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Improving Early Sepsis Identification on Inpatient Units

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Abstract

Sepsis is a life-threatening condition that arises from a complication of severe infection characterized by a systemic inflammatory response (SIRS). As a time critical illness requiring early identification and treatment, delayed recognition of sepsis can lead to organ failure and death. Effective sepsis protocols need to be established and implemented to reduce the number of patients declining to sepsis in the hospital setting. For this project, nursing practice and knowledge of SIRS and sepsis protocol were assessed to obtain a baseline measure of the nurses' knowledge.

A root cause analysis was used to identify existing barriers to performing timely sepsis screening and discrepancies with the inpatient units' sepsis algorithm and the hospital's protocol. The CNL students collaborated with the Director of the Sepsis Screening Committee to develop a "Sepsis Screening Observation Checklist" to ensure nurses were documenting the sepsis screenings in a timely manner. A chart review audit was conducted by using a "Sepsis Chart Screening Data" form, allowing students to review EMR charts of 100 patients in five inpatient units. The students administered a "Sepsis Survey" to assess nurses' knowledge of sepsis and obtain feedback of the current sepsis protocol.

Results indicated that vital signs were reported to nurses in a timely manner 50% of the time, and only 38% of the participating nurses feel adequate sepsis educational resources were provided. The participants' responses and subjective interpretation of the current sepsis protocol suggested that inpatient units would benefit from the project's sepsis educational campaign to improve early sepsis identification.

Keywords: sepsis, sepsis protocol, early sepsis identification, inpatient units

Improving Early Sepsis Identification on Inpatient Units

Introduction

Sepsis is an infection of the bloodstream characterized by the body's systemic inflammatory response to an infection that can lead to a cascade of life-threatening multiple organ failure. It is a potentially fatal condition where every minute counts for surviving this silent killer. Sepsis remains a leading cause of mortality worldwide. According to the Centers for Disease Control and Prevention (CDC), more than 1.5 million people in the United States suffer from sepsis each year, about one in every three patients who die in the hospital setting have sepsis, and at least 250,000 Americans die each year as a result of sepsis ("Data Reports | Sepsis | CDC," 2017).

One primary cause of the high mortality rate for sepsis is that early signs and symptoms are very subtle and nonspecific, and are oftentimes overlooked upon initial assessment. Treatment delays can contribute to disease progression and possibly worse outcomes. According to statistics from the Sepsis Alliance organization, mortality from sepsis increases eight percent for every hour that antibiotic treatment is delayed in severe sepsis. As many as 80% of deaths resulting from sepsis could be prevented with prompt diagnosis and treatment ("Sepsis Fact Sheet", 2016). Reducing mortality rate of sepsis requires nurses to be more vigilant in the early phases of patient care, which demands greater awareness and timely recognition and delivery of sepsis treatment. With early sepsis identification and aggressive treatment, reduced morbidity and mortality rates and improved patient outcomes can be achieved (Novosad et al., 2016). Due to the high morbidity and mortality rates associated with sepsis, early identification and management of sepsis has become a common area of interest within the clinical setting.

Literature Review

Literature review and analysis demonstrated that successful treatment of sepsis requires rapid identification and treatment of the condition with appropriate early-goal directed interventions. According to a study by Daniels et al. (2011), implementing the six intervention measures— 1) administer high flow oxygen 2) take blood cultures 3) give broad spectrum antibiotics 4) give intravenous fluid challenges 5) measure serum lactate and hemoglobin and 6) measure accurate hourly urine output—when initiated within an hour of identifying sepsis reduced mortality and morbidity. Rapid and appropriate initiation of these interventions optimizes patient outcome when managing sepsis during the critical first hour of recognition.

Literature review was conducted using the CINAHL Complete and PubMed databases. Extensive search terms and phrases, such as "sepsis", "early sepsis identification", "sepsis screening", "improving sepsis", "inpatient units" and "sepsis bundle", were utilized to retrieve published articles within the last 10 years that are applicable to this project. For instance, using the phrase "early sepsis identification" in the CINAHL Complete database generated 45 articles, and "sepsis" and "inpatient units" retrieved 13 articles. Whereas, the PubMed database generated 731 articles exclusively using the phrase "early sepsis identification. By conducting a retrospective medical record review, the efficacy of the current sepsis protocol and sepsis screening compliance will be evaluated. Ensuring that the hospital has a well-developed sepsis protocol, which aligns with The Surviving Sepsis Campaign's (SSC) international guidelines for best evidenced-based practice for sepsis performance and management, as well as, the guidelines established by the Centers for Medicare and Medicaid Services (CMS), will help identify areas of improvement for early sepsis identification and treatment.

Methods

The sepsis topic was identified by the hospital to help bring awareness of the need to improve early recognition of sepsis on non-Emergency Department (ED) and non-Intensive Care Unit (ICU) units. Presented by the hospital's Chief Nursing Officer (CNO), the sepsis topic was selected for the Clinical Nurse Leader (CNL) students' Master of Science in Nursing (MSN) thesis project. In the context of the project, the problem defined by the CNO was the late identification of sepsis on inpatient units. With collaboration with the hospital's Director of the Sepsis Committee and specialized sepsis nurses, the students conducted a needs assessment to evaluate the nurses' general clinical knowledge of sepsis and the hospital's current sepsis protocol. The needs assessment would help identify barrier recognition and possible discrepancies of the sepsis protocol currently in placed. The analysis and results of the needs assessment provided a guide for the development of the project plan and implementation.

Root Cause Analysis

A root cause analysis (RCA) was performed to identify barriers to adherence to the hospital's sepsis protocol. A systematic review of the inpatient unit's sepsis process maps/protocol and the hospital's Sepsis Protocol Administrative Manual, as well as the CMS Sepsis Core Measure, was conducted in order to address disparities and inconsistencies among the protocols. Using a variety of data collecting methods (nurse-student observation, chart review audits and participant survey), data was gathered to determine the nurses' baseline knowledge of sepsis and the hospital's current sepsis protocol.

Microsystem Assessment

The microsystem is a licensed general acute care hospital serving the healthcare needs of the communities of Southern California. It operates a total of 384 licensed beds with eight floors

consisting of several units such as ED, ICU, Medical-Surgical, Pediatrics, Obstetric, Telemetry, Oncology, and Cardiac. It is a Level II Trauma Center and consists of nine surgical operating rooms, and three cardiac catheterization labs for inpatient and outpatient services (x). The microsystem observed for this project were five inpatient units (2E, 4, 5, 6, and 8). Due to majority of the patients' stable condition and recovery state when admitted to these units, the observed units rarely treated critically ill patients or performed intensive procedures.

The 5 P's Assessment tool was used to assess the microsystem: Purpose, Patients, Professionals, Processes, and Patterns. The Purpose is to be a "values-driven integrated healthcare delivery system in collaboration with those who share our values" (x). Patients observed were ages 18-years-old and older from inpatient units. Professionals consisted of a multidisciplinary approach that included, but not limited to, a team of physicians, nurses practitioners, registered nurses, licensed vocational nurses, nursing assistants and respiratory therapists. The inpatient unit processes provides inpatient acute care that include patient stabilization and treatment tailored to each individualized care plan. The pattern consisted of a multi-specialty approach of the microsystem focused on individualized care for each patient with everyday functioning and patient safety as a priority.

The patient care delivery model for the unit is the patient-family centered care model. The primary goal of this model is to provide comprehensive healthcare that promotes healthy families and lifestyle, focusing not only on the patient but also the family members to be proactive in the patient's care and treatment. The model was modeled after Jean Watson's theory of Transpersonal Caring, which emphasized an empathetic relationship with patients, and the Synergy Model, which focused on nurses' competencies on patient-family centered care (x).

Data Collection

Nurse-Student Observation

In collaboration with the Director of the Sepsis Committee and the CNL students, a checklist form, "Sepsis Screening Observation Checklist" (see Appendix A), was developed to evaluate nurses' timely documentation of sepsis screening in the electronic medical record (EMR). The checklist included questions that discussed the steps necessary to identify early sepsis, such as completion of the sepsis screening in the EMR, vital signs, suspected or confirmed infection, and sepsis protocol initiation. Per administrative approval, the nurse-student observation was only conducted on Unit #4 during the hours of 7:00 AM to 10:00 AM. The students shadowed their assigned morning-shift nurse and completed the checklist upon observation. Prior to observation, the director disclosed to the nurses that the students would be observing sepsis screening. Audit data from 66 patients were obtained.

Chart Review Audit

To further evaluate electronic nurse documentation of sepsis, a retrospective chart review audit was conducted to assess the completion of sepsis screenings on the EMR. The CNL students and director developed a "Sepsis Chart Screening Data" form (see Appendix B). Using this screening form to gather EMR data, the students reviewed EMR charts of 100 patients (199 sepsis screenings- both morning and night shifts for each patient) from all five inpatient units. The inclusion criteria for chart audit were adult patients age 18-years or older, and who were day two post-admission.

Participant Survey

Using the hospital's Sepsis Protocol Administrative Manual, a survey, the "Sepsis Survey" (see Appendix C), was developed to identify the nurses' baseline theory and operational

knowledge of early sepsis identification and the hospital's sepsis policies. To assess the nurses'

competence of sepsis and the implementation of the sepsis nurse driven protocol, the questions

focused on topics related to the clinical knowledge of sepsis and the hospital's sepsis protocol

instructions. Additionally, the survey discussed topics related to contributor(s) to the delay of

treating septic patients and educational resources available to the nurses. Participation was

voluntary and anonymously. Completed survey forms were gathered from 32 nurses from all five

inpatient units.

Consent

Institutional Review Board (IRB) approval was not necessary to obtain per hospital

requirements. Project permission to conduct the nursing observations, chart review audits and

surveys were obtained from the Director of the Sepsis Committee of the hospital. Site visitations

were arranged ahead of time with the director in order to determine a suitable time for the

students to interact with the nurses' on-shift. Means of communication with the director

comprised of email or phone conversations. Upon receiving preferred dates of visitation, the

students equally divided the allotted shifts amongst themselves. The hospital policy manual

regarding sepsis protocol was reviewed and used to help formulate questions for the checklist

and survey forms. Observations, audits and surveys were conducted anonymously or

confidentially.

Potential Changes

If time permitted and access to additional units were granted, the CNL students would

have preferred to perform audits during the nurses' full 12-hour shift, rather than the limited 3-

hour morning shift time frame. By shadowing the nurses during their entire shift or up until the

screening was completed in the EMR, the students would have more precise data of which vital

signs were used and when the screening was completed. Furthermore, to adhere to data integrity, the students would prefer to refrain from disclosing to the nurses that we are observing sepsis screening or anything related to sepsis during nurse-student observations.

Results

The data from the three different methods (nurse-student observations, chart review audits and participant surveys) were analyzed and tabulated to compare the results and the participants' responses.

The following results were collected from the "Sepsis Screening Observation Checklist"; the observational form the CNL students utilized when observing the nurses during the 7:00 AM to 10:00 AM shift. Observation data from a total of 66 patients were obtained. In 58% of the cases (38 patients), the sepsis screenings were not performed within the first three hours of the nurse's morning shift. In 42% of the cases (28 patients), the sepsis screenings were performed within the first three hours of the nurse's morning shift (see Appendix D for Graph 1 *"Sepsis Screening Observation Data"*). Furthermore, of the cases that performed sepsis screenings within the first three hours of the morning shift, 93% of those cases used vital signs that were completed between the hours of 5:00 AM to 10:00 AM the same day. In 32% of the cases, both the nurse and the student suspected or confirmed an infection. In 18% of the cases, two SIRS criteria and a suspected and/or confirmed source of infection were present. Lastly, 7% of the cases resulted in the initiation of the sepsis protocol (see Appendix D for Graph 2 *"Sepsis Screening Data Based on Completed Screenings"*).

The following results were collected from the "Sepsis Chart Screening Data" form. The students utilized this form during the retrospective chart review audit, which was conducted in order to further assess the compliancy of completed sepsis screenings on the EMR. In this chart

review audit, a total of 100 EMR patient charts were reviewed from all five inpatient units, and a

total of 199 audited sepsis screenings. Sepsis screenings for both morning and night shifts were

reviewed for each patient. Of the 100 EMR patient charts reviewed, one patient did not qualify

for both morning and night shift sepsis screenings due to the patient's early discharge (only

morning shift screening was included). Thus the total audited sepsis screenings was 199 sepsis

screenings, rather than 200 sepsis screenings. In 72% of the cases (144 sepsis screenings), the

sepsis screening was performed within the first three hours of the nurses' shift (morning or night

shift). In 28% of the cases (55 sepsis screenings), the sepsis screening was performed after the

first three hours of the nurses' shift (see Appendix D for Graph 3 *"Sepsis Screening Chart*

Audits").

The following results were complied from the "Sepsis Survey" form, which were given to

participating nurses on each of the five inpatient units. A total of 32 completed survey forms

were collected. In Graph 4 (see Appendix D for Graph 4 *"Nursing Sepsis Survey Results"*),

In 88% of the cases, the correct definition of positive sepsis screening was identified. In 94% of

the cases, the correct identification of SIRS criteria was answered correctly. For the

identification of the *incorrect* nursing intervention for a positive sepsis screening, 44% answered

correctly and 53% answered incorrectly; 3% were omitted due to participant not answering the

question. For the identification of criteria required for a code sepsis, 31% answered correctly and

66% answered incorrectly; 3% were omitted due to participant not answering the question.

Lastly, in 97% of the cases, identification of interventions to be performed within three hours of

the presentation of severe sepsis was answered correctly.

Furthermore, Graphs 5-8 (see Appendix D for Graphs 5-8) depicts additional data from

the survey. In 50% of the cases, abnormal vital signs were not reported to nursing in a timely

manner (see Appendix D for Graph 5 *"Are Abnormal Vital Signs Reported to Nursing in a Timely Manner?"*). The top three contributors to delays in the treatment of sepsis were the following: Lab delays (22 cases); Knowledge deficit regarding appropriate treatment (12 cases); and Lack of recognition of potential sepsis in triage (11 cases) (see Appendix D for Graph 6 *"Greatest Contributor to Delays in the Treatment of Sepsis"*). In 38% of the cases, adequate educational resources regarding sepsis were almost always provided to nursing; 44% answered sometimes and 12% answered no hardly ever (see Appendix D for Graph 7 *"Are Adequate Educational Resources Regarding Sepsis Provided to Nursing?"*). Regarding the resources utilized to reference the nurse driven protocol for sepsis, 56% used Arcis and 47% used the hospital's policy and procedure manual (see Appendix D for Graph 8 *"Resources Utilized to Reference Nurse Drive Protocol for Sepsis"*).

Implementation

To assist nurses in early identification and treatment of sepsis in the inpatient units, the CNL students modified and redesigned the hospital's current inpatient sepsis process map/algorithm. Upon reviewing the inpatient unit's current sepsis process map and the hospital's sepsis policy, as well as, the results obtained from the sepsis surveys, data suggested that there were discrepancies and inconsistencies with the current process map/algorithm and the hospital's policy. In an effort to reduce ambiguity of the inpatient unit's sepsis protocol, the CNL students redesigned the process map/algorithm to align with the hospital's sepsis policy (see Appendix E for "Sepsis Process Map"). Furthermore, the students simplified the process map/algorithm to make it universally understandable and easy to follow, and will be accessible and displayed throughout the inpatient units as a reference for nurses during their shift. To further help nurses improve sepsis identification and management, the CNL students also created a Sepsis Protocol

badge for the nursing staff to wear with their current hospital identification badge (see Appendix F for "Sepsis Protocol" badge). This supplementary badge, which contain critical sepsis related information such as the SIRS Criteria, Nurse Driven Protocol and Sepsis Panel, serves as a quick reference guide for nurses.

To help improve the compliance rate of sepsis screening, the CNL students and the Director of the Sepsis Committee agreed that establishing a strict time frame of when sepsis screening should be completed in the EMR would be beneficial for improving sepsis identification in the hospital. The CNL students recommended the nurses complete the sepsis screening by 10:00 AM for the morning shift and 10:00 PM for the night shift. Although the EMR Task List suggest that the "Sepsis Screening" be completed by 8:00 AM or 8:00 PM, nurses are not required to complete the screenings by those time frames because the current hospital policy does not state a specific time frame, nor does the EMR notify the nurse of an incomplete screening. The nurses currently understand that the sepsis screening must be done once per shift, no specific time. Establishing a specific time frame in the hospital's policy and enforcing the new changes will help enhance early recognition of sepsis. Inconsistencies in receiving vital signs will be reduced due to the nurses' utilizing the most current vital signs taken at the beginning of each shift. Furthermore, routine audits of nurses will be performed in order to continue to identify problems with SIRS screening and measure compliance and accountability of the nursing staff.

To optimize sepsis management and emphasize the importance of timely treatment, the application of Sepsis Champion nurses on each inpatient unit will be implemented to help prevent and monitor patients at risk for sepsis or suspected/confirmed. These nominated Sepsis Champion nurses will be ICU nurses specially trained in sepsis identification and management.

These sepsis expert nurses will also serve as additional educational resource and clinical assistance for the other nurses on the unit. To help build a collaborative environment and reinforce teaching of sepsis, annual trainings will be conducted for all nurses. The hospital's Sepsis Committee and the Sepsis Champion nurses will teach these mandatory trainings, which will include topics such as current hospital sepsis policy and procedures, SIRS criteria and the importance of prompt identification and appropriate interventions for sepsis management in inpatient units.

<div align="center">**Cost Analysis**</div>

According to a 2016 brief from the Healthcare Cost and Utilization Project (HCUP), sepsis ranked as the most expensive condition to treat in the United States. The mean expense associated with sepsis hospitalization is $18,000 per stay, whereas the average expense for other health conditions estimate around $10,000 per stay (Torio & Moore, 2016). According to the hospital's Director of the Intensive Care Unit, the ICU has an average of 2-3 septic patients a week, the ED has an average of 3-4 septic patients a day and inpatient units (non-ICU and non-ED) rarely encounter or treat septic patients. Based on these estimated numbers, the hospital treats 1,176-1,584 septic patients a year, which roughly estimates to $21-$28 million in expenses each year for the care of sepsis patients within this hospital. The CDC reported patients positive for sepsis stayed an average length of stay (LOS) of 8.5 days (Products – Data Briefs, 2011). While the purpose of this project is to improve early sepsis identification, the desired outcome for early recognition and treatment of sepsis is to reduce sepsis related mortality and average LOS. By reducing the total average LOS by 0.5 days, the hospital can potentially save an estimated $1.2-$1.7 million a year, which is adequate to cover the cost of the project implementation.

Evaluation

The outcome evaluation component of the Roberta Straessle Abruzzese (RSA) evaluation model will be used to assess the effectiveness of the teaching efforts of the modified sepsis algorithm, Sepsis Protocol badge and annual sepsis trainings. According to Bastable (2014), outcome evaluation summarizes what happened after teaching has been completed or after an educational project has been carried out. By evaluating the changes that result from teaching and learning, the educator can determine whether the objectives for the learners were met or what areas of learning needs to be refined. The purpose of the evaluation is to assess for needed adjustments in materials, learning objectives, and sepsis trainings, as it is being implemented.

The nurses will be assessed on how well they retained the sepsis clinical knowledge and operational knowledge of the hospitals sepsis protocol. The initial sepsis survey will provide the nurses' baseline knowledge of sepsis, which is given prior to the training. Ideally, an outcome evaluation should include "measuring nurses" knowledge or behavior at some time after they have returned to the unit (Bastable, 2014). To determine whether the nurses have acquired the learning objectives of the algorithm, badge and sepsis training, the sepsis survey will be re-administered three months after the training. Analyzing pre- and post-training assessment results will allow the educator, as well as the participants, to compare and quantify the knowledge and skills attained during the training. Furthermore, following the implementation and teaching of the modified sepsis algorithm, audits will be performed to evaluate staff understanding of the redesigned algorithm and the hospital's current sepsis protocol.

A chart review audit will be conducted six months after the training to determine whether the project resulted in long-term change in sepsis screening compliance. The newly acquired data will be compared with the baseline data to evaluate changes in early identification and treatment

of sepsis. The measured metrics will include sepsis screening times, positive sepsis screenings, and sepsis bundle initiations.

Discussion

The purpose of this project was to emphasize and improve early identification of sepsis as an effective way to prevent and reduce sepsis-related mortality. Implementation of the various components of the sepsis education campaign, including a modified sepsis algorithm, the Sepsis Protocol badge, strict time frames for sepsis screenings, SIRS/Sepsis nurse champions on each unit and extensive sepsis annual trainings, results in raising awareness of early sepsis recognition and management in the hospital.

In efforts to understand the barriers to early sepsis identification and management, the CNL students shadowed the nurses on the inpatient units to observe the completion of the sepsis screening during designated time frame of 7:00 AM to 10:00 AM. The findings indicated that majority of the nurses did not complete the sepsis screening when the CNL students physically observed the nurses. However, results from the chart review audits did not reflect with the results from the physical observation. The EMR utilized at this hospital allowed the nurses to time stamp charted information, such as sepsis screening. Thus, that data in the EMR was not charted in real time, which indicates a discrepancy in what the CNL students observed and what the nurses charted in the EMR. The data from nurse-student observation and the data from EMR chart review audit did not accurately reflect one another.

In regards to the sepsis survey given to the nurses to assess their baseline knowledge, the original questionnaire used to conduct the first round of surveys was a "Select All that Apply" (SATA) format. Upon receiving the completed surveys, the CNL students realized that the SATA format was not an ideal survey for this project. Several nurses were unfamiliar with this

type of question and did not know how to answer the questions, creating misunderstanding.

Therefore, the survey was reformatted to a multiple-choice format to eliminate ambiguity.

A major barrier that contributed to delays of the project and small data collection was the

participation from the registered nurses. The CNL students found it difficult to find nurses who

were willing to participate and complete the sepsis survey. Due to the lack of time and resources,

the only available time to survey the nurses was the beginning of their shift or during the

morning/evening team huddle. Results of the sepsis survey could potentially be inaccurate due to

the nurses' time constraints while taking the survey; the nurse may not have been able to

thoroughly read and answer the questions correctly because of insufficient time. Additionally,

the lack of time resulted in a smaller sample size of nurses because of the unavailability of nurses

to participate in the survey. A larger sample size would have been beneficial in order to obtain

more data to address a larger scope of the sepsis issue in the hospital. Other alternatives that are

more ideal to ensure full nurse participation would be to incorporate the sepsis survey as part of a

mandatory module distributed by the hospital.

Nursing Relevance

Often serving as first responders to patients with deteriorating conditions, nurses play a

vital role in identifying patients with early symptomatic indications of sepsis and continually

monitoring patients for risk of sepsis. During the nurse-student observation phase of the project,

it was noted that numerous nurses in the inpatient setting charted sepsis screenings in the EMR

without physically assessing their patient, nor did they utilize current vital signs to determine the

patient's sepsis parameters. According to this hospital's sepsis protocol, it is within their EMR

Task List that they perform sepsis screenings during the beginning of their shift, preferably by

10:00 AM for the morning shift and 10:00 PM for the evening shift.

As nurses whose primary role is to advocate for the patient by conducting ongoing assessment of the patient's health status and needs, it is imperative to promote awareness of the nurses' responsibility to acquire the necessary skills and knowledge to recognize early sepsis signs and symptoms and the initiation of early treatment. A significant contribution to improving early sepsis identification is to utilize the nursing role in performing routine physical assessments of each patient and performing timely sepsis screenings, as well as, promptly initiating appropriate interventions to manage patients with sepsis.

CNL Relevance

As a lateral integrator who coordinates and facilitates care among a diverse group of professional disciplines and complex care settings, the CNL has the ability to ameliorate communication breakdowns and reduce fragmentation within a hospital setting. Ineffective communication among the healthcare providers and lack of standardization within the microsystem has led to devastating outcomes, such as increasing sepsis mortality rates due to ineffective sepsis identification and treatment. As a leadership position, the CNL can empower all levels of the microsystem to contribute to improvements in patient safety and high-quality care. Because of their critical thinking capacity, microsystem clinical workflow knowledge, and advanced leadership role, the CNL can serve as an effective liaison to mitigate the drawbacks and barriers associated with sepsis protocol implementation and sepsis screening compliance. The CNL competencies that resonate with this project are the following: *Quality Improvement and Safety*, *Informatics and Healthcare Technologies, Health Policy and Advocacy* and *Master's Level Nursing Practice*.

The competency of Quality Improvement and Safety is evident with the CNL's role in using evidence-based practice to help create and promote the sepsis education campaign to

improve early identification of sepsis in the inpatient units. The CNL can use evidence-based

practice to make clinical decisions and assess patient outcomes, as stated in one of the CNL

Competencies "Use performance measures to assess and improve the delivery of evidence-based

practices and promote outcomes that demonstrate delivery of higher-value care" (AACN, 2013).

With an organizational leadership approach and values based on evidenced-based practice, the

CNL is well-positioned to assist the nursing staff in implementing an Early Identification Sepsis

Program by performing a microsystem assessment and designing the protocol improvements

based on current evidence.

As stated in the CNL competency, *"Participate in ongoing evaluation, implementation*

and integration of healthcare technologies, including the electronic health record" (AACN,

2013), CNLs are optimally positioned to lead an interdisciplinary team in creating a standardized

strict time frame for sepsis screening in the EMR. Embodying the competency of Informatics &

Healthcare Technologies, the CNL would use information technology to maintain sepsis

screening completion at 10:00 AM/10:00 PM, as well as continual chart audits to analyze gaps

and discontinuities. The CNL role fosters interdisciplinary collaboration and is well positioned to

lead and train the clinical staff in the new technological process. With the involvement of the

CNL in the design, development, and implementation of EMR, this will allow "the CNL to be a

leader and role model within the microsystem in the use of informatics to support care delivery"

(Harris, 2014) and create a receptive organizational culture to the new health care advances.

With a focus on point-of-care coordination across a horizontal microsystem level, the

CNL encompasses a unique and larger vision that allows them to see issues and challenges at a

different angle in comparison to other clinicians. The CNL demonstrates the competency of

Health Policy & Advocacy by consistently advocating for continual sepsis education to maintain nurse competency as well as work towards broadening and widening the impact of this project.

Furthermore, the CNL is ideally suited in leading a role in developing and executing a clinical process to meet the new benchmark performance measures placed by the ever-changing healthcare system. Reflecting on the competency of Master's Level Nursing Practice**,** the CNL would facilitate continual modification of nursing interventions based on evidence, as well as, the changing needs of the microsystem to improve healthcare outcomes, and further improve the early identification of sepsis on inpatient units. By embodying these quality improvement principles, this project will improve the process of care and clinical outcomes of septic patients on the inpatient units.

Future Directions

With a focus on enhancing and bridging communication gaps within the microsystem, the CNL can help breakdown the fragmentation of patient care and improve healthcare outcomes and clinical processes. For instance, the CNL can serve as the bridge between the clinicians, nurses and students to help ameliorate communication barriers encountered in the project. The CNL can improve effective interdisciplinary communication and coordination, and potentially encourage open communication between the nursing staff and the students. The CNL assigned to each inpatient unit can nominate specific nurses to become the Sepsis Champions for the inpatient units, in which the nurses would be experts for fellow colleagues and students. The CNL will assist in coordinating in-service educational sessions on the Sepsis Screening protocol to the nursing staff biannually.

Upon reviewing the observations and results of this project, the CNL students have concluded that the current sepsis protocol used in inpatient units contains information that do not

align with the hospital's current sepsis policy. To ensure that all inpatient units are utilizing the same sepsis protocol that is congruent and uniformed with the hospital policy, the inpatient sepsis protocol needs to be thoroughly examined and revised to eliminate discrepancies and uncertainty. Once the basic educational tools are finalized, the Sepsis Screening tool will be an effective tool to improve early sepsis identification and outcomes.

Conclusion

Early identification of sepsis on inpatient units allows for emergent treatment and interventions to begin sooner, reducing the likelihood of further complications associated with the progression of sepsis. By educating and training nurses on an effective sepsis screening protocol, nurses will develop competence and confidence in their ability to detect early signs and symptoms of sepsis. The CNL is a crucial asset in implementing change within the microsystem by reducing communication barriers between the staff and students, and applying evidence-based information to design new processes to improve early sepsis identification and treatment. This project will not only enhance the nurses' clinical knowledge and evidence-based practice skills, but it will also empower nurses to create a culture within the inpatient units based on safety and team collaboration.

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x The references which can identify the hospital were purposely omitted in order to provide text

of privacy of institution where this work was done.

Appendix A

Form used for Nurse-Student Observation

Sepsis Screening Observation Checklist

1. Was the sepsis screening done?
    a. No
    b. If yes, then answer questions 2-6.

2. What time were the vital signs done that were used to complete the screening?

    a. Note: vital signs from 5am-10am can be used.

3. Did the nurse feel that the patient has a suspected or confirmed infection?
    a. No
    b. Yes. If so,why?

4. Do you think the patient has a suspected or confirmed infection?
    a. No
    b. Yes. If so, why?

5. Did the patient have 2 SIRS and a suspected/confirmed source of infection?
    a. No
    b. Yes

6. Was the sepsis protocol initiated?
    a. No
    b. Yes

Appendix B

Form used for Chart Audit Review

Sepsis Chart Screening Data

1. Was sepsis screening done?

2. What time?

3. What time were vitals taken which were used for the sepsis screening?

4. What were the lab values related to the SIRS criteria?

    a. Temperature

    b. RR rate

    c. WBC count

    d. HR

5. Did patient have a suspected or confirmed infection?

6. Was the sepsis bundle initiated?

7. Was the patient transferred to a higher level of care?

8. How long was the patient on the floor before transfer was completed?

Appendix C

Form used for Participant Survey

UNIVERSITY OF
SAN FRANCISCO

CHANGE THE WORLD FROM HERE

Sepsis Survey

1. **True or false. A positive sepsis screening is defined as 2 SIRS + a suspected or confirmed source of infection.**

2. **Which of the following is <u>NOT</u> considered SIRS criteria?**
    a. Body temperature >38.3°C/100.9°F or body temperature <36°C/96.8°F
    b. Tachycardia
    c. WBC >12,000/mm3 or <4,000 or 10% bands
    d. Bradypnea

3. **If patient presents with positive sepsis screening, which of the following is <u>NOT</u> nursing intervention(s) to be implemented?**
    a. Call RRT
    b. Draw sepsis panel labs
    c. Call Code Sepsis
    d. Obtain urinalysis and culture/sensitivity

4. **True or False (circle one): only call "code sepsis" if in the ED, ICU or if Severe Sepsis.**

5. **Which of the following must be performed within 3 hours of presentation of severe sepsis?**
    a. Obtain blood cultures prior to administering antibiotics
    b. Measure lactate level
    c. Administer broad spectrum antibiotics
    d. Administer 30mL/kg crystalloid for hypotension or lactate >2mmol/dL
    e. All of the above

6. **Do you feel that abnormal vital signs are reported to you in a timely fashion?**
    a. Yes, almost always
    b. Sometimes
    c. No, hardly ever

7. **In your experience, what is the <u>greatest</u> contributor to delays in treatment of sepsis in your department? (Select all that apply.)**
    a. Lack of recognition of potential sepsis in triage
    b. Delay in diagnosis of sepsis
    c. Knowledge deficit regarding appropriate management
    d. Nursing delays (time to completion of orders)
    e. Lab delays
    f. Lack of necessary equipment (Please explain.) _____
    g. Other (Please explain.) _____

8. **Do you feel that this facility provides adequate educational resources regarding sepsis for nurses?**
    a. Yes, almost always
    b. Sometimes
    c. No, hardly ever

9. **When needed, what resource do you use to reference the Nurse Driven Protocol for sepsis?**
    a. Arcis (electronic medical record)
    b. Policy and Procedure Manual
    c. Google

10. **What additional resources/information would you like to have regarding sepsis?**

_____

_____

Appendix D

Graph 1. Sepsis Screening Observation Data
Data derived from the "Sepsis Screening Observation Data" form.
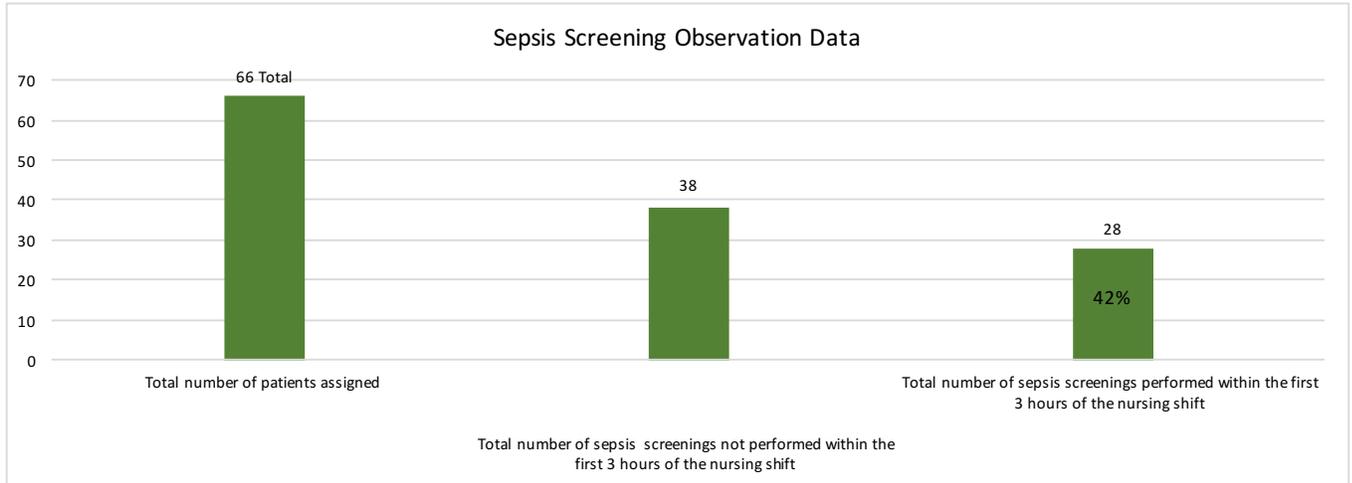
Graph 2. Sepsis Screening Data Based on Completed Screenings
Data derived from the "Sepsis Screening Observation Data" form.
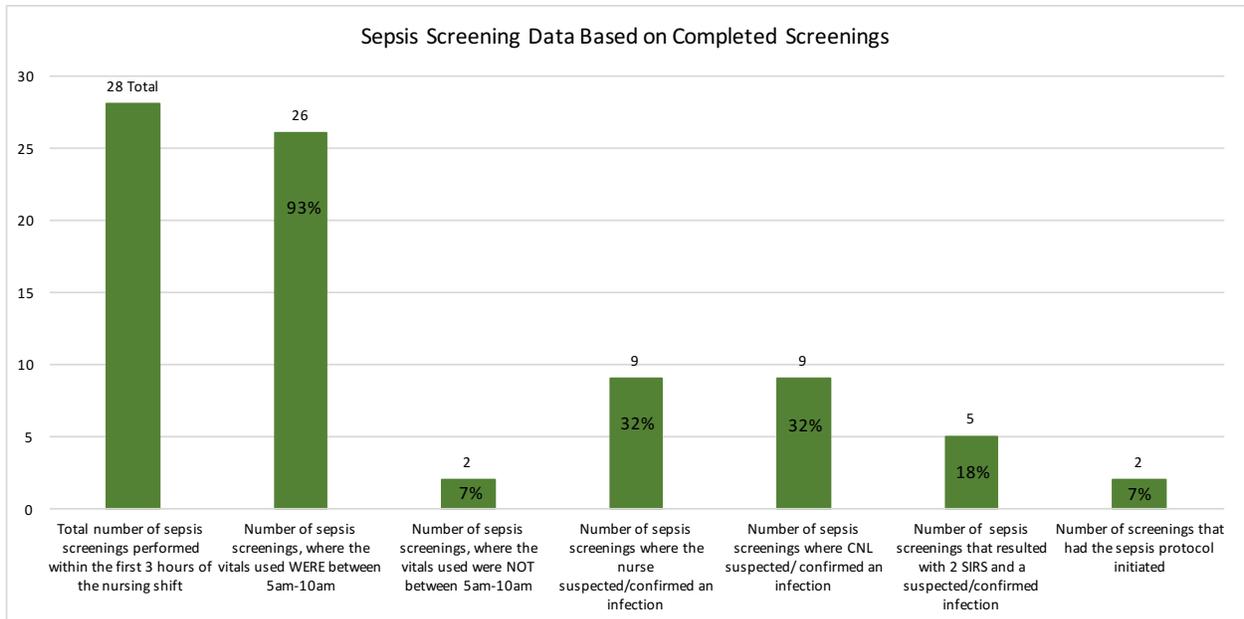
Graph 3. Sepsis Screening Chart Audits
Data derived from the "Sepsis Chart Screening Data" form.
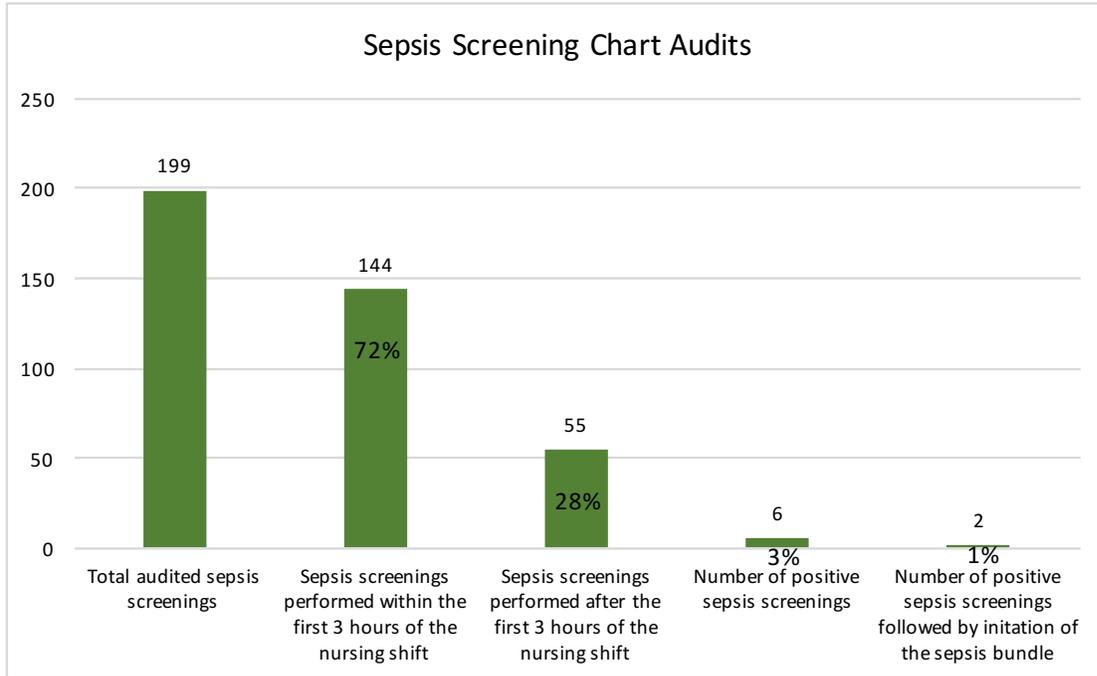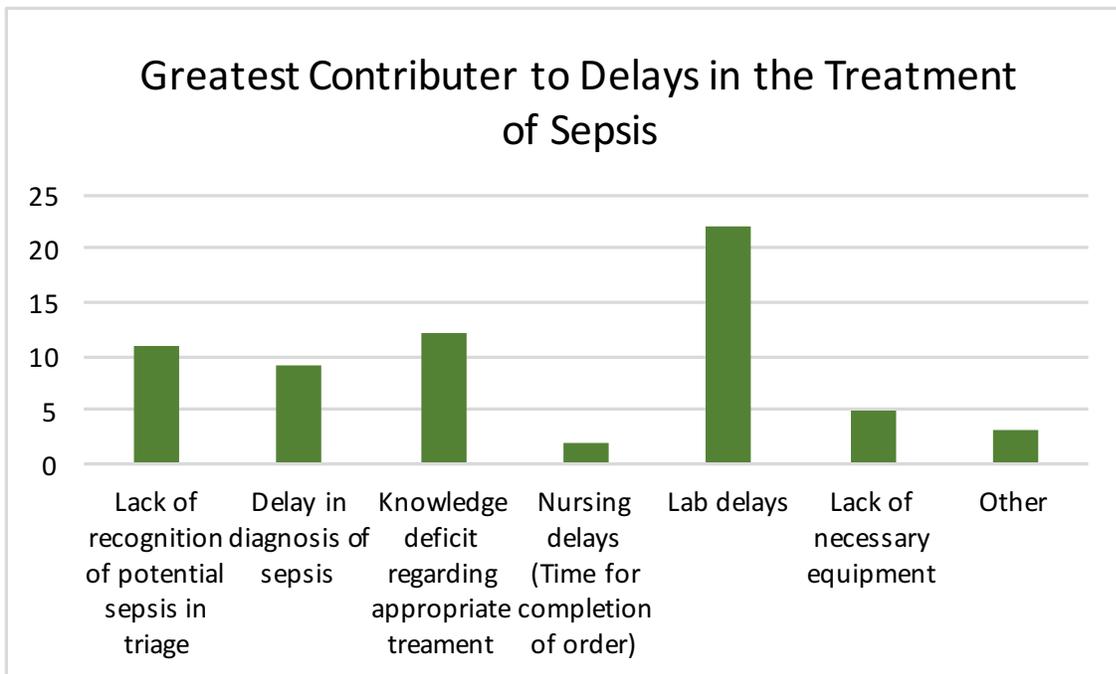

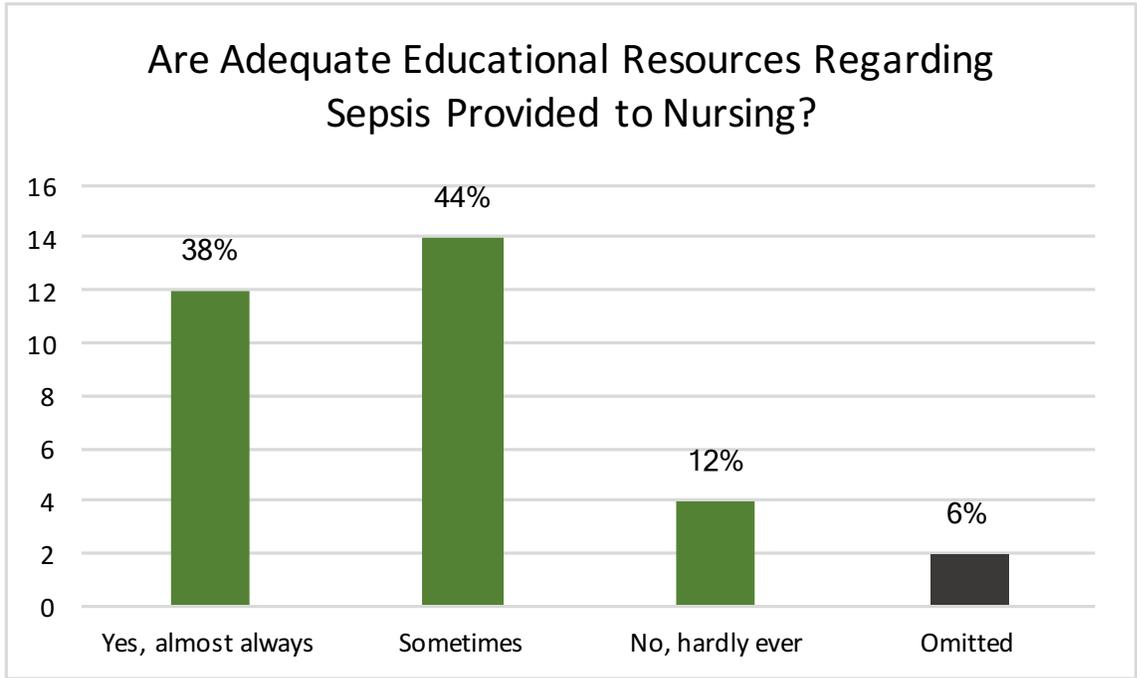**Graph 4.** Nursing Sepsis Survey Results
Data derived from the "Sepsis Survey" form.
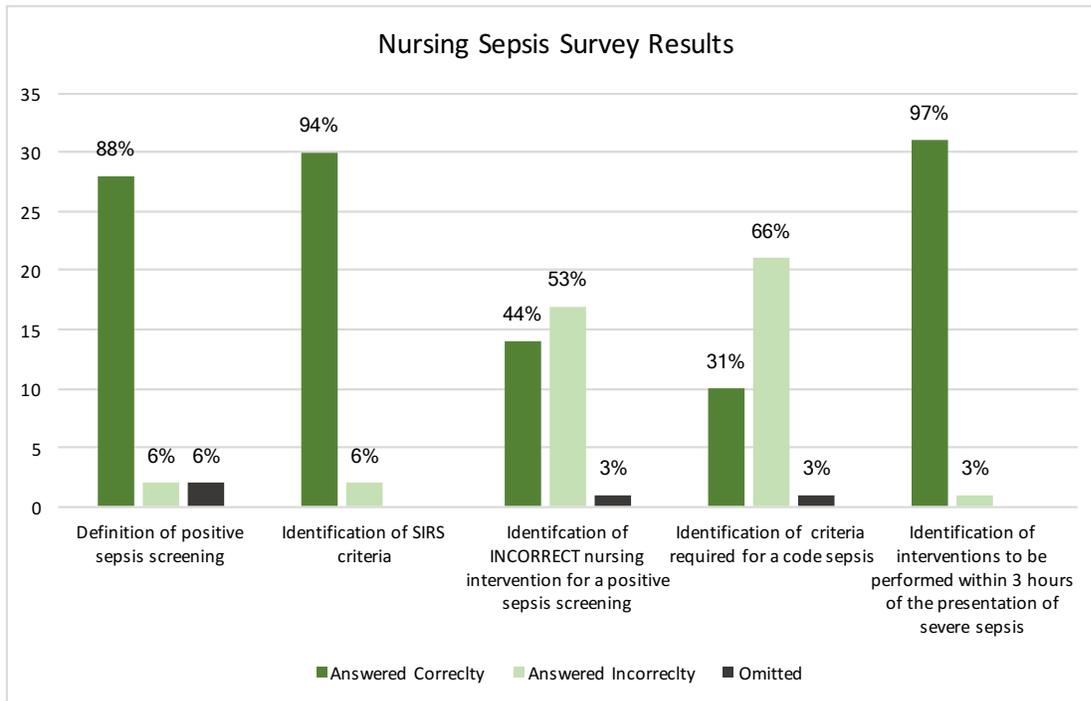
Graph 5. Are Abnormal Vital Signs Reported to Nursing in a Timely Manner?
Data derived from the "Sepsis Survey" form.

Are Abnormal Vital Signs Reported to Nursing in a Timely Manner?
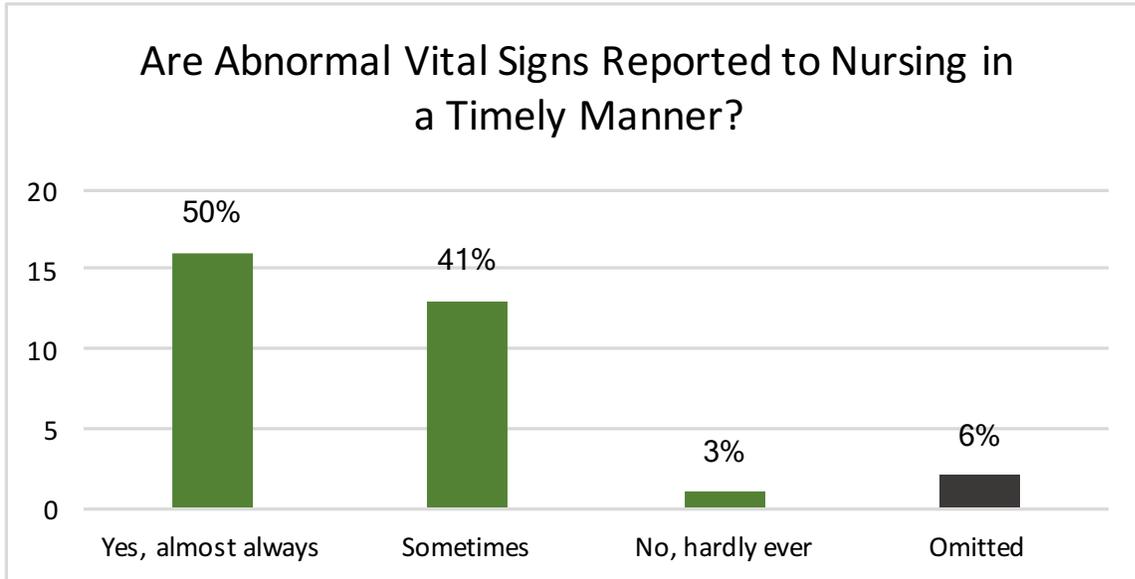
Graph 6. Greatest Contributor to Delays in the Treatment of Sepsis
Data derived from the "Sepsis Survey" form.

Greatest Contributer to Delays in the Treatment of Sepsis

Graph 7. Are Adequate Educational Resources Regarding Sepsis Provided to Nursing?
Data derived from the "Sepsis Survey" form.

Are Adequate Educational Resources Regarding Sepsis Provided to Nursing?

Category	Value	Percent
Yes, almost always	12	38%
Sometimes	14	44%
No, hardly ever	4	12%
Omitted	2	6%

Graph 8. Resources Utilized to Reference Nurse Driven Protocol for Sepsis
Data derived from the "Sepsis Survey" form.

Resources Utilized to Reference Nurse Driven Protocol for Sepsis

Category	Value
Arcis (electronic medical record)	18
Policy and Procedure Manual	15
Google	1
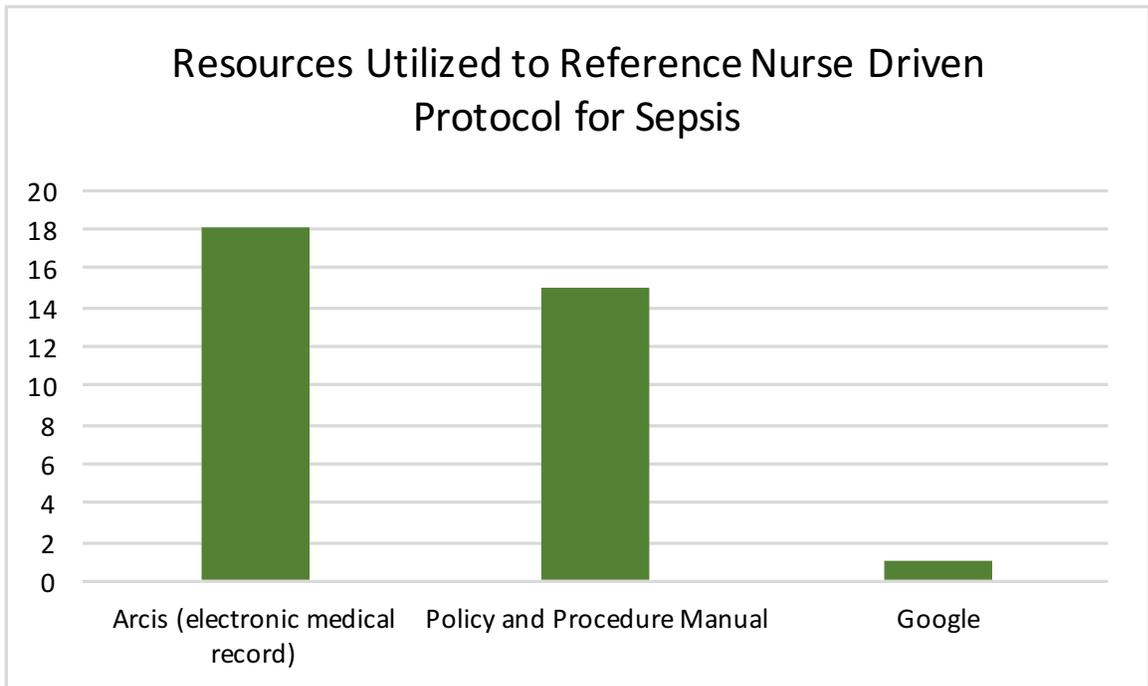
Appendix E

"Sepsis Process Map" created by the CNL students

Appendix F

"Sepsis Protocol" badge created by the CNL students.

Sepsis Protocol
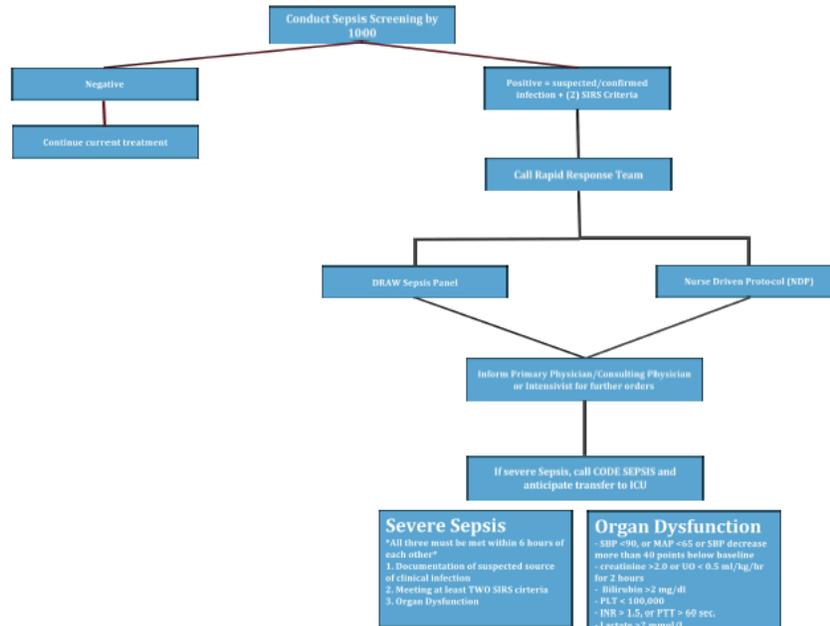
SIRS Criteria:
- 1. Temperature >38.3°C/100.9°F or <36°C/96.8°F
- 2. Heart rate > 90
- 3. Respiratory rate > 20
- 4. WBC > 12,000 or < 4,000
- 5. > 10% for differential bands

*If 2 SIRS criteria & suspected/confirmed infection are present, CALL RRT & initiate nurse driven protocol & sepsis panel.

Sepsis Protocol

Nurse Driven Protocol:
- Start O2, keep saturation >95%
- Start peripheral IV w/at least 18g
- Tylenol 650mg PO or rectal for temp >101F
- Vital signs q15 min w/neuro checks until stable, then q1 hour
- STAT labs
- Lactic acid
- CK-MB, Troponin
- CMP, CBC w/ differentials, PT w/INR, PTT
- Cultures (order set in MAR)
- Diagnostic: CXR, EKG (if not done in past 24 hours)

Sepsis Panel:
- **Draw and send to lab:**
- CBC
- PT/PTT
- Blood cultures x2
- Lactate (lactate level is to be placed in gray tube and immediately placed on ice)
- Obtain urinalysis, urine culture & sensitivity