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Improving Early Sepsis Identification on Inpatient Units

Eva M. Diaz

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Abstract

Sepsis is a medical emergency resulting from an infection. Its systemic effects can quickly lead to death if it is left untreated. The condition is extremely costly in regard to human life and national healthcare costs. In an effort to combat rising rates of sepsis effective protocols must be implemented into hospitals. Assessments were performed to ascertain the level of nursing knowledge regarding sepsis criteria, treatment, and hospital protocol. A microsystem assessment was performed using the Five Ps Assessment Tool, which addresses purpose, patients, professionals, processes, and patterns. A root cause analysis (RCA) helped identify factors affecting adherence to the hospital's sepsis protocol. Nurses were observed to determine whether sepsis screenings were being performed in a timely manner. A chart review of 100 patients' sepsis screening was utilized to further assess electronic nurse documentation. Lastly Clinical Nurse Leader (CNL) students administered a nursing sepsis survey to establish nurses' baseline theory and operational knowledge of early sepsis identification and hospital protocol specifics. The results showed the majority of nurses knew the correct definition and criteria for sepsis and were performing sepsis screenings on time. Two out of six positive sepsis screening were followed with the initiation of the sepsis bundle as indicated per hospital protocol. There was a clear knowledge deficit regarding protocol following a positive sepsis screening. It is essential that nurses have a strong understanding of early sepsis identification and treatment in order to improve patient outcomes.

Keywords: sepsis, nurse-driven protocol, sepsis screening tool, early sepsis identification

Improving Early Sepsis Identification on Inpatient Units

Introduction

Sepsis is a serious and often fatal clinical syndrome, resulting from infection. The causative organism may be bacterial, viral, fungal, parasitic, and in some cases unknown. Sepsis is defined as the presence of a suspected or confirmed infection coupled with at least two systemic manifestations of infection. The systemic manifestations of infection are known as systemic inflammatory response syndrome (SIRS) and include the following criteria; fever (>100.4 F) or hypothermia (<96.8 F), tachycardia (>90), tachypnea (>20), and/or abnormal white blood cell count (<4,000 or >12,000) (Jones et al., 2015).

Sepsis has become an area of focus within the healthcare realm due to its high morbidity and mortality rates. The Centers for Disease Control and Prevention (CDC) reports that more than 1.5 million people in the United State face sepsis annually, approximately one in three patients who die in the hospital have sepsis, and at least 250,000 Americans die due to sepsis every year (CDC, 2017). The number of annual cases has been on the steady rise. If early sepsis identification and treatment is achieved it may lead to decreased morbidity and mortality rates (Novosad et al., 2016). This underscores the importance of the MSN thesis in addressing this problem.

Literature Review

A literature review was conducted using CINHAL Complete and PubMed search engine databases. Keywords included sepsis, evidence-based practice, nurse-driven, sepsis screening, and early sepsis identification. The search was furthered refined by selecting English articles published within the last five years. The literature review revealed numerous solutions but the ones with the most overwhelming support were nurse driven screening tools and protocol paired

with education. Nurses are at the patient's bedside and therefore are in a key position to identify early stage sepsis.

An observational study of community acquired severe sepsis performed by Nygard, Skrede, Langeland, & Flaatten (2017) compared intensive and non-intensive care patients. The study was conducted by performing a one year prospective observational study and followed survivors for five years. The study showed the time to first antibiotic administration was longer in intensive care unit (ICU) patients. ICU patients developed more organ dysfunction, had longer hospital stays, and higher five-year mortality rates.

A nurse-initiated emergency department sepsis protocol's impact on time to initial antibiotic administration was explored by Bruce, Maiden, Fedullo, & Kim (2015). It also assessed the compliance with the three hour Surviving Sepsis Campaign goals and identified predictors of in hospital sepsis mortality. The project utilized retrospective chart reviews, pre- and post-protocol implementation data, and multivariate logistic regression analysis. The results showed the implementation of a nurse initiated sepsis protocol improved the median time to initial antibiotic administration. Higher in hospital mortality rates were associated with vasopressor administration, respiratory dysfunction, central nervous system dysfunction, and low body weight.

The efficacy of a sepsis screening tool was assessed in a non-intensive care unit through the use of an observational study by Gyang, Shieh, Forsey, & Maggio (2015). Consecutive patients were screened over a one month period and their clinical data was retrospectively reviewed. The RNs on the unit completed the screening at the beginning of each shift using a study tool adapted from the Surviving Sepsis Campaign and Institute for Healthcare

Improvement (IHI). The study concluded that the nurse driven screening tool for sepsis can help improve early identification and treatment of sepsis.

Tedesco, Whiteman, Heuston, Swanson-Biearman, and Stephens (2017) created a project aimed at improving interprofessional collaboration to enhance sepsis care and survival. A sepsis management algorithm tool was created using the Surviving Sepsis Campaign guidelines. Unit staff, including physicians, nurses, and patient care technicians, were educated regarding sepsis identification, the three-hour bundle, bedside lactate screening, and use of the algorithm. Mortality from sepsis had a significant decrease after staff education and the implementation of the algorithm into standard care. Compliance with the three-hour bundle improved as well as identification and screening of patients with suspected sepsis.

Torsvik et al., (2016) completed a pre- and post-intervention study that investigated whether the combination of a clinical tool for triage of SIRS, an alert and treatment flow chart, and educational reinforcement, would improve in hospital survival among patients with sepsis. The key messages from the study are that early recognition and prompt management can prevent patients from progressing along the sepsis continuum. It can also decrease length of stay in the ICU and can increase 30-day survival. The implementation and training in the use of a SIRS triage combined with a patient flow chart showed improvements in the observation of all vital signs and is believed to aide nurses in the early identification of sepsis.

A project by O'Shaugnessy, Grezelka, Dontsova, & Braun-Alfano (2017) sought to facilitate the early recognition of sepsis by using a sepsis screening tool coupled with education of staff nurses. The project reached its goal of improving nursing knowledge regarding sepsis as evidenced by a 50% increase in a post-intervention survey. There was also an increased percentage of sepsis cases reported to healthcare providers and decreased time to notification. It

concluded that routine sepsis screenings and nursing education led to an improvement in early sepsis identification.

Drahnak, Hravnak, Ren, Haines, & Tuite (2016) aimed to improve sepsis care by adopting Surviving Sepsis Campaign and IHI bundles, nurse education interventions, and an electronic health record sepsis screening and documentation tool. A gap analysis was performed to determine the state of sepsis care by using a pre-and post-survey along with a retrospective chart review to assess adherence to sepsis screening, report, and treatment recommendations. The study concluded that providing nurses with current evidence paired with appropriate tools builds the foundation of an effective interprofessional organizational sepsis treatment program.

Theoretical framework

The Donabedian Healthcare Quality Triad will be used as the theoretical framework for this project. The framework focuses on the triad of structure, process, and outcome to evaluate healthcare's quality. Structure refers to the organizational and physical properties where care is rendered. Process is defined as the actual care involving patients and care providers. Outcomes are the products of changes in structures and processes (Ayanian, & Markel, 2016). This is applicable to this project because it involves the alteration of structures and modification of processes to improve early sepsis identification and therefore improve patient outcomes.

Methods

Microsystem Assessment

The project was implemented in a 384-bed hospital located in a large metropolitan city. The hospital includes eight floors with various services including a level II trauma center, emergency, obstetrics, pediatrics, behavioral health, skilled nursing, cardiovascular, and oncology. Furthermore, the hospital boasts nine operating rooms and three cardiac

catheterization labs (X). The project was carried out on several units including 2 East, 4, 5, 6, and 8. The epicenter was the sixth floor which is a medical-surgical/telemetry unit. The microsystem was evaluated using the Five Ps Assessment Tool, focusing on purpose, patients, professionals, processes, and patterns.

Purpose. The hospital's vision is to be a value driven integrated health care delivery system in unison with those who share their values of respect, caring, integrity, passion, and stewardship. They aim to promote quality, patient centered care through advocacy and health preservation of the community (X). The purpose is to implement evidence based practices to promote early sepsis identification and prompt treatment. The goal is to increase early recognition of sepsis and therefore halt its progression and sequela.

Patients. The patients observed during this project included those over 18 years old and from inpatient units including oncology, telemetry, and medical-surgical. These patients are often immunocompromised and therefore susceptible to opportunistic infections. Many patients are uninsured and therefore rely on Medi-Cal to receive care. An approximate 60% of the hospital's inpatient mix is comprised of Medi-Cal Managed Care (31%) and Medi-Cal Traditional (29%) patients (X).

Professionals. The units are typically staffed with three nurses per pod, two certified nursing assistants (CNA) per floor, and one charge nurse. The interdisciplinary teams are consisted of registered nurses, licensed vocational nurses, nurse practitioners, physicians, CNAs, respiratory therapists, occupational therapists, and physical therapists. Translators and case managers, though seldomly seen, are also part of the team.

Processes. A portion of doctor orders are written on a paper chart but others are documented into the computer. The variability is inconsistent and deciphering handwriting can

be a hindrance. The microsystem utilizes ARCIS as its electronic medical record operating software. It is important to note, that the emergency department does not use the same operating software, creating a disconnect and consequently a possibility for mistakes to occur. ARCIS currently does not utilize an algorithm to alert nurses of possible sepsis, which leaves room for human error.

Patterns. The unit uses the patient family centered care model that encourages the patient and their family to actively engage in the plan of care and delivery. This is important because the family, as a unit, plays an important role in promoting improved patient outcomes. The microsystem also revealed some detrimental patterns such as poor interdisciplinary communication and lack of educational opportunities.

Root Cause Analysis

The RCA was utilized to uncover problems affecting adherence to sepsis screenings and treatment protocol. This was done with a multifaceted systematic review of the sepsis process map, policy & procedure manual, sepsis screening tool, and charts. The data was collected by comparing the policy & procedure manual to the sepsis process map and identifying any deviations. It also included nursing observations, retrospective chart audit, and a nursing survey.

Sepsis Screening Observations. After receiving the Sepsis Committee Director's approval, the CNL students created an observational checklist (Appendix A). It was intended to evaluate nurses' timely documentation of sepsis screenings in the electronic medical record. The CNL students visited the 6th floor from 0700 to 1000. The students were usually split into two groups and assigned either a Thursday or a Friday visit. Each student was paired with a nurse and observed an average of four patients each visit. A total of 66 patients were observed. There were several limitations to the observations. The first being the risk for the Hawthorne effect, which

states that subjects of a study may alter their behavior because they know they are being observed. The second limitation was time, a longer observation period would have resulted in more accurate results. The third barrier was staff pushback, several nurses voiced their concern with having students shadow them and felt as though it caused delays in their care.

Sepsis Screening Chart Audit. An audit form (Appendix B) was created to assess staff compliance with sepsis screening and subsequent protocol for positive screenings. The CNL students were once again split into two groups and scheduled for Thursday and Friday morning visits. The students collected the data on 100 patients yielding 199 sepsis screenings for morning and evening shifts. The patients were randomly selected from a list, and their second day post admission data was collected and later analyzed. Access to ARCIS was delayed, had this not been the case the CNL students may have collected more data.

Nursing Sepsis Survey. Utilizing the hospital's policy & procedure manual, a nursing sepsis survey (Appendix C) was created to determine the nurses' level of baseline theory and operational knowledge of early sepsis recognition and protocol. The survey included ten items varying from SIRS criteria to an area for additional information. The surveys were distributed on five units during the beginning of the day and night shift. 32 surveys were collected and later analyzed.

Results

Sepsis Screening Observation

The CNL students completed sepsis screening observations by shadowing a nurse and noting their documentation for the first three hours of the nursing shift. The results of the sepsis screening observation showed that out of the total 66 patients observed by CNL students only 28 patients (42%) had sepsis screenings completed within the first three hours of the nursing shift

while the other 38 patients (58%) did not (Figure F1). Out of the 28 patients with completed sepsis screenings 26 were assessed utilizing vitals between 0500 and 1000, leaving two patients assessed with vitals outside of this parameter. The CNL students and nurses suspected infections from the completed 28 sepsis screenings at an equal rate of 32%. There were five positive sepsis screenings, of which, only two were followed by the initiation of the sepsis protocol (Figure F2)

Sepsis Screening Chart Audit

The retrospective sepsis screening chart audit was conducted by reviewing the EMR charts of 100 patients. Utilizing the day and night shift sepsis screenings a total of 199 screenings were reviewed. The results (Figure G1) found that 72% of the screenings were performed within the first three hours of the nursing shift. There was a total of six positives sepsis screenings but only two were followed by the initiation of the sepsis bundle.

Nursing Sepsis Survey

The nursing sepsis survey was developed to assess the baseline knowledge of early sepsis identification and hospital protocol. The results show that 88% of the surveyed nurses correctly identified the definition of a positive sepsis screening and 94% were able to identify SIRS criteria. 53% of nurses were unable to identify the incorrect nursing interventions for a positive sepsis screening. 66% of nurses could not identify the criteria required for a code sepsis. 97% correctly identified the interventions to be performed within three hours of the presentation of severe sepsis (Figure H1).

The majority of nurses (50%) responded that abnormal vital signs were almost always reported to them in a timely manner, while 41% answered with sometimes, 3% responded hardly ever, and the rest omitted the question (Figure H2). 38% of nurses felt that adequate educational

resources regarding sepsis were almost always provided to nursing, 44% felt resources were provided sometimes, and 12% responded with hardly ever (Figure H3).

The greatest contributors to delays in treatment of sepsis were lab delays, knowledge deficit regarding appropriate treatment, lack of recognition of potential sepsis in triage, followed by a delay in diagnosis of sepsis, lack of necessary equipment, and nursing delays (Figure H4). Lastly, the hospital's electronic medical record was found to be the most utilized resource to reference nurse driven protocol for sepsis followed by the policy & procedure manual. Google was found to be seldomly used for this purpose (Figure H5).

Implementation

This project's primary goal was to improve early identification of sepsis by assessing gaps in care, providing educational resources, conducting chart audits, and updating existing materials. The RCA findings included an incongruence between the policy & procedure manual and the sepsis process map, a knowledge deficit regarding positive sepsis screening protocol, and a lack of sepsis screening adherence.

The intended purpose of the sepsis process map is to serve as an easy to use guide for sepsis identification and interventions. Several inconsistencies were identified during a careful comparison of the hospital's policy & procedure manual and the sepsis process map. The subject was discussed with the Sepsis Committee Director and the discrepancies were attributed to a time and resource constraint. The sepsis process map was updated to reflect the policy & procedure manual. Additional changes were made to increase clarity and aesthetics. The updated sepsis process maps (Appendix D) are to be printed and distributed amongst the inpatient units and placed in areas with high visibility. The CNL students also created a sepsis protocol badge

(Appendix E) to be worn by all nursing staff and referenced as needed. The badge lists SIRS criteria, nurse driven protocol, and the components of a sepsis panel.

The CNL students recommend an annual educational session for nurses to address knowledge deficits pertaining to sepsis. The educational session would be one hour long and cover topics such sepsis pathophysiology, SIRS criteria, and protocol. A PowerPoint presentation along with audiovisual components would be utilized to address different learning styles. The session is to be led by CNL students to allow for evaluation of any needed changes in learning objectives, materials, or environment.

Lastly, it is recommended to appoint a SIRS/sepsis unit champion to help identify and treat patients with SIRS and/or sepsis. The nurse chosen for the role must have significant experience with sepsis. Furthermore, the unit champion may act as a resource for other nurses as it pertains to sepsis. In addition to the unit champion, designated staff will be chosen to perform randomized sepsis screening audits to determine compliance and identify barriers.

Cost Analysis

The 2013 Healthcare Cost and Utilization Project found sepsis to be the most expensive condition to treat in the U.S. While sepsis is responsible for 3.6% of hospital stays, it accounts for $23.7 billion of the aggregate costs for all hospitalizations which equates to 6.2% of national costs (Torio & Moore, 2016). The average expense associated with sepsis is $18,000 per stay, in contrast other conditions average around $10,000 (Torio & Moore, 2016). The project hospital's Sepsis Committee Director estimates that the hospital sees 23 to 31 patients with sepsis per week on average. This translates to an estimated 1,176 to 1,584 patients per year. Using the aforementioned figures the annual spending for the care of sepsis patients is approximately $21-28 million.

The CDC reported an average length of stay (LOS) of 8.5 days for patients with sepsis (2017). Reducing the total average LOS by 0.5 days per patient would save the hospital an estimated $1.2 million to $1.7 million annually, or an average of $1.45 million. With an increased sepsis awareness amongst nurses, a hypothesized 1% reduction in sepsis patients would reduce cases from 12 to 16 patients annually. This would result in the annual savings of $216,000 to $288,000, or an average of $252,000.

TABLE 1 Estimated Costs for Materials and Labor for First Year

Materials and Labor	First Year Costs
32 RN Wages @ $45/hour	$1,440
Paper/Lamination Services	$22.00
Total	$1,462

TABLE 2 Cost Benefit Analysis

	2017
Total Annual Cost	-$1,462
Benefits	
Reduction in length of stay	$1,450,000
Reduction of sepsis patients	$252,000
Total Benefit	$1,702,000

Net Benefits	**$1,700,538**
Benefit-cost (B/C) Ratio:	$1,164

The estimated cost for the project's startup (Table 1), including materials and labor, is $1,462. The biggest expenses are RN wages at an average of $45 hour for 32 nurses to attend the annual training. The figure also includes the cost for paper and lamination services for the sepsis process maps and sepsis protocol badge cards, which is an estimated $22. The half day decreased length of stay and the 1% reduction in sepsis patients results in net benefits of $1,700,538. A cost benefit analysis (Table 2) shows that for every dollar spent on the project there will be an estimated savings of $1,164.

Evaluation

Project evaluation is imperative to determine the program's effectiveness following the completion of interventions. Evaluation of this project will be guided using a modified Roberta Straessle Abruzzese (RSA) evaluation model, focusing on four types of evaluation in relation to one another. The four types of evaluation include process, content, outcome, and impact (Bastable, 2014). The process evaluation will be conducted by assessing for needed adjustments in materials, learning objectives, and student educators as the project is being implemented. This will help prevent problems before they occur and identify issues as they arise. Content evaluation will be performed to determine whether the participants have acquired the knowledge taught during the learning activity. The nursing sepsis survey will be readministered immediately after the training. The newly acquired information will then be compared with baseline data to evaluate the change in knowledge and opinion. In addition, following the introduction of the sepsis process map, audits will be performed to evaluate staff compliance. The outcome of the project will be evaluated by administering the nursing sepsis survey three months after the

training and compared with baseline data to measure the level of change that persists. Lastly, the impact of the project will be evaluated to determine the relative effects on the institution. 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.

Discussion

The results of the sepsis screening observations showed that the majority of nurses did not complete the sepsis screenings during the designated time of 0700 to 1000. Some nurses noted it was due to a time constraint because those are their busiest hours. However, when retrospectively reviewing sepsis screenings during the chart audit, it was found that the majority of screenings were being charted on time. This is a major discrepancy that may indicate the use of time stamping to make sepsis screenings appear as if they were completed on time. Although, it may also signify that nurses are completing a mental sepsis screening and are documenting it when time permits.

The administration of the nursing sepsis survey was met with several difficulties. The survey was originally a ten-item questionnaire with five select all that apply questions. It was met with very low participation because the select all that apply questions were time consuming and unpopular amongst the nurses. The survey was reformatted by converting the five select all that apply questions into multiple choice questions. Participation significantly increased after this change but remained a major barrier throughout the course of the project. Limited time and participation resulted in 32 completed surveys, which is not a significant sample size. A larger sample size may have provided more accurate results and representation.

Nursing Relevance

Nurses are at the forefront of care because they have the most interaction with patients. They are in a key position to recognize sepsis and begin prompt management that may prevent patients from deteriorating. It essential that a nurse possesses the ability to assess a patient's vitals and physical condition to promote early detection of sepsis. However, it is also imperative that a nurse adheres to the protocol and does so in a timely manner. The sepsis screening observation revealed that several nurses were performing the assessments correctly but were not following through with the correct interventions. The sepsis screening provides the option to dismiss the initiation of the sepsis bundle after a positive screening. This was the case on several occasions, and therefore those patients did not receive prompt intervention to manage their condition. The observations were performed from 07000 to 1000, thus it is possible that those patients may have received treatment after that time frame but it is also possible that they did not receive any treatment at all. The identification of this gap allows for improvements to the nursing role as it pertains to sepsis. The contribution of this project aims to bring further awareness of the importance of timely screening and prompt management.

CNL Relevance

The CNL assumes responsibility for a specific group of patients through the application of research based information to design, implement, and evaluate plans of care. They not only provide and manage care but they also promote lateral integration of care services, which is vital for this project. The CNL competencies that closely relate to this project include quality improvement and safety as well as informatics and healthcare technologies (AACN, 2013).

Quality improvement and safety requires the use of performance measures to assess and improve the delivery of evidence based practices that promote outcomes indicative of a high

value care. A microsystem assessment identifies the context for problem identification and action (AACN, 2013). This quality improvement project closely aligns to this competency because performance measures alerted the Sepsis Committee Director of a problem, which then prompted him to enlist the help of CNL students to address the issue. The RCA guided the development of an action plan to promote the highest quality of care. The competency of informatics and healthcare technologies involves the use of technology and information systems to facilitate the data collection, analysis and dissemination (AACN, 2013). This was performed when conducting the sepsis chart review to obtain the data for the project.

Future Directions

An in depth look at the microsystem may be the right move for future students. This would call for longer stays on the unit to get a more comprehensive look at factors affecting sepsis screenings. Nursing interviews could also help obtain qualitative data that may not be discovered during observations, chart audits, or surveying. Overall, a larger sample size and more time would help ensure the findings are representative of the sample.

Now that the gaps in knowledge have been identified the next step is for the CNL students to create an educational module for the annual trainings. At the moment, it is planned as an in-person session but may be adjusted to meet individual needs. It may change to include a simulation component to help nurses obtain further experience. Furthermore, the CNL students may appoint a sepsis champion on each unit to help expand and promote the project. The next step includes finding nurses who are the right fit for the role.

Conclusion

This quality improvement project encountered several challenges but managed to progress and ultimately build a foundation that future CNL students can utilize to champion for

improved patient outcomes. Several major issues were identified but with additional time and resources this project has the potential to thrive and create long lasting change within the microsystem and beyond. CNL involvement potentiates the impact because they have a different vantage point that allows for a unique contribution to the project.

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(X). *The references that can identify the hospital were purposely omitted to protect the privacy of the institution where this work has been conducted.*

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

Nursing 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?

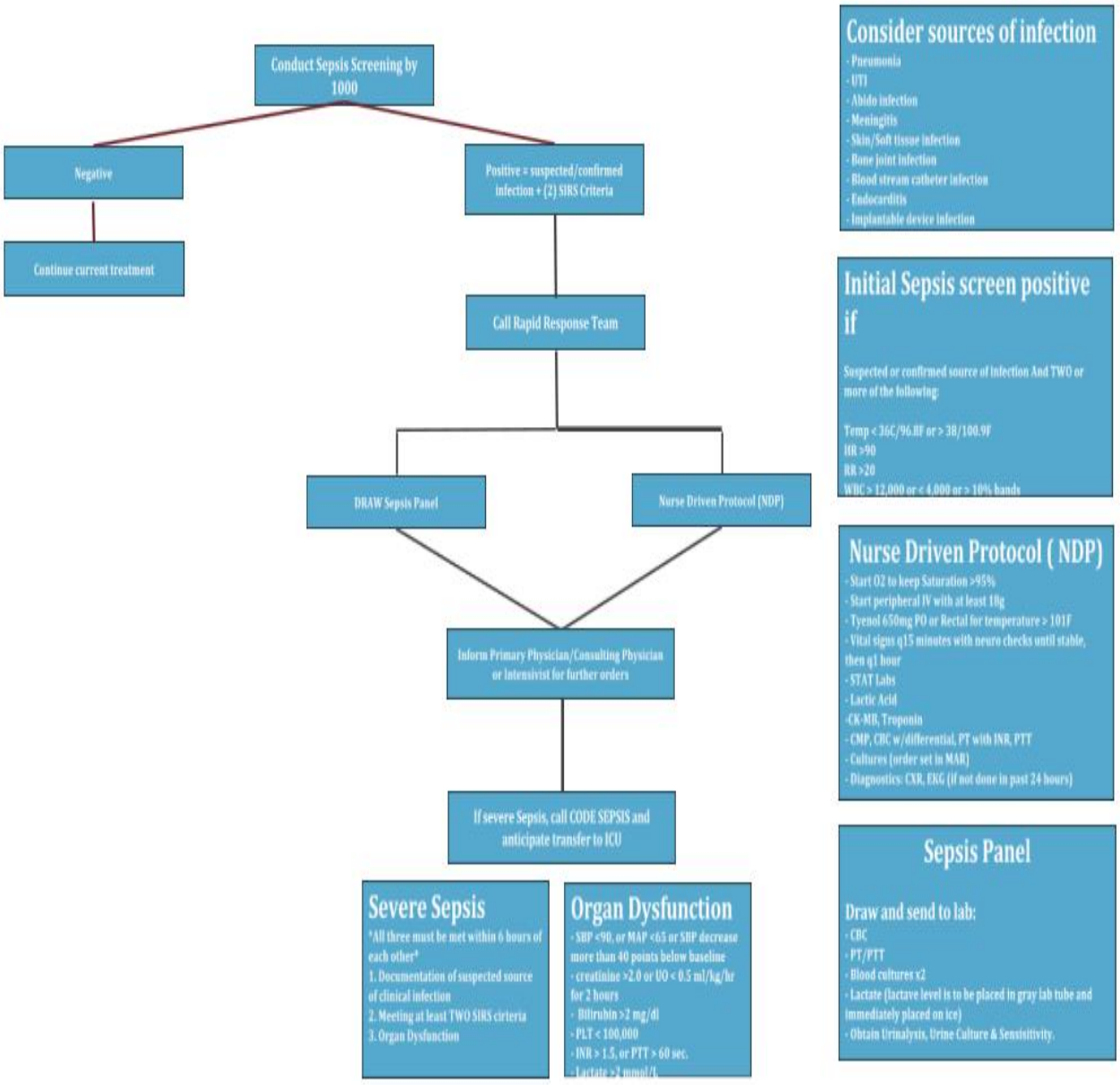
a. Arcis (electronic medical record)
b. Policy and Procedure Manual
c. Google

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

_____
_____

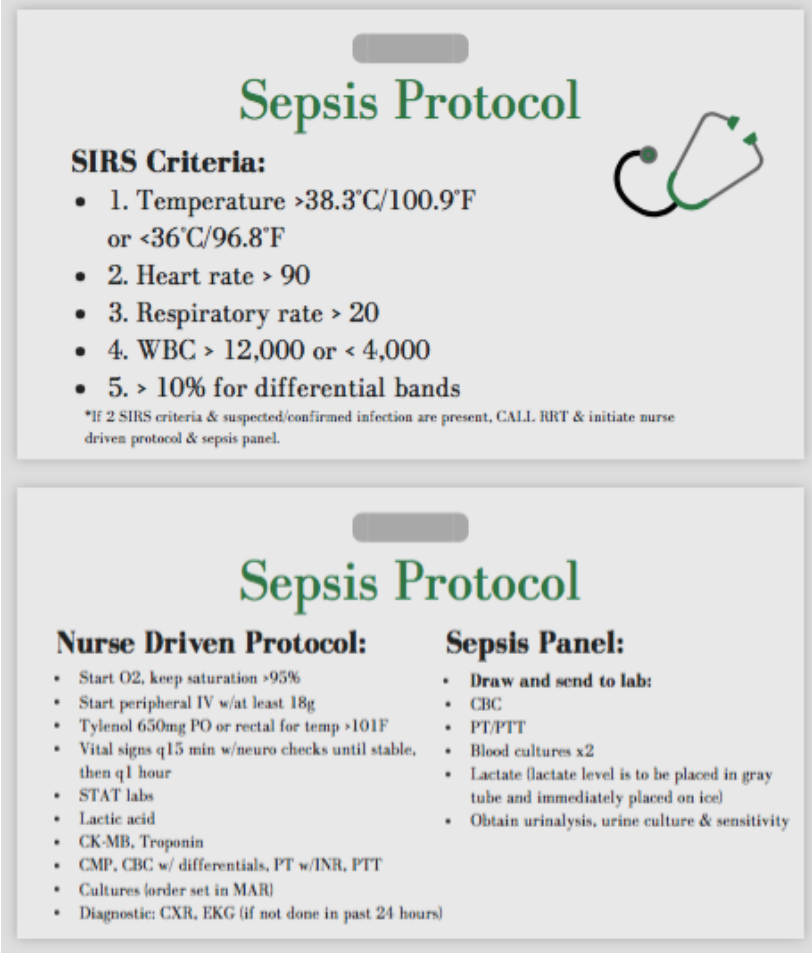
APPENDIX D

Sepsis Process Map



APPENDIX E

Sepsis Protocol Badge



APPENDIX F

Sepsis Screening Observations Results

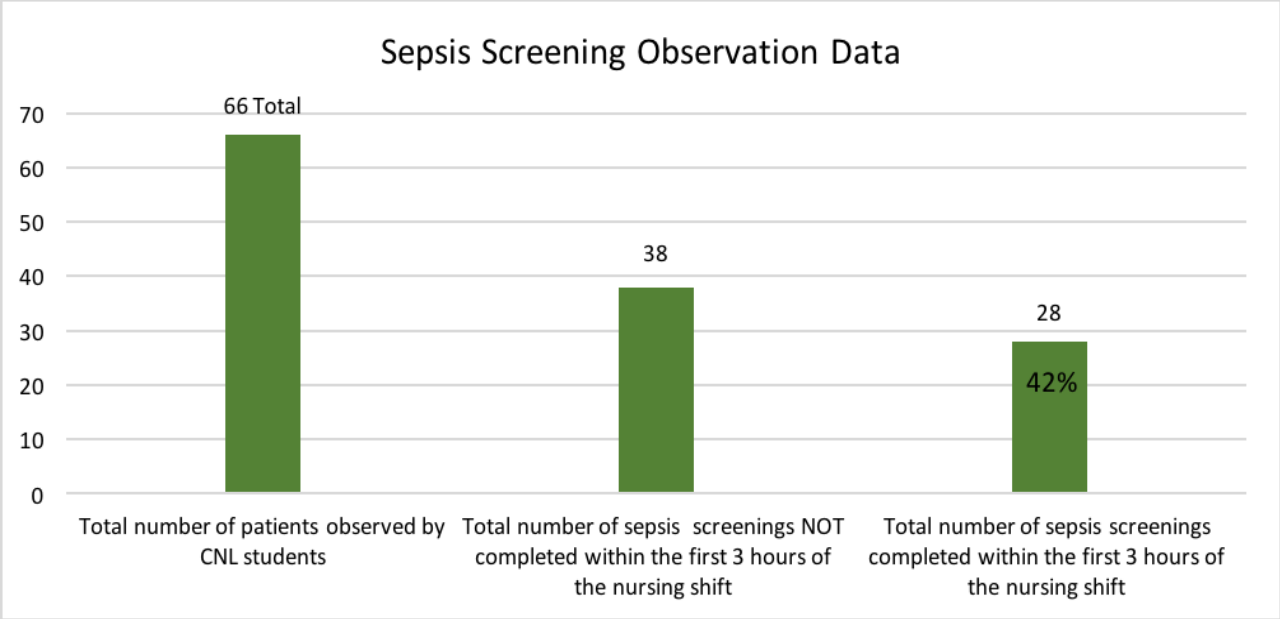


Figure F1.

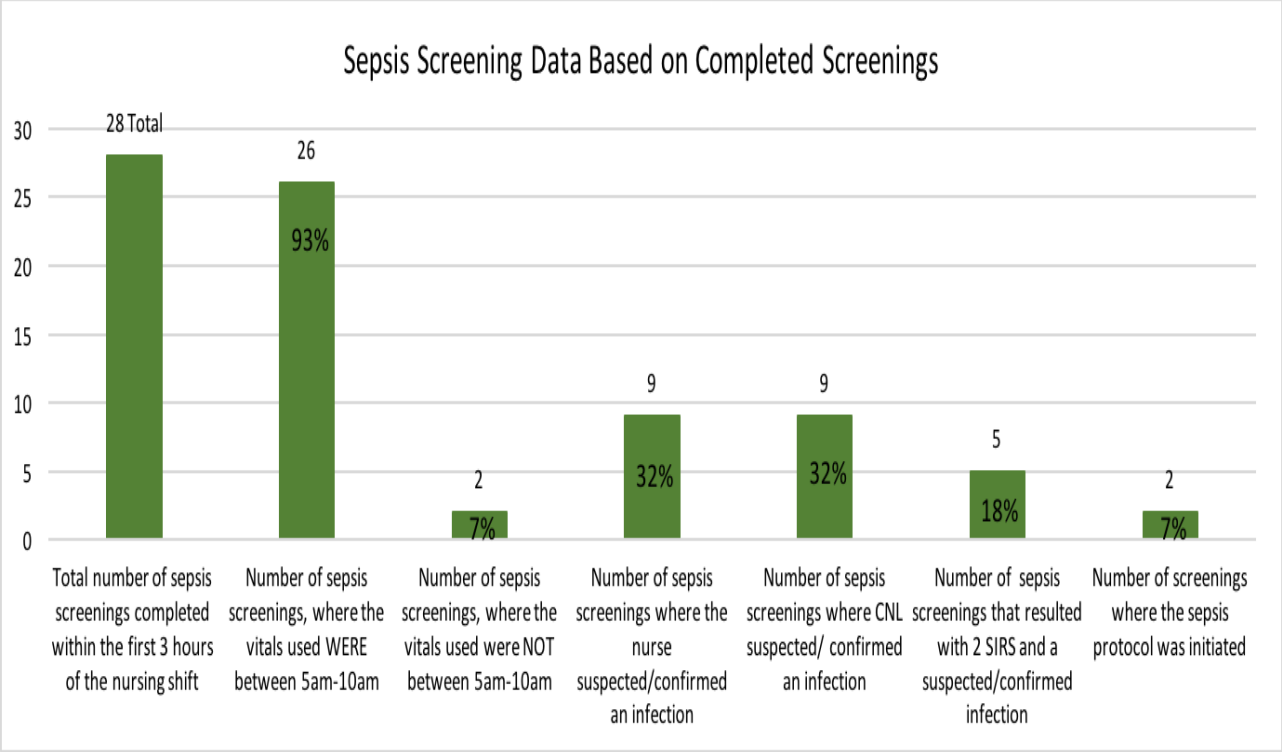


Figure F2.

APPENDIX G

Sepsis Screening Chart Audit Results

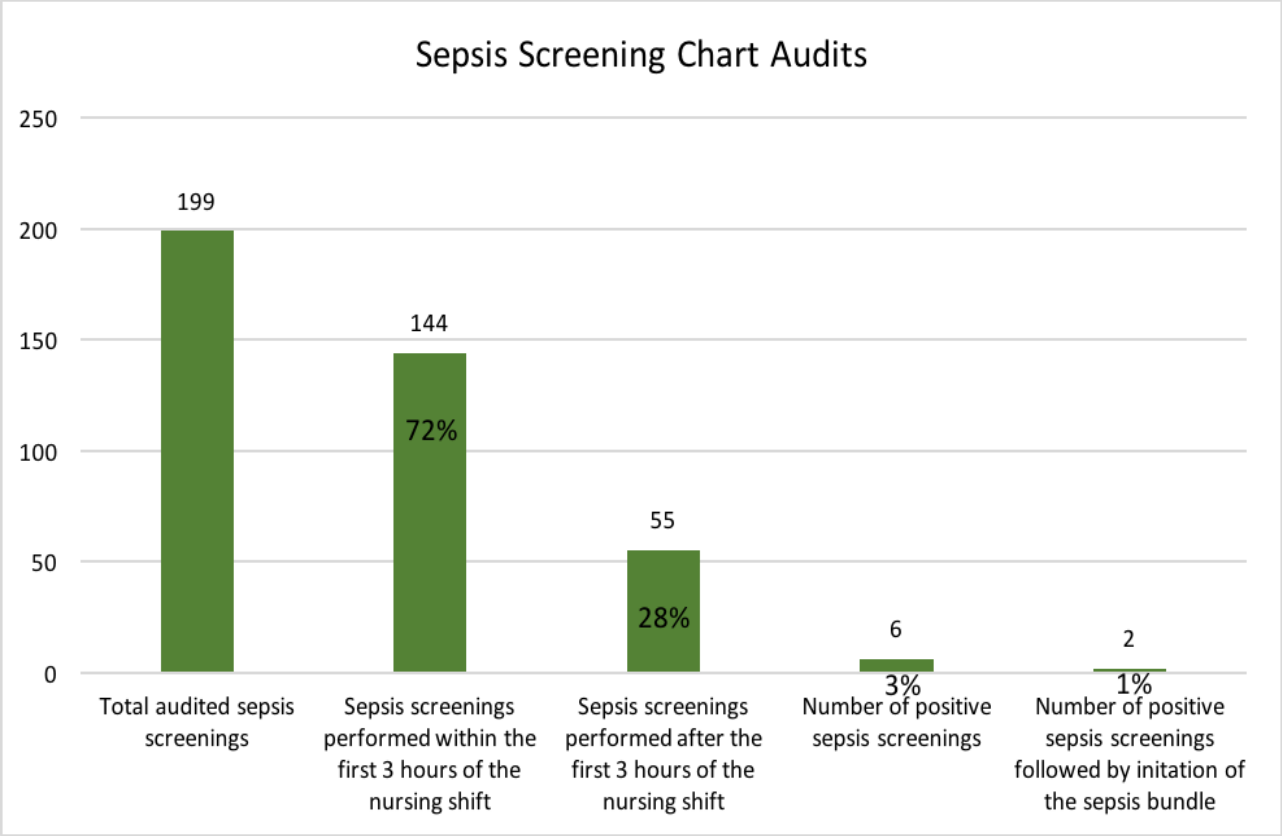


Figure G1.

APPENDIX H

Nursing Sepsis Survey Results

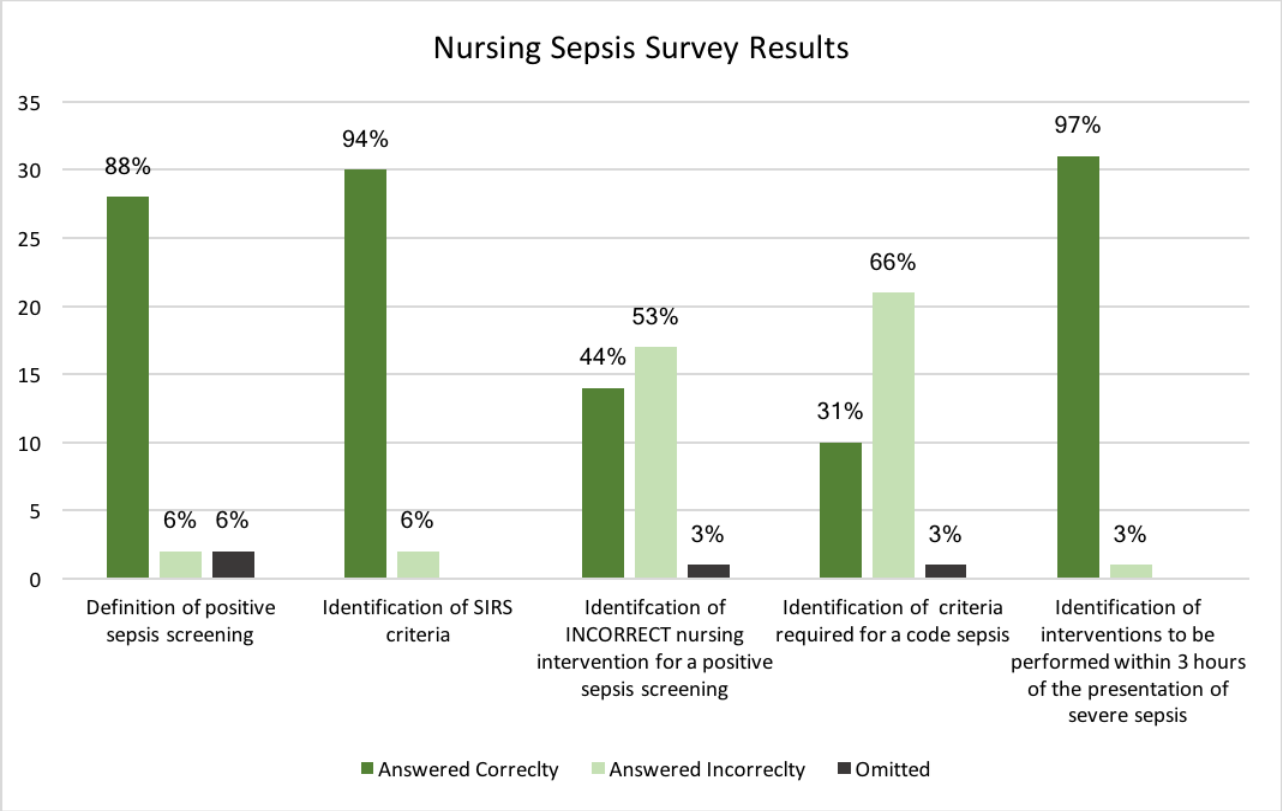


Figure H1.

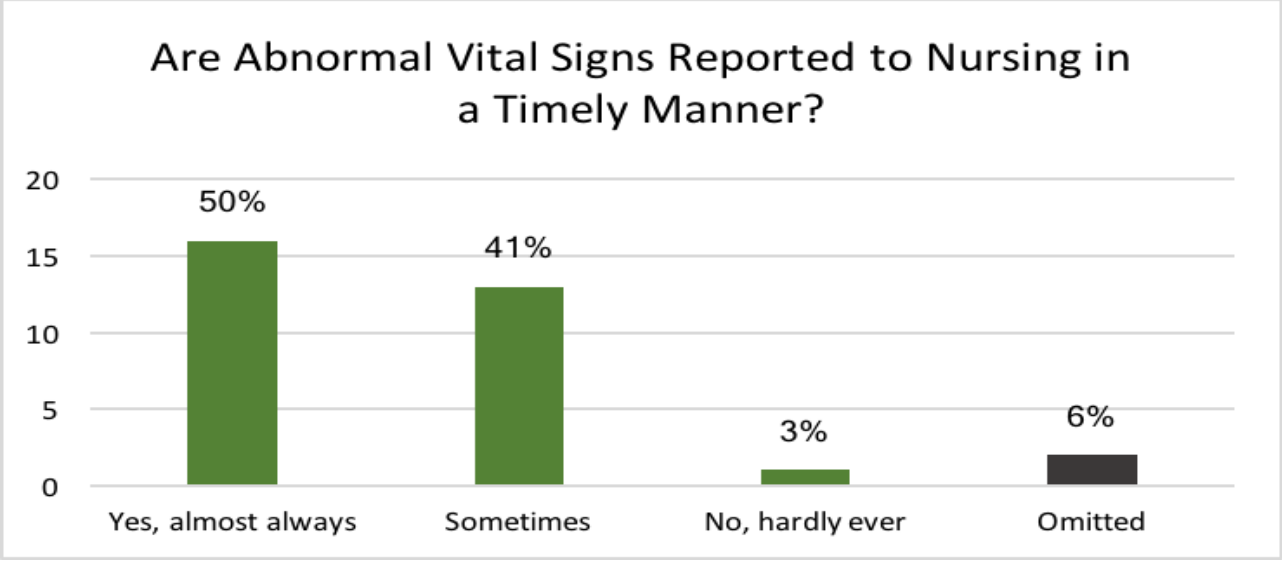


Figure H2.

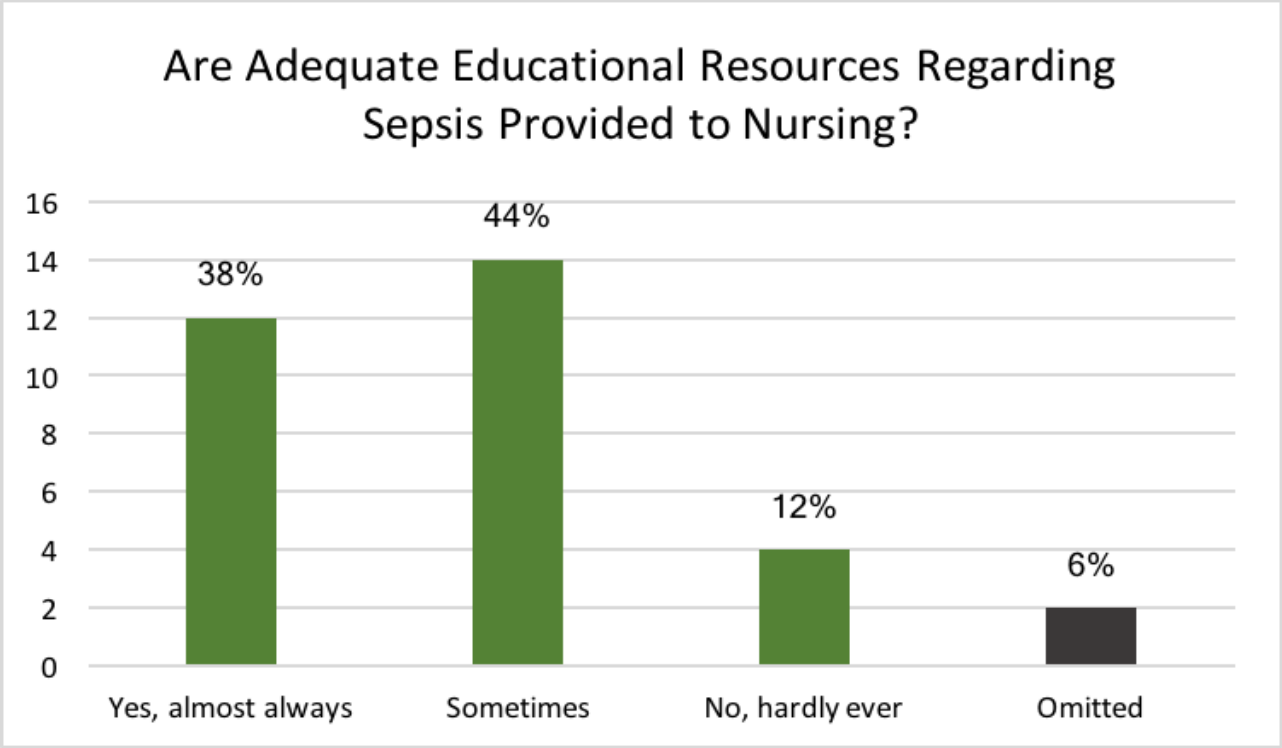


Figure H3.

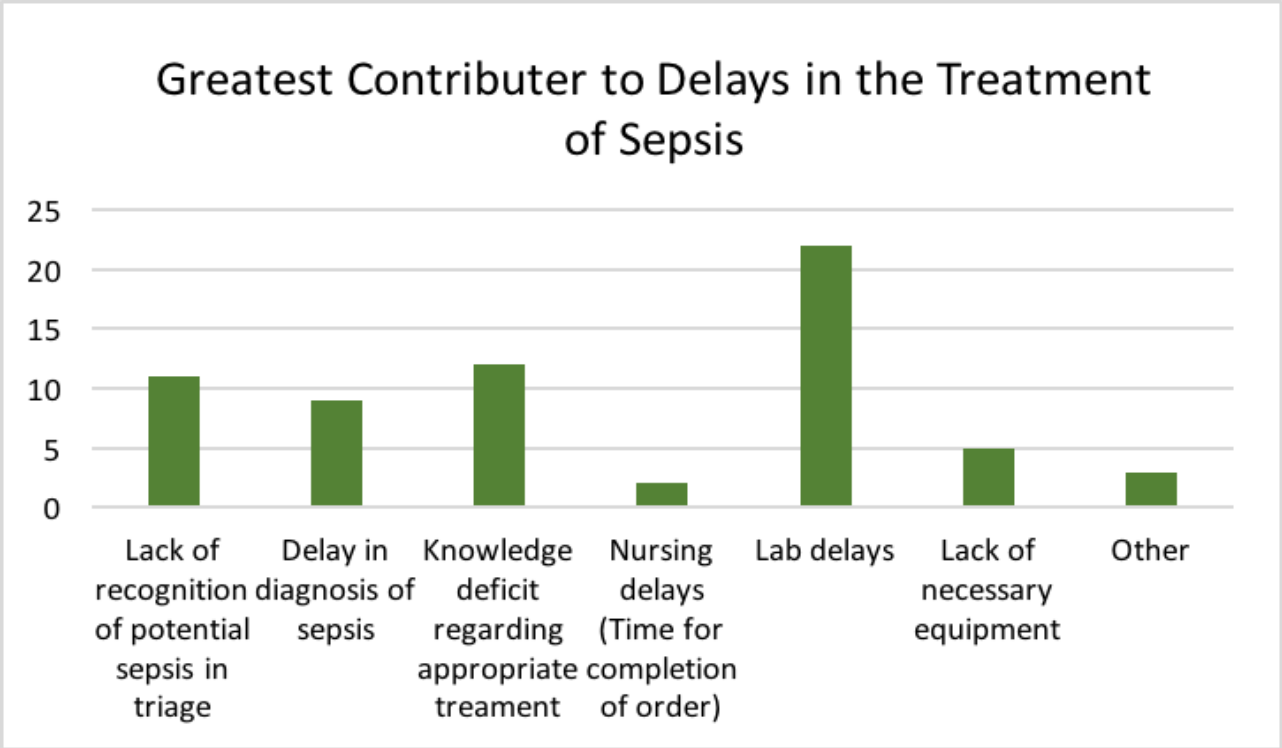


Figure H4.

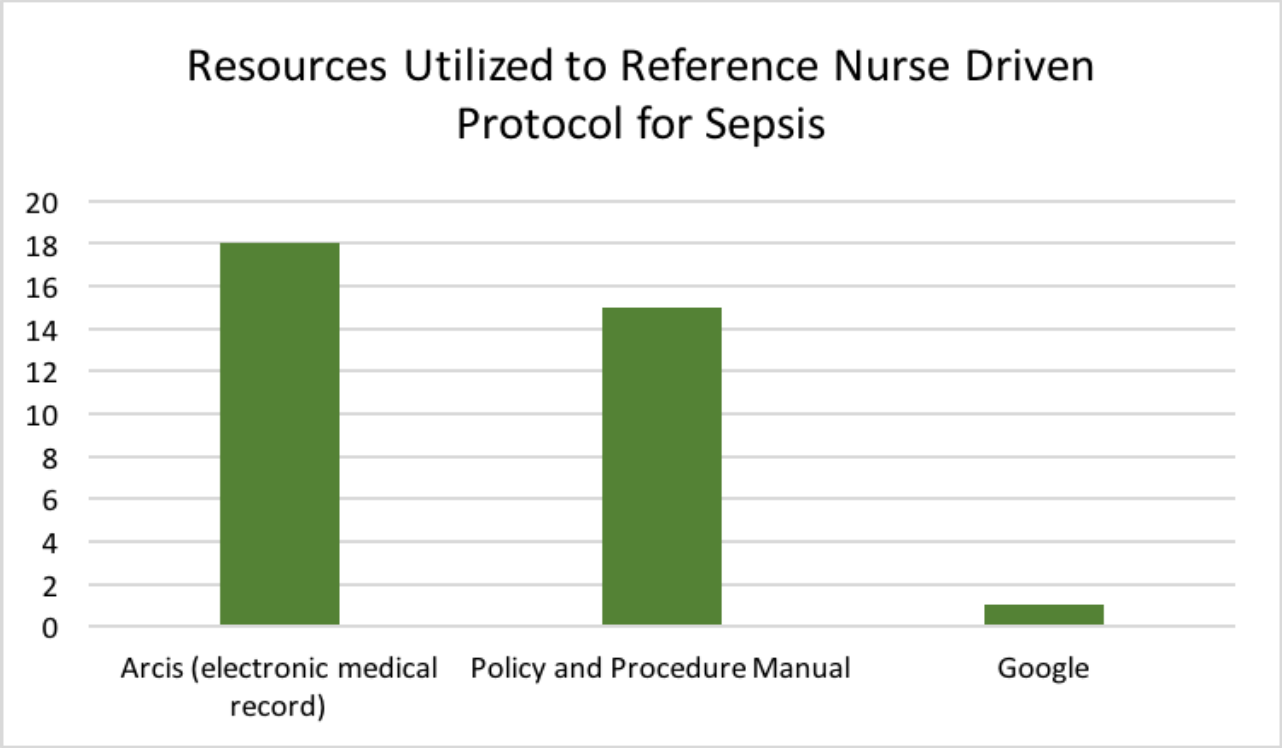

Resources Utilized to Reference Nurse Driven Protocol for Sepsis
20
18
16
14
12
10
8
6
4
2
0
Arcis (electronic medical record)
Policy and Procedure Manual
Google

Figure H5.