Implementation of a Nurse Champion Role to Improve Sepsis Guideline Adherence in the Emergency Department

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Date of Submission: April, 18, 2020

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Abstract

The purpose of this project was to evaluate the effect of a nurse champion role on adherence to sepsis guidelines. The guidelines of interest were collection of lactate and blood cultures, administration of antibiotics and intravenous fluids, and repeating of elevated lactate levels. The project was implemented in the emergency department at a 610-bed academic medical center in central New Jersey. Six sepsis nurse champions were recruited and trained on the role. Data on adherence for a period of two months pre- and two months post-intervention were compared. There was no statistically significant improvement in sepsis guideline adherence. There was improvement in overall adherence, blood culture collection, IVF administration, and repeating lactate levels. There was no change in initial lactate collection. There was a decrease in the rate of appropriate antibiotic administration. The results may have been negatively affected by the COVID-19 pandemic and additional testing was recommended. Significant increase in guideline adherence, if shown on further testing, would mean a nurse champion role is an effective quality improvement strategy in clinical practice. Improving adherence to sepsis guidelines could lead to improved patient outcomes. Adherence to sepsis guidelines is a core measure, monitored by CMS on a national level. Adherence with current guidelines will prepare the hospital to adapt to anticipated new guidelines, which will reduce the time of sepsis care from three hours to one hour. Sepsis nurse champions provided education to their peers on an ongoing basis and during formal education sessions.

Introduction

Sepsis is an emergent medical condition in which a dysregulated immune response to infection results in potentially life-threatening organ dysfunction (Singer, et al., 2016). It is a condition that exerts a significant burden on society and on the health care system. According to

the Center for Disease Control and Prevention (CDC), it is responsible for the largest number of inpatient deaths in the United States (CDC, 2019). It is also the most expensive medical condition to treat, accounting for over 6.2% of the total cost of healthcare in 2013 (Torio & Moore, 2016).

In 2004 the Surviving Sepsis Campaign (SSC), an international, multidisciplinary collaborative, group created specific guidelines that have been associated with reduced mortality (Surviving Sepsis Campaign, 2019). Hospital deaths due to sepsis decreased from 51.7% to 39.3% in the decade following the SSC's guidelines publication and widespread implementation (Pan, 2018).

Interventions such as early patient identification, the implementation of order sets, sepsis specific documentation and ongoing education for providers and nursing staff have shown improvement in guideline adherence (Ramsdell, Smith, & Kerkhove, 2017). Despite the growing body of evidence supporting the use of the SSC guidelines in the management of sepsis, adherence remains low (Deis, Whiles, Brown, Satterwhite, & Simpson, 2018), and there remains room for improvement.

The SSC provides direction for achieving better guideline implementation. The core of its strategy is to tailor interventions to the specific setting. It also calls for representatives from relevant stakeholder groups to take ownership of the project (Surviving Sepsis Campaign, 2019). These representatives would be more familiar with the local practice environment, local processes, project aims, the literature, and resources available (Surviving Sepsis Campaign, 2019). Representative staff nurses would play a key role in such a team.

The role of the nurse champion has been shown to be instrumental in bridging the gap between evidence and practice (White, 2011). This role calls for nurses to take ownership of the

change project, promote it to their peers and to help improve its adoption (White, 2011). The current project sought to evaluate the effectiveness of nurse champions in improving adherence to sepsis guidelines.

Background and Significance

The SSC**,** a collaborative effort between the European Society of Intensive Care Medicine (ESICM) and the Society of Critical Care Medicine (SCCM) sought to reduce mortality from sepsis by using a multipronged approach (Surviving Sepsis Campaign, 2019). The campaign first published its guidelines in 2004. The SSC sought to improve diagnosis, increase the use of appropriate treatment guidelines and provide education to healthcare professionals. These guidelines have been widely adopted into current practice (Septimus , et al., 2017). In October 2015, the Center for Medicare & Medicaid Services (CMS) introduced its sepsis guidelines that were based on the SSC guidelines. CMS began tracking and reporting hospital adherence to these guidelines. Adherence to the treatment guidelines was adopted as a core measure for the purpose of comparison of hospital performance and consequently may be a determinant of hospital reimbursement (Milano, Desai, Eiting, Hofmann, & Lam, 2018).

Current CMS guidelines call for specific interventions within three hours of the identification of sepsis or septic shock. These interventions are: measurement of lactate levels, obtaining blood cultures, administering broad spectrum antibiotics after blood culture collection, and administering crystalloid fluids at a rate of 30ml/kg for hypotensive patients and patients with elevated lactate levels greater than 4 mmol/l (Surviving Sepsis Campaign, 2019). Additionally, the serum lactate level must be repeated within six hours if it is elevated and hydration status must be reassessed by the provider. If warranted, vasopressor medications are to be started within six hours if hypotension persists after fluid administration.

Overall adherence with the sepsis bundle has been shown to significantly reduce mortality (Milano et al., 2018). However, according to publicly available data, the average national compliance with guidelines is at 50% (Hospital Compare, 2019). Although adherence to the guidelines at the proposed project implementation site has been better at an average of 80.5% between October 2018 and January 2019 (S. Gallant, personal communication, February 18, 2019), there remains an opportunity to further improve outcomes for more patients with sepsis by improving adherence to the guidelines.

The effectiveness of the nurse champion to bridge the gap between research and practice has been suggested by previous studies. Campbell (2008) used nurse champions to improve adherence to an intensive care unit (ICU) protocol for sepsis screening. The rate of guideline adherence increased from 23% to 74% in a pre- and post- study. Griffith, et al. (2019) examined the use of stroke nurse champions in the emergency department (ED) and noted improved door to needle times for stroke patients. However, no research was found that investigated the effect of nurse champions on adherence to sepsis guidelines in the ED.

The majority of sepsis cases are initiated in the ED. Milano et al., (2018) found as much as 70% (n=4582) of their study population was identified as septic in the ED. This project evaluated the effectiveness of a nurse champion role in the ED population to improve adherence to established sepsis guidelines. Improvement in guideline adherence with the ED population would affect the greatest number of patients and potentially have significant improvements in mortality and morbidity due to sepsis.

Needs Assessment

The need for this project was initially established through an informal interview with the sepsis Quality Improvement (QI) nurse (S. Gallant, personal communication, February 18,

2019), by reviewing current QI data, and through personal observation of current practice. The sepsis QI nurse highlighted the persistent failure to adhere to specific aspects of the guidelines despite the implementation of various strategies to improve performance. Some of the areas missed were administration of the full 30ml/kg intravenous (IV) fluid bolus as ordered, collection of blood cultures before antibiotic administration and collection of repeat lactate samples after completion of the fluid resuscitation. The compliance rates were 78%, 91%, and 89% respectively for these components. While the individual component deficiency rates were low, the resulting overall adherence rate, which was the metric tracked by CMS, was at 73%. She noted that the blood culture collection failure was likely a failure to document properly as she had observed most nurses were actually drawing the blood culture specimens appropriately.

SWOT Analysis

A Strength, Weaknesses, Opportunities and Threats (SWOT) analysis (Teoli & An, 2019) was conducted to evaluate current practice. A SWOT analysis is a tool used to examine internal and external factors in an entity that place it at an advantage or disadvantage when compared to other similar entities (Teoli & An, 2019). In this case, it was used to evaluate the intended implementation site for factors that might affect the project.

Strengths. There were many strengths identified that would help with the implementation of this project. The presence of an established sepsis protocol meant that there was an established framework to help meet the CMS guidelines. There was a strong sepsis continuing education program at the site. Education was provided using electronic modules that were mandatory training for all staff nurse. As a result, education materials were available, and all nurses had been provided with the knowledge basis for practice. Current practice included EHR flagging of patients who met sepsis criteria during triage. These patients were then assigned

to the resuscitation area of the ED instead of a regular ED bed. They were immediately evaluated by a provider and a dedicated resuscitation nurse. Care was then initiated in accordance with the guidelines before the patients were transferred to the main ED. This provided a central location to focus efforts to improve initiation-related guideline adherence such as the collection and documentation of blood cultures. The current EHR used for order entry has built in prompts for repeat lactate level sample collection. The EHR schedules the order correctly to meet the guidelines. The nurse is therefore only responsible for carrying out the order on time.

Weaknesses. Some of the weaknesses identified include a high volume and high acuity ED with high patient ratios, and low staffing. Owing to the high nurse to patient ratios, nurses may have been unable to complete all tasks on time or to document that they did so. Low staffing in the department led to the use of travel nurses who may not be familiar with the nuances of the site-specific sepsis protocol.

Opportunities. The availability of previously collected QI data on sepsis and the use of a clinical practice ladder at the hospital were identified as opportunities. Past data on sepsis guideline performance was used as the retrospective data in this study. The hospital, as a magnet institution, has a strong leaning towards engaging nurses to drive change. A well-established clinical practice ladder acknowledges and rewards nurses who engage in activities beyond their daily practice. This was an opportunity to present the project intervention as a clinical ladder item to encourage participation.

Threats. A few threats to the project were identified. There was an ongoing renovation of the emergency department. There was a reduction in available beds during the construction period, which meant overcrowding and potentially resulting in worse nursing guideline adherence. (Shin, et al., 2013). There was a change in nursing management personnel including

the clinical nurse specialist (CNS) which could have been disruptive to ongoing efforts to improve sepsis care performance.

Based on the needs assessment, there was a gap in practice that the nurse champion role could help bridge.

Problem and Purpose Statement

The problem identified was poor adherence to sepsis guidelines in caring for ED patients. This has been shown to negatively affect the outcomes of patients presenting with sepsis in the ED (Milano et al., 2018). The purpose of the project was to examine the effect of a nurse champion role on adherence to sepsis guidelines. Documented collection of lactate and blood culture samples within three hours of sepsis identification as well as administration of appropriate antibiotics and fluid resuscitation was evaluated before and after the intervention. Repeating of lactate levels, if initially elevated, was also evaluated. The intervention was creation of a sepsis nurse champion (SNC) role.

Clinical question

In patients identified as having sepsis in the ED, how does the implementation of a SNC role, compared to usual practice, affect adherence to CMS guidelines for sepsis treatment?

Aims and Objectives

In order to achieve the stated purpose of implementing and evaluating an SNC role in the emergency department, a systematic approach was utilized. The first step was to develop the SNC role. The effect of this role on adherence to SSC guidelines was then evaluated. Specific steps to achieve these aims are outlined below.

To develop a SNC role we

- Recruited candidates from current ED staff nurses

- Provided education and training on the role
- Provided information to all relevant stakeholders to increase participation and present the champions as a resource in meeting the sepsis guidelines.

To assess the effect of the SNC role on adherence to sepsis guidelines we

- Collected data on current performance from available QI data
- Implemented the SNC role
- Collected data after implementation of the SNC role from available QI data

Literature Review

A literature search was conducted to evaluate the current state of the evidence related to the clinical question. Specifically, evidence was sought on the concepts of nurse champion and on sepsis guidelines in relation to patient outcomes. The main databases used were the Cumulative Index of Nursing and Allied Health Literature (CINAHL), PubMed and Google Scholar. The results of the literature search are found in Appendix A.

A search of the PubMed database using the keyword *nurse champion* yielded 586 full-text articles. The search was narrowed to articles within the last five years and to articles with the keyword, *nurse champion,* in their title or abstract. After the filtering parameters, 13 articles were returned by the search. The abstracts of these articles were then reviewed more closely. Two articles were found to address the PICO question. A search of the CINAHL database with similar parameters yielded 23 articles. Reviewing the abstracts of these articles yielded three additional articles that were deemed relevant. Using google scholar yielded over 298 articles. Filtering articles on this database was not effective and the number of results remained large. Browsing some of the articles returned by this search yielded one additional relevant article. However, due to the large volume of results, it was not possible to extensively evaluate all the

results on this database. One additional article that was outside the 5-year parameter was included due to its very specific similarity to the current project. This article was found by reviewing the reference lists of the other articles.

Exclusion criteria was articles older than five years and articles that did not help to answer the PICO question. The term "nurse champion" was used in multiple contexts. In addition to being used to describe the role of a nurse champion, the term was also used to describe advocacy for the role of nursing or to indicate accomplishment or superiority. Other suggested terms that were used interchangeably with nurse champion such as opinion leader and nurse change agent (Miech, et al., 2018) did not yield additional results in this search.

A literature search on sepsis guidelines and patient outcomes was also conducted. The keywords *sepsis bundle, adherence* and *compliance* were used to search the PubMed database. Limits were set for articles with the key words in the title or abstract. The search was limited to articles within the last two years in order to focus on the latest studies. Eleven unique articles were obtained from the search. The abstracts of these articles were evaluated for appropriateness and two articles were chosen: a pre- and post- interventional study by McColl, et al. (2017) and a retrospective cohort study by Ramsdell, Smith, & Kerkhove (2017). A third retrospective observational study by Milano, et al. (2018) was obtained from the "list of similar articles" provided by the database.

Nurse Champions

There were five pre- and post-intervention studies that directly evaluated the role of the nurse champion in implementing a change in practice. Four of the studies were at single acute care institutions (Campbell, 2008; Griffith, et al., 2019; Luton, et al., 2018; Witkamp, Zuylen, Rijt, & Heide, 2015). One study was done on a larger scale as part of a state program to improve

newborn screening for critical congenital heart diseases (Farner, Livingston, Rubio, Gutierrez, & Gong, 2014). Additionally, there was one systematic review that evaluated articles on the implementation of the nurse champion role that were published between 1980 to 2016 (Miech, et al., 2018).

In all the single-center studies reviewed, the nurse champion was a peer nurse who was chosen or who volunteered to take on the role (Campbell, 2008, Griffith, et al., 2019, Luton, et al., 2018, and Witkamp, et al., 2015). The nurse champion completed a specified training program that ranged from small group sessions to electronic modules. They then assumed specific roles as nurse champions.

One of the most common functions found in three of the studies was of quality improvement (Farner, et al., 2014, Griffith, et al., 2019, and Luton, et al., 2018). The nurse champions participated in collecting some form of quality improvement data. This data was used to evaluate the effectiveness of an ongoing change in practice and the nurse champions then reviewed the results with their peers.

In one study the nurse champions had to assist their peers in performing skin assessment and they documented their own scores to establish interrater reliability of the study tool (Luton, et al., 2018). This is an instance where the nurse champion was hands-on with the change in practice being implemented. In other studies, the nurse champion was more removed from the actual implementation. In the study by Farner et al. (2014), the nurse champions were expected to teach their peers about newborn screening and evaluate their knowledge. In this case, they had no direct role in performing the screening themselves.

In all the studies examined, the nurse champions had an education role. They either introduced new knowledge (Farner, et al., 2014) or helped to reinforce information that their

peers should have had (Campbell, 2008, Griffith, et al., 2019, Luton, et al., 2018 and Witkamp, et al., 2015).

Only one out of five individual studies found no improvement in the implementation of a practice change with the use of nurse champions (Witkamp, et al., 2015). It should be noted that this study, which was on palliative care, only evaluated one component of the possible impact of champions: the perception by relatives of the quality of life and quality of dying. It may not have effectively evaluated the whole impact that nurse champions had. The other single center studies demonstrated an improvement in how effectively a change project was implemented. The systematic review had similar results; of 199 studies, over 80% found that the nurse champion was key to implementation success (Miech, et al., 2018).

Sepsis Guidelines

One of the aims of the current project was to improve adherence to sepsis guidelines. The current guidelines in use at the implementation site are based on the work of the SSC and adopted by CMS. It was therefore important to evaluate current literature to make sure the latest evidence still supported the guidelines. This was to ensure the outcomes of the project would remain relevant in the future. Since the publication of the original SSC guidelines in 2004, a large body of evidence on their effectiveness has been developed (Pan, 2018). Because evaluating the effectiveness of the sepsis guidelines was not the primary aim of the study, the literature search was limited to the studies published within the last two years to evaluate whether there has been any change in the evidence.

Two of the articles examined the association between adherence to sepsis guidelines and patient outcomes (Milano, et al., 2018, and Ramsdell, Smith, & Kerkhove, 2017). They both found that there was a negative correlation between adherence to sepsis guidelines and mortality.

The study by Ramsdell, Smith and Kerkhove (2017), however, did not reach statistical significance.

The third article focused on process improvement for sepsis treatment (McColl, et al., 2017). The process improvement included optimized sepsis identification in triage, doctor and nurse alerts, nursing protocols of care and EMR triggers in addition to SSC guideline-related changes. There was a statistically significant reduction in mortality seen in this study. However, because of the multiple changes that were implemented, it is not possible to directly link the improved patient outcomes to SSC guideline adherence.

Summary of Literature Review

The review of the literature was intended to evaluate whether the use of nurse champions was an effective way to facilitate the adoption of a practice change. The literature review suggested that there was a positive association between the use of a nurse champion role and the successful implementation of a practice change.

The second goal of the literature review was to evaluate the current state of evidence to determine if adherence to sepsis guidelines had a positive impact on patient outcomes. The literature review suggested that adherence to sepsis guidelines had a positive relationship to improved patient outcomes. The patient outcome for the studies in the literature review was described as a decrease in patient mortality (McColl, et al., 2017; Milano, et al., 2018, and Ramsdell, Smith, & Kerkhove, 2017).

Theoretical Framework

The Donabedian model was used as the theoretical framework for the project (Donabedian, 2003). The model, first developed by Avedis Donabedian in 1966, is a tool to

frame the evaluation of quality of care. There are three main components to the model: structure, process, and outcomes. These components are functional descriptions of care delivery and are not used to describe the attributes of specific items in the delivery of care. The placement of items in this model is therefore contextual. It depends on the purpose of the quality evaluation at hand. In this way the model allows for broad definitions of the three main components. The investigator can then evaluate their relationship and expected effect on each other.

Structure

When evaluating the quality of care based on the structure, the examiner would look at the environment, or condition under which the care is provided and how that affects the quality of care. In the current project some items that might have been evaluated under this category would be the physical facilities where care is provided, the providers of care and the presence of patients with sepsis. In evaluating the adherence to sepsis guidelines, the presence of the guidelines and the evidence supporting them would be considered structural items.

Process

In evaluating the process by which a healthcare related activity is accomplished, the examiner seeks to establish that the activity was conducted in a manner that would result in the delivery of quality. The determination of a quality process is based on already established evidence linking the process to the desired outcome (Donabedian, 2003). In sepsis care in the ED, the examiner might look at whether care of septic patients was provided in accordance with established guidelines. Because there is evidence to suggest an association between guideline-based care and improved outcomes, evaluating whether care was delivered in accordance with the guidelines would be an appropriate means of assessing the quality of care provided.

Outcomes

Outcomes are described as the end result of the care provided. Some examples of outcome measures might be mortality, morbidity, and length of hospital stay.

In developing the current project, the Donabedian model was used to outline the different components of sepsis care, taking into account research-based evidence of relationships that exist between them (Appendix B). After defining this relationship, a plan was developed to determine the most effective way to bring about the desired improvement in the quality of sepsis care in the emergency department. Through the literature review it was determined that a positive association between the use of established guidelines and improved outcomes for sepsis patients existed. The quality improvement that was needed in this case was increased adherence to the guidelines. Consequently, improving the adherence to sepsis guidelines became the new outcome. In the current practice environment, there is a strong evidence basis for the sepsis guidelines. There is also an imperative to use the guidelines because of the CMS core measures. The literature review confirmed that nurse champions were an effective way of improving the adoption of evidence into practice. Successful adoption would then result in improved adherence to the sepsis guidelines.

Methodology

Design

The project was a retrospective and prospective chart review, quality improvement project.

Intervention

The main intervention of the project was the introduction of a sepsis nurse champion (SNC) role. A total of six SNCs were used for the role; this included the PI and five staff nurses who were recruited from staff nurses on the unit. Recruitment was done using a flyer (appendix

F) that was provided to management and displayed on the unit. All staff nurses that volunteered and met the inclusion criteria and did not meet the exclusion criteria were recruited.

After recruitment, education was provided by the PI to all additional SNCs in individual sessions. Education on the SNC role included definition and evidence for the role, expected activities, resources available to them, and identification of stakeholders with whom they would be collaborating. It was expected that they would be collaborating with the hospital sepsis coordinator, the ED CNS, the ED physician-liaison on sepsis, and nursing management. Refresher education was also provided on current sepsis guidelines, QI data that is collected, and implications to practice. Information on the presence of the new role and the names of the nurses involved was provided to all staff during shift huddles.

The SNCs were expected to perform the following tasks:

- Review QI data and present it at shift huddles, including summarization of areas with poor rates of adherence and possible solutions
- Develop education material in collaboration with the ED CNS and educate other staff nurses during the annual mandatory education sessions
- Attend hospital wide sepsis committee meetings and collaborate with other disciplines such as the ED CNS, the physician liaison on sepsis and hospital sepsis coordinator to address issues affecting adherence to the sepsis guidelines
- Act as a resource to their peers in the course of their shift as staff nurses. They would be available to answer questions related to the sepsis guidelines, model good practice such as proper documentation, and discuss huddles faced by staff in adhering to the sepsis guidelines

Due to the limited scope of this project, direct measurement of the participation of each SNC in each of these activities was not feasible. The effect on sepsis guideline adherence was instead used as the outcome measure.

Data that were normally collected as part of sepsis QI was evaluated for a period of two months before the intervention and compared to similar data, collected over a two-month period after the SNC role was implemented.

Setting

The project was conducted in the adult ED at a 610-bed academic medical center in central New Jersey. The ED at this hospital serves approximately 96,000 adult and pediatric patients per year. The hospital is designated as a level one trauma center and a comprehensive stroke center. It is also affiliated with a regional cancer institute. These centers, along with the hospital's recognition as a high performing medical provider (RWJ Barnabas Health, 2019) contribute to the high acuity of the patients transferred to the hospital, often through the ED.

Study Population

The population from which the study drew its information was patients above the age of 21 who were evaluated in the adult ED and received a diagnosis of sepsis. All charts receiving a diagnosis of sepsis were routinely flagged by the EHR system and their medical record numbers were emailed to the ED sepsis QI team. A systematic sampling of every other chart received was used to choose charts for QI data extraction. These QI activities were already in place and were not part of the current project. The aggregate, de-identified QI data was used for the purposes of this project.

Outcome Measures

The main outcome measure for this project was adherence to CMS sepsis guidelines. The components of interest were measuring serum lactate, obtaining blood cultures prior to antibiotics, and administering antibiotics within three hours of identification of sepsis. Additionally, if the patient presented with hypoperfusion, defined as a systolic blood pressure (SBP) less than or equal to 90 or Mean Arterial Pressure (MAP) less than or equal to 65, or if the patient had an elevated lactate greater than or equal to four, they would receive 30ml/kg crystalloid IV fluid resuscitation within three hours. Lastly the lactate level was to be repeated within six hours if it was initially greater than or equal to two. This information was routinely collected as part of sepsis QI (Appendix C).

Measures included in the CMS sepsis core measures that were not included in this project are volume status reassessment within six hours by a medical provider and initiation of vasopressors if hypotension persisted after fluid resuscitation. These metrics are not routinely collected in ED QI and are beyond the control of nursing staff. It would, therefore, be unlikely that a nursing-based project such as the SNC role would affect these measures.

Subject cost and compensation

The SNCs conducted all activities in this role within their capacity as staff nurses in the department and were therefore compensated by the practice site. The SNCs did not incur any expenses that required additional compensation.

Project Timeline

The project was originally expected to last for 12 months. However due to a delay in the IRB process, it took about 15 months to complete. The table in Appendix E displays the timeline from project development to dissemination of the findings back to the practice site.

Resources Needed/Economic Considerations

All costs associated with this project were covered by the principal investigator. Stationery, printing cost for project flyers, and all other unanticipated costs amounted to less than 50 dollars total.

Data Maintenance and Security

Deidentified QI data was used for this project. The data was entered into an excel spreadsheet stored on the principal investigator's personal computer. The computer was password protected with only the principal investigator having access to it. All de-identified information will remain with the principal investigator in a password protected device until the completion of the project. Upon completion the deidentified data will be handed over to the DNP chair and stored within the school per Rutgers School of Nursing policy.

Data Analysis

Data collected was analyzed using SPSS software (IBM Corporation, 2017). A Pearson Chi-Square analysis was used to compare the difference in adherence levels between the pre- and post-intervention groups and measure significance (Mowery, 2011).

Results

A total of 134 individual charts were reviewed during the pre- and post-intervention periods. Pre-intervention data was collected from charts from November 2019 to December 2019. A total of 63 charts were reviewed. The post-intervention period was February and March of 2020. There were 71 charts reviewed in this period. 36/63 (57.14%) charts reviewed in the pre-intervention period and 43/71 (60.56%) charts in the post-intervention period adhered to all the sepsis guidelines. A Pearson Chi square test was conducted with a null hypothesis that the pre-intervention and post-intervention adherence rates were independent of one another. The

results, $\chi^2(1,N=134)=.161, p=.688$, showed that there was no significant association between adherence rates and the intervention. The null hypothesis could not be rejected.

There was an increase in appropriate blood culture collection from 65.1%(n=63) to 70.4% (n=71) (p=.508) and a decrease in antibiotic administration from 95.2%(n=63) to 94.1%(n=71) (p=.647). Initial lactate measurement remained at 100% through the study. In patients showing evidence of sepsis-induced tissue hypoperfusion (SITH) there was an increase in appropriate fluid resuscitation from 72.7%(n=22) to 80%(n=25) (p=.557). In patients with an elevated initial lactate, the number with levels redrawn within six hours increased from 86.5%(n=37) to 92.5% (n=40) (p=0.388). The results are displayed in appendix G.

Discussion

These results showed that, although there was improvement in adherence in most of the components of the sepsis guidelines, the change was not statistically significant. Association could therefore not be made between the implementation of the SNC role and improvement in adherence. The greatest increase was in the collection of repeat lactate levels if they were initially elevated. This would seem in line with the scope of influence of this project. The SNCs primarily interacted with other nurses to help improve adherence. As repeat lactate levels are autogenerated orders, the only reason for failure in this metric would be nursing related. In antibiotic administration, where failure had been primarily observed to be due to provider decisions not to order antibiotics, there was no improvement after the implementation of the SNC role. During the needs assessment, it was noted that one of the main failures was in appropriate documentation of blood culture specimen collection. It was anticipated that the SNCs, through education reinforcement, review of failures with staff and modeling of

appropriate documentation could significantly improve this measure. There was, however, only a statistically insignificant increase in adherence of blood culture collection.

There were some significant factors that may have affected the results of this project. The main event was the corona virus disease of 2019 (COVID-19) outbreak (Centers for Disease Control and Prevention, 2020). The outbreak which was first reported to the World Health Organization (WHO) in December of 2019, quickly evolved into a global pandemic. Patients with this disease often presented with symptoms suggesting sepsis (Centers for Disease Control and Prevention, 2020). Being a viral infection, however, meant that there was a reluctance by providers to initiate antibiotic treatment until other evidence of a bacterial infection was noted. This could have delayed antibiotic administration. All other resuscitation measures in the sepsis guidelines remained appropriate interventions for COVID-19 patients (Alhazzani, et al., 2020). It should be noted that the period of this project that overlapped with the disease was short and still in the early stages of the pandemic. The effects of the disease itself may therefore have been minimal.

The effect of the pandemic on available resources may have had a greater effect on project outcomes than the disease itself. Some of the difficulties faced were: delay in QI data availability due to decreased staff availability for the exercise; cancellation of staff education sessions scheduled for March 2020; and delay in implementation of a new documentation tool. The tool was developed by the sepsis champion team in collaboration with the hospital sepsis committee and the ED CNS. It was designed to allow an easy point of documenting sepsis related activities and being able to keep track of appropriate times. It was scheduled for release in early March 2020 but had to be delayed due to the need to focus on other education needs for the department.

One key facilitator to this project was the new ED CNS, who was instrumental in the smooth implementation of the project. She assisted in the recruitment of the SNCs, their introduction on the unit, and continually supported the team. There was, overall, support and accommodation from the leadership team. The ongoing QI on sepsis provided data for the project, reducing the risk of breach of patient confidentiality in project related activities as only de-identified data was used.

Implications

Clinical practice. Based on current evidence, it was anticipated that the SNC role would have a positive influence on adherence to sepsis guidelines. It was therefore anticipated that there would be a higher rate of adherence to guidelines in the post-intervention group when compared to the pre-intervention group. The results of this project show that there was an increase in adherence for most components of the sepsis care bundle, although not statistically significant. The lack of significant benefit demonstrated here may have been due to factors external to the project. There was no negative outcome associated with this project. The use of the nurse champion role to improve adherence to sepsis guidelines might therefore remain an appropriate quality improvement intervention. Further investigation of the effect of the SNC role over a longer period of time might be warranted to evaluate any additional benefit. The SNC role is expected to continue at the practice site after the completion of this project. Additional interventions, such as the implementation of a new documentation tool is expected to be supported by the SNCs in the future. Upcoming opportunities for the SNCs to provide education on guidelines and adherence are expected once in-person education sessions are feasible with resolution of the current pandemic.

Quality and safety. Current evidence has suggested that adherence to sepsis guidelines is associated with improved outcomes for patients with sepsis. Improved outcomes would mean decreased lengths of inpatient hospital stay and decreased morbidity and mortality (Pan, 2018). These improvements would help to decrease the social and financial burden of sepsis (Torio & Moore, 2016). As a quality improvement project, the implementation of the SNC role has created an opportunity to continuously evaluate performance in sepsis care and make additional changes as needed in the future. The SNCs continuously evaluate sepsis performance data and collaborate with other stakeholders such as the hospital sepsis committee and leadership. Through these activities they may continue to have incremental benefits beyond those realized in the span of this project.

The proposed documentation tool to improve appropriate documentation is an example of a product of this collaborative approach. This tool was initially proposed by the ED physician-liaison on sepsis. It was presented to the hospital sepsis committee with the SNCs present. It was then further developed by the ED educator in collaboration with the SNC team. Initial education on the tool was being disseminated to staff nurses by the SNCs in preparation for implementation. This process has, however, been paused, due to the current pandemic and strain on resources. Once implemented in the future, it is expected to improve timely documentation which would improve adherence on the blood culture component of the sepsis guidelines.

Healthcare policy. The current CMS guidelines are based on initial SSC guidelines, first published in 2004. The guidelines have since been updated by SSC to suggest that all initial components of sepsis treatment be completed within one hour instead of three hours (Surviving Sepsis Campaign, 2019). It would therefore stand to reason that CMS will also be updating its guidelines in the future to recommend this “hour-1 bundle” (Surviving Sepsis Campaign, 2019).

By continually improving on current performance, the project implementation site will be better prepared for this future change.

If further evaluation should reveal that there is a significant benefit in the use of the SNC role, nurse champions could be implemented in other areas of practice beyond sepsis care. It would be important to reevaluate the effectiveness of the SNC role when there are fewer outside factors that might affect the results to ascertain the effectiveness of the strategy.

Education: One of the main functions of the SNCs was to provide education to other staff nurses. In doing so, they helped to reinforce the current education efforts on sepsis care. Education by SNCs to staff nurses was provided in a formal setting during the annual education session. Education is also provided on an ongoing basis as SNCs, in their direct patient care capacity, are recognized as a resource on sepsis care.

Sustainability, Dissemination and Professional Reporting

This project implemented nurse champions in the ED only. A previous study (Campbell, 2008) showed the effect of a similar project on sepsis care in the Intensive Care Unit (ICU). If further evaluation revealed a significant benefit, the evidence could help make the case for the implementation of sepsis nurse champions (SNCs) throughout the hospital. The evidence gained from this project might also allow for replication of the SNC role in other facilities and in other areas of care.

Dissemination of this project will initially consist of a formal report of the project, a formal presentation to a DNP committee and a poster presentation within the school of nursing. The project will be made available in the school of nursing repository of DNP projects which will allow for dissemination to a larger audience. Future presentation of the project for publication in a peer reviewed journal will be considered.

Conclusion

The implementation of a sepsis nurse champion role to improve sepsis guideline adherence was investigated by this study. There was no statistically significant improvement in overall sepsis guideline adherence or in the separate components of sepsis care. It is, however, possible that external factors might have affected the results. A global pandemic of COVID-19 had emerged in the period between collection of pre-intervention and post-intervention data. Although direct consequence of the pandemic on sepsis performance is uncertain, it was evident that there was an immediate secondary effect of putting a strain on available resources and pausing project related activities. Further investigation of the effects of the SNC role is recommended.

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Appendix A: Literature review

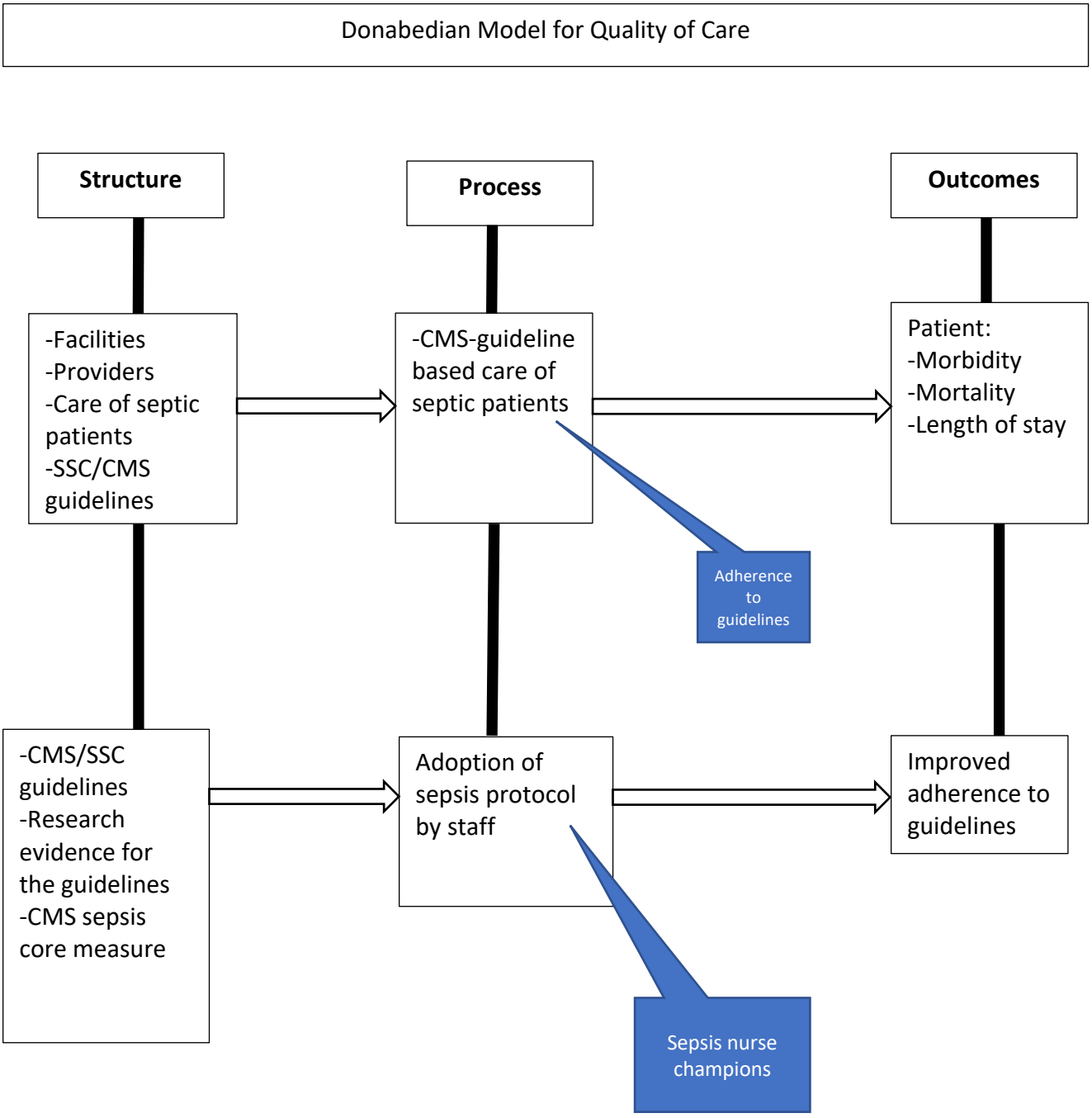
Article #	Author & Date	Evidence Type	Sample, Sample size, Setting	Study findings that help answer the EBP Question	Limitations	Evidence level and Quality
1	Miech, E., Rattray, N. A., Flanagan M. E., Damschroder, L. Schmid, A. A. Damush T. M.	Systematic review	Articles published between 1980-2016 on champions N=199	-Champions positively influence implementation effectiveness -the champion role is varied in function and description	-Study was limited to English language studies -Due to multiple terms use to describe the construct of champion, articles may have been missed	Level II Good quality
2	Griffith, T, C., Gupta, A., Gaffney, D. C., McCartney, D. L., Mkrtumyan, A., Punsalang, L. Y. Zahra, D. L., Ajani Z. A., Sangha, N. S.	Pre- and post-test	All ED stroke patients within the study period N=61	-Increase in patients receiving tPA and door to needle times (DTN) after initiation of Stroke Champion program	-Small sample size	Level II Low qualtiy
3	Campbell, J	Pre- and post- quasi-experimental design	All patients admitted to ICU with sepsis during the study period at 16 bed ICU. N= 120	-Statistically significant improvement in adherence to ICU sepsis guidelines for documentation of sepsis assessment. -Statistically significant number of septic	High staff turnover with new staff not familiar with protocol -Limited generalizability (small sample at singe site)	Level II Good quality

				patients treated with antibiotics. -No statistically significant relationship between documentation of sepsis assessment and initiation of sepsis protocol		
4	Witkamp, F. E., Zuylen L V., Van der Rijt C. CD., Van der Heide, A.	Controlled pre- and post- study	One relative of each person who had died after > 6hr inpatient stay during the study period N=396	-Palliative care nurses were appointed on intervention wards -There was no significant improvement in quality of life (QOL3) or quality of death (QOD) as reported by family in the pre- and post-test groups or the intervention and control groups	-Nurse champion difficulty in discussing treatment goals with providers -Difference in skill level of champions due to Complex (whole hospital with different wards) environment.	Level 1 Good quality
5	Ramsdell, T. H., Smith, A. N., Kerhove, E.	Retrospective cohort study	All patients with a diagnosis of severe sepsis or septic shock N=158	-After implementation of CMS core measures there was a statistically significant increase in guideline adherence -There was a reduction in mortality in the after group, but it was not	-Limited generalizability due to small sample size and short study period -Some changes preceded core measure implementation and may have affected the pre-study group	Level II Good quality

				statistically significant		
6	Luton, A., Gordon, M. D., Stewart, M., Steward-Scott, E., Mullen, J., Jones, A.	Pre- and post-intervention study	All patients admitted to a large pediatric hospital with over 32,000 admissions annually.	-The rate of healthcare associated pressure injuries decreased from 0.26 per 1000 patient days to below 0.1/1000 patient days	Lack of education material for the nurse champions that is specific to the pediatric population	Level II Good quality
7	Farner, R., Livingston, J., Rubio, S. A., Gutierrez, M. V., Gong, A.	Pre- and Post-intervention study	Newborn and Mother/Baby nurses at 13 hospitals. N= 215	-55% of all nurses on the target units received the education on newborn screening -All participants demonstrated improvement in knowledge about newborn screening -There was a high level (96%) of newborn screening after implementation of the education program	-Delay in acquisition of needed materials	Level II Good quality
8	McColl, T., Gatien, M., Calder, L., Yadav, K., Tam, R., Ong, M., Taljaard, M., Stiell, L.	Pre- and post-intervention study	Adult patients presenting to the ED with suspected sepsis N=352	-Statistically significant reduction in mortality after introduction of a sepsis protocol. -Increased adherence to sepsis protocol with extensive sepsis education campaign	-confounding factors such as increased identification rates of septic patients may have affected results -Risk for Hawthorne effect due to increased	Level II Good quality

					awareness of stud	
9	Milano, P. K. et al.	Retrospective observational study	Patients identified with sepsis in a healthcare system N=4,582	-Adherence with sepsis bundle is associated with improved survival -Improvements in outcomes realized in the ICU and not in the ED or on medical units.	-Severity of illness was not considered. -Retrospective design -Adherence is to SSC guidelines and not to CMS SEP1 guidelines at time of study.	Level III Good quality
10	Creehan	Practice description	All admitted patients at the medical center at risk of pressure ulcers	-Staff nurses empowered to affect change on their units -Nurse champion are a link for clinical experts to disseminate evidence and affect change on all the nursing units	-The level of effectiveness of the nurse champions is dependent upon unit based management support	Level III Low quality

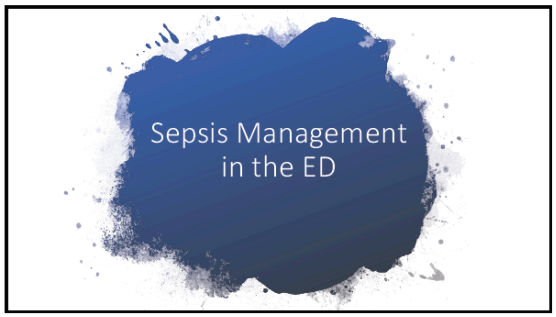
Appendix B: Theoretical Framework



Appendix C: Data Collection Sheet

Sepsis Nurse Champion Project Data Sheet								
Month	Number of charts reviewed	Lactate drawn %	BC drawn before ABX %	ABX within 3 hours %	Hypotensive or Lactate >/= 4 %	30ml/Kg IVF %	Rpt. Lactate %	All Applicable Bundle Compliance %

Appendix D: Sepsis education



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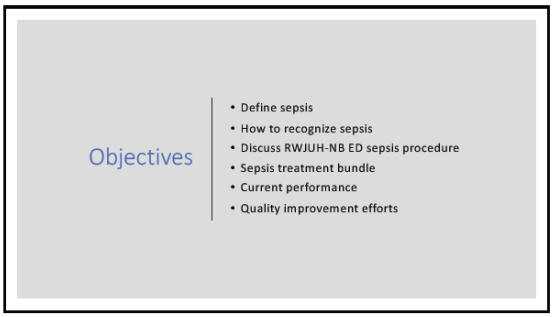

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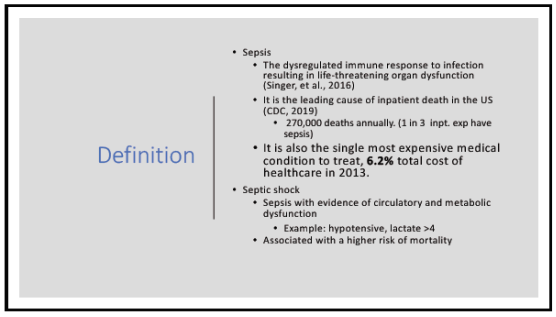

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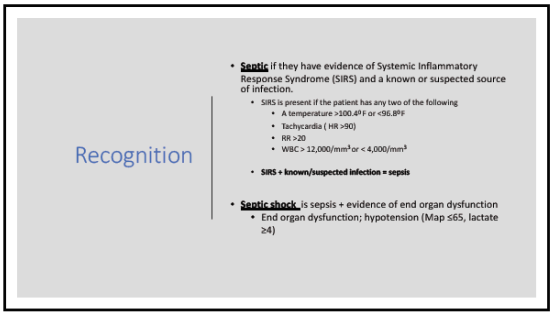

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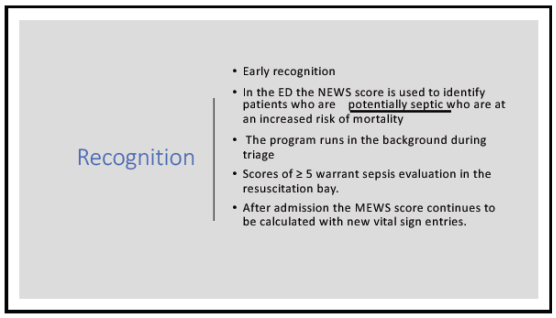

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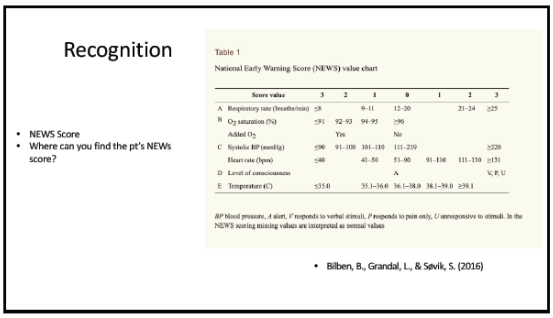

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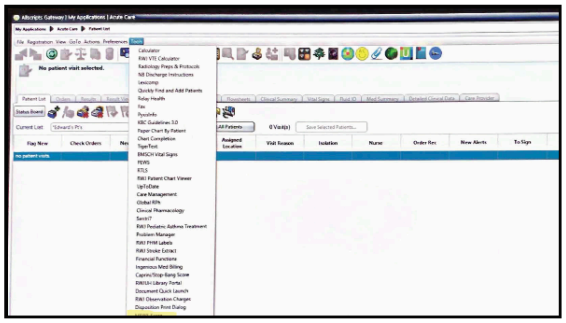

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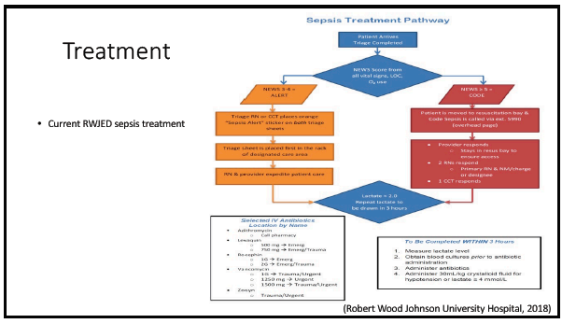
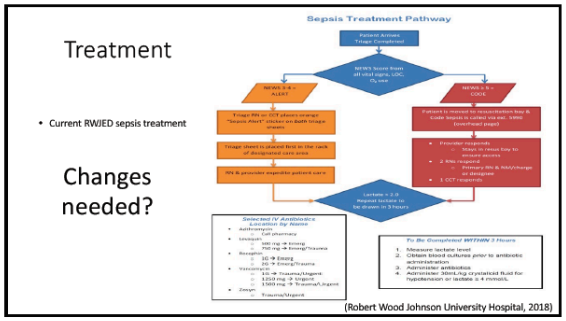
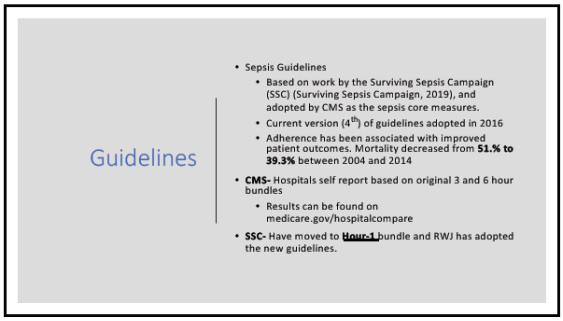

Treatment
Sepsis Treatment Pathway
• Current RWJED sepsis treatment
(Robert Wood Johnson University Hospital, 2018)

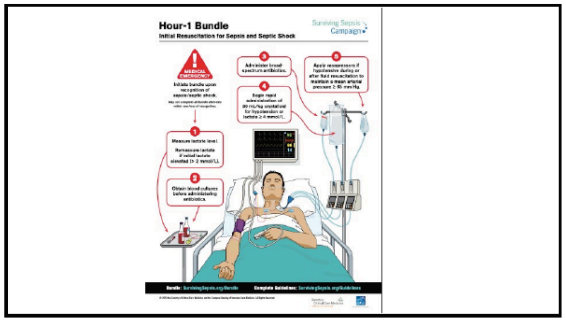
8


Treatment
Sepsis Treatment Pathway
• Current RWJED sepsis treatment
Changes needed?
(Robert Wood Johnson University Hospital, 2018)

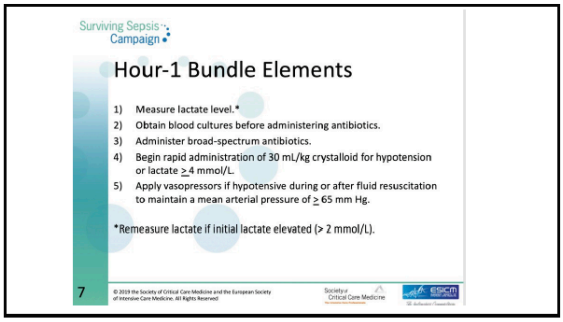
9


Guidelines
• Sepsis Guidelines
• Based on work by the Surviving Sepsis Campaign (SSC) (Surviving Sepsis Campaign, 2019), and adopted by CMS as the sepsis core measures.
• Current version (4th) of guidelines adopted in 2016
• Adherence has been associated with improved patient outcomes. Mortality decreased from 51.% to 39.3% between 2004 and 2014
• CMS- Hospitals self report based on original 3 and 6 hour bundles
• Results can be found on medicare.gov/hospitalcompare
• SSC- Have moved to Hour-1 bundle and RWJ has adopted the new guidelines.

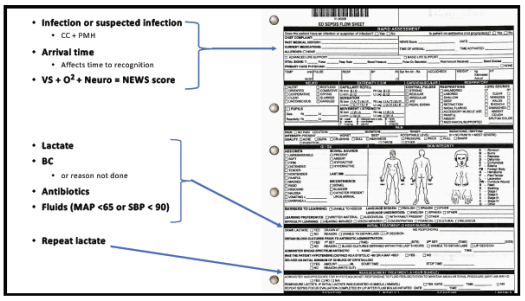
10


Hour-1 Bundle
Initial Resuscitation for Sepsis and Septic Shock
Surviving Sepsis Campaign

11


Surviving Sepsis Campaign
Hour-1 Bundle Elements
1) Measure lactate level.*
2) Obtain blood cultures before administering antibiotics.
3) Administer broad-spectrum antibiotics.
4) Begin rapid administration of 30 mL/kg crystalloid for hypotension or lactate ≥4 mmol/L.
5) Apply vasopressors if hypotensive during or after fluid resuscitation to maintain a mean arterial pressure of ≥ 65 mm Hg.
*Remeasure lactate if initial lactate elevated (> 2 mmol/L).
7

12



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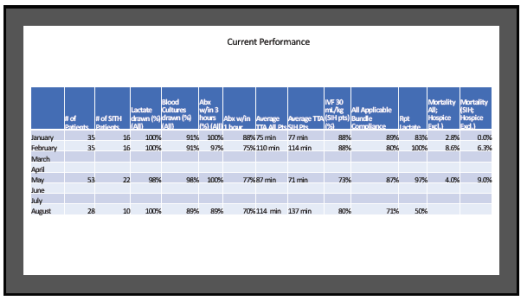

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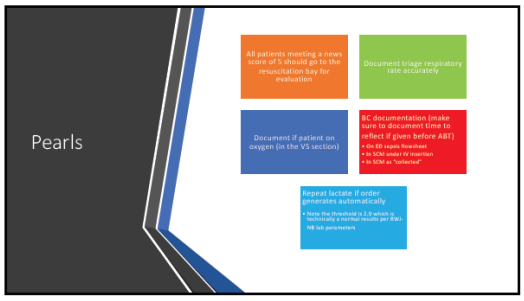

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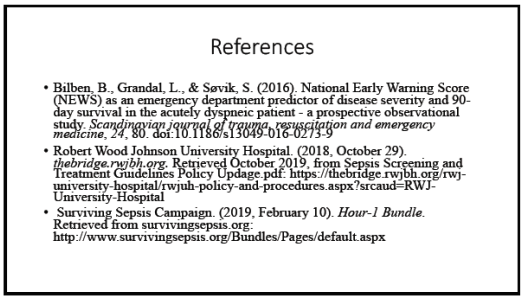

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Appendix E: Project Timeline

Sepsis Nurse Champion Project Timeline				
Task	Start Date	End Date	Time to complete	
PICO, Background, Needs, Aims and Objectives	1/28/19	2/17/19	20	
Literature search and Theoretical framework	2/17/19	3/31/19	42	
Methodology	3/15/19	4/20/19	36	
Proposal revision & presentation	4/21/19	5/6/19	15	
IRB application	5/6/19	1/02/20	86	
Subject recruitment/training/deployment	1/02/2020	1/31/20	30	
Pre intervention data collection	01/02/20	01/31/20	30	
Post intervention data collection	02/1/20	04/04/20	64	
Data analysis	04/04/20	04/05/20	2	
Conversion of proposal to final Project report	2/1/20	4/1/20	60	
DNP presentation/Poster presentation and close out	4/4/20	4/30/20	27	
Dissemination of results to project site	5/1/20	5/1/20	1	

Appendix F: Recruitment flyer

BE A CHAMPION FOR CHANGE

SEPSIS NURSE CHAMPIONS TO IMPROVE SEPSIS GUIDELINE ADHERANCE IN THE ED

WHO

-We are looking for full time or part time Registered Nurses to take on the role of nurse champions

-The nurses must be in a direct patient care role

-They must not be planning on leaving their current position for the duration of the study (4 months, exact dates to be announced)

WHAT

-A Quality improvement research project will be conducted in the Emergency department at [redacted]

-The goal of the project is to investigate the effectiveness of nurse champions to improve the care of septic patients

-The Aim of the study will be to improve adherence to current sepsis treatment guidelines

HOW

-Participants will attend a one-time, 40-minute education session on sepsis and the nurse champion role

-They will maintain close contact with the sepsis care team for ongoing education

-Participants will become peer leaders, content experts, and a liaison to facilitate interdisciplinary communication and teamwork on sepsis care

WHY

-Sepsis is responsible for the largest number of inpatient deaths in the United States

-Sepsis care accounts for a very large portion of our healthcare expenditure at 6.2% of all healthcare costs

-The use of CMS endorsed treatment guidelines has been associated with significant improvements in sepsis care outcomes

-Participants will gain knowledge on sepsis care and experience on the quality improvement process.

If Interested Please Contact

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Version 1.0. 04/18/2019

Appendix G: Results

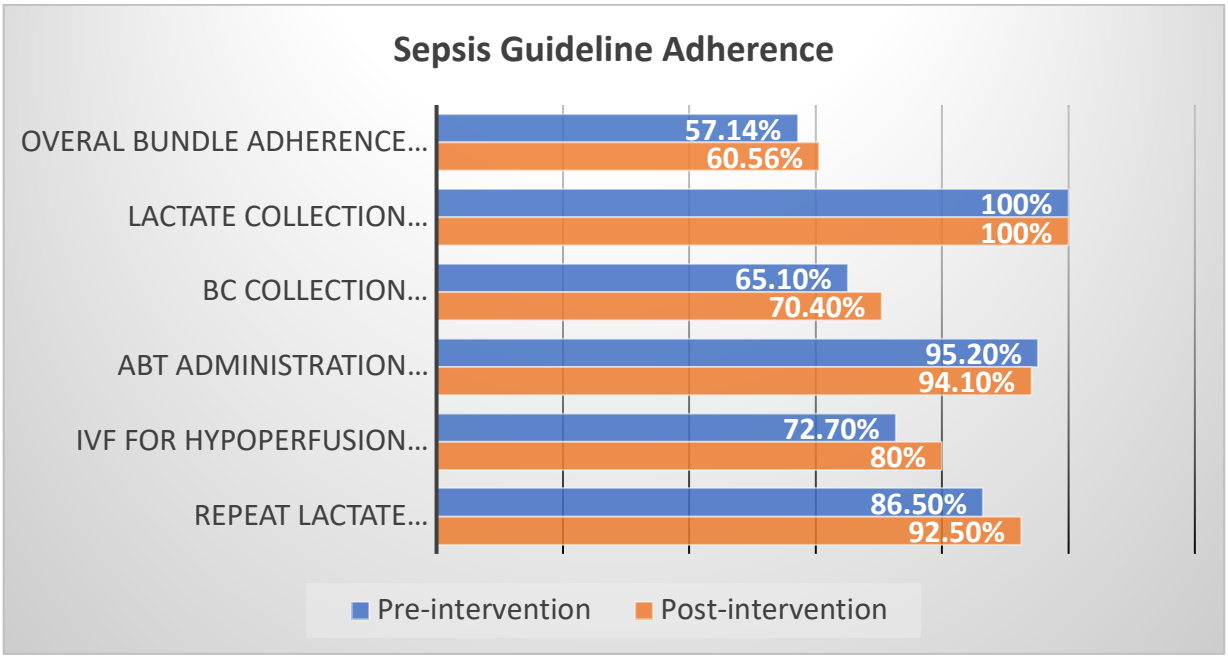

Table 1

Overall Sepsis Bundle Adherence

	Pre- or Post- intervention		
Group	Pre-	Post-	Total
Bundle met	36	43	55
Bundle not met	27	28	79
Total	63	71	134

χ^2 (1, N=134) = .161, p = .688

Table 2

Lactate Measurement

	Pre- or Post- intervention		
Group	Pre-	Post-	Total
Goal met	63	71	134
Goal not met	0	0	0
Total	63	71	134

No statistics computed

Table 3

Blood Culture Collection

	Pre- or Post- intervention		
Group	Pre-	Post-	Total
Goal met	41	50	91
Goal not met	22	21	43
Total	63	71	134

χ^2 (1, N=134) = .437, p = .508

Table 4

Antibiotic Administration

	Pre- or Post- intervention		
Group	Pre-	Post-	Total

Goal met	59	64	123
Goal not met	4	7	11
Total	63	71	134

χ^2 (1, N=134) = .546, p = .460

Table 5

IVF (30ml/kg) for Sepsis Induced Hypoperfusion

	Pre- or Post- intervention		
Group	Pre-	Post-	Total
Goal met	16	20	36
Goal not met	6	5	11
Total	22	25	47

χ^2 (1, N=47 = .345, p = .557

Table 6

Repeat Lactate if Initially Elevated

	Pre- or Post- intervention		
Group	Pre-	Post-	Total
Goal met	32	37	69
Goal not met	5	3	8
Total	37	40	77

χ^2 (1, N=77 = .747, p = .388