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### Improving Compliance with the SEP-1 Sepsis Management Bundle

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**Improving Compliance with the SEP-1 Sepsis Management Bundle**

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Internship NURS 670 – K9B

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## Abstract

**Problem:** Providing high quality sepsis care is an organizational priority, however this medical center has only met the target compliance goal for the Centers for Medicare & Medicaid Service (CMS) SEP-1 sepsis management bundle 50% of the time over the past year. Root cause analysis has revealed that 40% of the fallouts have been attributed to non-compliance with the intravenous fluid bundle element.

**Context:** A microsystem analysis was completed on the quality department, a supporting microsystem to the larger mesosystem involved with providing acute sepsis care. A return-on-investment analysis demonstrated that efforts to improve sepsis care and reduce sepsis progression could have significant cost savings for each patient that has reduced morbidity or length of stay.

**Intervention:** An online education module focused on weight-based intravenous fluid orders was developed and assigned to all emergency department and inpatient nurses. A sepsis bundle checklist tool was implemented, and huddle messages were also delivered at physician staff meetings.

**Measures:** The outcome measure was the percent of adult patients with severe sepsis and/or septic shock that met all elements of the CMS SEP-1 sepsis management bundle. Process measures included compliance with the intravenous fluid bundle element as well as compliance with order set use.

**Results:** The outcome measure of overall SEP-1 compliance post project implementation rose from 69.3% to 71.4%. Intravenous fluid bundle compliance rose from 81.6% to 100% for adult patients with septic shock and from 86% to 87% for adult patients with severe sepsis. Compliance with use of the septic shock order set rose from 45.6% to 77.6% post project implementation.

**Conclusions:** In conclusion, the implications for practice based on this project are significant. While the specific project aim was not achieved, in the short span of 4 months substantial improvements were seen with intravenous fluid sepsis bundle element compliance as well as sepsis order set utilization. It is expected that these improvements will contribute to ongoing improved compliance with the CMS SEP-1 sepsis management bundle moving forward.

## **Improving Compliance with the SEP-1 Sepsis Management Bundle**

Sepsis is a medical emergency and a health condition that poses many challenges for our current healthcare system. Sepsis affects more than 1.7 million patients in the United States each year, with nearly 270,000 deaths (Centers for Disease Control and Prevention, 2020). It is the number one cause of in-hospital mortality (Afshar et al., 2019). It is estimated that one out of every three patients that dies in a hospital has sepsis (CDC, 2020). In addition to high mortality rates, sepsis is also the costliest condition for the U.S. healthcare industry, with estimated costs of \$62 billion annually (Sepsis Alliance, 2020). These dire statistics uncover how much our health system is impacted by sepsis.

The high mortality rates and costs of sepsis have not gone unnoticed. Beginning in 2015, the Centers for Medicare & Medicaid Service (CMS) began mandating reporting of Severe Sepsis/ Septic Shock bundle performance in the Hospital Inpatient Quality Reporting Program (Afshar et al., 2019). This CMS core measure, titled SEP-1, includes standardized one size fits all 3- and 6-hour bundle elements designed to improve acute sepsis treatment and reduce sepsis mortality rates (Afshar et al., 2019). These sepsis bundle elements include early fluid resuscitation, blood cultures, lactate levels, and antibiotic administration. Although consensus is mixed regarding SEP-1 bundle guidance due to the all or none approach, there is agreement that early sepsis care and treatment can reduce associated mortality and morbidity.

### **Problem Description**

Regional dashboards comparing 21 medical centers belonging to a large managed healthcare organization in Northern California are updated monthly displaying current metrics for several quality measures ranging from mobility to smoking cessation. For one medical center located in Northern California that is part of this managed healthcare system, compliance with the CMS SEP-1 composite measure has been an ongoing struggle to meet. Considering that compliance with this measure is publicly reported, this metric has been identified as a “metric that matters” in the Quality Department

microsystem. As the Quality Department functions as a supporting microsystem to the larger mesosystem, the setting for sepsis performance improvement includes both the emergency department as well as the inpatient hospital units.

Providing high quality sepsis care is an organizational priority of this managed healthcare organization's overall goal for mortality and morbidity reduction. The compliance goal for the SEP-1 core measure set by the regional managed health care organization is 75% (The Permanente Medical Group Consulting Services, 2022). Over the last 3 years, this medical center has only met the SEP-1 compliance goal 50% of the time. While the regional SEP-1 compliance average over the last 12 months is 75.8%, this medical center has an average of only 69.3% (Regional Data Consulting, 2022). At this medical center, there have been 23 identified SEP-1 fallouts over the last 12 months (Regional Data Consulting, 2022). Further breakdown and root cause analysis of each fallout has revealed that 40% of these SEP-1 fallouts are attributed to non-compliance with the intravenous fluid requirement and more than half of the fluid fallouts were due to missed documentation opportunities by registered nurses (RNs).

SEP-1 fallouts associated with improper nursing documentation of intravenous fluids has been identified as a process gap and an opportunity for improvement. It is hypothesized that preventing fallouts due to nursing charting errors associated with weight-based fluid documentation, would contribute to increasing this medical center's compliance rate with the SEP-1 core measure. Although current research demonstrates that there is an increased need for high quality evidence based on randomized controlled trials to guide acute sepsis care, current available research does suggest that increased SEP-1 compliance is associated with a reduction in mortality rates attributed to sepsis (Townsend et al., 2022). Therefore, not only will educating nurses about the weight-based fluid help improve patient outcomes and quality metrics for this medical center, but it will also help improve the public image of sepsis care as SEP-1 data is publicly available for consumers via the CMS Care Compare website (Barbash et al., 2019).

## Available Knowledge

### PICOT Question

The following PICOT question was used to guide the literature review and synthesis of evidence-based best practices related to CMS SEP-1 bundle compliance. In adult patients with severe sepsis or septic shock (P), how does focused nursing education on IV fluid administration and documentation (I) compared to usual care (C) influence CMS SEP-1 bundle compliance (O) over three months (T).

### Literature Review

A comprehensive review of literature was conducted focused on the CMS SEP-1 core measure with a specific emphasis on the fluid bundle element of acute sepsis care. Peer reviewed research articles dating from 2016-2022 were searched for using databases including CINAHL, PubMed, and Cochrane. The following search terms and phrases were used: *CMS SEP-1*, *early goal directed therapy*, *weight-based fluid and sepsis*, and *nursing and sepsis bundles*. Five articles were identified as relevant to the PICOT question and evaluated using the John Hopkins Evidence-Based Practice appraisal guidelines (Dang & Dearholt, 2017). See Appendix A for evaluation table.

Townsend et al., published a comprehensive retrospective cohort study evaluating the impact of SEP-1 bundle compliance on mortality. This study, given an evidence rating of II A, included analysis of nationwide data reported to Medicare from 3,241 hospitals. Analysis demonstrated a statistically significant reduction in mortality associated with all SEP-1 bundle elements except vasopressors (Townsend et al., 2022). This study is useful in supporting rationale for complying with SEP-1 bundle elements to improve patient care.

A retrospective cohort study published by Liu et al. evaluated the implementation of sepsis treatment bundles for septic patients with intermediate lactate values across 21 hospitals in an integrated healthcare delivery system. This study was given an evidence rating of IIB. Results from the study found there was a statistically significant reduction in hospital and 30-day mortality among septic

patients with a history of heart failure or kidney disease after implementation of the sepsis bundles attributed to increased compliance with fluid administration targets (Liu et al., 2016). This study is useful in supporting the importance of adherence to the fluid bundle element in relation to decreased mortality.

In a quasi-experimental retrospective cohort study, given an evidence rating of II B, Baghdadi et al., compared SEP-1 bundle compliance between community onset sepsis identified in the emergency room vs. hospital onset sepsis. This study demonstrated that patients with hospital onset sepsis were less likely to receive care complying with SEP-1 bundle guidance within the recommended time frames in comparison with community onset sepsis (Baghdadi et al., 2020). This study is useful in supporting the argument that education regarding SEP-1 bundle compliance is needed in the inpatient setting in addition to the emergency department.

Barbash et al. published a longitudinal cross-sectional cohort study in 2021 exploring the impact of SEP-1 measure implementation across 11 medical centers. This study was given an evidence rating of II B. Analysis of the study revealed that there were not statistically significant changes in clinical outcomes associated with the implementation of the SEP-1 sepsis management bundle, however changes in process measures were evident including increased compliance with lactate measurement, timely antibiotic administration, and early fluid resuscitation (Barbash et al., 2020). This study is useful in illustrating the complexities and limitations of the CMS measure, as well as the impact that CMS core measures can have on increasing compliance with process measures.

In a systematic review by Pepper et al., given an evidence rating of II B, 17 observational studies were reviewed to evaluate the evidence supporting early antibiotics, weight-based fluid resuscitation, and repeat lactate measurements in adults with sepsis. This study demonstrated consistent survival benefit associated with antibiotic administration and fluid resuscitation, however statistical significance was not achieved (Pepper et al., 2019). This study is useful to provide a background concerning the lack

of strong evidence to support the specificity of SEP-1 bundle elements and the continued need for quality evidence based on randomized controlled trials.

In summary, the body of evidence revealed that although the SEP-1 sepsis management bundle continues to be vigorously debated for the composite bundle approach to sepsis care, there is a positive association between bundle adherence and decreased mortality. When taking into consideration the burden and impact that sepsis has on our current healthcare industry, the body of evidence did recognize the need for acute sepsis management guidelines to improve health outcomes. All studies highlighted the complexities of the sepsis management bundle and the need for further evidence-based research to support such a measure that has been nationally implemented with public reporting requirements.

### **Rationale**

The theory used to guide this project is Everett Roger's Diffusion of Innovations Theory (Kaminski, 2011). This theory is a change model that suggests that there are five stages involved in the process of adopting a new idea or practice as well as five categories of adopters that influence the course of adoption (Kaminski, 2011). The five-stage adoption process includes the knowledge or awareness stage, the persuasion or interest stage, the decision or evaluation stage, the implementation or trial stage, and the confirmation or adoption stage (Kaminski, 2011). When a new process is introduced, it gains momentum over time as it works through the five categories of adopters including innovators, early adopters, early majority, late majority, and laggards (Kaminski, 2011). The goal is to implement the new process to meet the needs of all categories of adopters.

During the initial stages of this project, the sepsis nurse champions were targeted as the innovators. Focused education about the learning module and handoff tools were presented to them along with context and scientific rationale about the organizational priority to improve compliance with the sepsis management bundle. Once the innovators were motivated by the project, they spread their



influence to the early adopters, and encouraged them to complete the education module and utilize the handoff tool. Once the early adopters felt comfortable with the new sepsis order sets, documentation requirements, and rationale for change, they then influenced the early majority who then began to complete the learning module and improve their practice. The early majority then influenced the late majority, who were initially skeptical of the change. Demonstrating the success and ease of the educational module and impact on bundle compliance was important at this point. Once the late majority of nurses complete the education module and started using the handoff tool, they will hopefully influence the laggards who may resist participating in the education module and handoff tool use. Using this model to implement new ideas into the microsystem will eventually result in “diffusion” or adoption of the new idea once it spreads through all five categories.

Peer to peer communication and networking are important components of this theory regarding overall acceptance of the new idea or process (Kaminski, 2011). This model is the best fit for this project, because a new process of documenting IV fluids is required to meet SEP-1 bundle compliance based on the current sepsis order sets for this medical center. Identifying the innovators and early adopters were critical to the success of this proposed change in practice.

### **Specific Project Aim**

The specific aim of this project to increase compliance with the CMS SEP-1 sepsis management bundle from an average of 69.3% to >75% compliance in the adult patient population with severe sepsis and/or septic shock by June 30th, 2022.

### **Context**

The context of this project was evaluated using a microsystem assessment and SWOT analysis. Microsystems are the frontline units that provide care to patients, and they are often referred to as the building blocks of healthcare systems. According to Capella (2019), “When these subgroups function well together, the organization thrives. However, when they do not function well together, the

organization stops functioning effectively.” Clinical nurse leaders can improve health care outcomes by recognizing gaps and variances within their microsystem and supporting practices that reduce clinical variability (Bender et al., 2019). Care of the adult sepsis patient occurs across various inpatient units and departments of the hospital; therefore, the microsystem analysis was completed on the quality department, which is a supporting microsystem to the larger mesosystem. See Appendix B for Microsystem Assessment.

### **Microsystem Purpose**

While the quality department does not directly provide care to patients, it does provide direct support and direction to all other frontline clinical microsystems within the hospital. Supporting microsystems serve as the foundation to clinical microsystems guiding service delivery, quality, safety, reliability, efficiency, innovation, staff morale, and patient/customer satisfaction (Institute for Excellence in Health and Social Systems, 2021). The purpose of the Quality Department is to support the hospital in maintaining compliance with regulatory standards and to support the continuous monitoring and evaluation of the improvement of patient care processes and services.

### **Microsystem Patients, Professionals, & Processes**

The patients or rather "customers" that the Quality Department serve are the various hospital clinical microsystems that partake in direct patient care as well as regulatory and non-regulatory reporting agencies. The professionals that make up the Quality Department function as team members, each with different responsibilities that all support the department's purpose. The processes that the department members tackle include accreditation regulatory and licensing, infection prevention and control, patient safety and risk management, Doctor of Medicine (MD) credentials and privileges, peer and department quality referrals, policy and procedure oversight, clinical decision support, metric auditing, performance improvement initiatives, and volunteer services. Improving sepsis care is an

organizational priority that is facilitated and guided by the sepsis program coordinator RN that works within the Quality Department microsystem.

### **Microsystem Patterns**

The Quality Department is driven by patterns, metrics that matter, and data. Regional and local initiatives, measures, and databases focused on improving the care and safety of the patient population are at the core of performance improvement initiatives guided by the Quality Department. While reviewing processes and patterns, many gaps and areas of concern were identified. One specific area of interest is the continued struggle to meet compliance goals with the CMS SEP-1 core measure. Patterns of sepsis bundle fallouts have been identified and attributed to increased fallouts occurring due to the timing of order set redesign and RN charting errors. There have also been patterns of repeat lactate sepsis bundle fallouts occurring soon after transition from the emergency department (ED) to the inpatient setting. Identifying patterns helps guide performance improvement initiatives.

### **SWOT Analysis**

A strengths, weaknesses, opportunities, and threats (SWOT) analysis of the mesosystem caring for adult patients with acute sepsis in the hospital setting was completed to evaluate the rollout of this project. Advantages to completing a SWOT analysis is that it focuses on both positive and negative aspects of the internal and external contextual factors that may influence the achievement of goals (Hollingsworth & Reynolds, 2020). Strengths included the strong facilitating team of the project including collaborative participation of both emergency department and inpatient MD sepsis champions and nurse leaders, as well as the senior leadership support of the organizational priority to improve sepsis care. Weaknesses include the fact that this project is being rolled out to various microsystems within the meso-system, therefore uniformity and consistency is lacking. Emergency department (ED) RNs and inpatient RNs are being educated using the same modality, yet their roles as care providers is quite different. Opportunities include the possibilities to improve other aspects of the sepsis care bundle

as well as other performance improvement initiatives that accelerate the sepsis program as a whole. Threats include staff turnover, limited staffing, high census, staff burnout, on-line educational module fatigue, and reluctance to utilize the paper check list tool. If nurses are overwhelmed and short-staffed, they may not have the time and/or bandwidth to complete the learning activity and participate in the change process. See Appendix C for SWOT analysis.

### **Return on Investment Plan**

A return-on-investment analysis was completed prior to the implementation of this project demonstrating that the interventions involved could be initiated with very minimal costs when compared to the potential financial savings. Designing and implementing the HealthStream educational module was associated with no extra costs, as that modality of virtual education delivery was already in use by the hospital organization. The module was designed so that nurses could complete it in less than 10 minutes to minimize any associated overtime pay. With 189 registered nurses assigned to complete the module in 10 minutes or less, estimated costs for the education time was \$3,314. Printing and distributing the sepsis checklist tool was associated with a minimal cost of \$75 per 500 sheets of paper, based on the estimated costs of color printing to be 12- 15 cents per page (Errera, 2019). Time required to implement the education module, print and distribute handoff tools, and conduct meetings was determined to be part of the normal workflow for the hospital organization sepsis coordinator with no extra costs.

A retrospective observational study published in 2018 that looked at data from over 2.5 million adult patients in the United States discharged with sepsis demonstrated that costs varied by the severity of sepsis (Paoli et al., 2018). The average cost of care per individual hospitalization was \$16,324 for sepsis, \$24,638 for severe sepsis, and \$38,298 for septic shock (Paoli et al., 2018). Average daily hospital costs were \$1,830 for sepsis, \$2,193 for severe sepsis, and \$3,087 for septic shock (Paoli et al., 2018). Mortality and length of stay also increased with increasing sepsis severity, therefore supporting efforts

to improve early identification and care of sepsis provides opportunities to reduce the severity of sepsis and overall economic burden of sepsis (Paoli et al., 2018). Considering that this performance improvement initiative is focused on improving compliance with the CMS SEP-1 sepsis management bundle and preventing sepsis progression, the hospital organization could have significant cost savings for each patient that has reduced morbidity or length of stay associated with higher quality acute sepsis care. See appendix D for Cost Benefit Analysis.

### **Communication Plan**

A communication plan was utilized to ensure transparency and timely feedback to key stakeholders throughout the project timeline. Project implementation, progress, and outcomes were discussed weekly via e-mail with sepsis program champions and department nurse managers and discussed monthly during the interdisciplinary hospital wide sepsis committee meeting. Monthly routine check-ins were also held with the Director of Quality, who then reported information and data to the Area Quality Leader.

### **Intervention**

A focused on-line HealthStream education module and learning assessment quiz was created in collaboration with the sepsis program coordinator quality nurse consultant, ED sepsis champion physician, and ED assistant nurse manager. The module consisted of a seven slide Power Point presentation and a 4-question quiz specifically focused on accurate administration and medical administration record documentation of weight-based intravenous fluid orders. The initial slides highlighted the rationale for intravenous fluid resuscitation in the early stages of sepsis management as well as illustrated the recent updates to the sepsis order set that guides physicians to order fluids based on the 30ml/kg option as recommended by the SEP-1 sepsis management bundle. The following slides illustrated the complexities of the weight-based fluid order such as the option for ideal body weight for patients with a body mass index (BMI)>30 as well as the option to take credit for fluids given prior to the

order being written by the physician. The next slides exposed the "problem" involving incorrect administration and documentation of IV fluid amount given, and the "solution" of administering and documenting the fluids to match the physician's order by manually entering the amount given rather than by just scanning and accepting a 1-liter IV bag of fluids. The module is followed by a 4-question learning assessment with a 75% minimum passing percentage. The learning module has been assigned to all emergency department (ED) RNs as well as inpatient RNs caring for the adult population.

A checklist tool to be used between handoff of care between the emergency department and the inpatient setting has also been created with a focus on promoting communication between care providers regarding any outstanding sepsis bundle elements. This tool was created in collaboration with the ICU RN manager and inpatient RN champion. Inpatient RNs were encouraged to use this checklist when they received report from the ED RN, with the hopes that the tool could guide the discussion to ensure that any missed bundle elements would be carried out once the patient arrived to the floor. See appendix E for Process Map.

Focused huddle messages were designed and delivered at hospitalist and ED physician staff meetings regarding the updated sepsis order sets as well as the new smart phrases designed to meet compliance with the CMS SEP-1 sepsis management bundle. The sepsis coordinator has collaborated with the ED Sepsis MD champion to ensure that all ED physicians have access to the new sepsis smart phrases. These smart phrases have been designed at the regional level for providers to use when they choose not to order the full 30ml/kg of fluids based on clinical presentation and their rationale for that choice. Additionally, the sepsis coordinator collaborated with the hospital-based-medicine physician champion to ensure that his colleagues have access and awareness of the smart phrase.

Edward Deming's Model for Improvement was used to guide the project by applying "Plan Do Study Act" cycles to evaluate and adapt to small tests of change (Associates in Process Improvement, 2022). We had two PDSA cycles with the HealthStream module role out. After planning and preparing

the module, it was assigned to all inpatient and emergency department nurses. During the study phase, feedback was gathered by assistant nurse managers regarding the module and associated quiz. Several of the nurses that completed the module during the first few week's post implementation were confused by one of the quiz questions, so we adapted the quiz for more clarity. We also had three PDSA cycles with the checklist. After the initial planning and roll out of the checklist, we have since adapted it twice to make it more user friendly and less time consuming to complete.

### **Study of the Intervention**

Baseline data was obtained from the facility level MIDAS database sepsis core measure report ranging from February 2021 through January of 2022. The population criteria included patients over the age of 18 admitted to a community hospital that met severe sepsis and/or septic shock criteria. Patients that transferred in from another facility were excluded. A root cause analysis of all fallouts from the 12-month time range were reviewed to analyze patterns and identify process gaps.

After the intervention was introduced, current data was reviewed on a weekly basis from health records on a minimum of 10 adult patients identified with severe sepsis and/or septic shock to assess the impact. Current metric data from the regional sepsis dashboards in addition to the MIDAS database sepsis core measure report were also reviewed and analyzed. Data elements gathered after the intervention included overall CMS SEP-1 compliance, compliance with documentation by the RN in the medical administration record for weight based intravenous fluid orders, sepsis order set use by the physician, sepsis fluids smart phrase use by the physician, checklist use by the RN, and any adverse events related to fluid resuscitation of septic patients such as fluid overload requiring intubation. See Appendix F for Project Charter.

### **Measures**

Outcome, process, and balancing measures were used to evaluate the process and outcomes of the intervention. The outcome measure was the percent of adult patients with severe sepsis and/or

septic shock that met all elements of the composite sepsis management bundle as defined by the CMS SEP-1 core measure. This outcome measure was chosen due to the all or none approach of the SEP-1 measure, in that all bundle elements must be met to improve overall compliance. The numerator was the number of patients in the regionally abstracted sample of patients with an ICD-10 principal diagnosis coding of sepsis that meet all CMS SEP 1 bundle elements and the denominator was the number of patients in the selected sample.

The first process measure included the percent of adult sepsis patients with correct RN medical administration record documentation of weight-based IV fluids. This measure was utilized to study the impact of the education module intervention on accurate administration and documentation of IV fluids. This was chosen due to the identified pattern of many fluid bundle fallouts in the previous 12 months being attributed to incorrect RN documentation. The second process measure was the compliance rate with physician use of the sepsis order set. This was measured by looking at whether or not the physicians have ordered sepsis elements a la carte or by using the structured order set that guides them to meet all bundle elements.

The identified balancing measure was adverse outcomes due to IV fluid resuscitation in the acute sepsis treatment phase including the possibility of fluid overload requiring intubation. This element was chosen because initial IV fluid resuscitation continues to be controversial for patients with high risk of complications, however data suggests that intubation rates do not increase after the recommended 30 ml/kg of fluids (Kahn et al., 2019). This data was gathered via chart review, the weekly regional sepsis report, and the house supervisor report. This balancing measure was chosen based on historical review of ED and hospitalist admission notes documenting reasons for IV fluids not given, with the most common documented reason being due to risk for fluid overload.



### **Ethical Considerations**

The American Nurses Association (ANA) Code of Ethics for Nurses with Interpretive Statements was reviewed to evaluate ethical considerations (ANA, 2015). This project best aligns with the ANA Code of Ethics Provision 4, which states that "the nurse has authority, accountability, and responsibility, for nursing practice; makes decision; and takes action consistent with the obligation to promote health and to provide optimal patient care" (ANA, 2015). The current identified issue of registered nurses not administering or documenting the correct amount of IV fluids, is consistent with not following the doctors' orders which is an ethical concern. The sepsis order set was designed to support evidence-based practice and acute care sepsis bundle management guidelines, and the learning module assigned to the nurses will help the nurses adhere to the physician orders and support the nurses with maintaining accountability for their nursing practice.

There are no ethical implications or potential conflicts of interest identified in regard to studying the interventions. A statement of determination was completed, acknowledging that this project is non-research based, but rather an evidence-based change of practice project. The aim of this project is to improve performance with the CMS Sep-1 sepsis management bundle and is a part of usual care. See appendix G Statement of Non-Research Determination Form.

### **Outcome Measure Results**

The outcome measure of overall CMS SEP-1 compliance has been reported for two months since the initiation of this project. With an overall sample size of 27 patients, 13 patients were excluded based on CMS SEP-1 abstraction guideline exclusion criteria. Of the remaining 14 patients, 10 patients met 100% compliance with all elements of the sepsis management bundle. Overall SEP-1 compliance for the two months since project implementation is 71.4%. Analysis of the 4 fallouts demonstrated that 3 of the 4 fallouts were attributed to noncompliance with the weight-based IV fluid bundle element, and one was due to an initial lactate not being drawn within the specified time frame. Of the fluid fallouts, one

was attributed to the physician ordering a la carte fluid boluses rather than using the sepsis order set, one was due to fluids not being ordered or initiated within 3 hours of sepsis time zero, and one was attributed to incorrect nursing documentation of weight-based intravenous fluids on the medication administration record.

Regional sepsis dashboards including data on 313 patients with an admitting diagnosis of severe sepsis and/or septic shock from July 2021 through June 2022 were monitored for adherence with the process measure of intravenous fluid bundle element compliance. For patients with septic shock, the mean compliance for weight-based IV fluid administration was 81.6% pre project implementation and 100% post project implementation. For patients with severe sepsis, the mean compliance with weight-based IV fluid administration for pre project implementation was 86% and post project implementation was 87%. A root cause analysis was completed on each fluid fallout post project implementation, demonstrating that there were 9 weight-based IV fluid bundle element fallouts, with 7 attributed to MD orders or lack of MD smart phrase use and 2 attributed to incorrect RN documentation on the medication administration record. Data on a total of 78 patients with septic shock from July 2021 through June 2022 was analyzed for physician use of the septic shock order set. The results demonstrated that the mean compliance rate with MD use of the septic shock order set prior to project implementation was 45.6% and post project implementation it rose to 77.6%. See appendix H for Run Charts.

Compliance with the sepsis checklist was challenging to obtain, with only intensive care unit sepsis champion and assistant nurse managers reporting. Since implementation, a total of 14 checklists have been submitted with an estimated utilization rate of 46% for patients admitted to the intensive care unit. Compliance with the physician smart phrase use was also analyzed from February 2022 through June 2022 demonstrating 56% compliance with 5 of 9 opportunities.

The balancing measure of adverse outcomes due to IV fluid resuscitation in the acute sepsis treatment phase including the possibility of fluid overload requiring intubation was studied from February 2022 through June of 2022 including 113 patients. Seven patients were intubated within 24 hours of arrival to the ED, and one case was attributed to flash pulmonary edema and fluid overload after aggressive fluid resuscitation. Therefore, there was an adverse outcome attributed to fluid resuscitation in 1 of 113 cases or 0.8%.

### **Summary**

Efforts involved with this project to improve compliance with the CMS SEP-1 sepsis management bundle did not achieve the project aim of increasing the average compliance rate from 69.3% to greater than 75%. Although the goal of greater than 75% was not achieved, the project did show improvement from 69.3% to 71.5%, which is a step in the right direction. Project implementation did correlate with substantial improvements in intravenous fluid bundle element compliance for septic shock patients and a minor improvement with severe sepsis patients as well. Compliance with physician use of the septic shock order set also dramatically improved after project implementation.

There are several key findings that contributed to the overall success of this project. Completing the microsystem assessment and diving deeper into the SEP-1 data at this facility exposed gaps and vulnerabilities that helped guide the focus of this project. Due to the complex nature of acute sepsis care spanning both the emergency department as well as inpatient units, another key finding was the importance of team member collaboration and communication regarding implementing tests of change. Leadership support as well as frontline staff engagement were imperative to the successful rollout of the focused education module. The final key finding was that making improvements to large composite CMS core measures takes time.

Lessons were learned regarding the complexity of improving compliance with a composite sepsis bundle measure. The improvements seen with individual bundle components and physician order

set use are only part of the equation. Ongoing gap analysis and focused improvement efforts are needed to impact overall compliance with the measure. Another lesson learned is that implementing the use of a new initiative during the ongoing Covid-19 pandemic when staffing is short and nursing morale is at an all time low, was significantly challenging. The biggest factor contributing to the overall success of this project was the multi-disciplinary shared vision to provide the highest level of acute sepsis care to our patients to reduce overall morbidity and mortality.

### **Conclusions**

In summary, this project should be considered a success. There was considerable improvement with two of the identified process measures, which has contributed to improved compliance with the CMS SEP-1 acute sepsis management bundle. With continued support of the project initiatives, continued improvement in sepsis bundle compliance is expected. The work completed is useful because this medical center is part of a managed healthcare system consisting of 21 hospitals that use the same sepsis order sets and workflows. Successful interventions could be shared to sister hospitals within the organization as part of the regional performance improvement plan. The sepsis coordinator at this medical center is part of a regional peer group with sepsis coordinators at all other medical centers in the managed healthcare system, therefore there is great potential for spread.

Usefulness of the work and sustainability depends on the continued success and teamwork of the local sepsis committee. Currently, the multidisciplinary team is very invested in improving and sustaining improvements aimed at acute sepsis care. Keeping physician sepsis champions and nursing leadership engaged and involved with continuous improvement with routine staff meeting updates is key to the continued success, ongoing progress, and sustainability of this project.

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## Appendix A

## Evaluation Table

Study	Design	Sample	Outcome/Feasibility	Evidence rating
<p>Baghdadi et al. Adherence to the SEP-1 sepsis bundle in hospital in hospital onset v. community onset sepsis: A multicenter retrospective cohort study. <i>Journal of General Internal Medicine</i>, 35(4), 1153-1160.  <a href="https://doi.org/10.1007/s11606-020-05653-0">https://doi.org/10.1007/s11606-020-05653-0</a></p>  <p>Baghdadi2020_Article_AdherenceToThe'</p>	<p>Quasi-experimental retrospective cohort study</p>	<p>4658 inpatients with diagnosis codes consistent with sepsis or disseminated infection from four university hospitals in California</p>	<p>Patients with hospital onset sepsis were less likely to receive care complying with SEP-1 bundle guidance within the recommended timeframe in comparison with community onset sepsis.</p> <p>This study is useful in supporting the argument that education regarding SEP-1 bundle compliance is needed in the inpatient setting in addition to the emergency department.</p>	<p>II B</p>
<p>Barbash et al. (2021). Treatment patterns and clinical outcomes after the introduction of the Medicare sepsis performance measure (SEP-1). <i>Annals of internal medicine</i>, 174, 927-935  <a href="https://doi.org/10.7326/M20-5043">https://doi.org/10.7326/M20-5043</a></p>  <p>Barbash et al. 2021.pdf</p>	<p>Longitudinal cross-sectional cohort study</p>	<p>51,810 adult patients admitted with community onset sepsis to 11 hospitals in the University of Pittsburgh Medical Center System. This sample including 29,051 patients pre SEP-1 measure implementation and 22,759 post SEP-1 measure implementation.</p>	<p>Statistically significant changes in clinical outcomes were not evident after implementation of the SEP-1 sepsis management bundle, however changes in process measures were evident including increased compliance with lactate measurement, antibiotic administration, and fluid administration. This study is useful in illustrating the complexities and limitations of the SEP-1 CMS measure.</p>	<p>II B</p>
<p>Liu et al. (2016). Multicenter implementation of a treatment bundle for patients with sepsis and intermediate lactate values. <i>American Journal</i></p>	<p>Retrospective observational cohort study</p>	<p>Seventeen observational studies including 11,303 control subjects and 4,977 subjects that received a focused</p>	<p>This study demonstrated consistent survival benefit associated with antibiotic administration and fluid resuscitation, however statistical significance was not achieved in regards to</p>	<p>II B</p>



<p><i>of Respiratory and Critical Care Medicine</i>, 193(11), 1264-1270.  <a href="https://doi.org/10.1164/rcm.201507-1489OC">https://doi.org/10.1164/rcm.201507-1489OC</a></p>  <p>Liu et al. 2016.pdf</p>		<p>sepsis bundle that included antibiotic and fluid administration with or without vasopressors.</p>	<p>antibiotic treatment time or ideal fluid volume amount. This study is useful to provide a background concerning the lack of strong evidence to support the specificity of SEP-1 bundle elements and the continued need for high quality evidence based on RCTs.</p>	
<p>Pepper et al. (2019). Antibiotic and fluid focused bundles potentially improve sepsis management, but high quality evidence is lacking for the specificity required in the Centers for Medicare and Medicaid Service's sepsis bundle (SEP-1). <i>Critical Care Medicine</i>, 47(10), 1290-1300.  <a href="https://doi.org/10.1097/CCM.0000000000003892">https://doi.org/10.1097/CCM.0000000000003892</a></p>  <p>Pepper et al. 2019.pdf</p>	<p>Systematic review of 17 observational studies (quasi-experimental)</p>	<p>Seventeen observational studies including 11,303 control subjects and 4,977 subjects that received a focused sepsis bundle that included antibiotic and fluid administration with or without vasopressors.</p>	<p>This study demonstrated consistent survival benefit associated with antibiotic administration and fluid resuscitation, however statistical significance was not achieved in regards to antibiotic treatment time or ideal fluid volume amount. This study is useful to provide a background concerning the lack of strong evidence to support the specificity of SEP-1 bundle elements and the continued need for high quality evidence based on RCTs.</p>	<p>II B</p>
<p>Townsend et al. (2022). Effects of compliance with the early management bundle (SEP-1) on mortality changes among Medicare beneficiaries with sepsis: A propensity score matched cohort study. <i>Chest</i>, 161(2), 392-406.  <a href="https://doi.org/10.1016/j.chest.2021.07.2167">https://doi.org/10.1016/j.chest.2021.07.2167</a></p>  <p>Townsend et al. 2022 .pdf</p>	<p>Quasi-experimental retrospective cohort study</p>	<p>This study included 337,770 patients <math>\geq</math> 18 years of age that met CMS inclusion criteria for SEP-1 eligibility, including 140,504 patients that met full bundle compliance and 193,266 patients that did not meet bundle compliance.</p>	<p>A comprehensive and recent study including nationwide data with a large sample size. Analysis demonstrated statistically significant reduction in mortality associated with all SEP-1 bundle elements except vasopressors. This study is useful in supporting rationale for complying with SEP-1 bundle elements to improve patient care.</p>	<p>II A</p>

## Appendix B

## Supporting Microsystem Profile

**A. Purpose:** Why does your microsystem exist? **The Quality Management Department's mission is to support the hospital in maintaining compliance with regulatory standards and to support the continuous monitoring and evaluation of the improvement of patient care processes and services.**

Name of Service: Quality Department      Site Contact: Marie Paulson, RN      Date: 9/27/21

Service Manager: Suzie Byrne, AQL      Service Lead: Marie Paulson, Quality, AR & I/Risk

**B. Know Your Customers:** Take a close look into your microsystem; create a "high-level" picture of the Customers that you serve. Who are they? What resources do they use/request? How do customers view the services they receive?

Est. Distribution of workload	%	List Your Top 10 Work type requests		Top requesting Customers	Customer Satisfaction Scores	% Excellent	
Source- Accreditation, Regulatory, and Licensing	30%	1. Accreditation, regulatory, and licensing	6. Policy and Procedure Oversight	Patient Care Services	Experience via phone	90%	
Source- Infection Prevention and Control	10%	2. Infection Prevention and Control	7. Clinical Decision Support	Regulatory Agencies and Non-Regulatory Reporting Agencies	Length of time to get complete work	90%	
Source- Patient Safety and Risk Management	25%	3. Credentials and Privileges	8. Metric auditing	Emergency Department	Accuracy of work	95%	
Source- Peer/ Department Review	10%	4. Patient Safety and Risk Management	9. Performance improvement initiatives	Surgical Services	Satisfaction with personal manner	95%	
Source- Other: Policy/ Procedures, Credentialing/ Privileges, etc.	25%	5. Peer and Department Quality Referrals	10. Volunteer Services	Physicians (Credentials and Privileges)	Satisfaction with work product	95%	
		Customers who are frequent users of your service and their reasons for interacting with your microsystem	Other services you interact with regularly as part of your normal work processes.		<b>Workload distribution: Do these numbers change by season? (Y/N)</b>	<b>#</b>	<b>Y/N</b>
					Workload in a day	20	Y
Est. # of work requests in last month	500				Workload in last week	100	Y
					Workload in last month	500	Y
<b>Top Payors</b>		Many different microsystems must collaborate with the Quality Department to meet accreditation, regulatory, and licensing requirements.	The Quality Department interacts with regulatory agencies for routine surveys to maintain accreditation and certifications as well as unscheduled regulatory visits.		Other: It is difficult to estimate workload for this department as there are several different employees that work on various focused areas that support quality management and risk. Per local leadership, it is estimated that the department has 20 work requests per day across the entire department.		

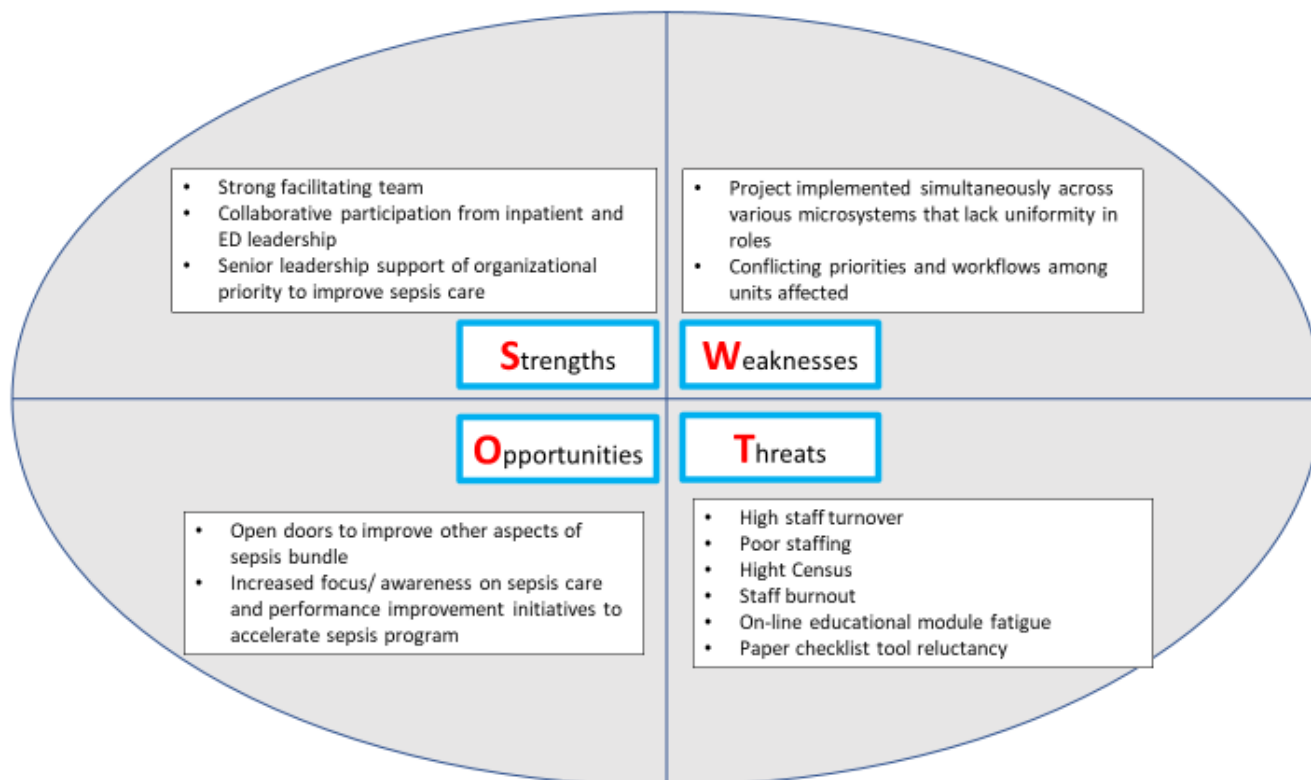
### \*Complete "Through the Eyes of Your Customer"

**C. Know Your Professionals:** Use the following template to create a comprehensive picture of your microsystem. Who does what and when? Is the right person doing the right activity? Are roles being optimized? Are all roles who contribute to the patient experience listed? What hours are you open for business? What is the morale of your staff?

Current Staff	FTEs	Role/Function	Days of Operation	Hours of Operation
Enter names below totals (Use separate sheet if needed)				
			Monday	8AM   5PM
			Tuesday	8AM   5PM
Microsystem Total			Wednesday	8AM   5PM
			Thursday	8AM   5PM
Title: Quality Nurse Consultant	3	The quality nurse consultants support quality initiatives and regulatory/ accreditation requirements.	Friday	8AM   5PM
1. Sona Mahal 2. Shawna Sturdevant 3. Allison Uppendahl		Sona's focus is patient care services, Shawna focus is surgical services, and Allison coordinates the Stroke and Sepsis Programs. All three also support department review.	Saturday	PRN
Title: Sr. Quality Consultant	2	The Senior Quality Consultants support various quality initiatives and risk management processes.	Sunday	PRN
1. Donna Klie 2. Alex Quiroga		Donna primarily supports department and peer review.	<b>Which activities are you involved in? Check all that apply.</b>	

		Alex supports various reporting requirements as well as risk reporting, ERRF management, and MIDAS database.	
Title: Infection Prevention Manager	1	Manages and coordinates the hospital infection prevention program.	<input type="checkbox"/> Electronic Work Request
1. Gina Passamani			<input checked="" type="checkbox"/> Data Management
Title: Volunteer Services Manager	.5	Coordinates the hospital volunteer program. Split FTE between Santa Rosa and San Rafael.	<input checked="" type="checkbox"/> Certification
1. Michael Cobbina			<input checked="" type="checkbox"/> Regularly attend clinical microsystem meetings you are supporting
Title: Sr. Quality Specialist	.5	Manages and maintains all licensed independent practitioner credentialing and privileges. Split FTE between Santa Rosa and San Rafael.	<input checked="" type="checkbox"/> Leadership meets regularly with clinical microsystems being supported
1. Karen Clark			
Managers			
Suzie Byrne	.5	Area Quality Leader, over Kaiser San Rafael and Kaiser Santa Rosa.	
Marie Paulson	1	Director of Quality Accreditation and Licensing. Director of Patient Safety and Risk.	
Other:			
<b>Work Type</b>	<b>Cycle Time</b>	<b>Comment</b>	
			Do you use a Float Pool? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
			Do you use On-Call? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
			Do you use Per Diems? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>Staff Satisfaction Scores</b>			
How stressful is this microsystem?	% Very stressed	30	
Would you recommend it as a good place to work?	% Strongly Agree	100	
<b>*Each staff member should complete the Personal Skills Assessment and "The Activity Survey"</b>			
<b>D. Know Your Processes:</b> How do things get done in the microsystem? Who does what? What are the step-by-step processes? How long does it take to complete the work here, are the delays? What are the "between" microsystems hand-offs? Have you discussed a shared purpose with clinical microsystems and other supporting microsystems?			
<b>1. Track cycle time from work requested, work assigned, work completed, final product sent to customer.</b> <ul style="list-style-type: none"> <li>Cycle time varies greatly due to the wide array of services provided. Our department is high functioning and is known for making deadlines. All activities by Quality Nurse Consultants and Senior Quality Consultants are overseen by the Director of Quality. Monthly check-ins with all staff members help keep people on track with larger projects and initiatives. We do discuss a shared purpose with other clinical microsystems and supporting microsystems, with that shared purpose being the mission statement of Kaiser Permanente to provide high quality affordable health care services and to improve the health of its members and communities.</li> </ul>			
<b>2. Complete the Core and Supporting Process Assessment Tool</b>			
<b>E. Know Your Patterns:</b> What patterns are present but not acknowledged in your microsystem? What is the leadership and social pattern? How often does the microsystem meet to discuss processes? Are customers involved? What are your results and outcomes?			
<ul style="list-style-type: none"> <li>Does every member of the microsystem meet regularly as a team?                             <ul style="list-style-type: none"> <li>Yes, we meet as a team every Tuesday morning.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Do the members of the microsystem regularly review and discuss errors, safety and reliability issues?                             <ul style="list-style-type: none"> <li>We discuss errors, safety, and reliability issues at various monthly committee meetings and staff meetings.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><b>What have you successfully changed?</b> <ul style="list-style-type: none"> <li>I have changed many elements of both our Stroke Program and Sepsis Program with an emphasis on clinician education. I have created all new education modules for stroke and various new sepsis education resources.</li> </ul> </li> <li><b>What are you most proud of?</b> <ul style="list-style-type: none"> <li>I am most proud of my community education projects for our stroke program.</li> </ul> </li> <li><b>What is your financial picture?</b> <ul style="list-style-type: none"> <li>I feel that the financial picture is stable in the Quality Department, although I do feel nervous at times by not being represented by a union.</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>How frequently?                             <ul style="list-style-type: none"> <li>Weekly</li> </ul> </li> </ul>			
<ul style="list-style-type: none"> <li>What is the most significant pattern of variation?                             <ul style="list-style-type: none"> <li>The biggest pattern of variation is social skills and professionalism.</li> </ul> </li> </ul>			

## Appendix C SWOT Analysis



## Appendix D Cost Benefit Analysis

	Budget	Costs
Nursing Educational Time for 189 Registered Nurses		\$3,314
Color Printing Cost/ Sepsis Bundle Checklist		\$75
	<b>\$3,500</b>	<b>\$3,389</b>

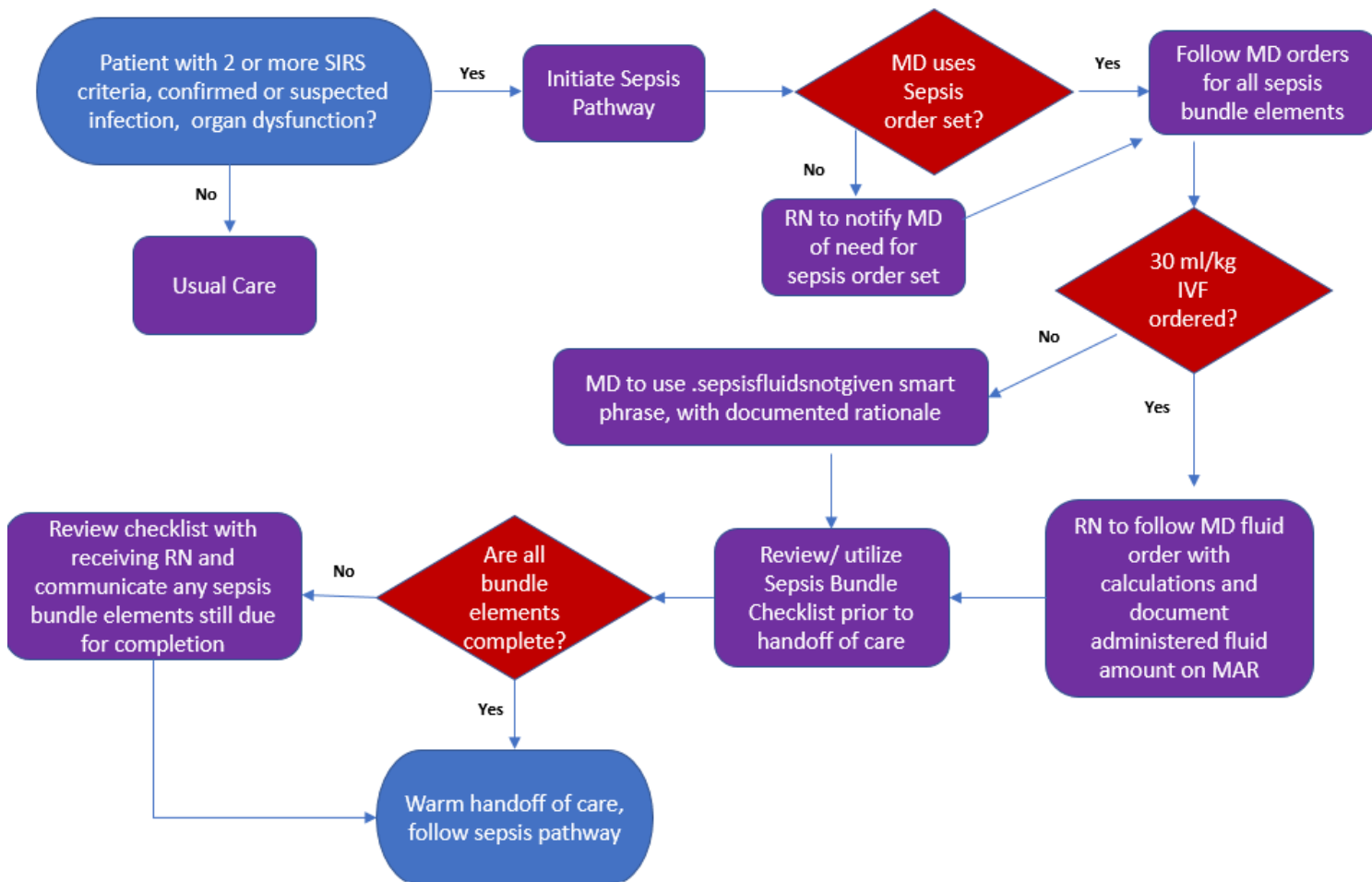
Estimate Daily Hospital Cost for Sepsis Based on Sepsis Severity	Daily Hospital Costs for Sepsis
• Sepsis	\$1,830
• Severe sepsis	\$2,193
• Septic Shock	\$3,087

Cost of Project Implementation	\$3,390
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Estimated cost savings by reducing the length of stay by one day for 10 patients over the course of a year	Cost Savings Per 10 Patients
• Sepsis	\$18,300 - \$3,390 = <b>\$14,910</b>
• Severe sepsis	\$21,930 - \$3,390 = <b>\$18,540</b>
• Septic Shock	\$30,870 - \$3,390 = <b>\$27,480</b>

Appendix E Process Map

Improving Compliance with the SEP-1 Sepsis Management Bundle Project Process Map



## Appendix F Project Charter

**Project Charter:** Improving Compliance with Severe Sepsis and Septic Shock Acute Treatment Bundles

**Global Aim:** The global aim is to improve severe sepsis and septic shock care by increasing compliance with the Centers for Medicare and Medicaid Services (CMS) SEP-1 sepsis management bundle.

**Specific Aim:** The specific aim of this project to increase compliance with the CMS SEP-1 sepsis management bundle from an average of 69.3% to >75% compliance in the adult patient population with severe sepsis and/or septic shock by June 30th, 2022.

### Background:

Sepsis is a medical emergency and a health condition that poses many challenges for our current healthcare system. Sepsis affects more than 1.7 million patients in the United States each year, with nearly 270,000 deaths (Centers for Disease Control and Prevention, 2020). It is the number one cause of in-hospital mortality (Afshar et al., 2019). Sepsis is also the costliest condition for the U.S. healthcare industry, with estimated costs of \$62 billion annually (Sepsis Alliance, 2020).

Beginning in 2015, the Centers for Medicare & Medicaid Service (CMS) began mandating reporting of Severe Sepsis/ Septic Shock bundle performance in the Hospital Inpatient Quality Reporting Program (Afshar et al., 2019). This CMS core measure, titled SEP-1, includes standardized one size fits all 3- and 6-hour bundle elements designed to improve acute sepsis treatment and reduce sepsis mortality rates (Afshar et al., 2019). Compliance with all sepsis bundle elements, excluding the vasopressor element, has been associated with a statistically significant reduction in mortality (Townsend et al., 2022).

### Sponsors

Clinical Nursing Director	L. D.
Director of Quality	M. P.
Emergency Department Assistant Medical Group Administrator	I. B.
Emergency Department Sepsis Champion MD	K. S.

### Goals

To improve compliance with the CMS SEP-1 sepsis management bundle via multimodal educational efforts for both physicians and nurses focused specifically on the intravenous fluid bundle element.

1. Development and assignment of HealthStream module for registered nurses focused on medical administration record documentation of IV fluid orders
2. Implementation of focused sepsis bundle “huddle” messages delivered to both inpatient and emergency department RNs
3. Standardize and implement root cause analysis review of fallouts with unit sepsis champions
4. Utilization of real time audit tools/ sepsis reports in the Emergency Department
5. Partner with physician sepsis champions to deliver focused education and sepsis updates at monthly physician staff meetings.

### Measures

Measure	Data Source	Target
<b>Outcome</b>		
% adult patients with severe sepsis and/or septic shock that meet all elements of the composite sepsis management bundle as defined by the CMS SEP-1 core measure.	Monthly Regional CQC Report MIDAS Core Measure Report StatIt Sepsis Report	75%
<b>Process</b>		
% adult sepsis patients with correct RN medical administration record documentation of 30ml/kg fluid orders	Chart review-Health connect	90%
% adult sepsis patients with fluid orders placed by the MD using the Sepsis order set	Chart Review-Health connect	90%
<b>Balancing</b>		
Potential increase in patients with fluid overload requiring intubation	Chart Review -Health Connect Weekly Regional Sepsis Report House Supervisor Report	< 1/month

### Team

MD Co-Lead	K.S.
RN Co-Lead	S.M.
CNS/Educator	G.G
Quality Nurse	A.U.
Staff nurse champion	S.N.
Pharmacy champions	C.Y.
MD champion	R.B.



### Measurement Strategy

**Background (Global Aim):** To improve sepsis care by increasing compliance with the Centers for Medicare and Medicaid Services (CMS) SEP-1 sepsis management bundle.

**Population Criteria:** Patients over the age of 18 admitted to a community hospital that meet severe sepsis and/or septic shock criteria. Patients that transfer in from another facility are excluded.

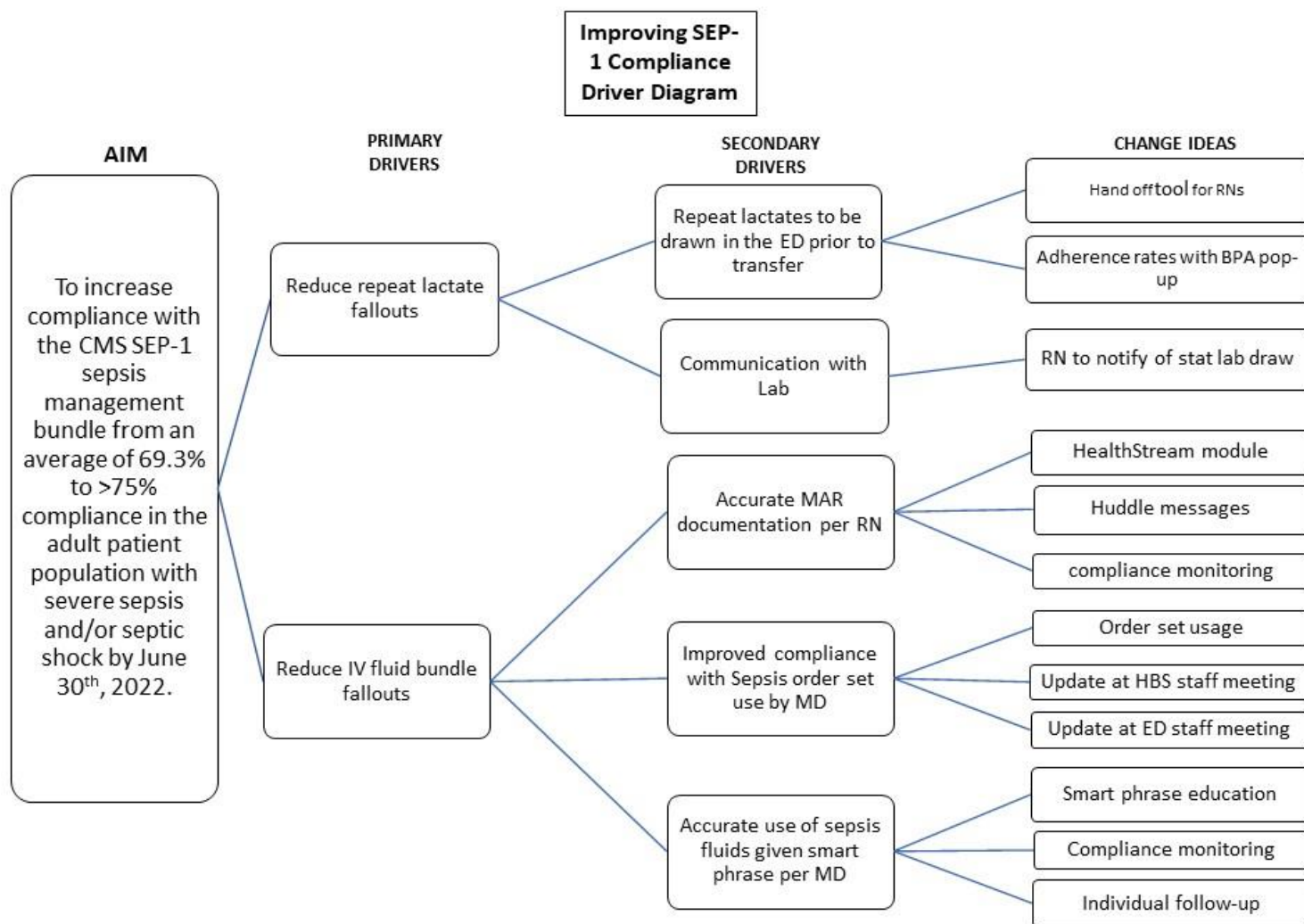
**Data Collection Method:** Baseline data will be obtained from the MIDAS database core measure reports from January 2021 through January of 2022. Current data will be reviewed on a weekly basis from health records on a minimum of 10 adult patients identified with severe sepsis and/ or septic shock.

#### Data Definitions

Data Element	Definition
SEP-1 Compliance	Overall compliance with the CMS SEP-1 composite sepsis management bundle
MAR charting of Sepsis IV Fluids	Documentation by the registered nurse in the medical administration record for weight based 30ml/kg intravenous fluids per MD order
Fluid orders per Sepsis Order Set	Intravenous fluid orders placed by the physician using the standardized sepsis order set.
Fluid overload requiring intubation	Patients that receive fluid resuscitation per sepsis bundle element that require ventilator support due to symptoms of fluid overload

#### Measure Description

Measure	Measure Definition	Data Collection source	Goal
% adult patients with severe sepsis and/or septic shock that meet all elements of the composite sepsis management bundle as defined by the CMS SEP-1 core measure.	N=# patients that meet all elements of the CMS SEP-1 sepsis management bundle D=# patients in the SEP-1 abstracted sample group that meet criteria for severe sepsis/ septic shock	MIDAS monthly Sepsis core measure report	75%
% adult sepsis patients with correct RN medical administration record documentation of 30ml/kg fluid orders	N= # patients with RN MAR administration per MD order D=# patients with 30 ml/kg IV sepsis fluids ordered	Chart review- Health Connect	90%
% adult sepsis patients with fluid orders placed by the MD using the Sepsis order set	N= # patients with IV fluids ordered per sepsis order set D=# patients with severe sepsis/ septic shock	Chart Review- Health Connect  Weekly regional sepsis report	90%



### **Changes to Test**

- 1.** Will creation and assignment of a HealthStream module focused on medical administration charting of sepsis IV fluids improve compliance with the fluid bundle element of the SEP-1 sepsis management bundle?
- 2.** Will utilization of a sepsis bundle checklist to be used during handoff of care between the ED and inpatient units decrease fallouts with the repeat lactate sepsis bundle element?
- 3.** Will delivery of a focused sepsis education message on the new sepsis smart phrases and updated sepsis order sets at MD staff meetings increase usage of the smart phrase and overall compliance with the fluid element of the SEP-1 sepsis management bundle

## Gantt Chart

Gantt Chart Improving Compliance with SEP 1				March 2022		April 2022		May 2022		June 2022	
		Week Of		3/6 - 3/19	3/21- 4/2	4/3-4/16	4/17- 4/30	5/1-5/14	5/15- 5/28	5/29- 6/11	6/12- 6/30
		Target End Date	Status								
W k	Major Milestones/ Deliverables	Target End Date	Status								
1	HealthStream Module Design	3/6/22	complete	complete							
1	HealthStream Module Assignment	3/7/22	complete	complete							
4	Team Building/ Team STEPPS	4/8/22	complete		in progress	complete					
5	Huddle message development	4/12/22	complete			in progress	in progress	complete			
8	Handoff tool checklist /design	4/30/22	complete				in progress	complete			
9	HBS huddle message/ staff meeting	5/3/22	complete					planned	In progress	complete	
11	ED MD huddle message/ staff meeting	5/19/22	complete					planned	In progress	complete	
13	Data Review/ Sepsis Committee	6/3/22	complete							planned	complete

### CNL Competencies

<p>Essential 2: Organizational and Systems Leadership</p>	<p>Essential 2-Competency 2: “Assume a leadership role of an interprofessional healthcare team with a focus on the delivery of patient-centered care and the evaluation of quality and cost effectiveness across the healthcare continuum” (American Association of Colleges of Nursing, 2013).</p> <ul style="list-style-type: none"> <li>• During this performance improvement project, this RN will assume a leadership role facilitating the monthly sepsis committee and subgroup team focused on improving compliance with the CMS SEP-1 sepsis management bundle, leading to improved sepsis outcomes and decreased length of stay.</li> </ul>
<p>Essential 3: Quality Improvement and Safety</p>	<p>Essential 3- Competency 4: “Perform a comprehensive microsystem assessment to provide context for problem identification and action ” (American Association of Colleges of Nursing, 2013).</p> <ul style="list-style-type: none"> <li>• This RN has completed a comprehensive microsystem assessment of the quality department and reviewed available data and metrics specific to the medical facility. After reviewing facility data on quality measures from the previous 24 months, this RN was able to identify gaps in poor performance and opportunities for improvement with sepsis care for the adult patient population.</li> </ul>
<p>Essential 5: Informatics and Healthcare Technologies</p>	<p>Essential 5- Competencies 1 c, d, f: “Use information technology, analytics, and evaluation methods to: collaborate to analyze data from practice and system performance, design evidence-based interventions in collaboration with the health professional team and identify gaps in evidence of practice” (American Association of Colleges of Nursing, 2013).</p> <ul style="list-style-type: none"> <li>• This RN has also utilized hospital metric reports to gather baseline data from the previous 12 months specific to the CMS SEP-1 sepsis management bundle. Patterns of fallouts with IV fluid management and repeat lactate compliance were identified and further root cause analysis performed by the sepsis committee demonstrated the need for focused RN and MD education on a few specific topics. Technology was used to deliver a HealthStream module to ED and inpatient RNs.</li> </ul>

**Appendix G Statement of Non-Research Determination Form**

**CNL Project: Statement of Non-Research Determination Form**

**Student Name:**     Allison Uppendahl    

**Title of Project:** Improving compliance with the Centers for Medicare and Medicaid Services SEP-1 Sepsis Management Bundle

**Brief Description of Project:** This project is designed to specifically focus on improving compliance with the fluid bundle element of the CMS SEP-1 core measure via focused multimodal and multidisciplinary education efforts with nursing staff and physicians.

**A) Aim Statement:** The aim of this project to increase compliance with the CMS SEP-1 sepsis management bundle from an average of 69.3% to >75% compliance in the adult patient population with severe sepsis and/or septic shock by June 30th, 2022.

**B) Description of Intervention:** A HealthStream module will be developed and assigned to all registered nurses in the emergency department and inpatient units focused on accurate administration and documentation of IV fluids per the standardized sepsis order sets. Huddle messages will be distributed to assistant nurse managers to be delivered at change of shift huddles, and focused sepsis updates will be delivered at physician staff meetings.

**C) How will this intervention change practice?** This intervention will increase compliance with the IV fluid bundle element of the acute care sepsis management bundle, which will increase overall compliance with the CMS SEP-1 core measure and decrease sepsis mortality rates.

**D) Outcome measurements:** The outcome measurements will include the % of adult patients with severe sepsis and or septic shock that meet all elements of the composite sepsis management bundle measures as well as the % that meet the specific three-hour fluid bundle element. Sepsis mortality rates will also be reviewed.

To qualify as an Evidence-based Change in Practice Project, rather than a Research Project, the criteria outlined in federal guidelines will be used: (<http://answers.hhs.gov/ohrp/categories/1569>)

- This project meets the guidelines for an Evidence-based Change in Practice Project as outlined in the Project Checklist (attached). Student may proceed with implementation.
- This project involves research with human subjects and must be submitted for IRB approval before project activity can commence.

Comments:

## EVIDENCE-BASED CHANGE OF PRACTICE PROJECT CHECKLIST

**Instructions: Answer YES or NO to each of the following statements:**

<b>Project Title:</b> Improving compliance with the Centers for Medicare and Medicaid Services SEP-1 Sepsis Management Bundle	<b>YES</b>	<b>NO</b>
The aim of the project is to improve the process or delivery of care with established/ accepted standards, or to implement evidence-based change. There is no intention of using the data for research purposes.	<b>X</b>	
The specific aim is to improve performance on a specific service or program and <b>is a part of usual care</b> . ALL participants will receive standard of care.	<b>X</b>	
The project is <b>NOT</b> designed to follow a research design, e.g., hypothesis testing or group comparison, randomization, control groups, prospective comparison groups, cross-sectional, case control). The project does <b>NOT</b> follow a protocol that overrides clinical decision-making.	<b>X</b>	
The project involves implementation of established and tested quality standards and/or systematic monitoring, assessment or evaluation of the organization to ensure that existing quality standards are being met. The project does <b>NOT</b> develop paradigms or untested methods or new untested standards.	<b>X</b>	
The project involves implementation of care practices and interventions that are consensus-based or evidence-based. The project does <b>NOT</b> seek to test an intervention that is beyond current science and experience.	<b>X</b>	
The project is conducted by staff where the project will take place and involves staff who are working at an agency that has an agreement with USF SONHP.	<b>X</b>	
The project has <b>NO</b> funding from federal agencies or research-focused organizations and is not receiving funding for implementation research.	<b>X</b>	
The agency or clinical practice unit agrees that this is a project that will be implemented to improve the process or delivery of care, i.e., <b>not</b> a personal research project that is dependent upon the voluntary participation of colleagues, students and/ or patients.	<b>X</b>	
If there is an intent to, or possibility of publishing your work, you and supervising faculty and the agency oversight committee are comfortable with the following statement in your methods section: <i>"This project was undertaken as an Evidence-based change of practice project at X hospital or agency and as such was not formally supervised by the Institutional Review Board."</i>	<b>X</b>	

**ANSWER KEY:** If the answer to **ALL** of these items is yes, the project can be considered an Evidence-based activity that does NOT meet the definition of research. **IRB review is not required. Keep a copy of this checklist in your files.** If the answer to ANY of these questions is **NO**, you must submit for IRB approval.

\*Adapted with permission of Elizabeth L. Hohmann, MD, Director and Chair, Partners Human Research Committee, Partners Health System, Boston, MA.

**STUDENT NAME (Please print):** Allison Uppendahl

**Signature of Student:**

*Allison Uppendahl*

**DATE** 4/10/22

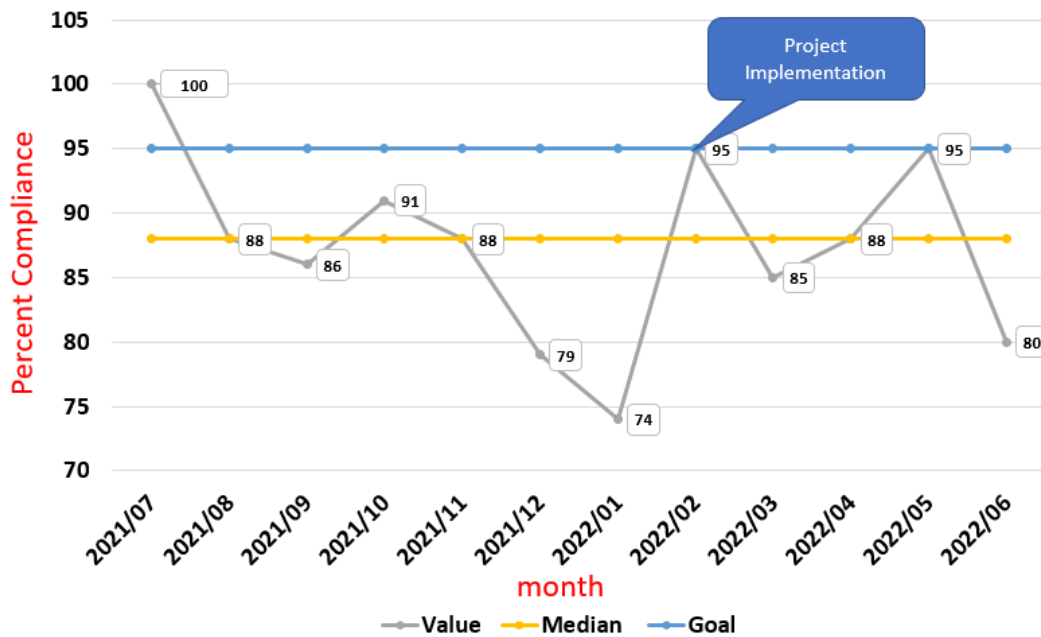
**SUPERVISING FACULTY MEMBER NAME (Please print):**

**Liesel Buchner**

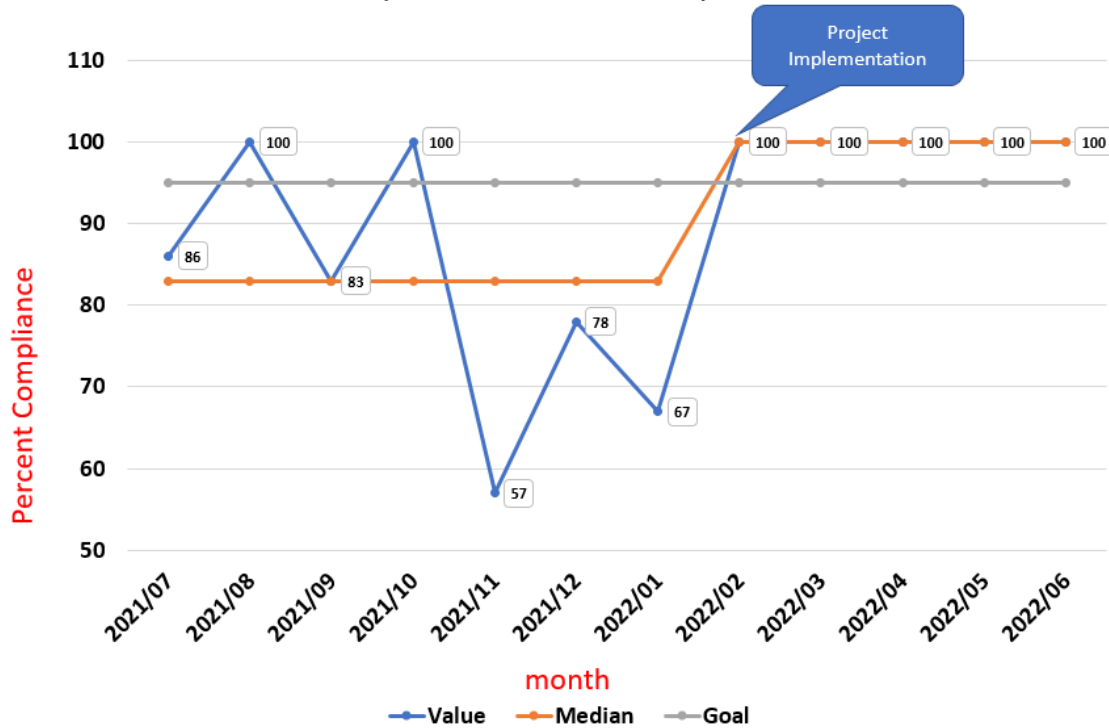
**Signature of Supervising Faculty Member** \_ **Liesel Buchner** **DATE** **7/2/22**



### Appendix H Run Charts Severe Sepsis IV Fluid Bundle Compliance



### Septic Shock IV Fluid Bundle Compliance



Percent Compliance of MD Use of Septic Shock Order Set

### Septic Shock Orderset Use by MD

