit have analyzed data records for Hospital A's ED and found that nurses are having difficulty adhering to sepsis bundle guidelines as the number of septic patients increases. Therefore, a Root Cause Analysis (RCA) was developed to identify potential areas for improvement in sepsis care. During this analysis, nurses reported factors contributing to delayed sepsis management or non-compliance. One factor is that patients having poor venous access and needing additional support from other healthcare professionals require more time which might exceed the one-hour bundle compliance. Also, the ED patient flow can be unpredictable, leading to overcrowding that delays further care for patients waiting for a treatment bed. Inadequate staffing on the unit is another factor that impacts the nurse's ability to promptly provide all components of the bundle. Next, the RCA shows that ED nurses receive sepsis education yearly with no reoccurring sepsis training in between to reinforce learning. Another potential barrier is that the current sepsis policy is not specific to the ED, meaning that nurses could benefit from a standardized policy ttargeting their patient population and unit. Nurses have discovered an additional obstacle related to the charting system. The gathered data suggests a need for revisions within the EPIC system to streamline the documentation of interventions performed by nurses for septic patients.

Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis

A Strengths, Weakness, Opportunities, and Threats (SWOT) Analysis tool was also utilized by CNL students to properly study sepsis care and compliance in the ED at Hospital A. Strengths were first analyzed which includes having an evidence-based sepsis bundle available

for the nurse on the floor, an annual training module on sepsis, and nurses taking the initiative and placing standing order for septic patients meeting SIRS criteria. On the other hand, some weaknesses revolve around the lack of standardization in protocols and collaboration among healthcare professionals. Even though Hospital A provides a sepsis protocol, it is not ED-specific or considers the challenges nurses have in this particular microsystem. Additionally, the annual module training on sepsis provides knowledge for nurses but nursing staff have expressed the need for an increase in frequency to reinforce the education material and resources. Some of the participants stated they did not receive additional training after the initial education. This gap impacts the retention of knowledge and application. Other weaknesses are having sepsis champions not being utilized as needed and insufficient IV access training and resources for nurses to overcome those challenging situations. The last weakness identified was the lack of collaboration as well as follow-up for noncompliance that will help with nurses' accountability when bundle components are not met.

The factors mentioned above help identify opportunities for the organization to improve through interventions. Some of these opportunities include a tailored ED sepsis protocol, skills and education for all nursing staff, reduced length of stay for patients, positive patient outcomes, and increased adherence to sepsis bundle components. Finally, some threats to incorporating interventions to address the weaknesses or challenges, include time and costs for training nursing staff, and the nursing staff's desire for change and the maintenance of it.

Cost-Benefit Analysis (CBA)

A Cost-Benefit Analysis (CBA) was developed to evaluate the related costs and benefits associated with the recommended interventions by the CNL students (Appendix G). Initially, students propose that three nurses receive training in ultrasound guided IV procedures per shift, totaling nine nurses. The estimated cost of this training is $2,400 per nurse and approximately $21,600 annually (Vascular Wellness, n.d.). Next, the sepsis badge reel cards, priced at around $7 per card, accumulate to $805 for the 115 nurses listed on the ED roster (Etsy, n.d). The next recommendation is to offer standardized and more frequent sepsis bundle training to improve nurses' knowledge and reinforce the material learned. Providing sepsis bundle training sessions to all 115 nurses twice annually, considering an average wage of $90 per hour at Hospital A's ED, results in an annual cost of $41,400. The overall projected expenditure for materials and labor in the first-year totals $63,805. However, yearly costs for septic care and associated complications, for just fifteen patients, average $1,030,000 (Paoli et al., 2018). Therefore, Hospital A can expect a net profit of $966,695 in year one and $988,600 in year two (Appendix G).

Timeline

A time management tool, Gantt Chart, provides a visual that displays the entire course of a project and was used for this QI project's timeline (Appendix H). The objectives outlined in the PDSA cycle were implemented and spanned from September 2023 to December 2023. These objectives can be identified using the Gantt Chart.

Intervention

Due to time limitations, interventions were not implemented. Nevertheless, survey responses from the pre-intervention questionnaire facilitated an analysis of sepsis compliances

and identified knowledge gaps within the unit. Evidence-based recommendations can serve as a guide for stakeholders regarding the effectiveness of suggested implementations. Initially, CNL students distributed a hard copy of the nine-question questionnaire (Table F1) as well as a flyer with a QR code for an online option during visits to the ED over five weeks. Additionally, surveys and incentives were left for nurses to complete during slower periods when students were not present on the hospital premises. The collected survey responses shed light on nurses' perceptions of sepsis protocol, the frequency and quality of education received, as well as challenges that might impede timely patient care; refer to Appendix F for detailed responses.

Upon analyzing the data collected, the group of students developed interventions and presented them to Hospital A's leadership, grounded in evidence and improvement models aimed at improving bundle compliance and patient outcomes. While Hospital A already has an established sepsis protocol for all microsystems to utilize, the recommendations proposed the development of a standardized sepsis protocol. This would include creating sepsis badge buddies outlining treatment steps, observation guidelines, and a structured escalation process for nurses needing additional support.

Moreover, the suggestions describe the need to appoint several sepsis champions, provide accessible and frequent education sessions on sepsis (as opposed to an annual computer-based module), and utilize technology-based resources for intravenous skill placement training. Assessing outcomes post-intervention would gauge improvements within the microsystem, guiding whether an alternate approach should be considered.

Study of Interventions

Upon the completion of interventions within the designated timeframe of the quality improvement project, members from the sepsis committee and leadership board should evaluate and determine whether the recommendations have positively impacted patient outcomes by reducing lengths of stay, sepsis mortality rates, readmissions, and unnecessary financial expenditure at Hospital A. Furthermore, post-intervention surveys should be given to nurses in order to determine whether staff have enhanced their critical thinking abilities on sepsis care, gained confidence in administering intravenous procedures, and improved their grasp of addressing septic patients within the initial hour of their arrival at the ED. Additionally, this survey would assess and provide an overview of the awareness level among nurses regarding the newly appointed sepsis champion and their familiarity with the current chain of command within the ED. If the overall compliance has not met the Quality Improvement Project's recommended standards for optimizing sepsis management, a fresh PDSA approach might be necessary to further refine sepsis care management at Hospital A.

Measures

To evaluate the nurses' understanding of the challenges in the microsystem, the CNL students created a pre-intervention questionnaire made up of nine open-ended questions. The results highlighted several opportunities in Hospital A's ED. Additionally, the qualitative questions given to nursing staff explored the suggestions for enhancing the sepsis protocol, the frequency of training sessions, and procedures regarding doctor's orders. The questionnaire was provided to the department in hard copy format and was also accessible via Google Forms using a QR code on a flyer displayed in the lounge room. All responses were collected and recorded anonymously.

Ethical Considerations

This project meets the guidelines for an evidence-based quality improvement project and does not meet the criteria for institutional review board (IRB) approval.

Results

Of the 115 nurses working in this microsystem, only 41 completed the survey for a response rate of 35.6%. The first question, focused on the protocol that nurses implement when having a septic patient. Many nurses reported following the available sepsis protocol to initiate care with no specific order. The second question, focusing on a timeline for sepsis and sepsis care prioritization, showed that 80.5% are aware of the importance of starting sepsis treatment within one hour and identified that 20% of nurses prioritize labs and fluids first rather than antibiotics, while 12.5% prioritized fluids over labs and antibiotics. Question three focused on barriers and timely implementation, where 27.4% reported IV access, patient assignment, and nursing ratios as being the challenges. Additionally, 15% of the respondents reported a shortage in treatment beds as a barrier.

Question four identified that some nurses are not following up with the proper chain of command when escalating sepsis processes, with 35.4% of nurses contacting physicians and other healthcare professionals while 29.3% spoke to a charge nurse. The fifth question, focusing on debriefing measures, shows that 46% of nurses have none and 14% did not answer. For sepsis training, question six, 58% report having annual training, and 24.4% report no training or being unsure. Questions seven and eight display that standing orders are set 43.9% of the time and 95% of nurses submit the order set. The last question, allowing nurses to express their feelings on the

current sepsis protocol, showed that 42% of the nurses wanted revisions to the protocol, 19% wanted changes in staffing, and 26% did not answer.

Appendix F, Figure 2-10, shows a more detailed perspective on the responses offered by the nursing staff at Hospital A's ED.

Discussion

Hospital A, in the greater Bay Area, recently experienced an increased amount of sepsis cases within their ED, uncovering inconsistencies in sepsis bundle compliance standards. Literature review studies consistently highlight and describe that more frequent sepsis education and training lead to improved overall sepsis bundle compliance (Milano et al., 2018). Even though this QI project faced limitations, the pre-intervention questionnaire allowed CNL student to analyze the microsystem and find areas of improvement to help nursing staff improve their sepsis care management. Several recommendations ranging from education to a standardized protocol for the ED can aid Hospital A’s nurse leadership in implementing evidence-based interventions. CNL students anticipate a comprehensive evaluation of outcomes in compared to the project's aim statement. This evaluation will determine whether all, some, or none of the recommendations are suitable for their microsystem (ED) or need further improvement.

Limitations

There were limitations to this study. The students encountered challenges getting the nurses to participate in this activity, partly due to some nurses’ refusal to participate and the busy nature of the ED. To encourage participation, the students offered some incentives to the staff, increasing the number of responses received. Another hurdle emerged due to a slight delay in accessing internal microsystem data, initially impeding the interpretation process. Due to time constraints, students could not extend the pre-intervention questionnaire. Nonetheless, the

leadership team received proposed interventions accompanied by an analysis of the survey results.

Summary

Sepsis continues to be a leading cause of death in the US. This project aimed to enhance the sepsis compliance rate at a hospital located in the greater Bay Area. CNL students in collaboration with the leaders at Hospital A, utilized evidence-based tools to identify causal and contributing factors of this issue. They established recommendations for improving the opportunities identified to enhance patient outcomes and efficiency in workflow.

Conclusion

This QI project and study can reduce the length of stay, readmission rates, and financial burdens associated with sepsis management. The results provide knowledge essential in developing interventions that help assess sepsis on a timely manner and improve outcomes for septic patients. Conducting repeated PDSA cycles and replicating this study can showcase the reliability and validity of heightened education for improving sepsis bundled care. Additional research is essential for a deeper understanding of the obstacles to compliance with evidence-based sepsis protocols. This QI project illustrates that specific interventions like education, ED-specific protocols, and standardized care hold promise for early sepsis detection, prompt treatment, and decreased morbidity and mortality rates.

References

Centers for Disease Control and Prevention (CDC). (2023). Sepsis program activities in Acute Care Hospitals - National Healthcare Safety Network, United States, 2022. *Centers for Disease Control and Prevention.* https://www.cdc.gov/mmwr/volumes/72/wr/mm7234a2.htm

Dang, D., Dearholt, S., Bissett, K., Ascenzi, J., & Whalen, M. (2022). *Johns Hopkins evidence-based practice for nurses and healthcare professionals: Model and guidelines. (4th ed.).* Sigma Theta Tau International

Dellinger P., Rhodes A., Evans L., Alhazzani W., Beale R., Jaeschke R., Machado R., Masur H, Osborn T., Parker M., Schorr C., Townsend R., Levy M. (2023). Surviving sepsis campaign. *Crit Care Med.1*;51(4):431-444. https://doi:10.1097/CCM.0000000000005804.

Etsy. (n.d.). Sepsis badge buddy for nurses. https://www.etsy.com/listing/1337351753/sepsis badge-buddy-for-nurses-in (https://www.etsy.com/listing/1337351753/sepsis-badge-buddy-for-nurses-in)

Gripp L, Raffoul M, Milner KA. (2021). Implementation of the surviving sepsis campaign one-hour bundle in a short stay unit: A quality improvement project. *Intensive Crit Care Nurs, 55*(1), 1-5. https://doi:10.1016/j.iccn.2020.103004

Kim, R. Y., Ng, A. M., Persaud, A. K., Furmanek, S. P., Kothari, Y. N., Price, J. D., Wiemken, T. L., Saad, M. A., Guardiola, J. J., & Cavallazzi, R. S. (2018). Antibiotic Timing and Outcomes in Sepsis. *The American Journal of the Medical Sciences*, *355*(6), 524–529. https://doi.org/10.1016/j.amjms.2018.02.007

Paoli CJ., Reynolds MA., Sinha M., Gitlin M., Crouser E. (2018). Epidemiology and costs of

sepsis in the United States analysis based on timing of diagnosis and severity level. *Crit Care Med*, *46(*12), 1-9. https://doi:10.1097/CCM.0000000000003342.

Malhotra, G. (2023). *What is the ADKAR model for Change Management? (2024)*. The Whatfix Blog | Drive Digital Adoption. https://whatfix.com/blog/adkar-model-what-is-it-and-how-to-use-it/

Milano PK., Desai SA., Eiting EA., Hofmann EF., Lam CN, Menchine M. (2018). Sepsis bundle adherence is associated with improved survival in severe sepsis or septic shock. *West J Emerg Med*, *19*(5):774-781. https://doi: 10.5811/westjem.2018.7.37651

Townsend SR., Phillips GS., Duseja R., Tefera L., Cruikshank D., Dickerson R., Nguyen HB., Schorr CA., Levy MM., Dellinger RP., Conway WA., Browner WS., Rivers EP. (2022). Effects of compliance with the early management bundle (SEP-1) on mortality changes among medicare beneficiaries with sepsis: a propensity score matched cohort study. *Chest Journal;161*(2):392-406. doi: 10.1016/j.chest.2021.07.2167.

Warstadt, N. M., Caldwell, J. R., Tang, N., Mandola, S., Jamin, C., & Dahn, C. (2022). Quality initiative to improve emergency department sepsis bundle compliance through utilisation of an electronic health record tool. *BMJ Open Quality, 11*(1), 1-9. https://10.1136/bmjoq-2021-001624

Appendix A

Statement of Determination

Student Project Approval: Statement of Determination

Title of Project:

Optimizing Sepsis Management Through Enhanced Protocol Compliance in the Emergency Department

Brief Description of Project:

This quality improvement project aims to enhance early sepsis management and sepsis bundle compliance among Emergency Department nurses to reduce the risk of sepsis-related deaths as well as hospital length of stays.

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) 11/22/2023

Signature of Student Monica Rabago (date) 11/20/23

Appendix B

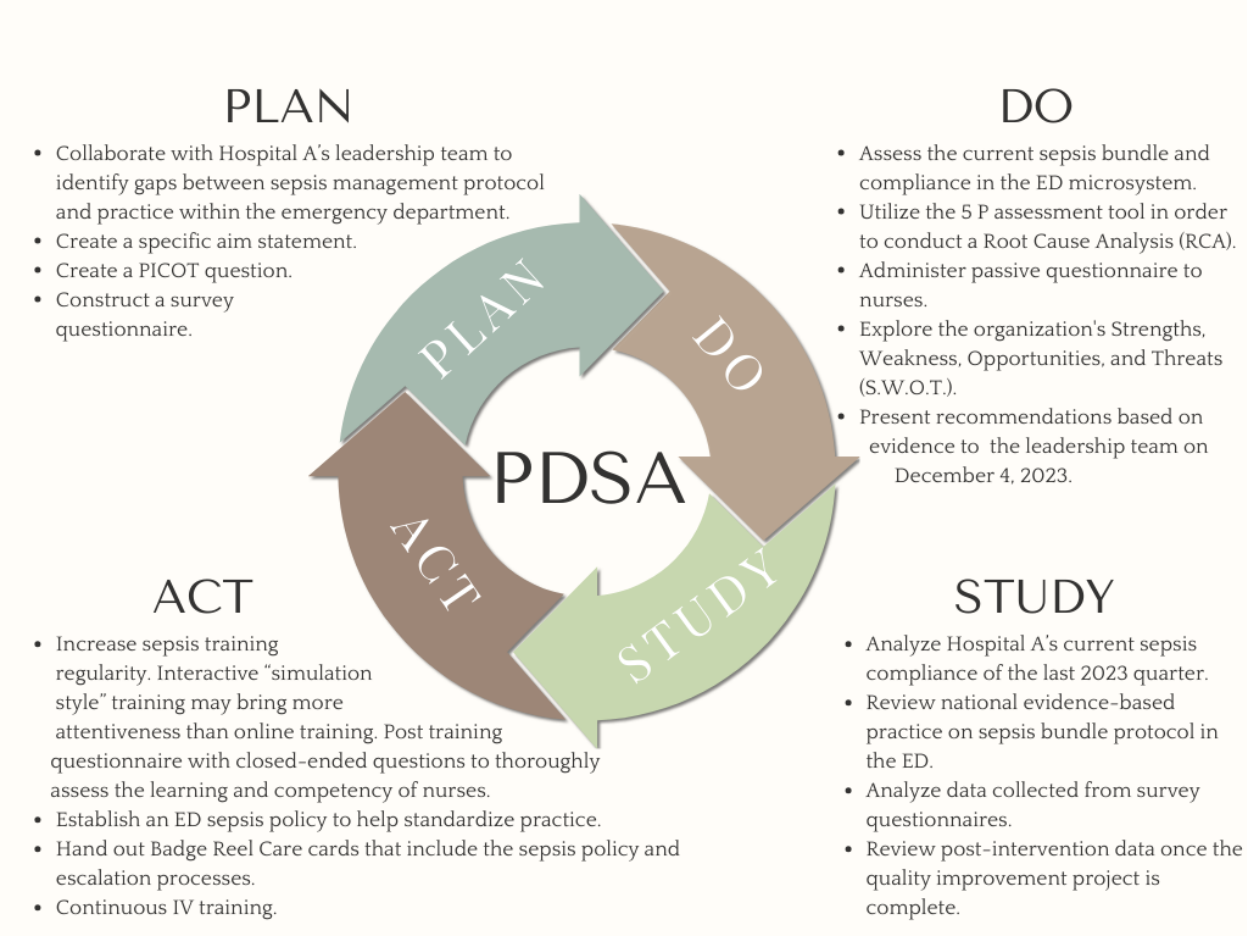
Literature Synthesis Table

Literature Review Table				
Study Author(s)	**Study Objective and Design**	**Sample & Setting**	**Results**	**Level of Evidence**
Gripp L, Raffoul M, Milner KA.	Ten-month prospective quality improvement project.	A 38-bed short stay unit within an 800-bed hospital in New York City	From May 6, 2019 to October 1, 2019, 32 patients were diagnosed with sepsis. It was shown that initial lactate and blood cultures were completed on every patient within 1one-hour of sepsis diagnosis. Antibiotics were administered within one-hour reached 100% after week four and was sustained.	Level II (Elsevier, 2021)
Kim, R. Y., Ng, A. M., Persaud, A. K., Furmanek, S. P., Kothari, Y. N., Price, J. D., Wiemken, T. L., Saad, M. A., Guardiola, J. J., & Cavallazzi, R. S.	Observational cohort study to evaluate the process from patient triage to hospital admission and emergency triage to antibiotics administration in the emergency department.	117 patients from the University of Louisville Hospital emergency department	For every hour of delay from patient triage to antibiotic administration, there is a 15% increase in mortality risk. Similarly, during the sepsis intervention phase for each delayed hour for antibiotics ordered, there was a 22% surge in mortality risk.	Level III (Dang et al., 2022)
Milano PK., Desai SA., Eiting EA., Hofmann EF., Lam CN, Menchine M.	Retrospective, observational study of adult patients with a hospital discharge diagnosis of	Patients who presented to one of three Los Angeles County Department of Health Services (DHS) full-	Among the 4,582 patients identified with sepsis, overall mortality was lower among those who received bundle-adherent care compared to those who did not.	Level II (Elsevier, 2021)

	severe sepsis or septic shock	service hospitals January 2012 to December 2014.		
Paoli CJ., Reynolds MA., Sinha M., Gitlin M., Crouser E.	A retrospective observational study was conducted using the Premier Healthcare Database	Sepsis patient hospitalizations, including inpatient, general ward, and ICU.	Methods to improve early identification of sepsis may provide opportunities for reducing the severity and economic burden of sepsis in the United States.	Level II (Elsevier, 2021)
Townsend SR., Phillips GS., Duseja R., Tefera L., Cruikshank D., Dickerson R., Nguyen HB., Schorr CA., Levy MM., Dellinger RP., Conway WA., Browner WS., Rivers EP.	Cohort Study- used propensity score matching and a hierarchical general linear model (HGLM) to estimate the treatment effects associated with compliance with SEP-1.	Patient-level data reported to Medicare by 3,241 hospitals from October 1, 2015, to March 31, 2017,	Compliance with SEP-1 was associated with lower 30-day mortality. Rendering SEP-1 compliant care may reduce the incidence of avoidable deaths.	Level II (Elsevier, 2021)
Warstadt, N. M., Caldwell, J. R., Tang, N., Mandola, S., Jamin, C., & Dahn, C	Two retrospective cohort studies	EHR tool utilization was monitored from June through December 2020.	EHR tool utilization increased from 23.3% baseline prior to intervention to 87.2%. Statistically significant difference in compliance between EHR tool utilization versus no utilization in overall bundle compliance and for several individual components: initial lactate, repeat lactate, timely antibiotics, blood cultures before antibiotics, initial fluid bolus and fluid reassessment.	Level II (Elsevier, 2021)

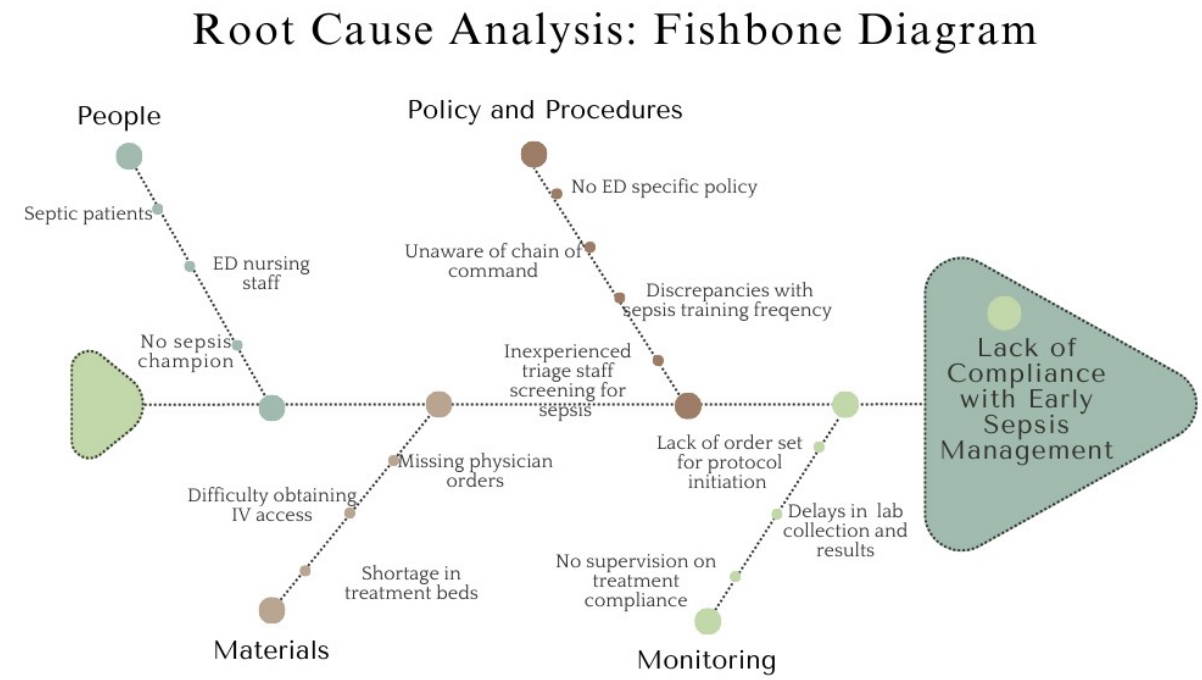
Appendix C

Plan, Do, Study, Act (PDSA) Cycle



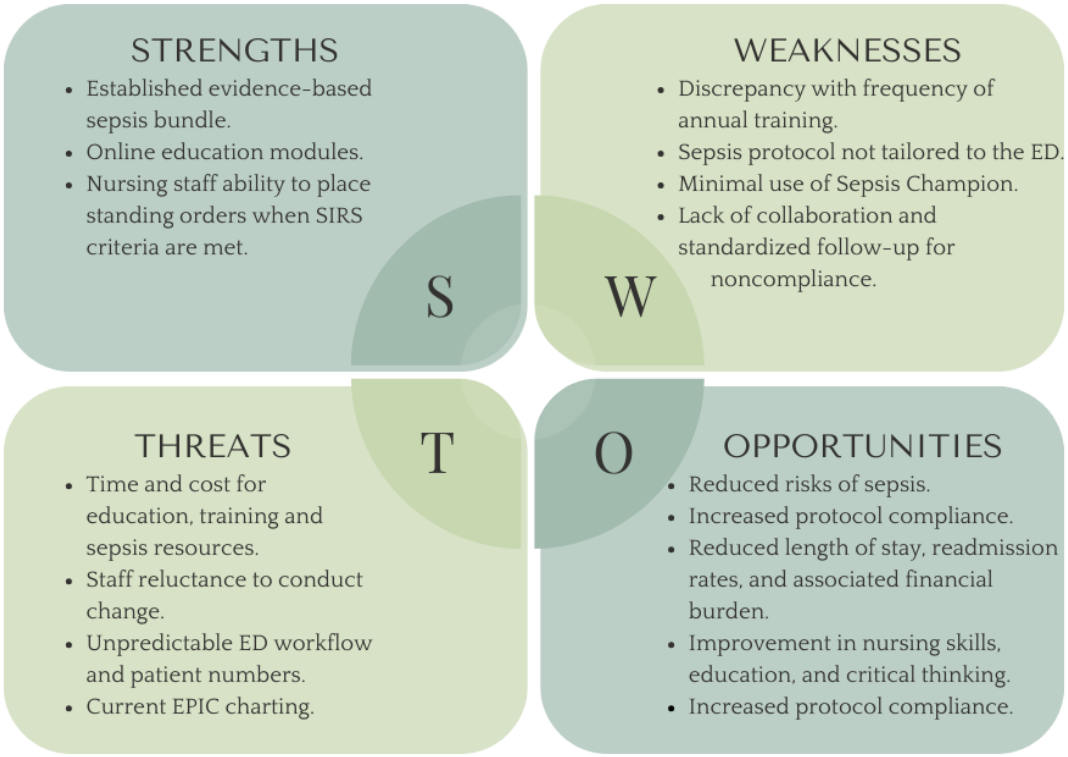
Appendix D

Root Cause Analysis



Appendix E

Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis



Appendix F

Pre-Intervention Questionnaire

Table F1

1. What is your protocol when treating a patient in the emergency room who is identified with sepsis?
2. How do you prioritize the treatments listed above? Is there a timeline?
3. What barriers prevent you from meeting sepsis bundle timelines?
4. What is your escalation process if you had questions or concerns regarding the sepsis treatment protocol?
5. When compliance with the sepsis protocol bundle is not met, what type of debrief or remedial training, if any, is conducted?
6. How often do you attend sepsis training?
7. How often do you place the standard orders for SIRS?
8. Do you wait for the doctor to submit the order set before initiating the sepsis protocol?
9. What changes do you feel can be made to sepsis protocol in order to improve patient outcomes?

Results: Figure F2 – F10

Figure F2

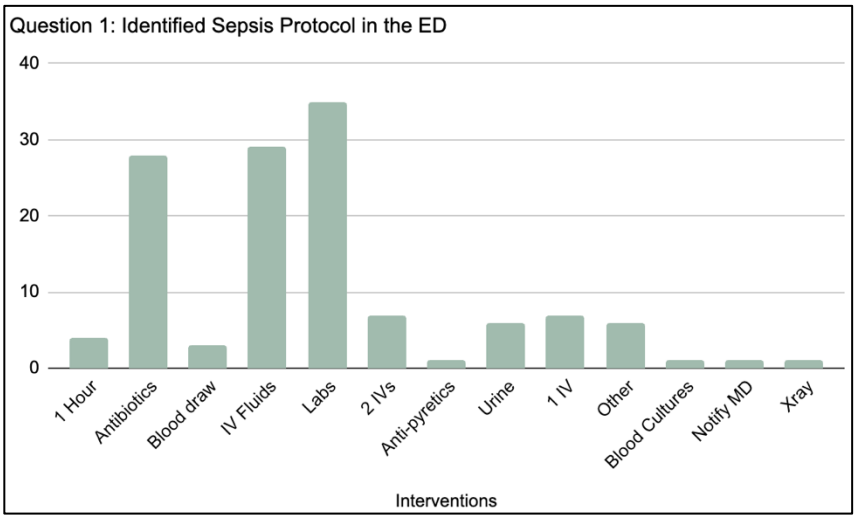
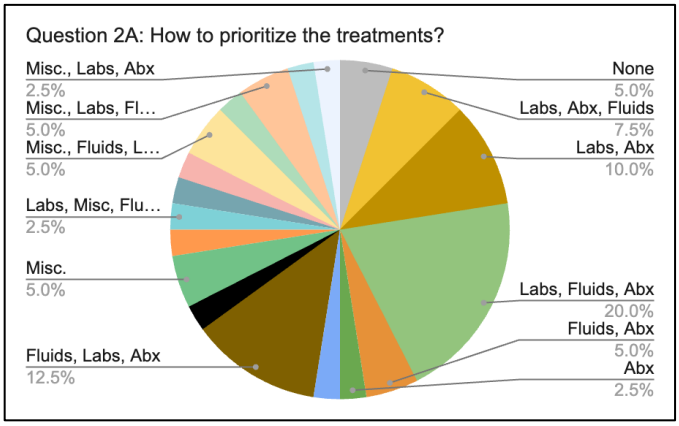
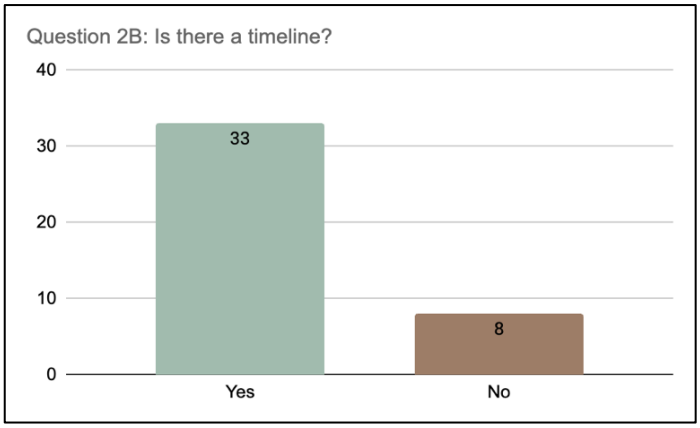


Figure F3





Legend:

Abx: Antibiotics
Fluids: Includes IV Line
Labs: Lactate, Cultures, Urine, Bloodwork
Miscellaneous: Vital Signs, Golden Hour, Order set, Room, EKG, EXR, VBG, X-Ray, Nasal Swab

Figure F4:

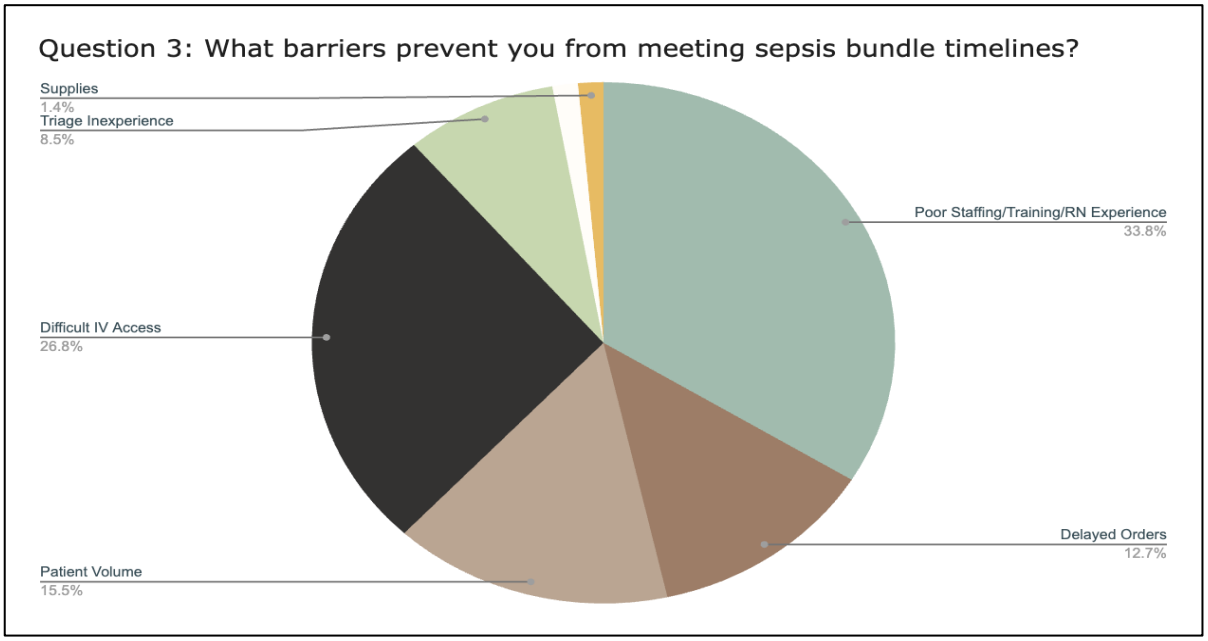


Figure F5:

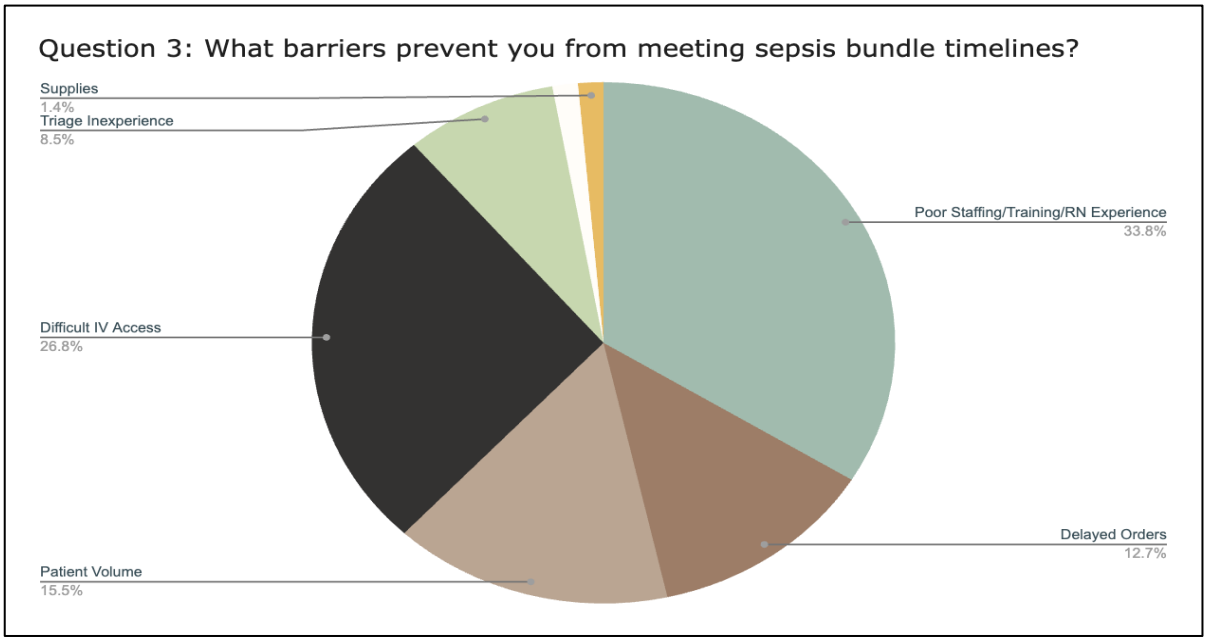


Figure F6:

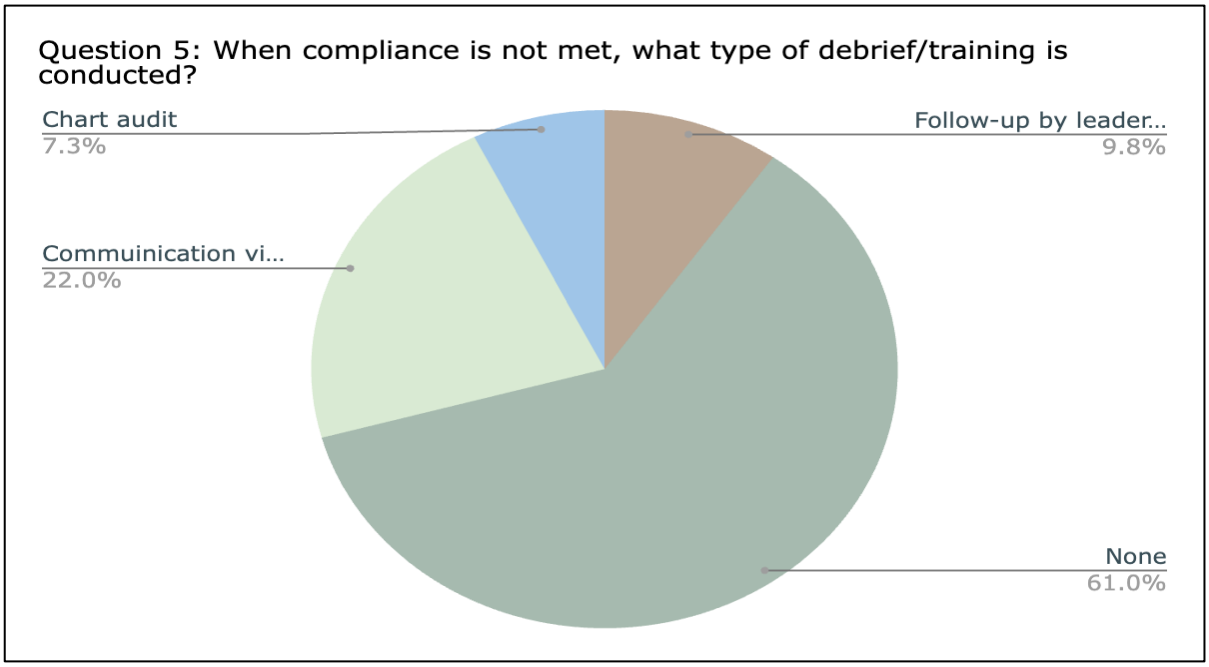


Figure F7:

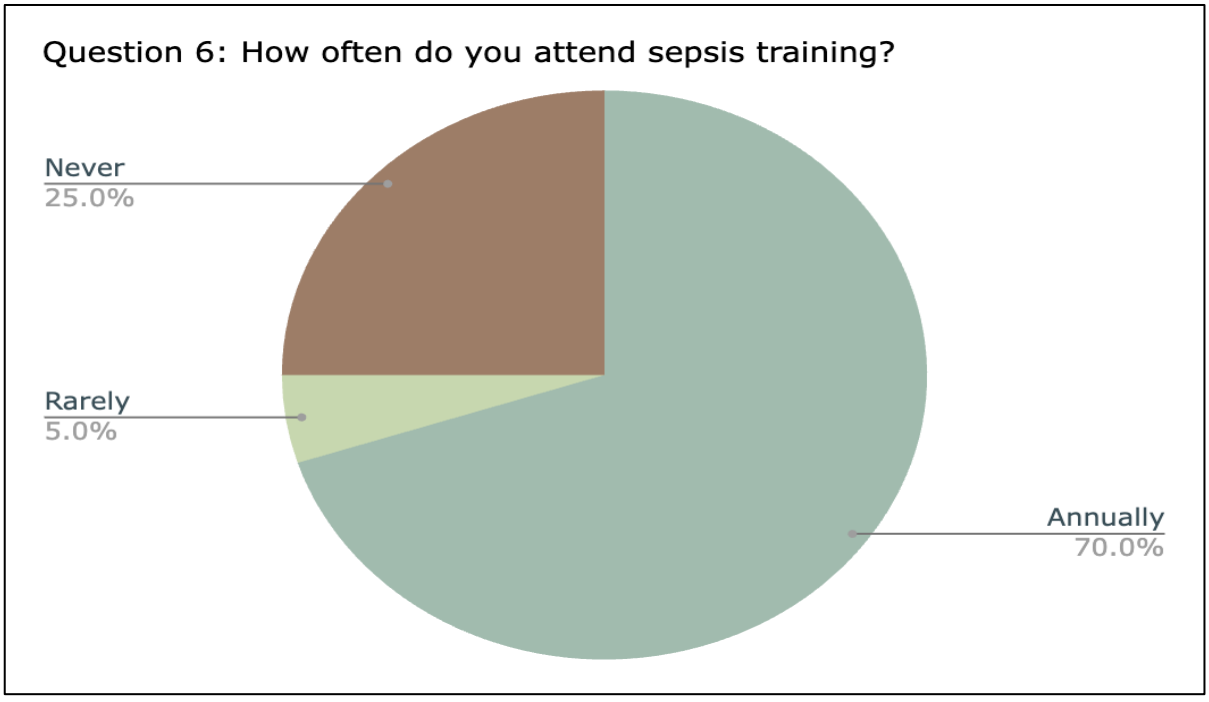


Figure F8:

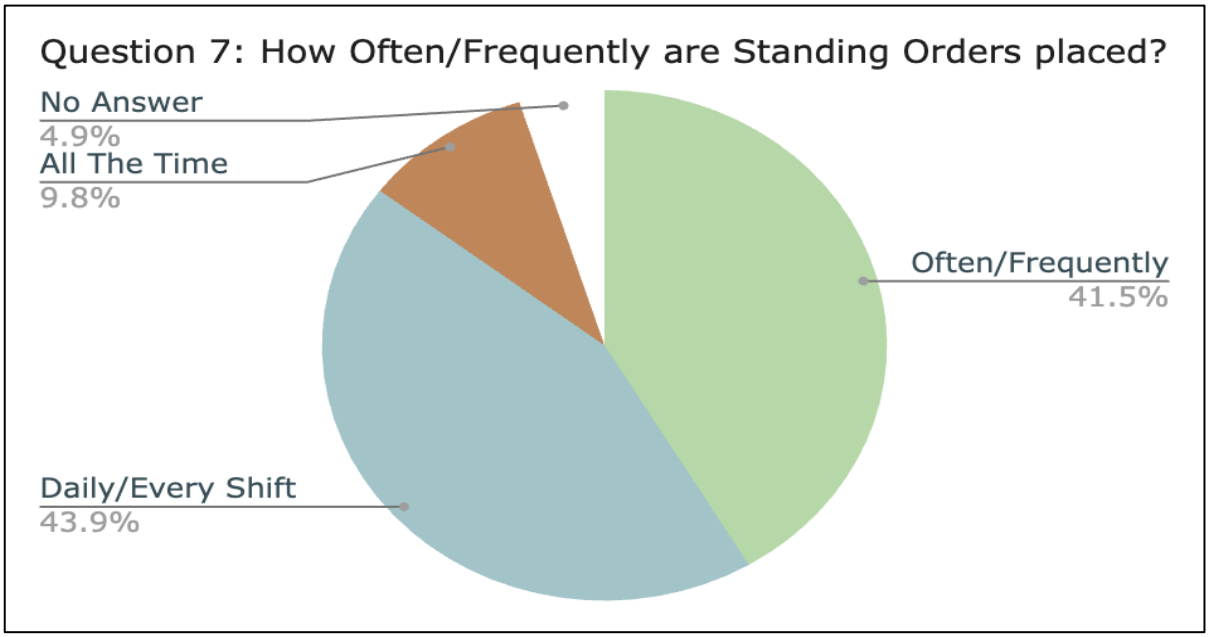


Figure F9:

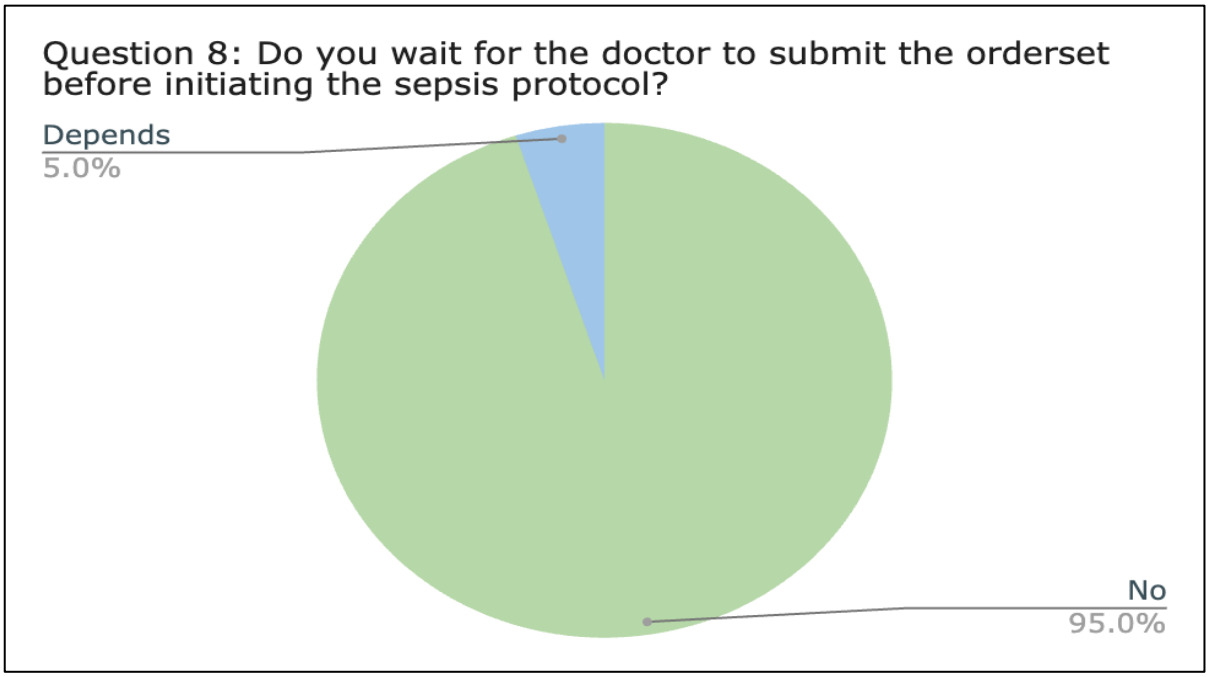
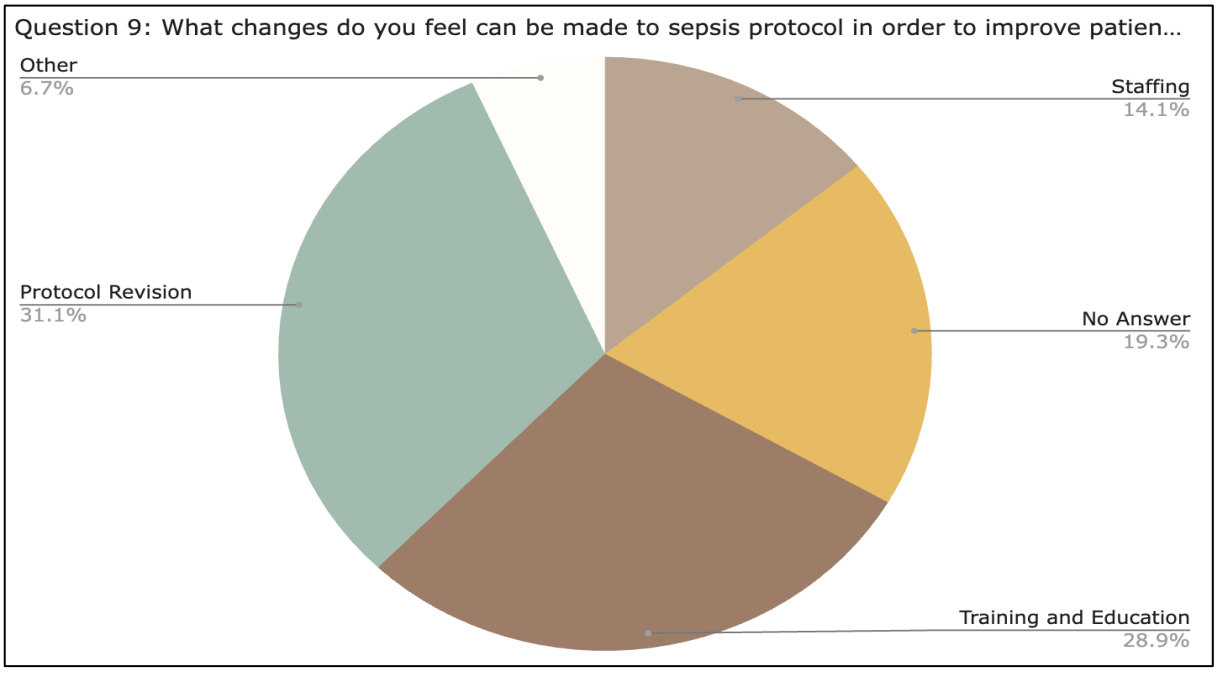


Figure F10:


Question 9: What changes do you feel can be made to sepsis protocol in order to improve patien...
Other
6.7%
Staffing
14.1%
Protocol Revision
31.1%
No Answer
19.3%
Training and Education
28.9%

Appendix G

Cost-Benefit Analysis

Appendix G: Cost Benefits Analysis			
Materials and Labor	**Year One**	**Year Two**	**Two-Year Total**
Ultrasound Guided IV Training ($2,400 x 9 ED RNs)	$21,600	N/A	$21,600
Sepsis Badge Reel Cards ($7 x 115 RNs)	$805	N/A	$805
Sepsis Bundle Training ($90/hr x 115 ED RNs x 2)	$41,400	$41,400	$82,800
Benefits			
Benefits based on the average U.S. national yearly costs for septic patients, and related complications, times 15 patients at Hospital A's Emergency Department..	$1,030,000	$1,030,000	$2,060,000
Net Benefits	$966,195	$988,600	$1,954,795
Benefit-Cost Ratio	15.1	23.9	18.6

Costs for Ultrasound Guided IV Training

IV training: $2,400
Train 3 RNs/shift: 9 nurses
$2,400 x 9 = **$21,600**

Costs for Sepsis Badge Cards

Price of cards: $7
ED RN staff: 115
$7 x 115 = **$805/year**

Costs for Sepsis Bundle Training (2x/year)

ED RN wage at Hospital A: $90 x 2hrs of training = $180
Frequency 2x/year: $180 x 2 = $360/year
Staff: 115 ED RNs
$360 x 115 = **$41,400/year**

Compared to average yearly costs of septic and related complications for 15 patients: **$1,030,000 per year**.

Appendix H:

Gantt Chart

GANTT CHART

TASK TITLE	START DATE	DUE DATE	AUGUST				SEPTEMBER				OCTOBER				NOVEMBER				DECEMBER			
			WEEK				WEEK				WEEK				WEEK				WEEK			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Project Conception																						
Define Project	8/25/23	8/25/23																				
Develop AIM/Draft Proposal	8/25/23	9/7/23																				
Literature Review	8/25/23																					
Sepsis Steering Committee Meeting	9/12/23	9/12/23																				
Identify Stakeholders	8/25/23	9/12/23																				
Project Planning																						
Microsystem Assessment/On-site Walkthrough	9/12/23	9/12/23																				
Develop Questionnaire	8/25/23	9/13/23																				
Project Proposal to Leadership	9/13/23																					
Project Implementation																						
Questionnaire Administration	9/13/23	10/29/23																				
Microsystem Observation	9/12/23	10/29/23																				
Project Evaluation and Synthesis																						
Data Analysis																						
Project recommendation to leadership																						
Effort and Cost Tracking																						