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**Optimizing Sepsis Management Through Enhanced Protocol Compliance
in the Emergency Department**

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NURS-653-01: Internship

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Abstract

Problem: The Quality Improvement (QI) Project focused on improving early sepsis management and sepsis bundle adherence among Emergency Department (ED) nurses to decrease sepsis mortality rates and avoidable length of hospital stays (LOS).

Context: A group of Clinical Nurse Leaders (CNL) students evaluated sepsis protocol compliance at Hospital A's ED, which provides critical care for patients with various medical conditions. The CNL students concentrated on patients identified with sepsis for the QI Project.

Interventions: Limitations and time did not allow for the implementation of interventions. Recommendations offered to management included increasing sepsis training biannually and intravenous placement skills, offering sepsis badge reels for nurses, and establishing a standardization specifically for the Emergency Department to improve sepsis compliance rates.

Measures: Once sepsis management was reviewed, the students developed pre-intervention questions to identify barriers and areas of improvement within the microsystem. In the post-intervention review, the staff would determine the effectiveness of the recommended details.

Results: The participants highlighted gaps in sepsis bundle compliance and workflow. They reported that 29.3% of nurses did not attend or know of sepsis training, and 46.3% did not receive remedial training after failed compliance. Also, 27.4% mentioned IV access, 24.7% said lack of beds, and 11% stated delayed orders created barriers to applying the protocol correctly.

Conclusions: The data collected revealed gaps in education and knowledge on sepsis compliance, and 42% of participants believe a sepsis protocol revision is necessary.

Keywords: *sepsis, septic shock, emergency department, sepsis bundle compliance, sepsis components, early management, microsystem, sepsis training, improvement project.*

Introduction

Secondary to infection, sepsis is recognized to cause at least 1.7 million hospitalizations and a minimum of 350,000 deaths annually in the United States (CDC, 2023). These numbers continue to rise as compliance is becoming more relevant but may require enhancements to identify and reduce prolonged stays in hospitals. If not detected early, sepsis can lead to extensive care, multiple organ failures, and mortality. John C. Marshall authored for the National Library of Medicine, 2001, that Multiple Organ Dysfunction Syndrome (MODS) is a potentially life-threatening reversible damage to two or more organs not involving the reasoning for admission to hospital units. Organ dysfunction generally occurs due to hypoperfusion and involves edema, tissue ischemia, inflammation, and fibrosis relative to the organs affected (Marshall, 2001). For this reason, increasing knowledge on sepsis compliance bundles can enhance interventions and minimize health and financial affliction.

Furthermore, promptly addressing septic patients with sepsis protocol adherence has demonstrated improved survival rates (Milano et al., 2018). According to the Surviving Sepsis Campaign (SSC), the implementation of timely treatment consists of the collection of lactate and blood cultures x 2, antibiotic measures using guidelines, and a Sepsis Champion to educate staff on methods to recognize and manage septic patients were recommended (Gripp et al., 2020). The SSC recommends 30 mL/kg of intravenous fluids (IV) if conditions permit while managing fluid overload, and the administration of antibiotics both have shown a 16.7% decrease in mortality rates if conducted within the hour mark (Kabil et al., 2022). Therefore, identifying sepsis earlier during Emergency Department (ED) admissions is critical to reduce complications and allow the interdisciplinary healthcare team to remain centered on providing essential care to patients nationwide.

Problem Description

Early sepsis management has become a concern at Hospital A's Emergency Department due to various reasons. This level II adult trauma hospital is located in Northern California's Bay Area, houses approximately 44 patient rooms within the ED, and employs over 100 diversely qualified nurses readily available to provide the utmost care to patients on arrival. The recent influx of septic cases suggests challenges with the current sepsis bundle compliance. At times, patients who are not receiving septic care within the hour increase hospital stay longevity, septic-related deaths and cause readmissions among the community. The Quality Improvement (QI) project will divulge current gaps in the process, provide recommendations on implementing education on early septic treatments, and establish standardization and collaboration to enhance the ED's current sepsis bundle compliance.

PICOT Question

As part of this Quality improvement (QI) project, a Patient, Intervention, Comparison, Outcome, and Time (PICOT) question was developed to determine the effectiveness of the project.

The PICOT question is: 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

For improvements to result in better patient outcomes, a change theory is implemented within a microsystem. The QI project focused on using Awareness (A), Desire (D), Knowledge (K), Ability (A), and Reinforcement (R), also known as ADKAR, for sepsis management within the Emergency Department. According to Prosci Inc. (2023), in developing the five goals and

outcomes, this improvement model allows leaders and hospital management to focus on sepsis initiations and the progress on staff change to achieve sepsis compliance results. Awareness focuses on highlighting the problems within a facility, such as sepsis protocol compliance, and informing hospital managers, nursing staff, and supervisors in a microsystem on what must change. The Desire (D) phase allows stakeholders to incorporate knowledge to better assist in creating a blueprint and recommended strategies for positive adherence with sepsis. So, the Knowledge (K) on financial savings, sepsis bundle, IV training, identifying a sepsis champion, and creating sepsis badge reels for nurses could improve compliance to improve ED outcomes and reduce the length of stays at the hospital. In the Ability (A) part, the project interventions are actively being conducted to promptly determine if the nurses can produce better results of septic patient identification and compliance. Lastly, the reinforcement (R) stage must focus on confirming the education and the knowledge gained on improvement methods, as well as providing continual support to the staff in the emergency department.

Search Strategy

The Clinical Nurse Leader (CNL) Students thoroughly researched improvement models and scholarly search engines to collect evidence-based data for the QI project. A literature review of previous work on sepsis compliance assisted in determining how to improve the current processes within the ED. Data was gathered over one month, beginning in September of 2023. Multiple site engines were accessed, such as Cumulative Index to Nursing and Allied Health, Scopus, PubMed, and MEDLINE, to find sepsis criteria and guidelines for compliance with sepsis interventions. Keywords focused on were “septic shock,” “Emergency Department,” “sepsis bundle compliance,” “sepsis protocol,” “sepsis champion,” “multiple organ dysfunction

syndrome,” “change model,” and “hospital length of stay.” In utilizing key terms, the words alleviated and narrowed the search for improvements in sepsis protocol studies.

Available Knowledge

The search strategies guided the knowledge gathered in developing an outline for the QI project. A literature review of available knowledge then focused on the quality of evidence utilizing the Johns Hopkins Evidence-Based Practice for Healthcare Professionals: Model and Guidelines (Appendix B) (Dang et al., 2022). Studies on sepsis, management, early detection, fluid and antibiotic administration, improvement models, and methods of improvement practices led the project for the Clinical Nurse Leader (CNL) students.

Sepsis is a dangerous and life-threatening condition; if detected early, it can be managed or prevented with knowledge and compliance. The Centers for Disease and Control and Prevention (CDC) articulated a Sepsis Program Activities in Acute Care Hospitals — National Healthcare Safety Network, United States, 2022 to acknowledge the current sepsis conditions, the dangers of not detecting sepsis in hospitals across the United States, and its methods for improvements (2023). Another article focused on the adherence of the sepsis bundle in association with an increase in survival rates for severe septic shock patients (Milano et al., 2018). Milano’s study intrigued the desire to understand better how the lack of sepsis compliance can lead to multiple organ dysfunction syndrome. John C. Marshall authored for the National Library of Medicine (2001) that Multiple Organ Dysfunction Syndrome (MODS) is a cause of death for patients admitted to hospitals when arriving with comorbidities, while sepsis is frequently unidentified yet so prevalent.

In understanding the background of knowledge of what sepsis is, the CNL students developed an improvement plan using a Clinical Nurse Leader process and tools. The first tool,

Plan Do Study Act (PDSA), is the most important as it guides the entire project. The Institute for Healthcare Improvement (IHI) explained how the ‘Plan, Do, Study, Act’ model centered on addressing fundamental questions about the project and to determine if such changes are improving the facility (2023). Furthermore, Prosci Inc. (2023) utilizes a developmental ‘ADKAR’ model in which management focuses on five goals and outcomes to establish individual change to reach organizational objectives. This model allows individual nurses to acknowledge the need for improvements in compliance, desire them, and implement them by applying reinforcement skills and behaviors. These models advanced the study and allowed for the acknowledgment of areas that need attention.

In instituting the layout for enhancing compliance, the literature review spearheaded the bundle and methods for improvement, and journal articles detected that early fluid and antibiotic administration was beneficial in sepsis care. One research article discussed how challenges arise in healthcare due to a lack of knowledge on sepsis protocol and how training implemented in the research over ten months to collect lactate and blood cultures and administrate antibiotics within the first hour saw positive results while tracking mortality rates and length of stays at hospitals (Gripp et al., 2021). This education should be frequented in all sepsis compliance bundles regardless of the department to decrease substandard patient outcomes while enhancing nursing knowledge on sepsis compliance (Gripp et al., 2021). The Early Restrictive or Liberal Fluid Management for Sepsis-Induced Hypotension journal covered a randomized controlled trial study to assess how influential administration early and use of vasopressors can be on patients who have hypotension due to sepsis (Shapiro et al., 2023).

Additionally, Kabil et al. (2022) furthered the notion in a meta-analysis review that although barriers are present, patient comorbidities, age, and shock diagnosis should not be

detrimental to sepsis management with fluids. The study resulted in a 47% increase in compliance when providing fluids within the proper timeframe. Other studies conducted in the literature review identified that a delay in administering antibiotics beyond the hour mark significantly affected mortality rates in septic patients (Sankar et al., 2021). Lastly, compliance was affected by delays in care due to a barrier to swiftly placing intravenous access in the Emergency Department. A randomized controlled trial study identified training and use of ultrasound-guided IV placement to increase patient care outcomes by almost 80 percent, whereas no device only improved success by 56 percent (Bahl et al., 2016). The literature review provided adequate knowledge to guide this QI project to optimizing sepsis management through enhanced protocol compliance in the Emergency Department.

Specific Project Aim

The QI project initiated by the CNL students in the Emergency Department of a Level II adult trauma hospital within the great Bay Area aims to improve the compliance rate of the sepsis bundle and its utilization. A survey questionnaire developed for nurses was to identify current sepsis barriers to sepsis compliance. Once the process concludes, a presentation to the nursing staff on recommendations of evidence-based practices will be conducted, with the prospect of increasing utilization and compliance with the protocol by up to 60% or greater. As sepsis continues to cause hospital-related deaths and consequential burdens financially, it is critical to address this concern sooner rather than later. The purpose is to enhance the current sepsis compliance rate, thus improving pivotal timing for sepsis management on arrival and minimizing sepsis-related mortality, hospital length of stay, and readmissions among the population.

Methods

Project Overview

The Emergency Department at Hospital A and the CNL students developed a QI project to discover why sepsis bundle compliance rates have been much lower than the desired outcomes. After analysis of prior quarterly results on sepsis compliance, the ED's management team, a group of stakeholders, and the CNL students concluded that a blueprint to improve outcomes was necessary. The significant data provided by the management allowed the students to create a Plan, Do, Study, and Act (Appendix C), so a PICOT question and specific aim statement can initiate the project. Once established, data required comparison to current policies at Hospital A; therefore, a literature review (Appendix B) on sepsis protocols and ED compliance provided evidence-based practices and reasoning for a pre-intervention questionnaire (Appendix F) within the facility.

For methodologies, the 5 P's Assessment tool guided the microsystems assessment and assisted in identifying the root cause (Appendix D) for barriers and how to address the matter in question. The Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis (Appendix E) magnified internal and external factors affecting the microsystem. Lastly, the CNL students produced a Cost-Benefit Analysis (CBA) (Appendix G) to find methods for reducing hospital expenditures, all while remaining within a timeline, illustrated in the Gantt Chart (Appendix H).

Microsystem Assessment

To create a project that increases compliance on any matter, an analysis of the microsystem will determine the areas that require change. The CNL students adopted the 5P's (Purpose, Patients, Professionals, Process, and Patterns) assessment tool for this purpose. This tool allowed for a deeper divide into its purpose of optimizing sepsis management through enhanced protocol compliance and standardizing a protocol specifically for the Emergency

Department. The incline in compliance results would increase sepsis recognition and decrease septic mortality due to underlying comorbidities or length of stay at Hospital A. For this accomplishment, the entire microsystem must work cohesively to improve the objectives, including all nurses, physicians, phlebotomists, lab staff, the rapid response team (RRT), and the rest of the interdisciplinary team. Everyone has an integral part in raising the current level of care within the Emergency Department, from screening during triage for Systemic Inflammatory Response Syndrome (SIRS) or Multiple Organ Dysfunction Syndrome (MODS), also known as Sequential Organ Failure (SOF) to proper Electronic Cardiac Arrest Risk Triage (eCART) documentation. These duties are vital, and if adequately attended to, they can create positive patterns and interrelationships in the microsystem, enhancing the desired compliance of the bundle.

Plan, Do, Study, Act (PDSA) Cycle

Several models for the improvement and development of sepsis-focused care have arisen. According to the Institute of Healthcare Improvement (2023), the Plan, Do, Study, Act (PDSA) model (Appendix C) developed a method to examine and adapt to changes to ensure that results have the desired improvements. For this QI project, the model for improvement started with the 'Plan' phase of the PDSA (Appendix C), where the CNL students worked closely with the managers of Hospital A's Emergency Department to determine if missteps had occurred in compliance with the sepsis protocol. In this phase, the students developed a specific aim statement and PICOT question to examine if the nursing staff was being held accountable or receiving support and education on the current compliance bundle or how to improve it within a set timeframe. The plan was then to establish a set of pre-intervention questions and ask the

nurses to answer so the students could analyze the responses and follow up with recommendations on improvements for the sepsis protocol.

In having a scheme set, the next phase of the PDSA is the 'Do' phase (Figure C). Students elaborately assessed the current sepsis bundle and compliance in the microsystem. Soon after, a 5 P assessment led to a Root Cause Analysis (RCA) that established concerns with the Bundle and the protocol within the department. The students created a self-administered questionnaire comprising nine questions distributed to the ED Nurses. The data collection lasted over five weeks, with the students alternating visits to the Emergency Department. Additionally, a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis was adopted to explore positives and negatives internally within the department and how external factors could improve with opportunities or identify threats to the project. In the 'Do' section, the last part would present evidence based on recommendations to the microsystem leadership on December 4th, 2023.

The 'Study' phase (Figure C) collected data from the previous 2023 quarter sepsis protocol and analyzed it, comparing it to national evidence-based practices. With the research scrutinized and the survey data gathered, the distribution of questions between the students focused on developing a conclusion once dissected and summarized. After recommendations, studies on the post-intervention data would determine if the interventions imposed improved sepsis bundle compliance in the microsystem. In conclusion, in the 'Act' phase (Figure C), the students proposed to the department to increase training aside from the annual online modules and develop a post-training assessment, refine intravenous practice for all nurses by utilizing technology-led IV placement, and distribute Badge Reel Care Cards with sepsis protocol and

escalation processes. More importantly, establish a sepsis policy specific to the ED to help standardize practice.

Root Cause Analysis (RCA)

The approach to improvement within any healthcare microsystem is to determine the root cause of the problem. Like any other microsystem, the ED can develop enhanced protocols, and its sepsis bundle is one area. Hospital A is a level II trauma hospital located in the Bay Area. This unit comprises 44 treatment pods with approximately 115 nurses trained to provide high-quality care. Within the unit, early sepsis numbers have increased, and a decrease in identifying such cases has developed longer patient stays, elevated mortality rates, and readmission of patients within the hospital. A root cause analysis (RCA) model discovers amongst all factors which is the more fundamental reason for gaps within a problem. Several factors affect the compliance of the sepsis bundle protocol. First, nurses would require additional colleague support when patients had more difficult access to intravenous placement. The second reason was the lack of ED policy protocol and nurses on the floor, consequently elevating patient volume per nurse; this would cause deviation from the sepsis protocol and delays in lab collection and review of results (Appendix F). Nurses are unaware of the escalation process, and inexperienced triage staff screening for sepsis compromises the identification of initiating the protocol. Next, the third response for nurses was the lack of available rooms, order sets for protocol initiation, and delays in lab collection and results. Lastly, training is only once a year, with minimal coverage of proper sepsis treatments and a lack of debriefing after a sepsis case (Appendix F). The collection of these modalities is the root cause of decreasing compliance with the current sepsis protocol in the ED.

Strengths, Weaknesses, Opportunities, Threats (SWOT) Analysis

The students examined the sepsis bundle for defects it may hold. The Strength, Weaknesses, Opportunities, Threats (SWOT) improvement model could analyze the state of the protocol within Hospital A's Emergency Department. Strengths determine the internal positive aspects of the compliance bundle and how easily available it is to the department. Furthermore, staff access the protocol through in-house reminders and annual module training. Unfortunately, the bundle lacks standardization and collaboration among the ED alone; the current sepsis protocol is a generalized version of the hospitals and is not specific to the fast-moving microsystem.

Also, the decrease in training on intravenous injections and its resources has caused more difficulty for nurses to access IV lines accurately in patients (Figure F3). Sepsis training is an annual concept utilizing technology; evidence suggests the lack of bi-annual training may cause nurses to omit the knowledge and, therefore, not remember if training is consistent (Figure F6). Areas of opportunities arise with the diffusion of sepsis protocol knowledge and lack of education, so improving critical thinking skills, sepsis compliance, and training can reduce the length of stays, and better patient outcomes can be feasible. Finally, threats are imminent in any microsystem; for Hospital A's Emergency Department, the lack of appropriate charting and timing, the decrease in education, and staff compliance with new protocols can hinder the progression of the desired sepsis upgrade.

Cost-Benefits Analysis (CBA)

A Cost-Benefit Analysis (CBA) was established by the CNL students to evaluate and compare Hospital A's associated benefit-related costs while basing it on the interventions recommended for sepsis compliance (Appendix G). Education is the first and most critical step in increasing compliance. Consistent training can only increase the nurses' knowledge on the

floor; therefore, providing sepsis training bi-annually for 115 nurses in the ED would cost \$90 an hour, calculating up to \$41,400 per year. This education would cost an estimate for labor and materials, totaling up to \$63,805 annually. Also, the Vascular Wellness Resource website (n.d.) provides guides and trains to improve the compliance and timing of intervention of ultrasound intravenous placement and how it can be implemented per shift for nine nurses a day, with the students estimating the value per nurse at \$2,400, totaling \$21,600 per year.

The CNL students found on the Etsy, Inc. (n.d.) website that sepsis badge reels would cost approximately 7 dollars per person for the 115 current nurses working in the Emergency Department, costing the facility a total of \$805. This price would be a bargain for the hospital as it could reduce time management, escalation process, and resources for the ED. Although these estimates impose a cost, the number of septic patients is rising quickly, so the expenditure of the amount mentioned above is justifiable. Furthermore, Hospital A can expect a net profit of \$966,695 for the first year and \$988,600 in the second year with the Cost Benefit Analysis plan (Appendix G).

Timeline

For the QI to remain on schedule, a Gantt Chart (Appendix H) exemplified the amount of production completed within a particular duration in connection with the planned amount within that timeframe. The designed project was to be accomplished from September to December 2023; although not completed, the interventions were presented at the latter date to the ED management so the parts of the PDSA model that were not complete could reach achievement.

Intervention

Time constraints did not allow the execution of interventions on the microsystems floor. Despite this, survey responses allowed for analysis of sepsis compliances and what gaps may

occur within the unit. Evidence-based recommendations could provide direction and offer more data on whether the suggested implementations improved compliance. The initial intervention was to have the CNL students issue a hard copy of the nine-question survey (Table F) throughout visits to the ED during five weeks. Surveys and incentives were also available while students were not on hospital premises expecting nurses to complete the forms during slower moments in the day. The open-ended survey responses provided knowledge on how nurses prioritize and perceive the sepsis protocol, if education is frequent and how often, and what barriers may affect timely patient care; see Appendix F for responses.

After analyzing data, the group formulated interventions and presented them to Hospital A's leadership team based on evidence and improvement models to increase compliance. Hospital A has a sepsis protocol that oversees the entire organization; the advice was to develop a sepsis protocol for the ED and offer Badge Reel Care Cards for each nurse on the floor containing steps to treatment, what to observe, and how to follow a proper escalation process in case a nurse required additional assistance. In addition, establishing sepsis screening policies and a sepsis champion, in-person and hands-on education training on sepsis is to be made readily accessible and provided more frequently rather than once a year on a computer module program, as well as intravenous skill placement utilizing technology-based resources. The interventions would provide measurements and feedback on outcomes following training and execution to determine the improvement within the microsystem.

Study of Interventions

Once interventions are completed, within the proposed timeframe of the QI project, leadership members could review and evaluate whether the recommendations improved patient outcomes in reducing the length of stays, sepsis mortality rates, readmissions, and futile

monetary expenditure for Hospital A. In addition, post-intervention surveys could offer knowledge of whether nurses have improved critical thinking skills, their confidence with intravenous sticks, and their understanding of how to address septic patients within the first hour of arrival to the ED. Moreover, the study would recognize if nurses understood who the newly elected sepsis champion is and the ED's current chain of command. If overall compliance has not reached the recommended standards of the QI project to enhance and optimize sepsis management, a new PDSA perspective may be necessary.

Measures

From the pre-intervention questionnaire, the evaluated data allowed for a better understanding of the sepsis protocol and compliance in the ED unit. The CNL students created nine open-ended questions in a hard-copy format during ED visits or through a Google Form's QR code; nurses anonymously expressed whether they understood the sepsis guidelines and when to activate it upon arrival of patients. Furthermore, the questions permitted the ED nurses to explain how frequently sepsis training occurred, identify barriers that may affect compliance, or who to approach when an escalation process is required.

After the applied interventions, the unit management team would develop a survey to measure whether the floor nurses felt more confident with their ability to use critical thinking and the sepsis bundle and perform the implemented training post-interventions.

Ethical Considerations

This paper, 'Optimizing Sepsis Management Through Enhanced Protocol Compliance in the Emergency Department,' qualifies as an evidence-based quality improvement project but does not meet the Institutional Review Board's (IRB) standard approval.

Results

The results had quantitative and qualitative answers from the 41 nurse participants in the quality improvement project. Overall, nine questions determine the best method of understanding whether the current protocol for sepsis treatment at Hospital A is accurately abided by or if improvements are required.

Question one identified if there is a protocol to treat septic patients in the emergency room at Hospital A. Nurses acknowledged the hospital-wide sepsis bundle is executed, with the most frequent answers consisting of labs with cultures, intravenous placements, fluids unless contraindicated, and antibiotics, all within the first hour (Appendix F, Figure F1). Question two had two parts. Whether nurses knew there was a timeline for sepsis treatment on initial arrival and if there was a standardized prioritization of sepsis treatment amongst employees. Figure F2A showed that of the 36% of nurses who participated in the survey, there was no clarity as to what services or in which order; evidence was inconclusive due to 20% being the highest among the multiple answers. For question 2A, the lab consolidated the lab draws with a lactate test, cultures, urine, and blood work (Figure F2A). Responses with fluids included starting intravenous lines, while the miscellaneous category was a collection of other answers, such as vital signs, placing the patient in a room, electrocardiogram, x-rays, etc., refer to Figure F2A. The prioritization with 20% consisted of labs first, administering fluids second, and followed by antibiotics, but again with the inconclusiveness on which of the labs or fluids each nurse selected first. The second percentage followed was 12.5% of fluids, labs, and antibiotics. A response that resulted in 10% identified labs and antibiotics as the only forms of treatment, while every other answer was 5% or less. For the second part of question two, 33 nurses understood that the first hour is the critical golden hour to treat sepsis for better patient outcomes. On the contrary, eight responses did not know the correct timeframe or gave inconclusive answers (Figure F2B).

The third question identified barriers that affect prompt treatment. Intravenous access was amongst the highest, resulting in 26.8%, while poor staffing, training, and RN experience had 33.8%. Amongst the other answers by nurses, patient volume scored at 15.5%, delayed orders at 12.7%, and triage assessments at 8.2% were identified as barriers to sepsis protocol treatment (Figure F3). Question four explored the chain of command or escalation process for sepsis treatment and data offered 35.4% (Figure F4) of nurses reported to physicians directly, 29.3% preferred to speak to the charge nurse or peers for guidance, on the other hand, 35.4% addressed concerns to educators, managers, or pharmacists. The following question, number five, identified if there was a debrief or remedial training when sepsis compliance was unmet. Staggering results determined that 61% of answers stated no follow-up debrief or training. Furthermore, the next closest was 22.0% on communication via email, 9.8% followed up with leadership, and 7.3% had chart audits (Figure F5).

The next question addressed the frequency of training. Nurses reported that 70% attended sepsis training annually, while 25% said never and 5% mentioned rarely (Figure F6). Question seven investigated if there were standard orders for SIRS, and a sizeable response indicated every shift at 43.9%. Frequently scored 41.5%, and 9.8% said all the time (Figure F7). 95% of nurses answered that they do not wait for the doctor to submit orders before initiating the sepsis protocol, and only 5% responded yes to question eight (Figure F8). Lastly, question 9 offered qualitative for nurses to express thoughts on changing the sepsis bundle to improve patient outcomes. Nurses responded that protocol is "fine," but implementation is the issue. RNs should be allowed to drive protocol/orders and have more hands-on education (Figure F9).

Discussion

Over the development of the project, up until the results, data demonstrated that there was a rise in septic cases with a decrease in bundle compliance within the Emergency Department. The lack of standardization specified for the ED has created complacency and has affected patient care while also increasing the length of stays at Hospital A, consequently elevating nonessential expenditures. For this reason, improving sepsis bundle protocol on a national level was researched and compared to the current state, concluding that a standard within the ED and making training more frequent throughout a calendar year is necessary. The PDSA guided the project, and the survey allowed for areas the CNL student could focus on. Moreover, it created the recommended interventions for the staff management to conduct, as time did not permit the student to do so. The hope is that with the interventions, everyone involved in the project could observe advancements in compliance, decreasing septic-related mortality rates and length of stays at Hospital A.

Limitations

Challenges arise when conducting research in medicine, most evident for the Quality Improvement project at Hospital A derived from the number of participating nurses answering the questionnaire created by the clinical nurse leader students. The roster provided by the supervisor offered a list of 115 Emergency department nurses, with four unavailable. Despite that number, only 41 surveys were completed by nurses as students attempted for several weeks at various hours of the day to accommodate the nurses on the floor, refer to Appendix H. Unfortunately, many nurses were occupied with patients or were not interested in participating with the survey at the beginning or end of the shifts despite incentivizing with food and gift cards offered by the CNL students. The result concluded with 36% of participants contributing opinions on the current sepsis policy.

Furthermore, the delay in receiving and misinterpreting the internal data from the Emergency Department caused delays in transcribing the evidence on sepsis adherence. Statistics also provided information for multiple hospital Emergency Department microsystems, skewing the data. The CNL students had to decipher the data for Hospital A so that correct analysis would be possible. Next, the open-ended questions left the nurses to interpret the questions as many gave more quantitative responses. Some answers required adjustments for a more cohesive understanding of the data (Appendix F). Another limitation was not having additional time for nurses to complete the survey to increase the accuracy of information on the Emergency Department's sepsis bundle protocol. Moreover, time constraints prevented the opportunity to implement the recommendations and provide a post-intervention analysis to determine if the current study improved the sepsis protocol or if further adjustments are necessary.

Summary

Clinical Nurse Leader students developed a Quality Improvement Project in Hospital A's Emergency Department to optimize sepsis management through enhanced protocol compliance. An increase in septic patients and expenditures at the hospital caused leadership to research the compliance bundle and determine if change is required. The students collaborated with the stakeholders to develop a PICOT question and begin the assessment of the microsystem utilizing CNL strategies. Initially, the 5P assessed the ED, a PDSA created the plan and its actions, the SWOT analyzed strengths and weaknesses, and the CBA provided a cost-benefit analysis. The change model used for this project was the Prosci ADKAR Model to identify and reach the intended goals. Only 36% of staff nurses answered the pre-intervention questionnaire, delaying the continuation of the project; therefore, the students made recommendations for leadership to implement at their discretion as 25% did not know of annual sepsis training, and 41% of nurses

deemed a change necessary in the sepsis protocol. Data revealed standardization and training within the ED require an adjustment, so staff are all working cohesively to swiftly identify sepsis, treat the well-being of patients, and reduce unnecessary hospital expenses.

Conclusion

Overall, the purpose of the QI project for the CNL students was to improve sepsis bundle compliance in the Emergency Department of Hospital A, located in the greater Bay Area. Although all objectives were unattained, the tedious portion concluded with research, data collection, and analysis so the ED management team could implement the recommendations provided by the students. The suggestions included standardizing and increasing sepsis training frequency using refined technology-assisted IV placement skills and hands-on simulations within the microsystem. Furthermore, develop post-training evaluations to solicit feedback, establish a comprehensive sepsis screening policy, and review cases on near misses. To minimize sepsis treatment times, the students mentioned creating Badge Buddy cards with visual aids detailing sepsis and escalation pathway guidelines to assist nurses. These recommendations are to improve bundle compliance in the microsystem and for the leadership to recognize gaps in sepsis treatment to help prevent increased patient mortality, lengthier hospital stays, and avoidable hospital expenditures.

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Appendices

Appendix A

Statement Of Determination

<p>Title of Project:</p> <p>Optimizing Sepsis Management Through Enhanced Protocol Compliance in the Emergency Department.</p>
<p>Brief Description of Project:</p> <p>This quality improvement project aims to improve 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.</p>

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 *M. Maclean* (date) 11/22/2023

Signature of Student *Oscar J. Castillo* (date) November 20, 2023

Figure A

Appendix B

Literature Synthesis Table

Literature Review Table				
Study Author(s)	Study Objective & Design	Sample & Setting	Results	Level of Evidence
Bahl, A., Pandurangadu, A. V., Tucker, J., & Bagan, M.	This randomized, single-site study aimed to compare the effectiveness of standard intravenous placement to ultrasound-guided intravenous access in patients with challenging accessibility.	There were 124 participants in total, with 63 assigned to the ultrasound-guided arm and 61 to the standard care arm. After excluding 2 patients, the final count was 59 participants.	76% of intravenous placements guided by ultrasound in the arm were successful, while only 56% of those in the standard care arm achieved success. Additionally, intravenous placements in the standard care arm were observed to be more time-consuming.	Level II (Dang et al., 2022)
Gripp, L., Raffoul, M., & Milner, K. A.	A ten-month quality improvement initiative aimed at enhancing sepsis care through the implementation of the 2018 Surviving Sepsis Campaign 1-hour bundle.	Thirty-two patients with sepsis treated in a short stay unit, which is part of an 800-bed hospital.	The sepsis implementation tool was utilized, and sepsis champions educated the staff on early recognition, treatment, and management. The result was a 100% compliance rate with the sepsis care bundle and timely treatment within one hour of diagnosis for all patients.	Level V (Dang et al., 2022)

<p>Kabil, G., Frost, S. A., Hatcher, D., Shetty, A., Foster, J., & McNally, S.</p>	<p>Conducting a systematic review, meta-analysis, and narrative review to explore strategies for enhancing compliance with early fluid administration and non-interventional measures. Lastly, identifying potential barriers influencing fluid management.</p>	<p>The researchers employed diverse databases for the retrieval of pertinent studies, including MEDLINE Ovid/PubMed, Ovid EMBASE, CINAHL, and Scopus.</p>	<p>Interventions were evaluated for effectiveness through Meta-analysis evaluated non-interventional measures were assessed using narrative studies. The meta-analysis studies revealed a 47% enhancement in compliance, whereas narrative studies indicated a 48% compliance rate for early fluid administration, with an average reduction in time of 24 minutes.</p>	<p>Level III (Dang et al., 2022)</p>
<p>Marshall, J.C.</p>	<p>An expert analysis on the poorly understood prevalence of multiple organ dysfunction syndrome (MODS) and its affects to patients.</p>	<p>MODS analysis focused on patients within the intensive care units (ICU) and how MODS is scored.</p>	<p>MODS related deaths is a complex series of physiological disorders developed after resuscitation and management due to interdependency of organ systems.</p>	<p>Level V (Dang et al., 2022)</p>
<p>Milano, P. K., Desai, S., Eiting, E., Hofmann, E., Lam, C., & Menchine, M.</p>	<p>An observational study of septic patients being discharged and their outcomes. The study researched the association of sepsis-bundle compliance and in-hospital mortality rates.</p>	<p>A total of 4,582 septic patients presented at one of three Los Angeles County Department of Health Services (DHS) full-service hospitals during 2012-2014.</p>	<p>Mortality rates were much lower among the patients who received bundle adherence (17.9%) in comparison to those who did not (20.4%).</p>	<p>Level III (Dang et al., 2022)</p>

<p>Sankar, J., Garg, M., Ghimire, J. J., Sankar, M. J., Lodha, R., & Kabra, S. K.</p>	<p>A prospective cohort study designed to analyze mortality risk and clinical outcomes in pediatric patients diagnosed with sepsis, severe sepsis, or septic shock. The study compares two groups: one receiving antibiotics within the first hour of recognition (early antibiotics group) and the other receiving antibiotics after the first hour (delayed antibiotics group).</p>	<p>A total of 441 pediatric patients treated in an emergency room for children.</p>	<p>The cohort that received antibiotics promptly experienced a notably quicker reversal of shock, along with an increased number of days free from ventilator support and hospitalization.</p>	<p>Level II (Dang et al., 2022)</p>
<p>Shapiro, N. I., Douglas, I. S., Brower, R. G., Brown, S. M., Exline, M. C., Ginde, A. A., Gong, M. N., Grissom, C. K., Hayden, D., Hough, C. L., Huang, W., Iwashyna, T. J., Jones, A. E., Khan, A., Lai, P., Liu, K. D., Miller, C. D., Oldmixon, K., Park, P. K., Self, W. H.</p>	<p>A randomized controlled trial (RCT) designed to evaluate the impact of fluids on individuals experiencing sepsis-induced hypotension.</p>	<p>A cohort of 1563 participants was recruited and divided into two distinct groups across 60 centers.</p>	<p>Patients with sepsis-induced hypotension did not exhibit notable differences in mortality rates up to day 90 upon discharge home, irrespective of whether they were subjected to the trial's restrictive or liberal fluid strategies.</p>	<p>Level II (Dang et al., 2022).</p>

Table B

Appendix C

Plan Do Study Act (PDSA)

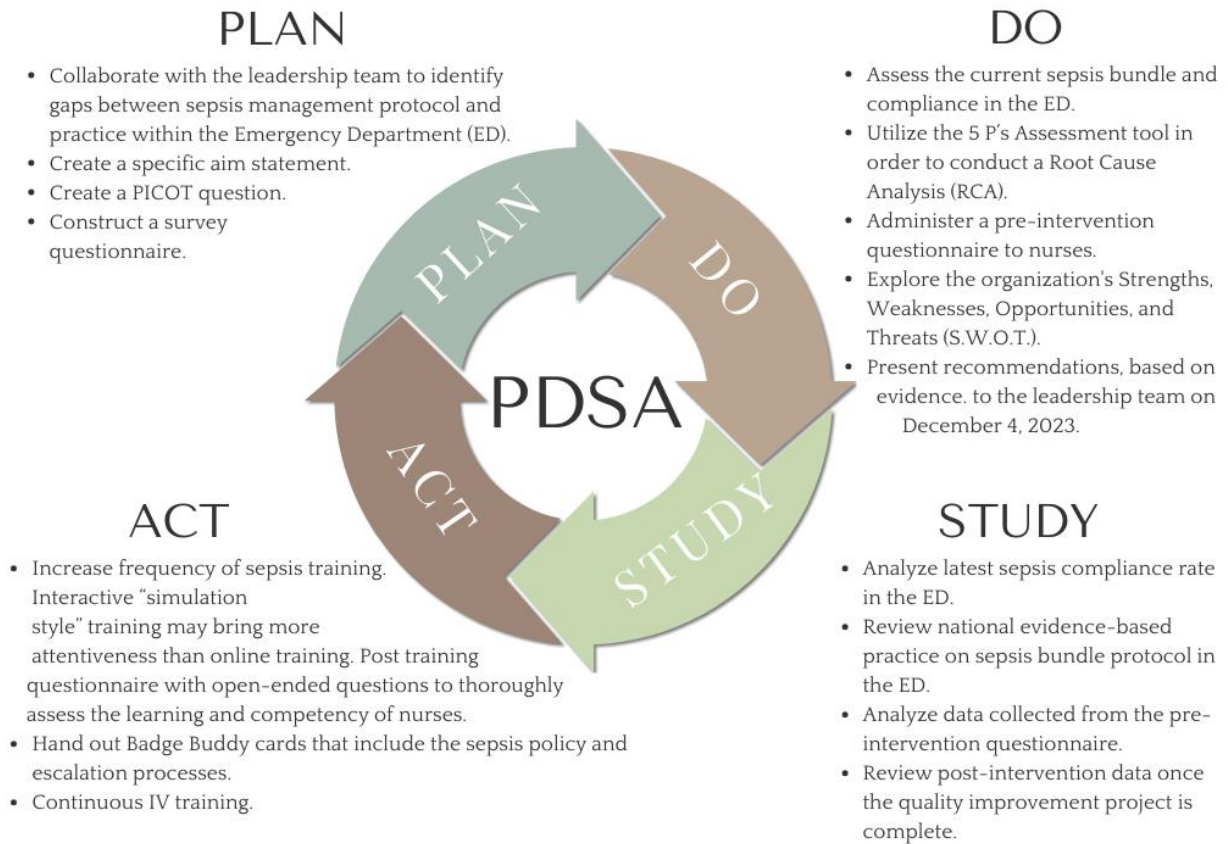


Figure C

Appendix D

Root Cause Analysis (RCA)

Fishbone Diagram

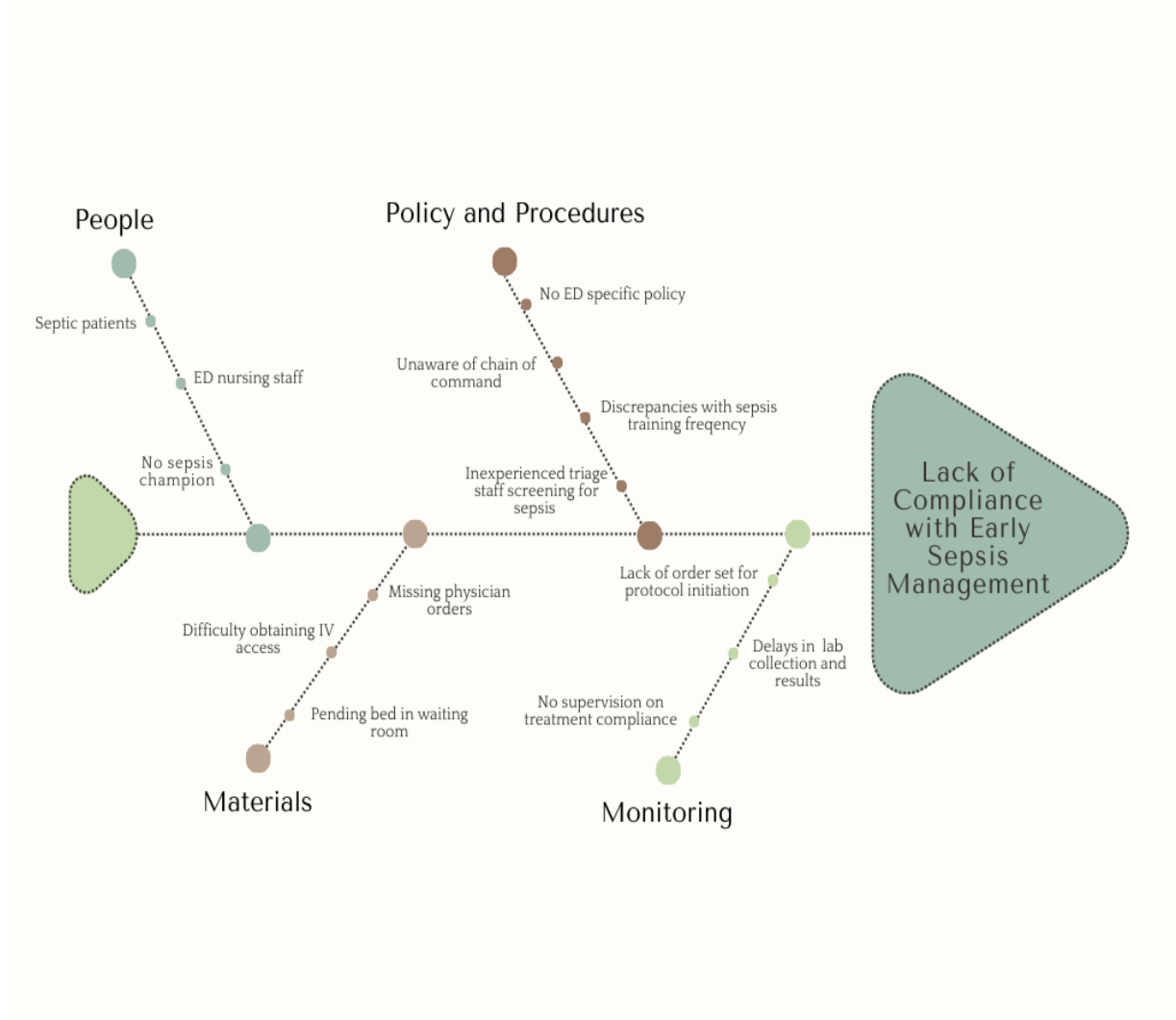


Figure D

Appendix E**Strength, Weaknesses, Opportunities, Threats (SWOT) Analysis****Figure E**

Appendix F

Pre-Intervention Questionnaire

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?

Table F

Question 1: Identified Sepsis Protocol in the ED

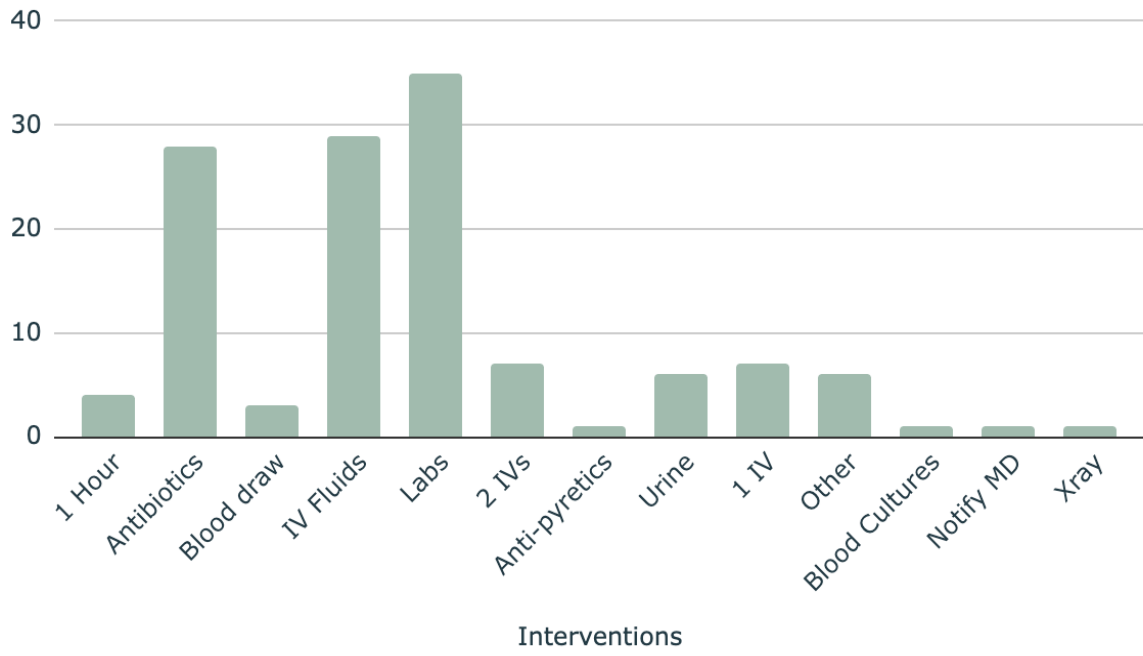
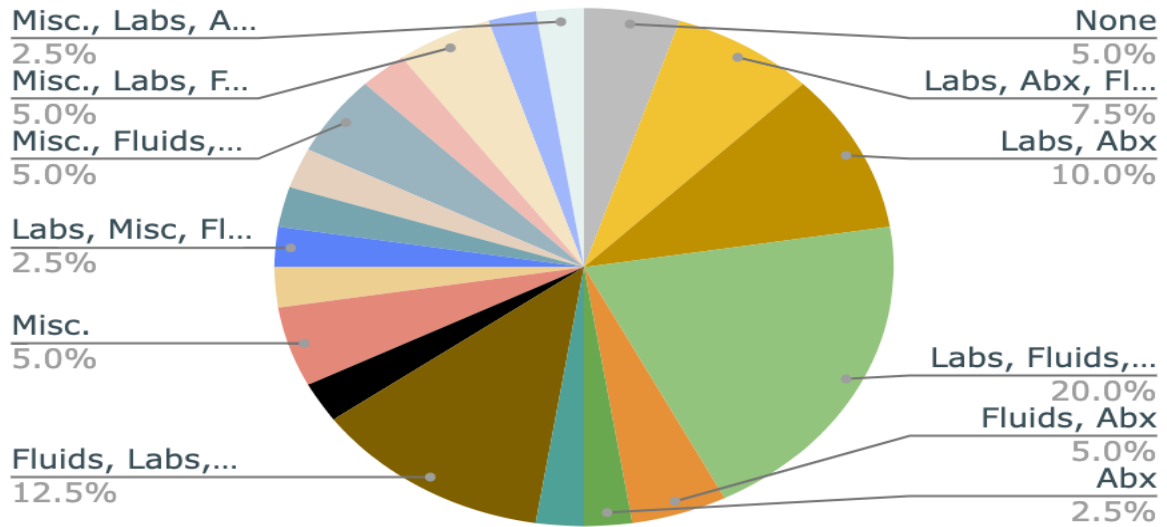


Figure F

Question 2A: How to prioritize the treatments?



Legend:

Abx: Antibiotics

Fluids include: IV Line

Labs include Lactate, Cultures, Urine, Bloodwork

Misc. include Vital Signs, Golden Hour, Order set, Room, EKG, EXR, VBG, X-Ray, Nasal Swab

Figure F2A

Question 2B: Is there a timeline?

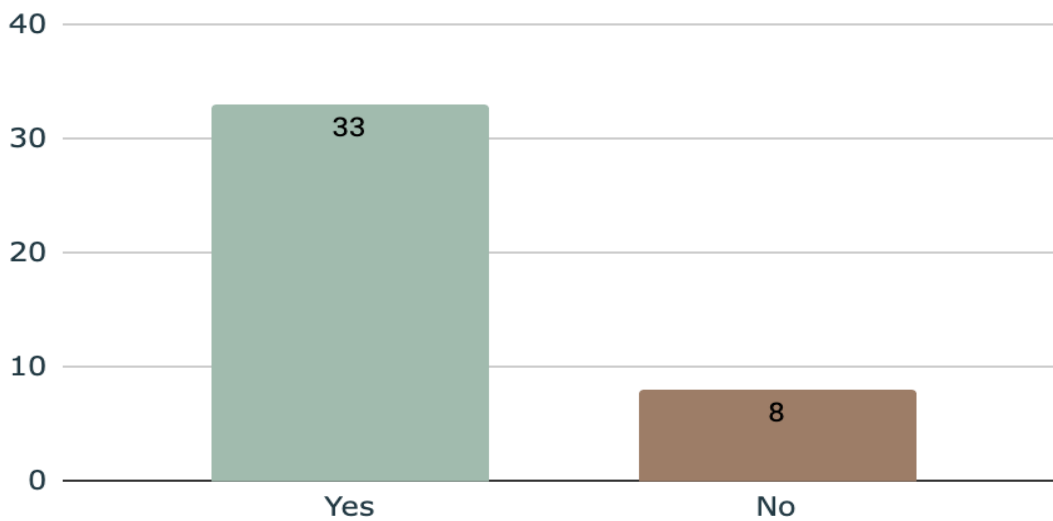


Figure F2B

Question 3: What barriers prevent you from meeting sepsis bundle timelines?

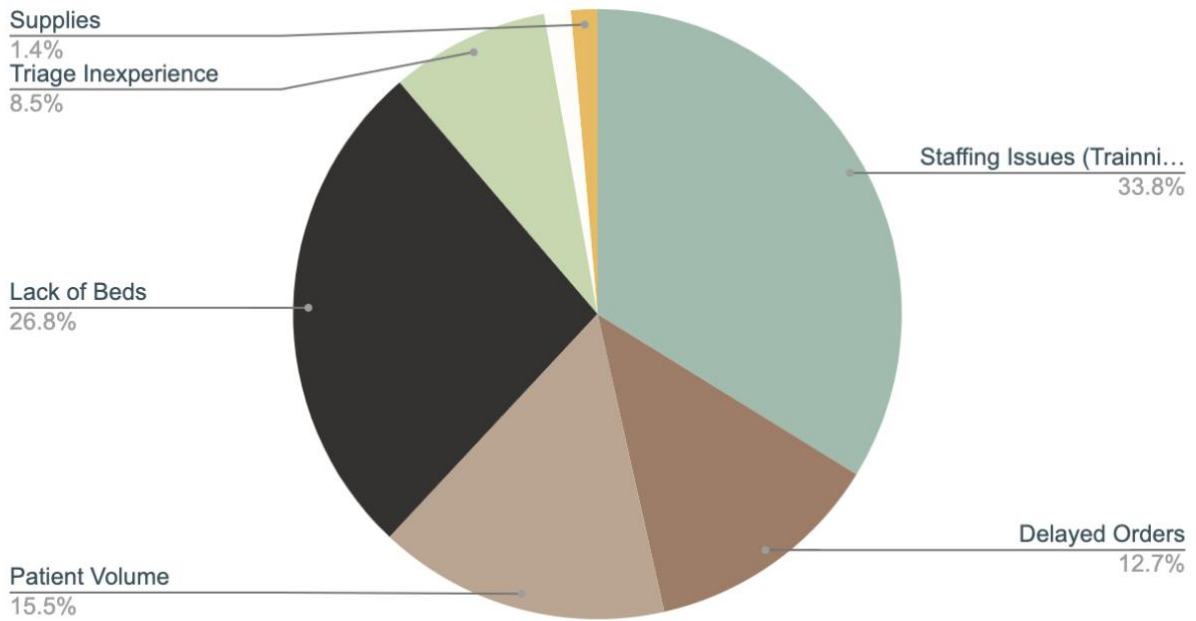


Figure F3

Question 4: What is your escalation process if you had questions or concerns regarding the sepsis treatment protocol?

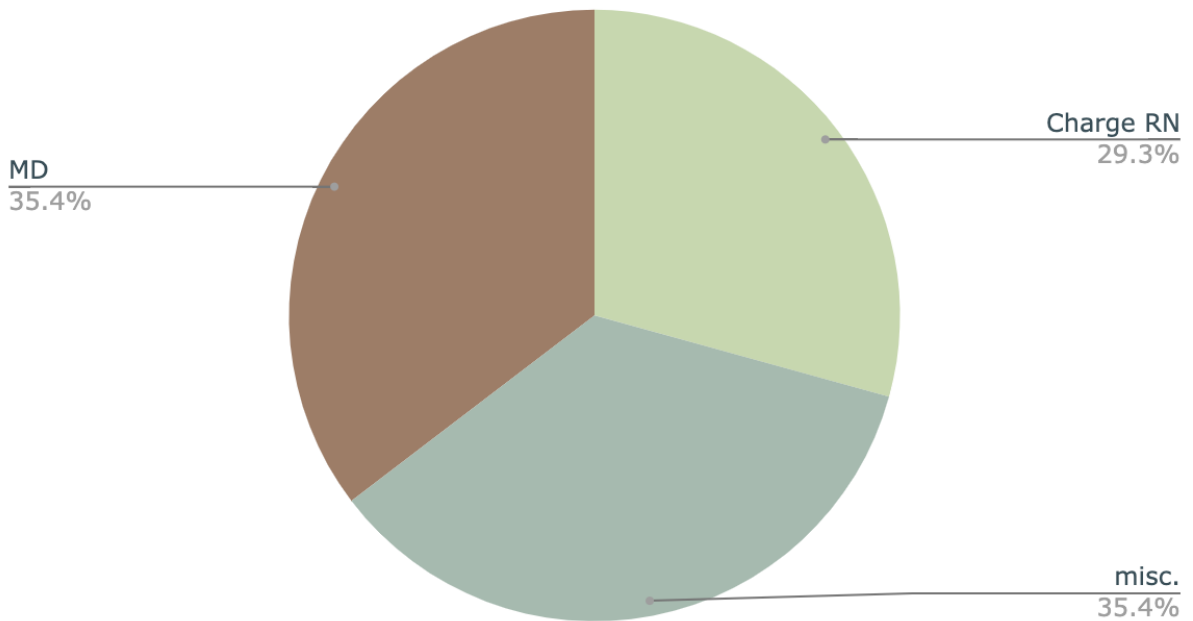


Figure F4

Question 5: When compliance is not met, what type of debrief/training is conducted?

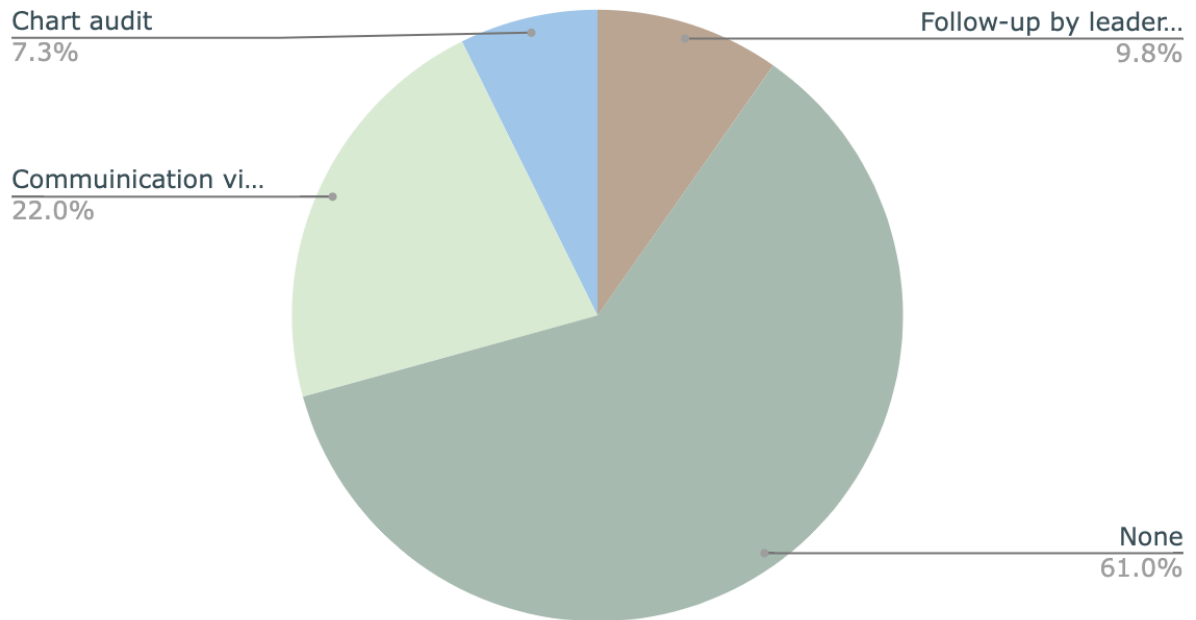


Figure F5

Question 6: How often do you attend sepsis training?

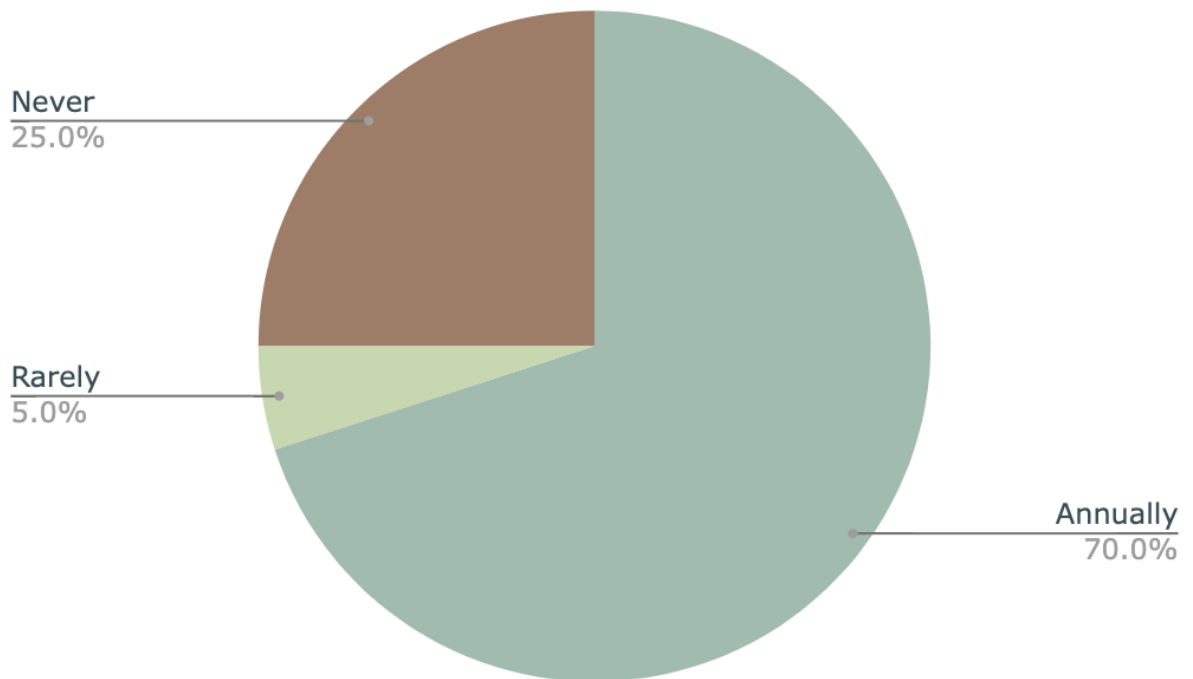


Figure F6

Question 7: How Often/Frequently are Standing Orders placed?

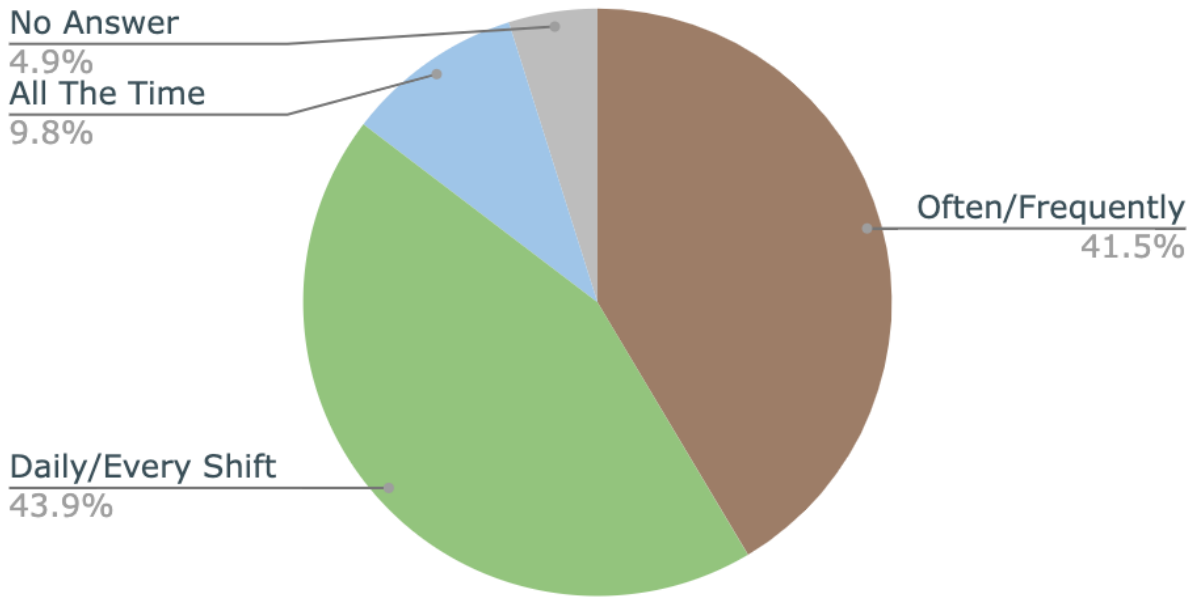


Figure F7

Question 8: Do you wait for the doctor to submit the orderset before initiating the sepsis protocol?

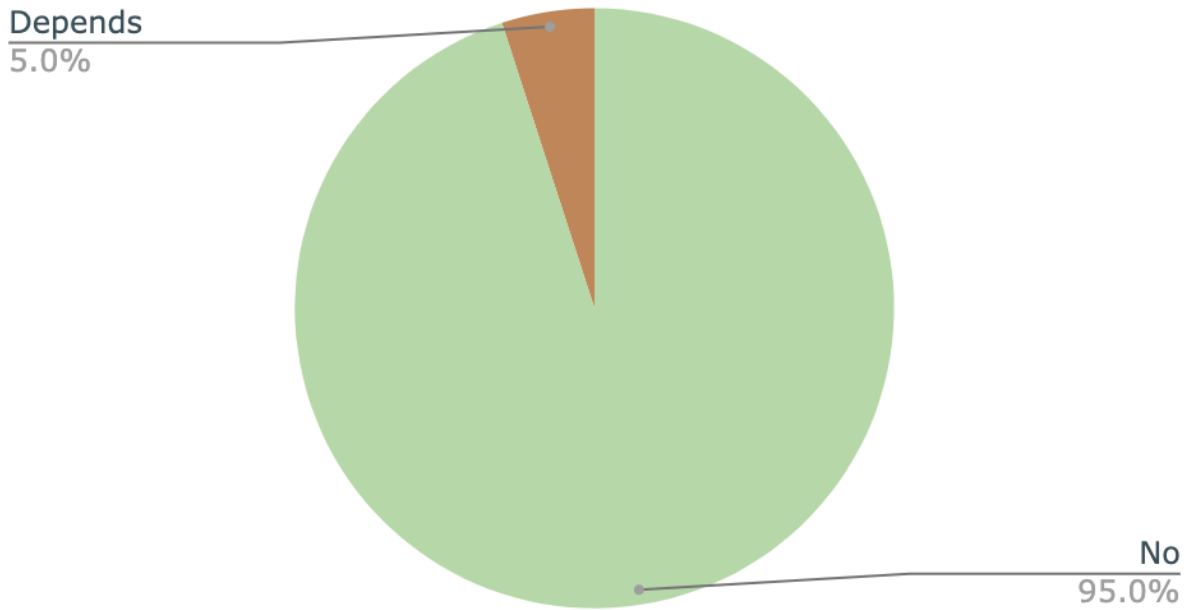


Figure F8

Question 9: What changes do you feel can be made to sepsis protocol in order to improve patien...

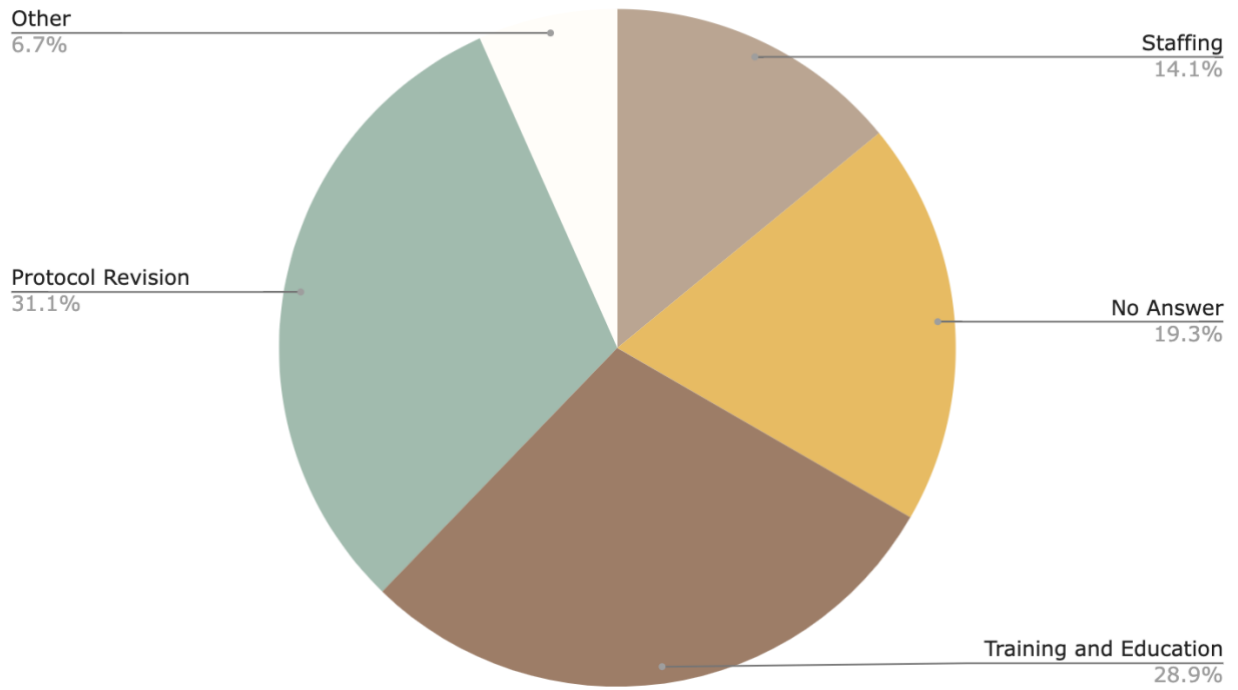


Figure F9

Appendix G

Cost-Benefit Analysis (CBA)

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

Table G

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																						

Figure H