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Stephanie Senda
stephanie.senda@yahoo.com

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Improving Early Sepsis Identification

Stephanie Senda

University of San Francisco

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. Accounting for high morbidity and mortality rates in the United States, sepsis has become an area of focus within the healthcare spectrum as it is frequently unrecognized and undertreated. The focus of this project is for the Clinical Nurse Leader (CNL) students to evaluate the policies and processes in place within a large metropolitan hospital as well as the hospital's ability to recognize and treat sepsis in a timely manner. The hospital was first assessed with the use of the 5 P's assessment tool: purpose, patients, professionals, processes, and patterns. Once the assessment tool was completed, the students then conducted a root cause analysis, which helped them identify any issues with compliance in completing the sepsis screening tool, contributing factors in the delay of identification and treatment of sepsis, and discrepancies within the hospital sepsis policies and algorithms. The root cause analysis included student-to-nurse observations, retrospective chart reviews, and nursing sepsis surveys. Upon the conclusion of the root cause analysis, the students then assessed their data. The data resulted with the sepsis screening tool being completed within the nurses' first three hours on the clock at 42% during the student-to-nurse observation and 72% of the time during the chart audits. The students discovered that this discrepancy could have resulted due to the nurses manually inputting and altering the time they actually conducted the sepsis screening tool within the electronic medical record. The nursing sepsis survey data indicated that 88% of the nurses knew the definition of a positive sepsis screening and that 94% of the nurses were able to identify the correct systemic inflammatory response syndrome (SIRS) criteria.

Upon analysis the data, the CNL students developed an implementation plan to help improve the hospitals early identification and treatment of sepsis. The plan encompassed the implementation of annual sepsis education session, the implementation of sepsis protocol badge cards, the revised process map, and the unit sepsis champions. Overall, the students were able to develop a full understanding of what the CNL leadership role entails and how it encompasses the competencies that support quality improvement projects.

Improving Early Sepsis Identification

Introduction

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. Accounting for high morbidity and mortality rates in the United States, sepsis has become an area of focus within the healthcare spectrum as it is frequently unrecognized and undertreated. 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). If sepsis is identified early and treated aggressively, morbidity and mortality rates will be reduced and improved patient outcomes can be achieved (Novosad et al., 2016). Therefore, it is imperative for the clinical nurse leader (CNL) students, within this quality improvement project, to assess the healthcare professional's understanding and implementation of the sepsis protocol, as well as its effectiveness within a large metropolitan hospital.

With the use of a survey questionnaire, clinical nursing practices will be evaluated. 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 core

measures set by the Centers for Medicare and Medicaid Services (CMS), will help facilitate the early identification and appropriate treatment of sepsis within this hospital setting.

Literature Review

To ensure thorough research was conducted for the topic of sepsis, the benefits of identifying it early and its burden on society, peer reviewed journals were searched through the Fusion, CINAHL Complete and PubMed databases. For all three databases, the phrase “sepsis early identification” was searched, publication dates were set for 2012-2017 and the box was checked with peer reviewed journals. The Fusion database resulted with 1,410 peer reviewed journals. The CINAHL Complete database resulted with 23 peer reviewed journals. The PubMed database resulted with 35 peer reviewed journals. Next, the phrase “early recognition of sepsis” was searched in all three databases, publication dates were set for 2012-2017 and the box was checked off for peer reviewed journals. The Fusion database resulted with 1,009 peer reviewed journals. The CINAHL Complete database resulted with 79 peer reviewed journals. The PubMed database resulted with 42 peer reviewed journals. After reviewing all three databases and an extensive number of journals, ten of the most relevant articles were selected for the purpose of this project. The articles were shared with the group members involved in the project. Additional research was conducted through the websites pertaining to the Centers for Disease Control and Preventions, the Surviving Sepsis Campaign, and the Centers for Medicare and Medicaid Services.

Methods

Microsystem Assessment

The large 384-bed metropolitan hospital which was assessed is located in Lynwood California, and had been serving the Southeast Los Angeles area for 72 years. It was first

established by a charity health system in 1945, but due to financial misfortunes that the hospital faced over the years, the operations of the hospital were allocated to a new healthcare system in December of 2015. Under the management of the new healthcare system, the hospital continues as a non-profit hospital, however the plan is for it to evolve into a for-profit hospital within the next 5 years. The hospital is approved as a level II trauma center, which also provides emergency, intensive care, pediatric, obstetrics, cardiovascular, oncology, behavioral health/mental health and skilled nursing care services. Since the hospital's adoption into the new healthcare system, they welcomed many new executive leaders and directors, including a new president and chief executive officer, a new chief nursing officer and a new director of critical care, to mention a few.

Purpose

The hospital's new healthcare system has dedicated its efforts toward restoring the hospital's service for its community with a newly-developed mission and vision statement. As stated on the hospital's web page, the mission and vision statements read, "[The hospital] is dedicated to serving the healthcare needs of the communities of Southeast Los Angeles. Our vision is to be a values-driven integrated health care delivery system in collaboration with those who share our values" (X). Along with the mission and vision statement, the new healthcare system has also developed a new slogan for the hospital, "Together in Health" (X). This slogan emphasizes togetherness, as the hospital strives to create a healthier community that works "side-by-side with patients, family, community members and local leaders" (X).

Patients

Serving a population of about 1.6 million individuals, the hospital is licensed for 384-beds. Of the population served by the hospital, 56.82% are Hispanics, 15.38% are Whites and

12.5% are African-American (X). 30.44% of the patients served are between the ages of 15-34 years old and 24.52% of the patients served are between the ages of 45-64 years old. 81.5% of the households serviced by the hospital speak Spanish, signifying that the hospital is located within a predominantly Spanish speaking community. The hospital obtains the largest portion of their reimbursements from Medi-Cal, Medicare and Los Angeles County at 76.1% (X).

Professionals

For this project, the hospital's five inpatient units were assessed. It was evident that those units would not be fully functioning without the certified nursing assistants, nursing students, registered nurses, case managers, social workers, occupational therapist, speech therapist, physical therapist, nutritionist, phlebotomist, a vascular assess team, a rapid response team, and the team of physicians. All of these individuals and teams were present to provide care for the patient on all five of the hospital inpatient units. For the five floors that this project focused on, the registered nurse-to-patient ratio was one nurse for every four to six patients. The nursing assignments varied due to the hospital's census as well as the varied patient conditions.

Processes

In order to provide patients with excellent care, the hospital follows the patient-family-centered care (PFCC) model. The PFCC model encompasses the idea that optimal care can be provided to patients by developing efficient and effective communication between the healthcare interdisciplinary team, the patient and the patient's family members. In order to follow the PFCC model, the healthcare professionals are to understand and respect every patient's "cultural traditions, their personal preferences and values, their family situations and their lifestyles" ("Our Approach Patient-and Family-Centered Care," n.d.). The interdisciplinary team is

expected to keep every patient and their family members involved by discussing choices and options regarding the patient's care. By including patients and their families, the interdisciplinary team will be able to provide dignity and respect, discuss important information, obtain participation and achieve collaboration. This model guides the healthcare team towards patient care excellence, as it leads them to discover key concepts that influence the patient's overall well-being.

Patterns

Communication techniques are of concern within this large metropolitan hospital as the nursing team lacks a concrete communication process. The nurses conduct informal, disorganized patient hand off reporting at the beginning of a new shift. Nurses rush through the delivery of their hand off, leaving the incoming nurses with many questions regarding their patients. The units do not host department huddles upon the commencement of a new shift, eliminating the opportunity for the oncoming nurses to obtain important information about the unit and the patients within it. Another issue that arises in regard to communication is that the director of critical care would like for the sepsis screening tool to be completed within the first three hours of a nurse's shift. The nurses are unaware of this expectation set by the director of critical care. Also, that expectation not stated within the hospital's Sepsis Administrative Manual or the sepsis algorithms.

Root Cause Analysis

Upon meeting with critical care director, who is also the director of the sepsis committee and the point of contact for the Clinical Nurse Leader (CNL) students working on this project, it was stated that the sepsis protocol is not followed as efficiently by the care providers on the acute floors, as it is followed by the care providers within hospital's ED and ICU floors. The

director of critical care expressed that many times nurses on the acute floors do not know when to transfer septic patients to the ICU or that they simply do not identify sepsis early enough.

Moving forward, a root cause analysis was created to assess the sepsis protocol implementation, barriers, and efficiency upon the acute floors. First, the sepsis protocol and algorithms were reviewed for consistency, accuracy, and feasibility. In order to assess for accuracy, the protocol was compared to the latest guidelines set by the Surviving Sepsis Campaign (SSC) and the latest core measures for sepsis set by the Centers for Medicare and Medicaid Services (CMS). Consistency was then measures by assessing the different versions and types of sepsis literature that the hospital had available for the care providers. Feasibility was then assessed by determining the ease in understanding and following of the different publications of literatures the hospital had available in regard to sepsis. Lastly, three different data collecting methods were used to assess the nurse's clinical knowledge of sepsis and their understanding of the hospitals sepsis protocol. This was done through student-to-nurse observations, retrospective chart reviews, and nursing sepsis surveys.

Time Motion Study

As part of the root cause analysis, a time motion study was conducted. With permission from the critical care director, each student nurse (10) was paired with an on-shift nurse on the telemetry unit. The student nurses created a document titled, "Sepsis Screening Observation Checklist," to help them track and evaluate the nurse's documentation on the sepsis screening tool, which is embedded within the hospital's electronic medical record system (EMR), Arcis (See Appendix B for Sepsis Observational Checklist). The CNL students assessed the completion of the sepsis screening, the steps the nurse took in conducting the screening, which vitals the nurse referred to when documenting in the screening, whether or not the nurse

suspected or confirmed an infection, if the nurse assessed the patient for the systemic inflammatory response syndrome (SIRS) criteria and if the nurse initiated the sepsis protocol. This student-to-nurse observation was conducted between the hours of 7:00 AM and 10:00 AM on four different days. The student nurses conducted the observations within the first three hours of the morning shift as all inpatient patients should “be screened for sepsis every shift,” according to the hospital’s sepsis protocol, supported by the fact that early identification and treatment can result in improved patient outcomes (Novosad et al., 2016). Observations were not conducted during the night shift as the director of critical care only approved observations during the day shift. In the end, observational data for 66 patients was obtained by the CNL students.

Audits

After the student-to-nurse observations were completed, the CNL students quickly learned that the critical care director had granted them access to Arcis. With the access to the hospital’s EMR system, the students proceeded by conducting a retrospective chart audit of the documented sepsis screening tool. The logic behind this audit was that the students would be able to assess what the nurses were documenting for the sepsis screening, what time they were completing the screening, what vitals they were using, and if they initiated the sepsis protocol and transferred the patient to the ICU floor. This data would then be used in comparison to the data obtained from the student-to-nurse observations. An additional document was created by the students that allowed them to tally the information they were looking for (See Appendix C for Sepsis Chart Review Form). The audits were conducted over a period of four different days, on all five of the hospital’s acute floors for patients 18 years and older, on their second post-admission day. The students audited 199 screenings for 50 patients. A day shift and a night shift

screening was assessed for all 50 patients, however one patient discharged before the second screening could be done, leaving the students with a total of 199 audits.

Questionnaires

Questionnaires were also conducted by the CNL students to assess the registered nurse's baseline theory and operational knowledge in the early identification of sepsis. The students created a nursing sepsis survey using the hospital's Sepsis Protocol Administrative Manual (See Appendix D for Nursing Sepsis Survey). The survey was distributed over a period of two days (during both the morning and night shifts) on all of the five inpatient units. The nurses displayed a bit of resistance in completing the survey due to lack of time however, in the end the students were able to gather 32 completed Nursing sepsis surveys.

Policy Review and Site Visits

As a result of the collaboration with the critical care director, the CNL students received access to the hospital's sepsis protocol and sepsis algorithms. Once the students reviewed the documents, they compared the information to the guidelines set by the SSC and the CMS core measures. Once the student fully understood the sepsis policy, they then used the information to create the tools used for the sepsis screening observation checklist, the audit checklist and the nursing sepsis survey.

The CNL students were able to conduct the site visits with permission and authorization from the critical care director. As a result of his approval, the students were able to conduct sepsis screening observations, sepsis screening chart audits and the nursing sepsis survey; all of which allowed the students to assess the efficacy of the hospital's sepsis protocol, the nursing knowledge on the acute floors and overall, any issues with the detection and treatment of sepsis within the hospital. As previously stated, the student-to-nurse observations were conducted over

a period of four days, between the hours of 7:00 AM and 10:00 AM. The chart audits were conducted over a period of four additional days between the hours of 7:00 AM and 10:00 AM, simply because those were the only hours that the critical care director could meet with the students. The nursing sepsis surveys were conducted over a period of two days. The first day, half of the students visited the hospital in the morning in order to attend the morning department meeting and distribute the nursing sepsis surveys. The second set of students visited the hospital on the same day however, they arrived in the evening in order to attend the evening staff meeting to distribute additional nursing sepsis surveys to different nurses. Once the student realized that they had not obtained as many surveys as they had hoped for on the first day, some of the students agreed to visit the hospital and distribute additional surveys the next morning.

Results

Upon visiting the hospital and conducting 3 methods of data collection, the CNL students were able to gather data that furthered their understanding of what was occurring within the hospital, in regard to the early identification of sepsis.

Through the sepsis screening observation checklist, the students learned that 42% of the time, the nurses were completing the sepsis screening tool in Arcis, within the first three hours of beginning their shift. 58% of the time the nurses did not complete the screening tool within the first three hours of their shift. From the 42% of the completed screenings, the students found out that 93% of the time the nurses were using vitals between the hours of 5:00 AM and 10:00 AM and 7% of the time they the vitals were not within the identified time range. 32% of the time that the screening was done, it resulted in a confirmed or suspected infection, 18% of the time the screening resulted in 2 or more SIRS criteria and 7% of the time the sepsis protocol was initiated. In the end, there was a greater amount of sepsis screenings not completed within the first three

hours of the shift; for the screenings that were done most of them used current vitals, however not many resulted in 2 SIRS criterion and even fewer resulted in the initiation of the sepsis protocol. (See Appendix A for graphs 1-2)

Once the CNL students received Arcis access they were then able to retrospectively audit the sepsis screening within patient's EMRs. The students audited 199 screenings. From those screenings, 72% of them had the sepsis screening tool completed in Arcis with the completion time within 3 hours of the beginning of the nursing shift. 28% of the audited charts indicated that the screening was not completed within three hours of the beginning of the shift. 3% of the audits resulted in a positive sepsis screening and 1% resulted in the initiation of the sepsis protocol. Compared to the student-to-nurse observation data, the audit data resulted with a higher completion rate of the sepsis screening tool within the first three hours of the nursing shift, a lower rate in positive sepsis screenings and a lower rate in the initiation of the sepsis bundle. The students suggested that the audit data results may have been skewed, as the system allowed the nurses to manually input the time the sepsis screening was complete rather than an automatic time stamp on the screening upon the nurses' completion. If the nurses did input the screening completion times inaccurately, chances are that they actually did not complete the screening within the first three hours of their shift but did document that they had done so, and that is why the screening completion percentage resulted greater in the audit data. (See Appendix A for graph 3)

Upon completing the sepsis screening tool data, the CNL students then proceeded by evaluating the nurse's clinical knowledge of sepsis and their understanding of the hospital's sepsis protocol. The students distributed the nursing sepsis surveys and were able to obtain 32 completed surveys. The surveys indicated that 88% of the hospital's nurses knew what defined a

positive sepsis screening, 94% of them were able to identify the SIRS criteria, 44% of them were able to identify incorrect nursing interventions for sepsis, 31% knew what criteria identified a code sepsis, and 97% were able to identify the sepsis interventions that should be implemented within three hours of the presentation of severe sepsis. Additionally, 50% of the nurse surveys stated that vitals are reported to nursing in a timely manner. The nurses identified a delay in labs and a knowledge deficit regarding appropriate sepsis treatment as the greatest contributors to delays in the treatment of sepsis among their patients. 38% of the nurses felt that the hospital always provides adequate educational resources regarding sepsis, 44% of the nurses felt that the hospital sometimes provides adequate sepsis resources and 12% felt that the hospital never provides adequate sepsis resources. The nurses indicated that 56% of the time they utilize Arcis as a reference to the nurse driven protocol, 47% of the time they use the hospital's Sepsis Administrative Manual, and 1% of the time they use google. Overall, the nurses knew the definition of sepsis and how to identify it, but lacked knowledge in regard to the nursing interventions for a patient who is positive for sepsis. Also, many of the nurses expressed that they would like to see the hospital provide more educational workshops regarding sepsis. With the survey results at hand, the students began to think that the data might have also been skewed as the nurses could have used resources to answer the questions regarding their knowledge of sepsis, rather than going off of knowledge alone. (See Appendix A for graphs 4-8)

Implementation

Upon review of the hospital's Sepsis Administrative Manual and the sepsis algorithms, the CNL students found any inconsistencies when compared to one another; also, the documents were not easy to read and understand as they were a bit convoluted. These issues lead to the creation of a new, concise, and easy to follow sepsis process map, developed by the CNL

students (See Appendix E for Sepsis Process Map). Alongside the process map, the students also created an easy to follow, Sepsis Protocol Badge Card for the nurses to have on them at all times (See Appendix F for Sepsis Protocol Badge Card).

If time allowed, the student would have liked to create an annual educational session for all of the nurses working within the five inpatient units. During the information session, the nurses would be presented with the sepsis process map and the badge card. These materials were created as resources for the nurses to use while working on the floor. Additionally, the nurses would receive education regarding the pathophysiology of sepsis and the SIRS criteria. In order to address the deficiencies and inconsistencies in the documentation of the sepsis screening tool within the first three hours of the nursing shift, the educational session would also provide the opportunity to explain the importance of prompt and appropriate interventions. The nurses would be presented with evidence-based rationales illustrating the important of completing the sepsis screening tool in Arcis by 10:00 AM for the morning shift and 10:00 PM for the night shift. The nurses would then be informed that they will be held accountable for the documentation of the screenings within the three-hour time frame, as routine audits would be implemented in order to track their documentation times. The audits would serve as a way of checking for compliance as well as a way of holding the nurses accountable for completing the screening on time. Also, the students would have liked to implement a SIRS/sepsis champion within each inpatient unit to serve as an additional resource for the nurses. The champion would serve as a second set of eyes to help the nurses identify sepsis early and possibly identify any patient with sepsis that the nurse missed.

Cost Analysis

With more than 1.5 million people suffering from sepsis each year, it has become one of the most expensive conditions to treat in the United States (Hall et al., 2011). Sepsis is not only costly for the U.S healthcare system due to its high incidence rate but also the cost associated with treating patients who become septic. The average length of stay for a condition other than sepsis cost about \$10,000 per stay, while the average cost for a patient with sepsis is about \$18,000 per stay (Torio & Moore, 2016). That alone is \$8,000 more per stay for a septic patient than a patient with another diagnosis.

According to the critical care director which the CNL students were partnered up with, the intensive care unit (ICU) of the hospital has about 2-3 septic patients a week, the emergency department (ED) has about 3-4 septic patients a day, and the inpatient floors are said to rarely have septic patients. With that being said, the hospital has about 1176-1584 septic patients per year. Out of the 1176-1584 patients treated for sepsis at the hospital, the CNL students were informed that about 3% of those cases were a result of poor treatment/management from the hospital care providers. The 3% of cases that arise from poor treatment/management cost the hospital approximately \$650,000-\$850,000 a year.

According to the Centers for Disease Control and Prevention (CDC), the average length of stay (LOS) for sepsis is 8.5 days. As previously mentioned, the early recognition of sepsis can result in reduced morbidity and mortality rates as well as improved patient outcomes, therefore a reduction in the average LOS for sepsis could result. If the interventions previously mentioned are implemented and early identification results, the hospital can potentially reduce the average LOS for sepsis by 0.5 days. A reduction in the LOS by 0.5 days can potentially save the hospital about 1.2-1.7 million dollars a year. With these savings at hand, the hospital could support the annual implementations of this project, as the savings would be greater than costs associated

with the implementations. With the implementations, the students also hypothesized a 2% (1% from 3%) decrease in sepsis cases resulting from poor treatment/management. The 2% decrease would result in an estimate savings of \$250,000 for the hospital. This 2% decrease would be a product of the implementation delivering education and knowledge in regard to sepsis and its early identification.

Evaluation

Upon the realization of the CNL student's proposed implementations, the next step would be the evaluation process. The students would help the hospital evaluate the effectiveness of the sepsis education sessions, the revised algorithm, the sepsis protocol badge card, and the sepsis champions. The students would begin the evaluation process by presenting the nurses with the same nursing sepsis survey, post implementation survey. The results from the survey would then be assessed in relation to the initial survey that was conducted by the students in the beginning of the project. The students would look for improvements in the nursing knowledge of sepsis, the sepsis treatment process, the understanding of the sepsis protocol, the use of the badge card and the satisfaction with all of the implementations overall. Next the students would conduct quarterly routine retrospective chart audits for the sepsis screening tool to obtain post implementation data. The newly resulted data would then be compared with the initial data to assess if the sepsis screening tool was done within the first three hours of the nursing shift and to identify any improvements in the identification and treatment process of sepsis. Lastly, the students and the director of critical care would then assess the hospitals data in regard to the sepsis incidence rate for the hospital, in order to assess if there was an increase or a decline in the identification of sepsis. The potentially acquired information would also serve as a form of identification for any needed changes to the original implementation plan moving forward.

Discussion

Upon the approval from the hospital's director of critical care, the CNL students began their investigation. As the students observed the nurses one-on-one, they discovered that not all nurses completed the sepsis screening tool within the EMR system within the first three hours of their shift, by 10:00 AM and 10:00 PM. When the students conducted the retrospective chart audits, the data showed that the nurses were completing the sepsis screening tool within the first three hours of their shift. The students came to find that the nurses were time stamping the sepsis screening tool rather than the EMR system doing so. This indicated that the nurses were in fact not completing the screening at the time they documented doing so. Also, upon the review of the hospital's sepsis protocol, the students found many inconsistencies along with difficulty in understanding the policy; both of which could be hindering factor to the early sepsis identification process. With that being said, the student found it imperative to revise the sepsis process maps in place and create an updated and concise version. The CNL students also found that the use of a badge card with brief and essential information regarding sepsis would assist the nursing staff in the early identification of sepsis.

When the students were conducting their evaluations, and creating the implementation plan, they realized that the data and information collection processes were quite complex and very time consuming. The students also realized that the prospective educational sessions would be complex in developing and implementing; however doable.

Nursing Relevance

With nurses being the caregivers who spend the most time with the patients, it is imperative that they spend the time to fully understand what sepsis is, what it looks like and what the treatment process entails. It is important for nurses to continue to learn and expand their

knowledge as evidence-based practices progress. In order to identify sepsis early and help reduce the morbidity and mortality rates, nurses need to follow the policies and protocols in place; they need to perform timely assessments, as well as timely documentation. Nurses need to know how to identify the early signs and symptoms of sepsis, the SIRS criteria, the abnormal labs, as well as how to implement the appropriate treatment and interventions to help identify and treat sepsis as early as possible. By being well educated in regard to sepsis and its treatment, nurses will not only comply with their hospital policies but also with the ethical principle of beneficence. In the end, it is a nurse's duty to put the patient first and do what is best for the patient.

CNL Relevance

Being that a Clinical Nurse Leader (CNL) is a master's prepared nurse who directs their focus on improving patient outcomes within a microsystem, a CNL would be the perfect facilitator for this project. The CNL nursing role creates quality improvements within a microsystem by assessing the current patient care practices that are in place, comparing them to the most current evidence-based practices, utilizing informatics, assessing risks, and collaborating with other healthcare professionals. Once the CNL identifies the improvements that need to be made, the CNL can then design and implement the processes needed in order to improve the patient-centered outcomes. This leader is exactly what this project needs; A leader who will assess the issues that impeded the early identification of sepsis with use of evidence-based practices, develop an implementation plan, carry out the implementations, and assess any changes and improvements that result from the implementations.

For this particular project, a CNL could follow the competencies and curricular expectations for Clinical Nurse Leader education and practice set by the American Association

of Colleges of Nursing. From the list of competencies, the CNL could use the Health Policy and Advocacy competency to begin the project. This competency would guide the CNL to analyze the hospitals current sepsis policies and how they influence the structure of “health care, practice and health outcomes,” in regard to sepsis (AACN, 2013). Once the analysis is complete, the CNL could follow the Informatics and Healthcare Technologies competency, to “[e]valuate outcome data using current communication technologies, information systems, and statistical principles to develop strategies to reduce risks and improve health outcomes” (AACN, 2013). Lastly, the CNL could follow the Quality Improvements and Safety competency, to “implement evidence-based plans based on trend analysis and quantify the impact on quality and safety” (AACN, 2013).

With the guidance of a CNL, any hospital could assess any issues that they are facing and create an implementation plan to help improve it, and improve the hospital’s patient outcomes. The CNL role is an ideal catalyst for change.

Future Directions

In order for microsystems to improve issues that result in poor patient outcomes, the systems need leaders such as the CNL present. CNLs are the leaders that our healthcare system needs in order to assess, implement and evaluate changes that are aimed to result in improved patient outcomes and effective patient-centered care. The CNL not only serves as a quality improvement champion but also as a liaison between the multidisciplinary team within the microsystem.

Throughout the time that the CNL students spent at the large metropolitan hospital assessing and researching the issue regarding the early identification of sepsis, they experienced some issues. As the students were eager and enthusiastic to begin the project, they experienced an extensive delay in coming into contact with the director of critical care. Once connected with

the director of critical care, the students then experienced further delays in obtaining computer access and implementation approval. Despite the delays the students moved forward and proceeded with their action plan. When the students conducted the nursing sepsis survey, they then experienced push back from the clinical registered nurses as they many of them expressed a lack of time to complete the survey. In the end, the students obtained 32 nursing sepsis surveys and although they hoped to obtain more they worked with what they had at hand. Overall, the students always remained optimistic and positive despite the many setbacks and limitations that they faced.

If time would have allowed, the students would have liked to fully implement the education sessions, sepsis protocol badge cards, revised process map, and unit sepsis champions. Because time did not allow, the following students will have the opportunity to implement the plan. They can begin by analyzing the data from the nurse-to-student observations, the retrospective chart audits and the nursing sepsis survey. They then can plan for the implementation of the annual sepsis education session, the implementation of sepsis protocol badge cards, the revised process map, and the unit sepsis champions. Lastly, they can conduct post implementation surveys and audits to assess the effectiveness of the microsystem implementations and any improvements in the early detection of sepsis.

Overall, this project allowed the CNL students to experience what it is to identify a problem, assess the microsystem, work together with a team to enhance collaboration, advocate for the patients and the clinical providers simultaneously, and strive to improve patient outcomes all together. The duties of a CNL are not easy, but they are possible with much collaboration and unending persistence.

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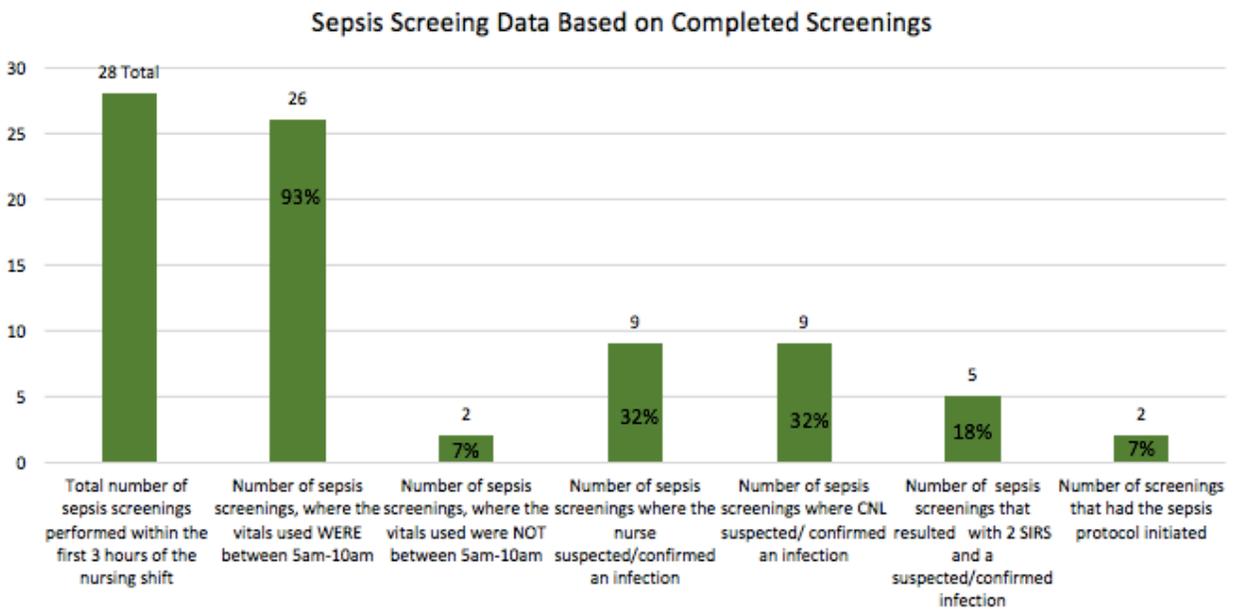
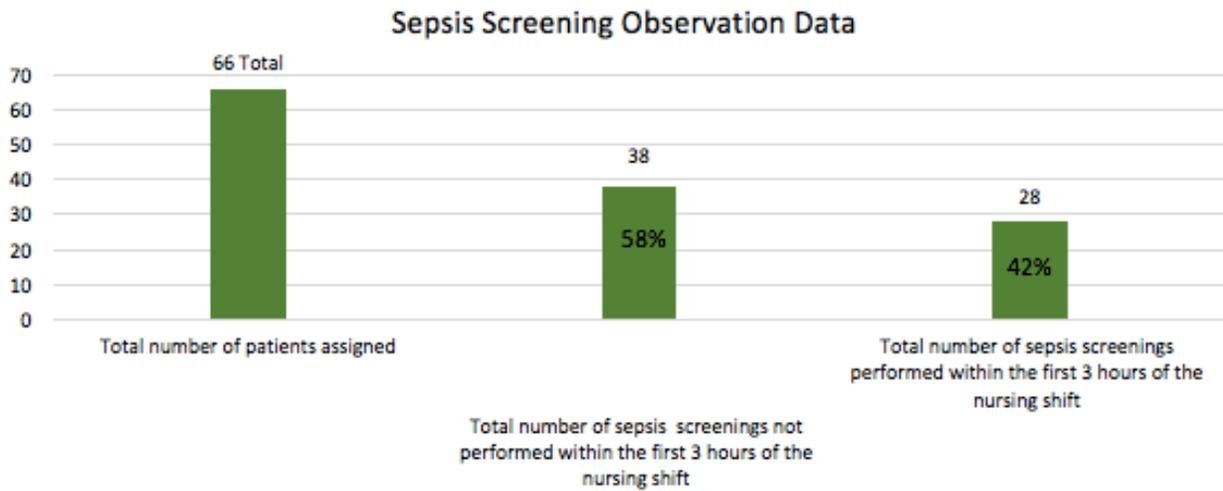
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- X- The references which can identify the hospital, where purposefully omitted in order to protect the privacy of the institution where this project was conducted.

APPENDIX A

Result Graphs

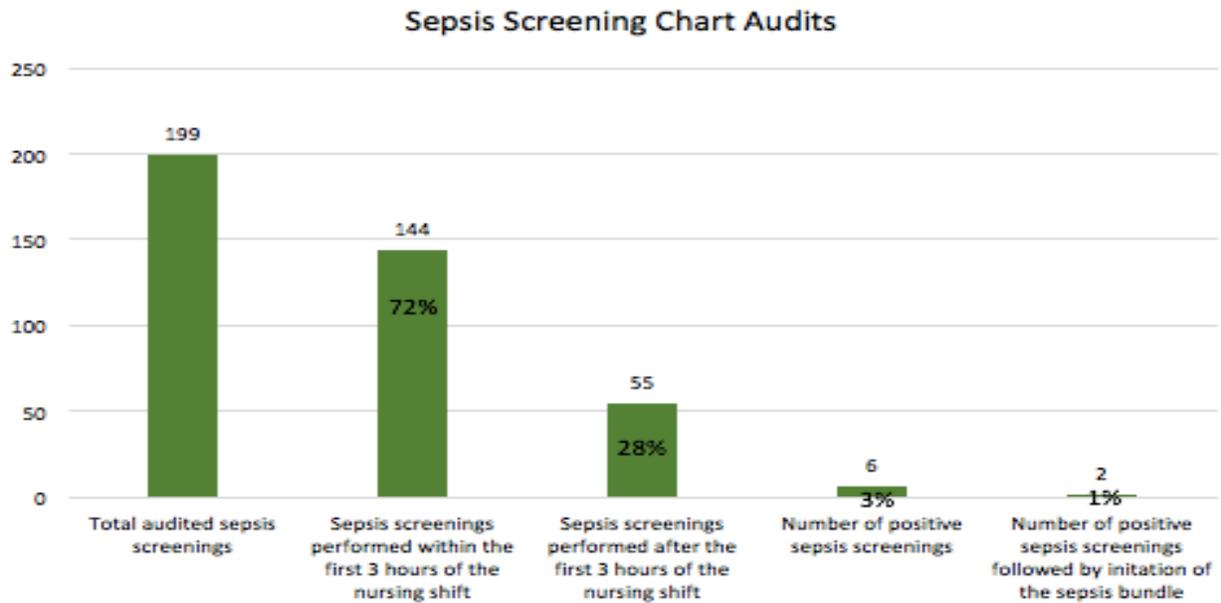
Graphs 1-2

Data derived from the Sepsis Screening Observational Checklist



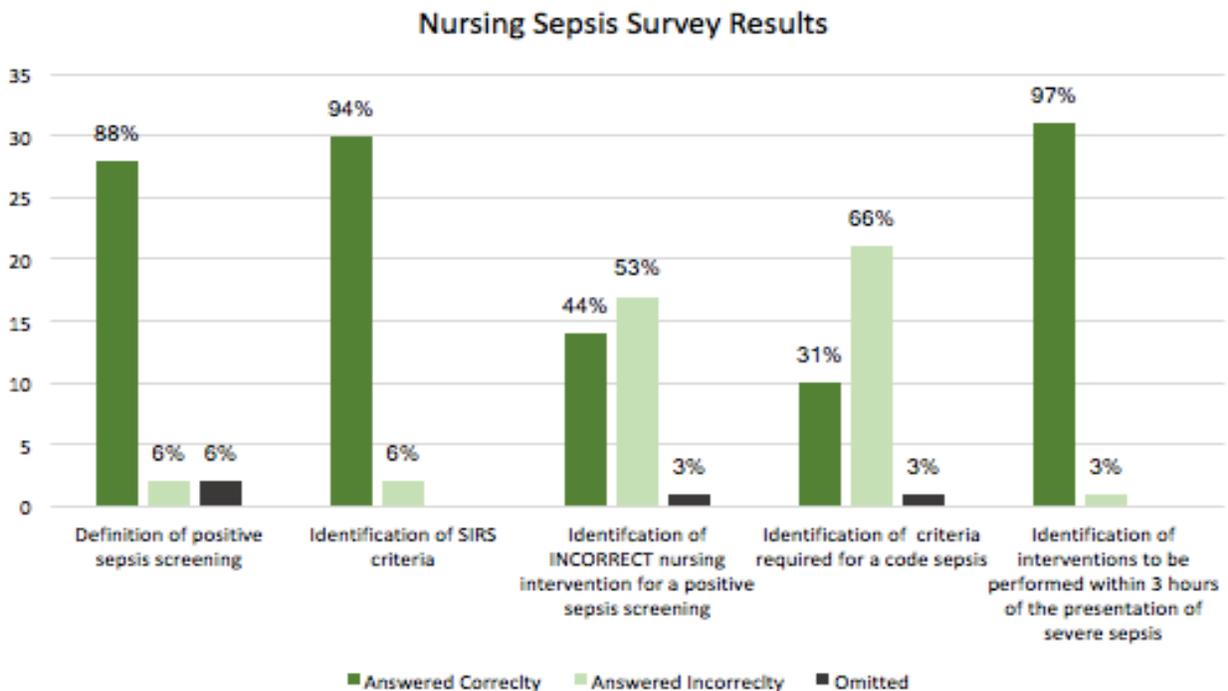
Graph 3

Data derived from the Sepsis Chart Review Form

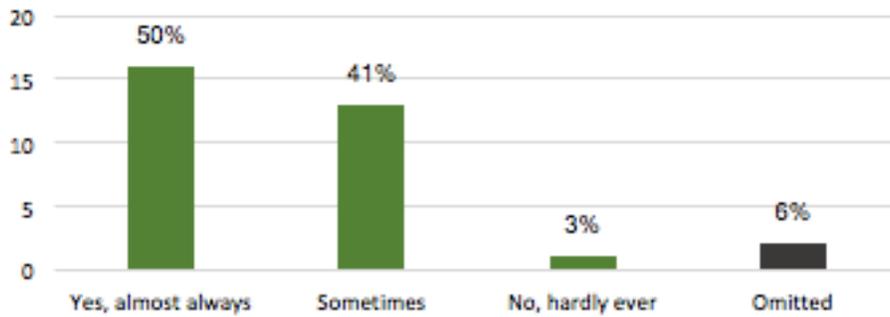


Graphs 4-8

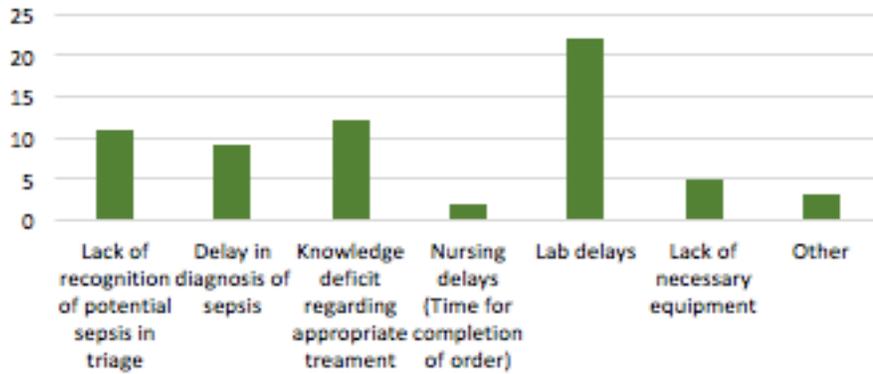
Data derived from the Nursing Sepsis Survey



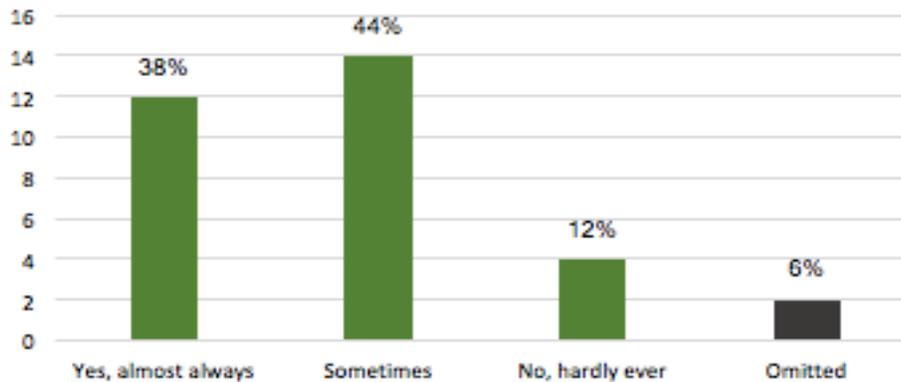
Are Abnormal Vital Signs Reported to Nursing in a Timely Manner?



Greatest Contributor to Delays in the Treatment of Sepsis



Are Adequate Educational Resources Regarding Sepsis Provided to Nursing?



Resources Utilized to Reference Nurse Driven Protocol for Sepsis



APPENDIX B

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 C

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 D

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 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?**
 - 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 $>2\text{mmol/dL}$
 - 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 greatest 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?**

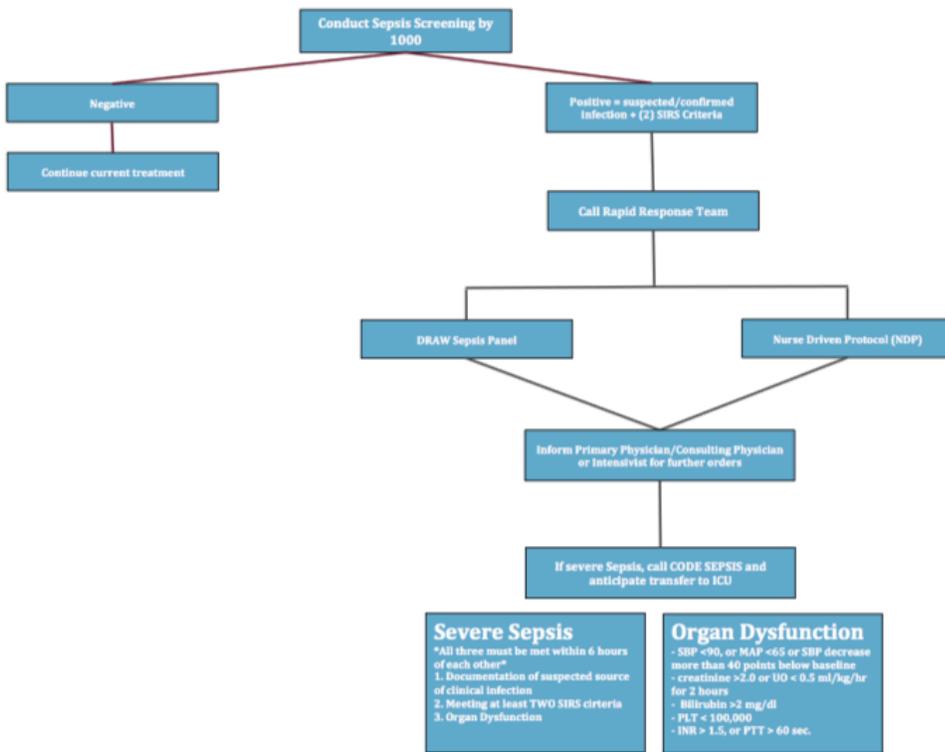
- a. Arcis (electronic medical record)
- b. Policy and Procedure Manual
- c. Google

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

APPENDIX E

Sepsis Process Map

Sepsis Screening Process Map



Consider sources of infection

- Pneumonia
- UTI
- Abldo infection
- Meningitis
- Skin/Soft tissue infection
- Bone joint infection
- Blood stream catheter infection
- Endocarditis
- Implantable device infection

Initial Sepsis screen positive if

Suspected or confirmed source of infection And TWO or more of the following:

Temp < 36C/96.8F or > 38/100.9F
 HR >90
 RR >20
 WBC > 12,000 or < 4,000 or > 10% bands

Nurse Driven Protocol (NDP)

- Start O2 to keep Saturation >95%
- Start peripheral IV with at least 18g
- Tylenol 650mg PO or Rectal for temperature > 101F
- Vital signs q15 minutes with neuro checks until stable, then q1 hour
- STAT Labs
- Lactic Acid
- CK-MB, Troponin
- CMP, CBC w/differential, PT with INR, PTT
- Cultures (order set in MAR)
- Diagnostics: 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 lab tube and immediately placed on ice)
- Obtain Urinalysis, Urine Culture & Sensitivity.

Severe Sepsis

All three must be met within 6 hours of each other

1. Documentation of suspected source of clinical infection
2. Meeting at least TWO SIRS criteria
3. Organ Dysfunction

Organ Dysfunction

- SBP <90, or MAP <65 or SBP decrease more than 40 points below baseline
- creatinine >2.0 or UO < 0.5 ml/kg/hr for 2 hours
- Bilirubin >2 mg/dl
- PLT < 100,000
- INR > 1.5, or PTT > 60 sec.

APPENDIX F

Sepsis Protocol Badge Card

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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