

Winter 12-15-2017

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Improving Early Sepsis Identification on Inpatient Units

Nursing 653: Clinical Nurse Leader Internship

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Abstract

Sepsis is a serious complication, which is initiated by the body's extreme response to an infection. If sepsis is not identified and treated promptly, it can rapidly lead to tissue damage, organ failure and death. In order to reduce the number of patients who decline to sepsis in hospital, an efficient sepsis protocol needs to be implemented. Nursing practices, knowledge, and early recognition of systemic inflammatory response syndrome (SIRS) were assessed and measured in order to implement effective interventions. A root cause analysis was conducted to identify any discrepancies with compliance performing the sepsis screening in a timely manner, identify contributing factors in sepsis treatment delays, and ensure that the sepsis process map is reflective of the hospital policy.

The Clinical Nurse Leader students under the direction of the Sepsis Committee Director developed a Sepsis Screening Observation Checklist to observe the nurses on the unit to determine if in fact the sepsis screening was completed. A chart review audit was conducted by using a Sepsis Chart Screening Data form, which allowed students to review EMR charts of 100 patients in five different nursing units. The students also provided nurses with questionnaires to assess their knowledge on sepsis and about their sepsis hospital policy and protocol. Results demonstrated that vital signs are reported to nurses in a timely manner 50% of the time, the greatest contributor to delays in the treatment of sepsis are labs, and only 38% of nurses feel adequate educational resources regarding sepsis are provided to nurses. A nurse's understanding and knowledge of sepsis is vital in identifying septic patterns and the necessary interventions a nurse needs to take in order to keep his/her patient safe.

Improving Early Sepsis Identification on Inpatient Units

Sepsis is a life-threatening medical emergency that requires prompt interventions to reduce adverse complications such as organ failure and death. 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). Due to the high mortality and morbidity rates, sepsis has become an area of focus within the hospital setting to identify early and implement evidence-based practices to promote recognition and uniform policies for treatment. Sepsis affects approximately 750,000 people in the United States, with mortality rates of 28% to 50% and costing \$17 billion each year (Winterbottom, Seoane, Sundell, Niazi & Nash, 2011). Routine sepsis screening is one essential method utilized to identify systemic inflammatory response syndrome (SIRS) early so that prompt interventions are initiated to prevent adverse outcomes, optimize patient outcomes and reduce cost expenditure.

Literature review was conducted utilizing CINAHL Complete and PubMed databases. In the CINAHL Complete database, utilizing phrases such as “early sepsis identification” which gave 54 articles retrieved literature review. Also, additional phrases “sepsis checklist” generated 4 articles and “improving sepsis screening” and “inpatient units” had 788 articles total. The PubMed database showed 388 articles using “early recognition of sepsis.” The nursing knowledge and understanding of sepsis identification and treatment, as well as the nursing culture as a whole, will help identify areas where

improvements can be developed to improve patient outcomes. By conducting a retrospective medical record review, the efficacy of the current sepsis protocol will also be evaluated. Ensuring that the hospital has a well-developed sepsis protocol, which aligns with the international guidelines for the management of sepsis and septic shock released by The Surviving Sepsis Campaign (SSC), as well as the guidelines set by the Centers for Medicare and Medicaid Services (CMS), will help facilitate the early identification and appropriate treatment of sepsis.

Methods

Microsystem Assessment

This large, metropolitan healthcare facility is a 384-bed hospital facility that provides an array of medical services including the following: Level II Trauma Center, emergency, oncology, cardiovascular, pediatrics, behavioral health, skilled nursing and obstetrics. The interdisciplinary team is responsible for monitoring these patients and improving their well being by providing excellent care with social justice and dignity (x). The vision of this institution states, “our vision is to be a values-driven integrated health care delivery system in collaboration with those who share our values” (x). This institution strives on promoting quality, patient-centered care through advocacy and preserving the health of the community. The values of the hospital include respect, caring, integrity, passion and stewardship. It is also a non-profit organization and is heavily dependent on grants, charitable donations and endowments to continue providing medical services within this area. This hospital “was incorporated in 1983 as a nonprofit public benefit corporation and is governed by a volunteer Board of Trustees” (x).

The microsystem observed for the sepsis project comprised of five-inpatient units- 2E, 4th, 5th, 6th and 8th floors. The emphasis of this project was predominantly focused on the telemetry/medical-surgical floor located on the sixth-floor where the sepsis screening observations were conducted. Also, the purpose of this microsystem is to serve and treat cardiac diseases, especially stroke patients as well oncology, telemetry and medical-surgical patients. Many of the patients that the hospital serves are uninsured, and they rely on Medi-Cal coverage to receive treatments and services. Approximately, “60% of the Hospital’s inpatient payer mix consisted of Medi-Cal Managed Care (31%) and Medi-Cal Traditional (29%) patients” (x). There is a multi-disciplinary team that oversees the care of each patient which include: physicians, nurse practitioners, registered nurses, respiratory therapists, certified nursing assistants and licensed vocational nurses. Each of these healthcare professionals is a vital asset for to promote patient safety, optimize patient outcomes, and implement quality patient care.

The patient care delivery model for the unit is the patient-family centered care model. This model not only focuses on the patient but also incorporates the patient’s family members to be proactive in delivering quality care. Family members play a crucial role in improving patient outcomes by incorporating social, emotional and spiritual well-being. In addition, this also improves communication with the patient, family members and the interdisciplinary healthcare team to provide coordinated and effective care. This model encompasses safety, quality, service, and the hospital’s values.

Root Cause Analysis

A root cause analysis was performed to identify compliance and potential disparities to completing the sepsis-screening checklist for each patient at the beginning

of each shift. A systematic review of the inpatient units' sepsis protocol maps, policy, algorithm, and screening tool were utilized to identify disparities within the protocols and improve the sepsis protocol and screening. The data was collected through observation audits on the sixth floor noting if the registered nurse completed the sepsis screening between 7:00am and 10:00am, chart review audits, and surveying the registered nurses about the sepsis protocol and obtain a measureable baseline of their knowledge. The Clinical Nurse Leader students along with the collaboration and direction of the Director of the Sepsis Committee performed weekly observational audits.

Observational visits were coordinated with the Director of the Sepsis Committee to schedule a time and date to visit the unit and conduct the observations. Generally, the observations were divided into two days with half of the students attending one of the days and then meeting with him for a post-conference to discuss our findings and identify the next objective. The total number of patients audited during this time was 66 patients (See Appendix A for Sepsis Observational Checklist). If time permitted and access to additional units were granted, the Clinical Nurse Leader students would have benefited more if the observational audits were performed during the nurses' full 12-hour shift, rather than the limited 3-hour morning shift time frame. Also, if the students also had the opportunity to observe if the sepsis screening was done during the night shift would have crucial data to evaluate compliance and identify barriers and not limited to only one specific timeframe. By shadowing the nurses during their entire shift or up until the screening was completed in the EMR, we would have a more precise data of which vital signs were used and when the screening was completed. Furthermore, to maintain the

validity and precision of the audits, the students refrained from disclosing to the nurses the purpose of the audits to remove limitations and skewed data.

In addition, a “Sepsis Chart Screening Data” form was utilized to review EMR charts of 100 patients (199 sepsis screenings- both morning and night shifts for each patient) from all five inpatient units. The chart review for each patient must be a patient age 18-years or older and day 2 post-admission. Furthermore, the registered nurses baseline knowledge was assessed through a questionnaire given to each nurse on the unit. Questionnaire forms were gathered from 32 nurses from all five inpatient units. There was no need to obtain Institutional Review Board (IRB) approval to proceed with this project. The only permission acquired for this project was in coordination with the Director of the Sepsis committee to approve the questionnaires, chart reviews and observational checklist for the sepsis screening.

Results

The following results were compiled from the observational checklist the Clinical Nurse Leader (CNL) Students’ created and utilized when shadowing the nurses during the morning shift. This particular checklist discussed topics of delegation, communication, educational resources available on the unit, contributor of delays in treating septic patients, and if adequate resources available to find and implement the nurse driven protocol when the patient presents two systemic inflammatory response syndrome (SIRS). The following graphs are data collected from the sepsis screening observation. Figure 1 depicts the data collected if abnormal vitals are reported in a timely manner. The nurses responded that 50% of the time abnormal vitals are reported back to them in a timely manner. Thirteen nurses responded that sometimes abnormal vitals are

reported in a timely manner. Figure 2 demonstrates the greatest contributor to delays in the treatment of sepsis. Twenty-two nurses stated that lab delays are the greatest contributor to the delay of sepsis treatment. The second greatest contributor is knowledge deficit regarding appropriate treatment of sepsis with twelve responses. Next, eleven nurses revealed that lack of recognition and identification of potential sepsis in triage is another contributor of sepsis treatment delay.

Figure 3 asked whether adequate educational resources regarding sepsis are provided to nurses. Twelve nurses stated that yes almost always was the second largest response with a total of 38%. Fourteen nurses responded sometimes the healthcare facility provides sepsis educational resources. Figure 4 demonstrates whether nurses utilized resources as a reference to implement the sepsis nurse driven protocol. The data analyzed highlighted that 56% of nurses stated that Arcis, the hospital's electronic medical record, is the most utilized resource to find the nurse driven protocol. 47% of nurses responded that they search through their hospital's policy and procedure manual to find the nurse driven protocol. Figure 5 depicts if the sepsis screening was completed by 10:00am. A total of 66 patients were observed from 7:00am to 10:00am and 42% of those screenings were completed by 10:00am.

Figure 6 illustrates the data collected and analyzed during the sepsis chart review audit. The data showed that 28 total sepsis screenings were performed during the first 3 hours of the nursing shift. Next, 93% of sepsis screenings utilized recent vitals between the hours of 5:00am to 10:00am. On the other hand, 7% of the screenings did not utilize the most recent vitals when completing their sepsis screening. 32% of sepsis screenings were conducted with a suspected and/or confirmed infection. 18% of the screenings

resulted with two systemic response inflammatory syndrome (SIRS) criteria and a suspected and/or confirmed infection. 7% of the screenings indicated that the sepsis protocol was initiated.

In order to determine if the nurses were compliant with completing the sepsis checklist in the beginning of shift, a chart review was conducted. In this chart review, 100 electronic medical record (EMR) patient charts, an overall 199 sepsis screenings from day and night shifts, were reviewed in the five inpatient units-2E floor, 4th floor, 5th floor, 6th floor and 8th floor. The Clinical Nurse Leader (CNL) students narrowed their efforts by focusing on what time the screenings were completed, if the latest vital signs were utilized, if there was indeed a suspected or confirmed infection the patient was suffering from, if any of the screenings indicated a positive systemic inflammatory response syndrome (SIRS) criteria along with a suspected or confirmed infections, and if the sepsis protocol was initiated for any of the patients reviewed (See Appendix B for Sepsis Chart Review Form). Figure 7 extrapolates further the data analyzed from the sepsis chart review audits. 72% (144 screenings) of the sepsis screenings were performed within the first three hours of the nursing shift. 28%(55 screenings) were performed after the first three hours of the nursing shift. 3% (6 screenings) were positive sepsis screenings and 1% (2 screenings) were positive sepsis screenings followed by the initiation of sepsis bundle.

The following graph depicts the nursing questionnaire the Clinical Nurse Leader (CNL) students created and used to survey the nurses to establish a baseline of their knowledge regarding sepsis and their hospital policy and protocol. The questions were derived from the hospital's policy to determine if the nursing staff knows the protocol,

how to initiate the sepsis protocol, early recognition, and signs and symptoms of systemic inflammatory response syndrome (SIRS). In addition, it is essential to assess each nurse's knowledge and competence to implement the nurse driven protocol and what falls under the nurse's scope of practice (See Appendix C for Nurses' Questionnaire). Figure 8 depicts the responses collected from the nurses' questionnaire. The data illustrates the following: 88% of nurses correctly defined positive sepsis screening, 94% of nurses correctly identified systemic inflammatory response syndrome (SIRS) criteria, 44% incorrectly identified the nursing intervention for positive sepsis screening, 31% correctly identified the criteria required to call a code sepsis, and 97% identified the appropriate interventions to perform within three hours of the presentation of severe sepsis (See Appendix D for all graphs).

Implementation

The focus of this quality improvement project was predominantly focused on the nursing staff's sepsis assessment practices. For this project, the Clinical Nurse Leader (CNL) students recreated the sepsis process map or algorithm so that it can be reflective of the hospital sepsis policy. The current sepsis process map utilized was not congruent with the policy and there were unclear components. The Clinical Nurse Leader (CNL) students simplified the algorithm to make it easier to follow, complement the hospital policy and can be displayed throughout the inpatient units as a quick reference (See Appendix E for Sepsis Process Map created by the CNL students). The students also created a sepsis protocol badge for all nursing staff to hang on their current badge as a quick reference for SIRS criteria, nurse driven protocol and what the sepsis panel is comprised of (See Appendix F for Sepsis Protocol Badge).

In addition, the Clinical Nurse Leader (CNL) students recommended to the Sepsis Committee Director to improve the sepsis hospital policy by including a time frame when the sepsis checklist must be completed. For instance, the sepsis checklist should be performed and documented between the hours of 7:00am-10:00am and 7:00pm and 10:00pm. Currently, the nurses understand to complete this assessment once per shift but there are no strict time frames. By including a time frame, early identification can be recognized but utilizing the most current complete vital signs at the beginning of each shift. Also, perform routine audits of nurses to identify discrepancies with the systemic inflammatory response syndrome (SIRS) screening to measure compliance and accountability of the nursing staff.

Creating a SIRS/Sepsis champion within each inpatient unit to monitor patients closely with suspected SIRS and/or at risk. This role will be an ICU nurse with experience on how to identify and treat SIRS and/or septic patients. Moreover, this individual can serve as a resource for other nurses to learn and utilize as reference from a more experienced nurse in this area. Enhancing clinical knowledge and experience are two components vital to optimize patient outcomes and reduce adverse complications. Conducting mandatory annual trainings for all nursing staff to attend to discuss policies and procedures, prompt and appropriate nursing interventions, and how to recognize SIRS early.

Cost Analysis

A 2016 brief from the Healthcare Cost and Utilization Project (HCUP) showed sepsis as the most expensive condition to treat in the US. The average expense associated with sepsis is \$18,000 per stay, while the expense per stay for other conditions averages

around \$10,000. For example, the Intensive Care Unit (ICU) has on average 2-3 septic patients a week. On the other hand, the Emergency Department (ED) has a greater number of septic patients from 3-4 on average a day. Other inpatient units rarely monitor or care for septic patients. Approximately, the hospital treats 1176-1584 sepsis patients a year. This roughly estimates to \$21-28 million in cost each year for the care of septic patients within this healthcare facility. The CDC reported patients with sepsis stayed an average length of stay (LOS) of 8.5 days. The desired outcome for early recognition and treatment of sepsis is to reduce sepsis related mortality and lower the average length of stay. Reducing the length of stay by 0.5 days can save the hospital \$1.2 - 1.7 million a year, which is more than enough to cover project cost.

Evaluation

To evaluate whether the interventions were successful or not, one method is to utilize the sepsis questionnaire used to survey the nurses. This can be used as a pre and post-test to determine if there was an increase in knowledge from the first survey. The questionnaire will be re-administered immediately after the educational annual training(s) to determine if they were effective by assessing the nurses' knowledge and compare the responses to the baseline data. In addition, the questionnaire will be redistributed to the nurses three months after the training to measure sustainability of the trainings. Routine audits will be performed per quarter term to determine compliance. A chart review will be performed six months after the training to ascertain whether the project resulted in long-term change. The newly acquired data will be compared against the baseline data to evaluate the change in early identification and treatment of sepsis. The measured metrics will include sepsis screening times, positive sepsis screenings, and sepsis bundle

initiations. Also, the implementation plan will be evaluated for needed adjustments in materials, learning objectives, and student educators, as it being implemented.

Discussion

The efforts of this project is emphasized in early sepsis recognition by the nurses completing the sepsis screening checklist between the hours of 7:00am-10:00am and 7:00pm and 10:00pm. The Clinical Nurse Leader (CNL) students shadowed the registered nurses on inpatient units to observe if the screening was being completed during the designated timeframe. The results indicated that majority of the nurses did not complete the sepsis screening when physically being observed; however, during the chart review audit painted a different picture. The electronic medical record (EMR) utilized at this facility allowed for the nurses to time stamp their screening demonstrating a discrepancy it what the students observed and what was charted in the electronic medical record.

In regards to the nurses' questionnaire, the original format included a few select all that apply responses. The nurses were perplexed and did not know how to answer these style questions; therefore, the questionnaire was reformatted to multiple-choice format eliminating select all that apply responses. A barrier to the project was participation from the registered nurses. Due to the lack of time and resources, the only available time to survey the nurses was at the beginning of their shift. This time constraint may have skewed the responses since the nurses may not have the adequate time to read the questions thoroughly and answer appropriately. Also, the sample size of the nurses was limited due to this reason. A greater sample size would have been ideal to obtain a larger scale of issue being addressed. Another alternative would be to email the

survey to all the nurses within the inpatient units so that it can be done during their leisure or be a mandatory module distributed by the hospital to ensure full participation.

Nursing Relevance

Nurses play an integral role in identifying patients with sepsis by incorporating their critical thinking skills and continual monitoring of the patient(s). During the observation phase of the project, it was evident that some nurses within the inpatient setting documented and completed the sepsis-screening checklist without assessing their patients and utilizing the most current vital signs. According to this facility's protocol, it is within their task list that they perform these screenings early in the shift, preferably by 10:00am or 10:00pm. Therefore, the most significant contribution in improving early sepsis identification is utilizing the clinical nursing role to promote awareness that it is the nurses' responsibility to identify patients for any indication of sepsis by conducting a thorough assessment on each patient.

Because identification of SIRS, sepsis and septic shock is key to early recognition, performing sepsis screenings along with timely, prompt interventions will enhance the patient's outcomes and prevent adverse complications. This facility is committed to align their work with their values: "Respect, Caring, Integrity, Passion, Stewardship" ("Our Values", 2017). To align these values with improving early sepsis identification, nurses must recognize that they are the forefront of providing high quality patient care. Nurses are entrusted members of the healthcare team and the patients are relying on their clinical judgment and expertise to advocate for them during their hospital stay. Nurses are in a unique, vital position to provide quality level patient-centered care to patients and are the forefront of influencing each patient's health status.

Clinical Nurse Leader Relevance

As a leadership position, the Clinical Nurse Leader (CNL) is a catalyst for change aimed in creating a culture embedded in accountability, altruism, and coalition. The CNL can be an effective liaison among members of the interdisciplinary team, management and the health informatics department to implement methods to improve sepsis-screening compliance, identify discrepancies and bridge gaps in knowledge to improve patient outcomes. The Clinical Nurse Leader competencies that resonate with this quality improvement project are organizational systems leadership, quality improvement and safety, informatics and healthcare technologies, health policy and advocacy, and master's level nursing practice.

For example, the Clinical Nurse Leader demonstrates the competency of organizational systems leadership by demonstrating a working knowledge of the healthcare system and assumes a role of leadership to focus on patient-centered care, quality and cost effectiveness, evaluate evidence-based practices on a microsystem unit, and collaborate with professionals to implement improvement opportunities (AACN, 2013). This was the focal point of the entire project to improve patient-centered care by identifying sepsis early and forming a coalition of interdisciplinary members to be apart of the movement. Also, the competency of quality improvement and safety performs microsystem assessments and design system improvements based on current evidence, create and promote a culture of continuous quality improvement, conduct root cause analyses, develop a business plan (including a budget), and evaluate processes using a variety of data sets (AACN, 2013). This was conducted by identifying an issue within the

hospital setting, performing a root cause analysis of the discrepancy, develop a plan, do, study and action plan with interventions and means of evaluation.

Informatics and healthcare technologies competency utilizes information technology to collect identify and analyze gaps. Healthcare informatics was utilized when conducting the chart review audits to obtain data pertinent to the project. The health policy and advocacy competency advocates for policies that promote wellness, improve patient outcomes and reduce costs. The sepsis policy does have discrepancies and is not translated into the inpatient units. A sound policy is imperative to prevent adverse outcomes and serves as a reference to implement the appropriate interventions. Master's level of nursing practice evaluates the effectiveness of health teaching, design and implement interventions to advocate for patients to provide quality, safe, and value-based outcomes. This is competency describes the entire effort of this particular quality improvement project to implement evidence-based interventions, evaluate its effectiveness to ultimately improve the patient's health status.

Future Directions

As a Clinical Nurse Leader (CNL), it is crucial to have a comprehensive and systematic approach in place for an effective process in which all health care members are involved. The CNL can be the bridge between the clinicians, nurses and students to implement improvement opportunities and keep communication open. The CNL assigned to the floor can delegate specific nurses to become "Sepsis Champions" in which these nurses would be the experts for fellow colleagues and students. The CNL will provide in-service educational sessions on the Sepsis Screening protocol to staff biannually. The Clinical Nurse Leader students have concluded that there are gaps in the current Sepsis

protocol that need to be addressed and revised to make it congruent and uniform with the hospital policy. Once the basic educational tools are finalized, the Sepsis Screening tool will be an effective tool to mitigate adverse complications, reduce cost associated with an increase in length of stay, and prevent mortality rates.

In this hospital setting, there are many areas that require improvement in order to deliver effective patient-centered care. There are components within the microsystem that a Clinical Nurse Leader can reduce and improve standards of nursing care. In addition, the CNL can reduce discrepancies in communication, identification and compliance, which the CNL role can be a valuable asset to bridge gaps within the inpatient units. Also, the CNL can implement methods to improve teamwork and facilitate effective workflow to maximize care. The CNL can initiate change by enhancing collaboration through leadership and advocacy.

Conclusion

The Clinical Nurse Leader is a pivotal, ground-breaking role that can transform healthcare by focusing its efforts on revising clinical practice guidelines, evaluate interventions by data analysis and enhance communication among all disciplines to improve collaboration and incorporate shared decision making process. The CNL provides leadership at the point of care by optimizing patient outcomes by delivering safe, evidence-based strategies. The clinical nurse leader is a front-line catalyst promoting and sustaining nursing excellence, collaboration, and building quality care delivery models. This role has provided new meaning to patient-centered care by focusing its efforts not only on the patient, but extending those efforts to meet the needs of patient's family members and staff. A Clinical Nurse Leader can be highly beneficial

in this microsystem to ensure compliance completing the sepsis screening in a timely manner and identify any barriers preventing the nurses from completing the screening. The CNL can utilize their critical thinking skills to impact the healthcare continuum of this microsystem.

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- (x) The references in which can identify the hospital has been omitted purposefully to maintain the privacy of the hospital.

APPENDIX A

Sepsis Screening Observational 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

Sepsis Chart Review Form

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 present positive for sepsis screening
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

Nurses' Questionnaire

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 NOT considered SIRS criteria?**
 - a. Body temperature $>38.3^{\circ}\text{C}/100.9^{\circ}\text{F}$ or body temperature $<36^{\circ}\text{C}/96.8^{\circ}\text{F}$
 - b. Tachycardia
 - c. WBC $>12,000/\text{mm}^3$ or $<4,000$ or 10% bands
 - d. Bradypnea
3. **If patient presents with positive sepsis screening, which of the following is NOT nursing intervention(s) to be implemented?**
 - . Call RRT
 - a. Draw sepsis panel labs
 - b. Call Code Sepsis
 - c. 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?**
 - . Obtain blood cultures prior to administering antibiotics
 - a. Measure lactate level
 - b. Administer broad spectrum antibiotics
 - c. Administer 30mL/kg crystalloid for hypotension or lactate $>2\text{mmol/dL}$
 - d. 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 greatest contributor to delays in treatment of sepsis in your department? (Select all that apply.)**
 - . Lack of recognition of potential sepsis in triage
 - a. Delay in diagnosis of sepsis
 - b. Knowledge deficit regarding appropriate management
 - c. Nursing delays (time to completion of orders)
 - d. Lab delays
 - e. Lack of necessary equipment (Please explain.) _____
 - f. Other (Please explain.) _____

8. Do you feel that this facility provides adequate educational resources regarding sepsis for nurses?

- . Yes, almost always
- a. Sometimes
- b. No, hardly ever

9. When needed, what resource do you use to reference the Nurse Driven Protocol for sepsis?

- . Arcis (electronic medical record)
- a. Policy and Procedure Manual
- b. Google

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

APPENDIX D

Results Graphs

1. The following graphs are results from data analyzed from the Sepsis Observational Checklist.

Figure 1:

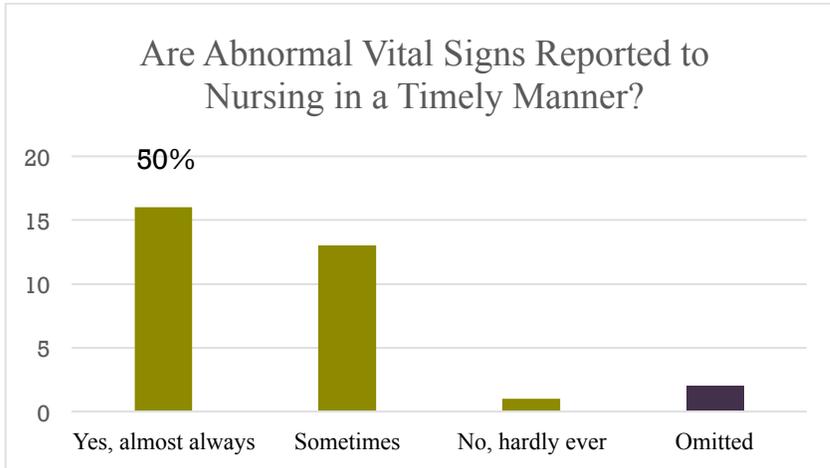


Figure 2:

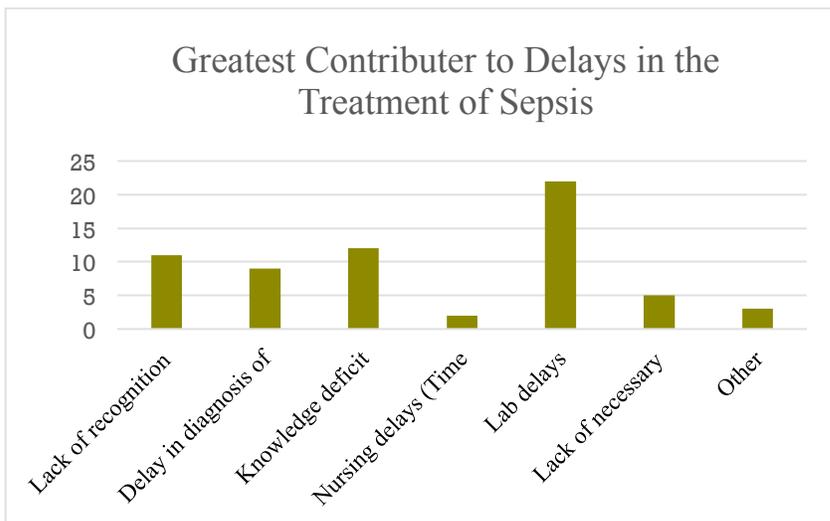


Figure 3:

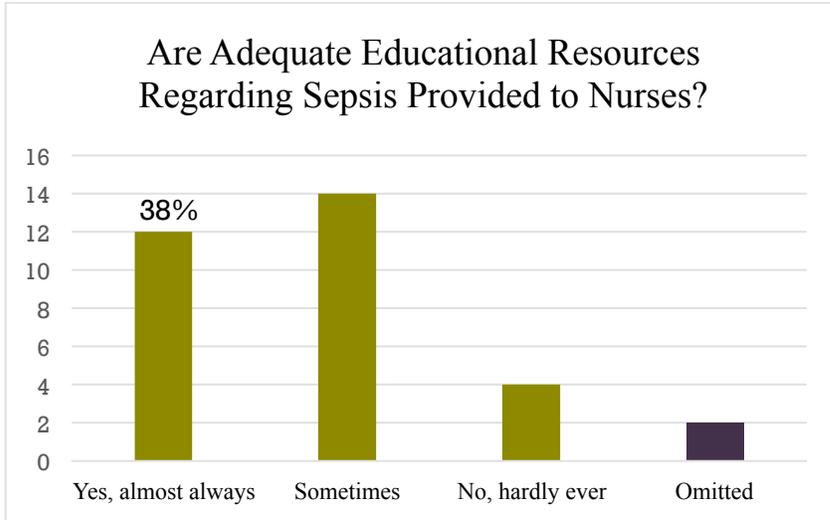


Figure 4:

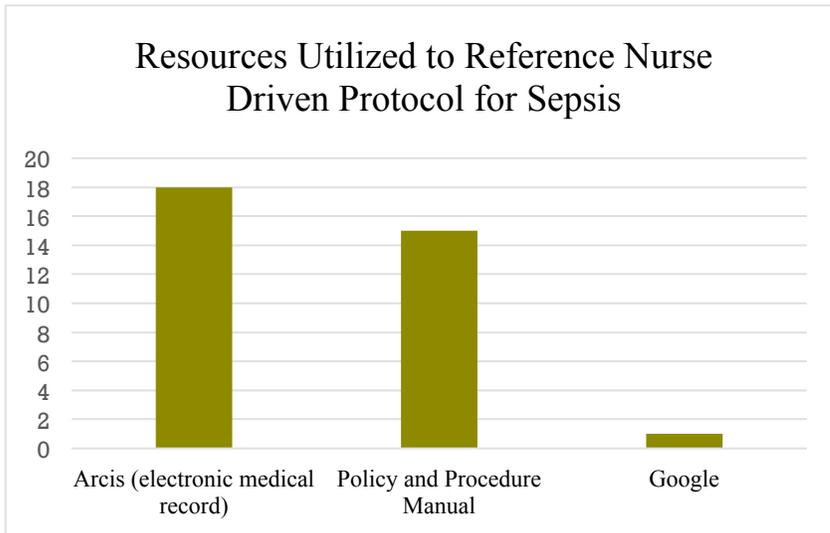
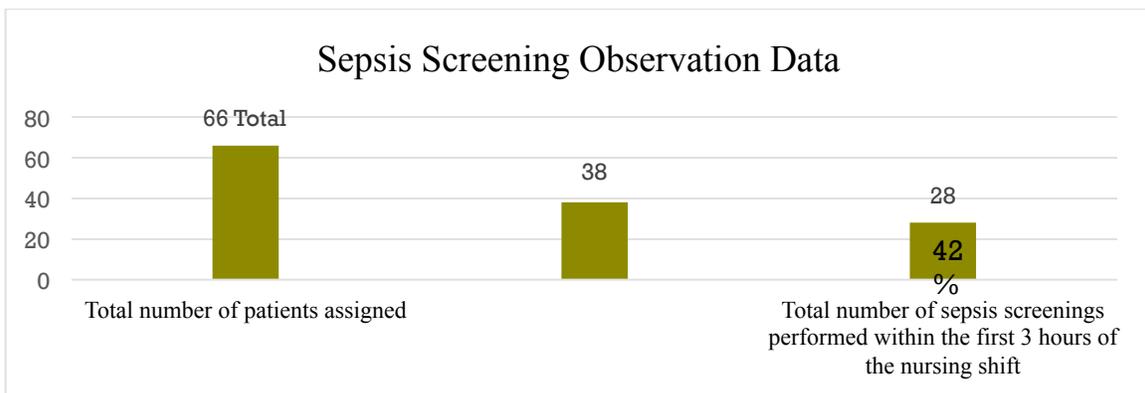


Figure 5:



2. The following graphs are data derived from the Sepsis Chart Review:

Figure 6:

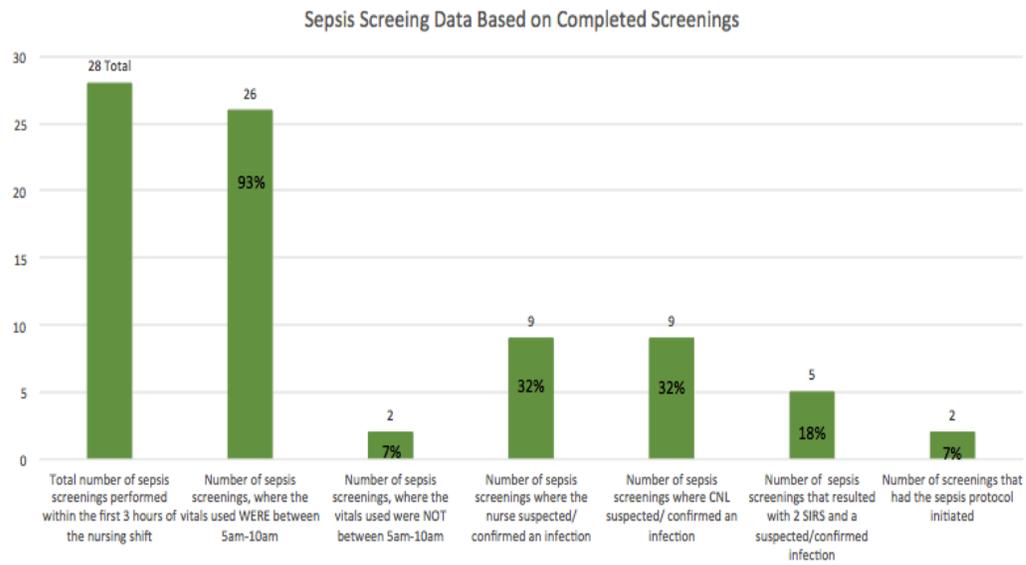
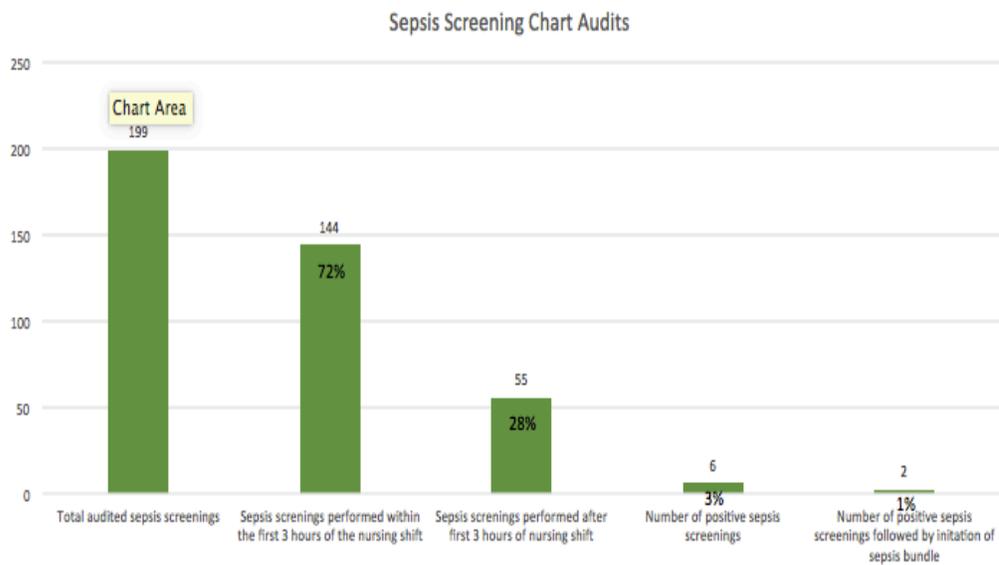


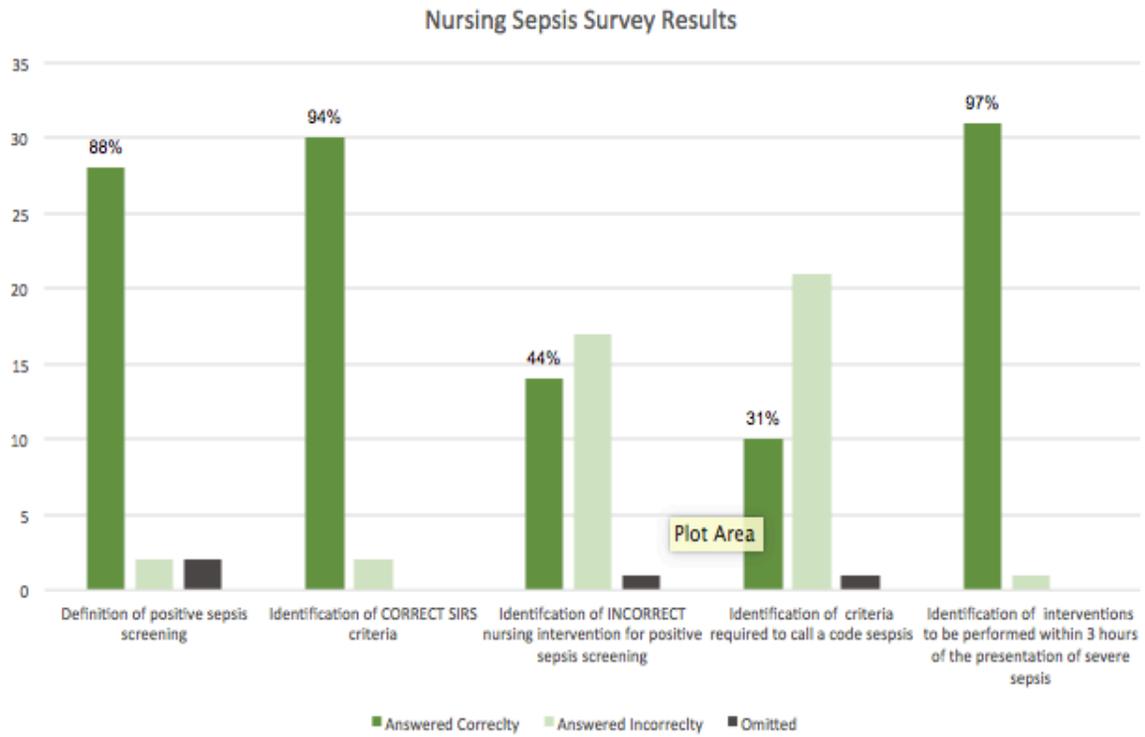
Figure 7:



3. The following graph is data obtained from the responses from the Nurses’

Questionnaire:

Figure 8:



APPENDIX F

Sepsis Protocol Badge Figure

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

<p>Nurse Driven Protocol:</p> <ul style="list-style-type: none"> • 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) 	<p>Sepsis Panel:</p> <ul style="list-style-type: none"> • 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
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