Early Sepsis Recognition Saves Lives: Optimizing Sepsis Care in a Medical-Surgical Telemetry Unit

Genevieve Kales
gkgk29@hotmail.com

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Early Sepsis Recognition Saves Lives:

Optimizing Sepsis Care in a Medical-Surgical Telemetry Unit

Genevieve Kales, RN

University of San Francisco School of Nursing and Health Professions

NURS653-01: Quality Improvement Internship

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

May 11, 2023
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Abstract

Problem: This Quality Improvement project aims to improve sepsis bundle education to reduce mortality and morbidity rates related to septicemia in a Medical-Surgical Telemetry Unit at a San Francisco Bay Area Hospital, Hospital Z.

Context: The Quality Improvement project occurred in a Medical-Surgical Telemetry unit at Hospital Z. This Unit is a 32 beds unit with an increased mortality and mobility rate with decreased sepsis bundle compliance.

Intervention: Collect active and passive observational data in the microsystem. Data collection was conducted through anonymous self-administered questionnaires to the registered nurses on the unit. No intervention was implemented at this time.

Measures: It began with completing an initial microsystem assessment using the 5 Ps. Edible incentives were given to encourage the nurses to actively participate in the survey. We assessed the nurses' knowledge of the unit through a sepsis questionnaire (see Appendix E). Results showed that nurses did feel the Electronic Cardiac Arrest Risk Triage (eCART) system was user-friendly, but there were barriers regarding education on Sepsis itself. The outcome measure would be to see a decrease in sepsis related morbidity and mortality.

Results: Our Results were a mix of quantitative and qualitative data. The response rate of 67% gave us a perspective of the nurse's opinions (see Appendix F). The questionnaire did reveal a need for stronger and more frequent sepsis education.

Conclusions: Ongoing research has shown that understanding the pathophysiology and immunological mechanisms of Sepsis and the approach to managing Sepsis leads to a better patient outcome (Ling Cheg et al., 2022). We found that the nurses' experience, knowledge, and on-site training affected their compliance rate and understanding of Sepsis.
Section II: Introduction

According to the Centers for Disease Control (CDC), sepsis influences around 1.7 million adults in the U.S (CDC, 2022). 350,000 adults who develop sepsis die during their hospitalization or are discharged to hospice (CDC, 2022). 1 in 3 people who die in a hospital had sepsis during that hospitalization (CDC, 2022). Sepsis is the body's staggering and hazardous reaction to infection. Without treatment, Sepsis can prompt serious inconveniences and even death, which is the reason education on Sepsis and working on the barriers to learning are so significant. Prevention of sepsis in healthcare facilities relies on functioning illness and prevention control teams and programs, effective hygiene practices, and well-functioning environments and equipment. It is imperative to be aware of the warning indicators for the initial sepsis assessment to be successful. Early recognition is fundamental in effecting the patient's outcomes. Mortality rises by 4% to 9% every hour that sepsis treatment is postponed (AACN, 2023).

Hospital Z is located in the San Francisco Bay Area and is a not-for-profit integrated healthcare system. The team reported an increase in sepsis mortality and morbidity in specific units. The Nursing Leadership team at Hospital Z approached our quality improvement student Clinical Nurse Leader group to assess the microsystem and offer recommendations on actions that can be implemented to enhance this opportunity. We aimed to improve sepsis education and bundle compliance and close the knowledge gap in the medical-surgical unit.

Problem Description

The Medical-Surgical Telemetry unit at Hospital Z is a 32 beds unit. The team reported barriers with proper management of the care patients admitted with a diagnosis of sepsis. While studying a U.S hospitals sepsis bundle consistency, it was observed that results are more
unequivocally connected with further developed staffing and consistency with sepsis protocol. (Dierkes et al., 2022). Current data at Hospital Z showed that the existing hospital's sepsis mortality rate of 14.41% is above the national benchmark (9.43%). The nurse plays a vital part in preventing sepsis infection on the unit along with unit secretaries, environmental, physicians, occupational therapists, respiratory therapists, and rapid response nurses to deliver individualized patient-centered care.

The process begins with an initial microsystem assessment of current sepsis bundle approaches and systems, investigation of current and significant evidence-based sepsis practice, and assessment of existing staff information on the sepsis bundle. The process ends with identifying informational gaps within the microsystem regarding the current sepsis education, suggestions based on the microsystem assessment, hospital policy and procedures, and data collected from questionnaires and feedback from the staff. By completing this microsystem assessment, we expect to improve the sepsis-related mortality rate, patient safety, and patient outcomes by working on the process.

**Available Knowledge**

We established a population, intervention, comparison, outcome, and time frame (PICOT) question to create the best evidence-based research. Does increased sepsis education provided to Registered Nurses (RN) improves sepsis bundle compliance and decreases sepsis-related morbidity/mortality rates for patients admitted to the Medical-Surgical/Telemetry unit compared to no sepsis education in three months? Having a PICOT in place helps guide our research and helps us assess the microsystem.
**Literature Review**

In our research, a few articles supported our suggestions and steps to move forward to guide leadership in improving sepsis education, ultimately, the mortality and mobility rate in the medical-surgical units. Peer-reviewed articles searched using educational databases. The following keywords were used when searching for evidenced-based research: Early intervention, Sepsis, bundle compliance, medical-surgical, telemetry, education, ECART, and Rapid Response.

A retrospective observational study of de-distinguished information portrays the ongoing weight, results, and expenses of overseeing sepsis patients in United States (U.S) hospitals. The most substantial weight of rate and total costs happened in the least severe sepsis accomplice populace. Sepsis cases were not analyzed until confirmation, and those with expanding seriousness had a higher monetary weight and mortality depending on the situation (Paoli et al., 2018). Techniques to work on the early recognizable clinical manifestations of sepsis might lessen the seriousness and financial weight of sepsis in the U.S. (Paoli et al., 2018).

A literature review revealed three major occurrences that can impact gaps in knowledge. Current nurses' understanding, with using electronic learning methods for education, and integrating simulation training into their educational procedures (Coiner & Wingo, 2020). This study addresses the importance of nurses receiving education regarding sepsis and how to intervene promptly, effectively, and critically.

A systematic review aimed to summarize proof regarding parts of sepsis protocols, consistency, consequences for lengths of stay and sepsis-related mortality and boundaries to executing sepsis current implementation. (Taj et al.). Eventually, working on sepsis protocols
are crucial for further developing sepsis-related mortality rates. In any case, satisfactory preparation of clinicians and adjusted conventions are vital for effective execution (Taj et al.).

While thinking about the devices as a whole and training expected to help nurses in their jobs and obligations, these articles can assist with affecting early acknowledgment and intervention when it comes to sepsis. In summation, all reviews discussed perceiving the significance of sepsis training and prior interventions, supporting our implementation and suggestions for this improvement project.

**Rationale**

Healthcare is ever changing, at times implementing change in an already established environment can be tough. If we did carry out a change in this study which we did not, we would use the Lewis change theory. In order to initial change, we would bring in the Lewis change theory that has three stages: unfreezing, change, and refreezing. Unfreezing, understanding change is needed, moving the process of initiating change and refreezing, establishing a new status quo (Barrow & Annamaraju, 2022). Unfreezing can be established by leadership and the fact that there is change needed due to the high mortality and morbidity rate linked to sepsis. Change, implementation of the recommendations to the current unit and assessing. Lastly, establishing new practices and standards when it comes to sepsis intervention and education.

**Specific Aim Statement**

This study aims to improve sepsis bundle compliance to reduce septicemia-related morbidity and mortality rates in the Medical-Surgical/Telemetry unit at Hospital Z. An evaluation of the Sepsis education initially provided to the nurses will be conducted to determine the effectiveness. Information collected from the self-administered questionnaires
over one month provided to the nurses in the Medical-Surgical/Telemetry unit will help to ascertain if there are gaps in knowledge for sepsis prevention. The team will present results from the data collection. Recommendations based on evidence-based practice, and verbatim comments from the staff to the leadership team.

Section III: Methods

Context

As Clinical Nurse Leader (CNL) students, we assessed the microsystem using the 5 Ps to gain a better understanding. We collected questionnaire data from February 2023-March 2023. To gain a better understanding of the gaps in learning, we conducted a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis, a root-cause analysis (RCA), and a Plan-Do-Study-Act (PDSA) cycle.

One of the microsystem assessments we conducted was the 5Ps, a valuable method for members to see their microsystem in a new way and ask further questions. This process should actively involve the microsystem team to build understanding and ownership. The findings from the 5Ps helped the team to create and select their theme for improvement. This study aims to improve staff compliance with the sepsis bundle and ultimately improve the overall care outcomes for patients with diagnosed sepsis. Our Medical-Surgical/Telemetry unit patients at Hospital Z are typically diagnosed with sepsis, congestive heart failure (CHF), electrolyte imbalance, and alcohol withdrawal. Individuals admitted in this microsystem commonly face access to treatment and housing.

An array of interdisciplinary team members handles the care for patients in the Medical-Surgical unit, including registered nurses, nursing assistants, unit secretaries, physicians, nurse practitioners, assistant and department managers, therapists, respiratory therapists, and rapid response team (RRT) nurses are to name a few. The processes that occur in this unit include
online new-hire sepsis training, nursing assessments, eCART documentation, and the sepsis protocol. The patterns have nurse shift handoff reports, shift huddles, RRT rounds, physician rounds, interdisciplinary communication, and electronic health record documentation.

Our Root cause analysis (RCA) (See Appendix B) helped us identify some of the root causes to identify proper solutions to advance. Our fishbone diagram breaks down the areas that need to be more focused on. Documentation, Monitoring, policies and procedures, people, and ultimately leading to the biggest issue is the need for sepsis bundle compliance. Documentation is such an essential step in any nursing process. We notice through our on-unit observations and discussion with nurses that frequent charting adds to the nurse's workload leading to fatigue; sepsis bundles are not posted on the unit. The unit is made up of a lot of new graduate RN who need to be more confident and more familiar with sepsis.

Policies and Procedures, some staff expressed they never got sepsis instruction and that a sepsis screen is certainly not a standard evaluation. However, one current strength is the ECART, their sepsis Monitoring tool seen in EPIC (Electronic Medical Record System), which helps flag patients showing symptoms of sepsis. However, like all technology, there can be errors. Nurses stated that abnormal eCART values are flagged but often explained by the patient's disease, not specifically sepsis. This tends to skew perspectives and concerns. A systematic review shows that early warning scores might not perform as well as expected and could harm patient care (Gerry et al., 2020). Future work should focus on the recommended approaches for making and surveying early concerning scores and investigating the impact and security of including these scores in clinical practice (Gerry et al., 2020).
Cost Benefit Analysis

Early Intervention in Sepsis is crucial for our patient safety and outcomes. The cost of sepsis management in U.S. hospitals ranks highest among admissions for all disease states (Paoli et al., 2018). To make these changes to early identification and improving sepsis education indirectly reducing hospital cost. Through our survey we received nurses’ recommendations on the unit for ways to improve their knowledge and guide their understanding. Badge buddies would create a fast and helpful way to guide the nurse in a critical situation and the next steps in early sepsis identification. Helpful signage tools to use instead of a 20+ page sepsis bundle which is not accessible in times of need. Refresher courses and additional help and support from rapid response nurses. This would cost the hospital $168,020 per year. Total Average Cost of Sepsis Care for an estimated 12 instances of Patients with Sepsis-Related Complications: $480,000 per year. See appendix H for cost benefit breakdown.

Intervention

Although we did not implement the interventions due to time constraints, the organization plans to adopt and implement our recommendation. In the Future, if an intervention was created based on research of evidence-based practice, Hospital Z policy and procedures, analysis of the Microsystem, and collaboration with the hospital's Quality Improvement Team. We collected active and passive observational data in the Microsystem and collected data about current sepsis protocol understanding and compliance through passive observation. As a team, we distributed an in-person self-administered questionnaire and had open discussions on the unit. The expected outcome is increased nurse compliance with sepsis protocol over time. After collecting data and observations, recommendations were presented to the Quality Improvement Team at the end of the school term. There were limitations to this
project, including time constraints. We had one month to collect and analyze data. Also, we did not have enough time to implement our recommendations. Furthermore, the Nurses did not trust the team initially, were not forthcoming with information, and were reluctant to participate in the data collection. However, that quickly changed once we gained their trust, thanks to the edible incentives provided.

**Study of Intervention**

The study of an intervention for early sepsis recognition was completed weekly and monthly from February-March 2023. We took turns to visit the unit to observe the nurses’ workflow. For consistency and elimination of bias, we observed all shifts-day, pm, night and weekend shifts.

During the PDSA cycle, (see Appendix A), we developed a step-by-step look at the approach to develop an evaluation plan. It started with our collaboration with the leadership at Hospital Z regarding sepsis among multiple medical-surgical units, developed a specific aim statement on the unit of choice, generated a PICOT question, created and presented a proposal for the leaders, and developed self-administered questionnaires. To do this, we assessed the microsystem using the 5 Ps, conducted a SWOT analysis, performed a root cause analysis, collected both passive and active observational data in the microsystem, and administered questionnaires to the nurses. We analyzed data from observations and questionnaires and reviewed the results from the gathered data. In the end, we gave recommendations based on the study's findings at the end of the semester. To mitigate the limitations involving implementation of the recommended intervention, we provided all material and results to the leaders for follow up.
Measures

The outcomes of this quality improvement project were to come forward to leadership with a concrete plan to address the opportunities identified including potential sepsis educational barriers, compliance, and communication in the medical-surgical unit. An anonymous questionnaire was given to measure the effectiveness of the current sepsis training and nurses’ understanding of the set protocol and expectations.

Our Plan, Do, Study, and Act cycle was the best method to plan how we would assess the microsystem and present our plan as we advance. First, we began with our Plan (P); the administration proposed the ongoing issue regarding sepsis in their medical-surgical unit and ICU. We assessed a few units and ultimately decided our help would be best on a telemetry unit. We developed our aim statement and a picot to help stay on track and returned to the leadership with our proposal. After it was approved, we started collecting data through questionnaires.

Following that, we start the DO(D) part of the PDSA cycle. We assessed the microsystem using the five p's, conducted a SWOT analysis to gauge where our strengths, opportunities, threats, and weaknesses lay, ran a root cause analysis, and collected the data. We collected data, both passive and active, within the microsystem from the unit's registered nurses to make sure we were assessing all the sides to come up with helpful recommendations to help them achieve orchestrate interventions in the coming month.

The last part of our cycle to develop a plan was Study (S); we analyzed all the data collected from our observations physically on the unit and questionnaires. Act (A), the last part of the cycle, was with all the knowledge and data contained, we brought our findings to the
leadership and presented our evidence-based recommendations based on our results to them on April 17, 2023. The PDSA was implemented to help guide us in the direction of our PICOT to make sure a correct microsystem assessment was completed.

**Ethical Considerations**

Our care for the whole person and when it comes to sepsis education and detection it is so very important to mitigate a poor outcome. It is very important to always respect the rights and wants of your patients. Healthcare workers have an obligation to cease abuse, limit hurt, and promote good towards patients (Haddad & Geiger., 2022). This project has been approved as a quality improvement project by University of San Francisco using the Quality Improvement review guidelines and does not require IRB approval.

**Section IV: Results**

After our surveys, we received both qualitative and quantitative results. Our response rate was 36/54 for 67% of nurses who work in this unit. Data analysis showed that 16.7% respondents of nurses indicated that they did not receive sepsis bundle training. Effectiveness of training (0 = no knowledge, 10 = high level of understanding): 50% of respondents rated the training between 8-10. 36.1% of the respondents rated the training 5-7 out of 10. While 11.1% rated the training between 1-4. 88.9% felt that rapid response is effective when managing the care of patients admitted with sepsis.
The Qualitative Data consisted of an array of different nurses' options on the unit, as seen in the Appendix. The nurses generally understood that ECART was easily accessible, however, we identified an opportunity to streamline their knowledge of sepsis. Furthermore, there were educational barriers between the experienced nursing staff and the new graduate nurses. The team agreed that hands-on training was more beneficial compared to computer training. Also, visual aids were not accessible or readily available to staff, so they had to rely on residual knowledge when needed. In times of crisis, a high ECART number, would trigger the rapid response process. A rapid response nurse from the intensive care unit will assess the patient and assist the nurse in developing a plan of care. The nurses reported that this process is effective though there are some challenges with the workflow resulting from having one rapid response nurse for the entire hospital in each shift.

To obtain these results, it's important to discuss the barriers and challenges to get them. We had challenges when it came to getting these results, responses, and information from the nurse's team. Some of the reason for this was nurses being busy, not necessarily interested, and believing it would stay the same. Additionally, 6-8 nurses are on shift at a time, and to gain above 50% response rate, we did have to come to the hospital campus frequently.
All in all, these results were more significant than I expected. 50% of our survey respondents were eight or higher when describing their knowledge of sepsis. It was found to be higher than expected because the mortality and morbidity rate on the said unit was high, so leadership sent us in to do a microsystem assessment. Overall, the general understanding across the board from charge nurses to unit nurses was the complaint rate and the fact that they did not necessarily feel prepared step by step if there were to be a critical situation on the unit involving sepsis.

Section V: Discussion

Sepsis is a life-threatening illness that needs to be adequately educated on to prevent mortality. Numerous studies have displayed the benefits of early identification and improving patient outcomes when hospital staff is well-educated on this illness. It is imperative to enhance sepsis education, which will ultimately give our patients better results and care. Our quality improvement project and bringing attention to the areas of barriers and lack will help push forward to change this. These will help reduce and improve the knowledge gap regarding sepsis education.

Summary

Overall, this project presented a great opportunity for the students. We were able to collaborate with the team at Hospital Z, including the frontline staff and leaders. Although the nurses initially hesitated to work with us, we applied the skills we learned in the CNL program to manage this challenge effectively. Sepsis is a serious healthcare challenge and can affect anyone. Organizations must develop appropriate training and education for their staff to eliminate delays in care. Early recognition and treatment save lives. Nursing specialization or master's level education, higher job grade, and working in critical care areas predicted higher
sepsis total sepsis knowledge scores. (Ling Cheg et al., 2022). The project's strength was the information we received from the nursing staff because it gave us a better understanding from the eyes and ears to hope to help them best.

**Lessons Learned**

Early Sepsis intervention saves lives, and it starts with early recognition. The Clinical Nurse Leader Role is designed to help survey and assess the microsystem to see where the gap and barriers lay. Within the quality improvement project, the Clinical Nurse Leader student served as team leaders, educators, advocate, helping prevent sepsis across the continuum of care.

**Conclusion**

The implications of our recommendations after our microsystem assessment are that they will impact the patient outcomes and the strength of the nursing staff and sepsis intervention. Our finding provided the unit leader a clear perspective on the issues and barriers lay. We found that physically being on the team helped nurses voice their opinion on how improvement can directly support them to enhance the patients' outcomes. We stayed streamlined with our Gantt chart for this quality improvement project, which was a very realistic timeline, and promptly came back to leadership with our recommendation. The following steps, after implementation of our advice (see Appendix G), a follow-up on respective would be to interview staff and conduct post-intervention surveys to evaluate the effectiveness of the recommendations and changes to education, assess the feedback from interviews and post-surveys and adjust as necessary to make changes the most accessible and continue to test the effectiveness of education retainment through surveys. In the future, complete follow-up surveys and continually assess the microsystems for sustainability. It will be essential during our microsystem assessment and our passive and active observation; we gained a more robust
understanding of the workflow of the nursing staff and the challenges associated with the gaps in knowledge in sepsis education.

Ultimately, the responses gathered will give a better trajectory and implementation on the path forward to helping in education for sepsis. Any education on sepsis and bettering the knowledge of sepsis will impact practice in the mesosystem. Finally, this is a patient center project to improve patient care through education and early sepsis detection to improve patient outcomes.
Section VI: References


Gerry , S., Bonnici, T., Birks, J., & Kirtley, S. (2020, March). Early warning scores for
detecting deterioration in adult hospital patients: systematic review and critical appraisal of methodology. BMJ. Retrieved from https://www.bmj.com/content/bmj/369/bmj.m1501.full.pdf


Appendix A: Plan, Do, Study, ACT (PDSA)

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

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

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

**STUDY**
- Analyzed data from observations and questionnaires
- Reviewed the results from the gathered data
Appendix B: Root Cause Analysis (Fishbone Diagram)

**Root Cause Analysis: Fishbone Diagram**

**DOCUMENTATION**
- Frequent charting adds to nurse workload, leading to fatigue

**MONITORING**
- Floor nurses rely on RRT rounding to check patients at risk for sepsis
- Asking ECART questions in EPIC
- Abnormal ECART values are flagged, but often explained by patient disease
- Rounding only done on flagged ECART patients
- Sepsis bundle is not posted on unit
- Sepsis screen is not a standard assessment
- Many New Grad RNs on floor that are less confident in assessments, less familiar with sepsis

**POLICIES AND PROCEDURES**
- Some staff have not received bundle education
- Sepsis education only given on initial orientation
- Rapid Response Nurse completes rounds once per shift on flagged ECART patients

**PEOPLE**

**Lack of sepsis bundle compliance**
Appendix C: SWOT Analysis (Strength, Weaknesses, Opportunities and Threats)

<table>
<thead>
<tr>
<th>SWOT ANALYSIS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STRENGTHS</strong></td>
</tr>
<tr>
<td>• Sepsis bundles are available as a resource on the unit</td>
</tr>
<tr>
<td>• Implementation of online sepsis education</td>
</tr>
<tr>
<td>• Easily accessible eCART in EPIC</td>
</tr>
<tr>
<td><strong>WEAKNESSES</strong></td>
</tr>
<tr>
<td>• Some staff have not received education on the sepsis bundle</td>
</tr>
<tr>
<td>• Lack of annual sepsis bundle compliance re-training</td>
</tr>
<tr>
<td>• Ineffective communication upon patient transfer</td>
</tr>
<tr>
<td>• Resistance to change among staff nurses</td>
</tr>
<tr>
<td>• Lengthy sepsis bundle</td>
</tr>
<tr>
<td><strong>OPPORTUNITIES</strong></td>
</tr>
<tr>
<td>• Increased compliance with sepsis protocol</td>
</tr>
<tr>
<td>• Reduced long-term hospital costs</td>
</tr>
<tr>
<td>• Increased infection control</td>
</tr>
<tr>
<td>• Increased efficiency and quality of care</td>
</tr>
<tr>
<td>• Decreased sepsis mortality/morbidity rate</td>
</tr>
<tr>
<td><strong>THREATS</strong></td>
</tr>
<tr>
<td>• Time and cost allocated for re-education</td>
</tr>
<tr>
<td>• Documentation fatigue</td>
</tr>
<tr>
<td>• Staff burdened</td>
</tr>
</tbody>
</table>
Appendix D : Gantt Chart

**GANTT CHART**

<table>
<thead>
<tr>
<th>TASK TITLE</th>
<th>START DATE</th>
<th>DUE DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project Initiation</strong></td>
<td></td>
<td></td>
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<tr>
<td>Literature Review</td>
<td>2/1/23</td>
<td>3/1/23</td>
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<tr>
<td>Project Initiation Meeting with Leadership</td>
<td>2/9/23</td>
<td>2/9/23</td>
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<tr>
<td><strong>Project Planning</strong></td>
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</tr>
<tr>
<td>On-Site Walkthrough</td>
<td>2/15/23</td>
<td>2/15/23</td>
</tr>
<tr>
<td>Questionnaire Development</td>
<td>2/15/23</td>
<td>2/23/23</td>
</tr>
<tr>
<td>Project Proposal to Leadership</td>
<td>2/23/23</td>
<td>2/23/23</td>
</tr>
<tr>
<td>Microsystem Assessment</td>
<td>2/28/23</td>
<td>2/28/23</td>
</tr>
<tr>
<td><strong>Project Implementation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Questionnaire Administration</td>
<td>3/1/23</td>
<td>4/8/23</td>
</tr>
<tr>
<td>Passive and Active Microsystem Observation</td>
<td>3/1/23</td>
<td>4/8/23</td>
</tr>
<tr>
<td><strong>Project Evaluation and Synthesis</strong></td>
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<td>Data Analysis</td>
<td>4/8/23</td>
<td>4/16/23</td>
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<td>Recommendation Presentation to Leadership</td>
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<td>4/17/23</td>
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<tr>
<td>Project Poster Creation</td>
<td>4/17/23</td>
<td>4/25/23</td>
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<tr>
<td>Project Poster Presentation</td>
<td>5/17/23</td>
<td>5/17/23</td>
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</table>
Appendix E Sepsis Questionnaire

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you received training on the sepsis bundle?</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td>If you answered &quot;no&quot; to receiving training on the sepsis bundle, why not?</td>
<td></td>
</tr>
<tr>
<td>Long answer text</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>On a scale of 0-10, how would you rate the effectiveness of the training method? (0 indicating no knowledge, 10 indicating a high level of knowledge).</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Explain your rating for the effectiveness of the training method.</td>
<td></td>
</tr>
<tr>
<td>Long answer text</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>How accessible is the eCART?</td>
<td></td>
</tr>
<tr>
<td>Long answer text</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>What challenges or barriers prevent nurses from adhering to the sepsis bundle?</td>
<td></td>
</tr>
<tr>
<td>Long answer text</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you feel the rapid response process is effective when managing the care of patients admitted with sepsis?</td>
<td></td>
</tr>
</tbody>
</table>
Appendix F: Staff Comments

“Having posters or a badge added to our reel”

“More hands on training. Not computer training.”

“Too busy”

“Making it simple and more clear”

“Refresher trainings”

“Training should be done in person”

NURSES REPORTED

“eCART is very accessible”

“Sometimes – only one rapid RN”

“We have RRT nurses who round on patients with high evaluated eCARTS... Maybe need an in person service”

“Trained a long time ago”
Appendix G: Recommendations

Our Recommendation given to the leadership were to add visual aids for step-by-step protocol on the floor (poster, cards, printouts). Badge buddy for sepsis protocol, Refresher training (e.g., monthly, biannually, or annually) (Rababa et al., 2022), Appointing sepsis champions (Taj et al., 2022), More hands-on training (Rababa et al., 2022), Simplifying sepsis bundle (Taj et al., 2022), Additional support/mentoring, Early intervention in the Emergency Department and enforcement of sepsis document completion before transfer. All of these evidence-based practice recommendations.
Appendix H: Cost Benefit Analysis

Cost-Benefit Analysis

Estimated Cost of a Badge Buddy
$300 per year

Estimated Cost of Sepsis Bundle Signage
$20 per year

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

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

Total Estimated Cost: $168,020 per year

Compared To:

Total Average Cost of Sepsis Care for an estimated 12 instances of Patients with Sepsis-Related Complications: $480,000 per year
APPENDIX I: Student Project Approval: Statement of Determination

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

Brief Description of Project: This Quality Improvement project aims to improve sepsis bundle education to reduce mortality and morbidity rates related to septicemia in a Medical-Surgical Telemetry Unit at a San Francisco Bay Area Hospital, Hospital Z.

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).

Signature of Student: Genevieve Kales

Date: May 7th, 2023
APPENDIX J: Evidence based change of practice project checklist.

**Student Name:** Genevieve Kales  
**Date:** May 7, 2023

**Supervising Faculty:** Dr. Nneka Chukwu

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

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

<table>
<thead>
<tr>
<th>✔</th>
<th>✔</th>
</tr>
</thead>
<tbody>
<tr>
<td>The agency or clinical practice unit agrees that this is a project that will be implemented to improve the process or delivery of care, i.e., <strong>not</strong> a personal research project that is dependent upon the voluntary participation of colleagues, students and/or patients.</td>
<td>✔</td>
</tr>
</tbody>
</table>

If there is an intent to, or possibility of publishing your work, you and the supervising faculty and agency oversight committee are comfortable with the following statement in your methods section.

*Adapted with permission of Elizabeth L. Hohmann, MD, Director and Chair, Partners Human Research Committee, Partners Health System, Boston, MA.*