

Quest for Excellence in Sepsis Care

August 2, 2022



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Criteria 1-Leadership/Planning

The Kearney Regional Medical Center (KRMC) Quality Improvement Risk Management (QIRM) strategic plan for 2022 continues to focus on overall safety with a specific aim to improve performance in sepsis care. The Sepsis Alliance Institute strongly recommends using a performance improvement program for sepsis, which includes sepsis screening and standard operating procedures for treatment. Our organizational compliance for the Centers for Medicare and Medicaid Services (CMS) Severe Sepsis and Septic Shock Management Bundle (Sep-1) for 2019 was 49%, driving the need for a quality improvement program to reduce the impact of sepsis amongst our patient population. This program would focus on early recognition and treatment of those patients meeting Sep-1 criteria. Sepsis is known for its high readmission and mortality rates.¹ Could improving our bundle compliance influence mortality and outcomes? Our goal was to receive executive leadership support to weave sepsis into our organizational culture and treat those patients meeting severe sepsis and septic shock like a medical emergency.

Our sepsis quality assurance performance improvement (QAPI) task force would initially consist of the director of medical affairs, emergency physician champion, emergency department educator, quality manager, and quality coordinator. This information would be shared with the QIRM leadership team and voted to be on our 2021/2022 strategic plan to improve overall safety in sepsis care. Our taskforce has now grown to include the above, with

¹ [Rudd KE, Johnson SC, Agesa KM, et al. Global, regional, and national sepsis incidence and mortality, 1990-2017: analysis for the Global Burden of Disease Study. Lancet 2020; 395:200.](#)

the addition of the director of quality and patient safety, risk coordinator, emergency room/intensive care manager and supervisor, pharmacy, informatics, laboratory, hospitalists, care management, clinical documentation, finance, and educators with monthly roundtable meetings.

Criteria 2-Process of Identifying Need

The initial goal was to understand the Sep-1 measure and our specific organizational outliers to come closer to the Sep-1 national benchmark of 60% compliance. In the fourth quarter of 2020, we began in-house abstraction which was vital to comprehending the measure in its entirety and to provide transparent, real-time feedback. The reason for an outlier could be related to a 3-hour bundle element, however, your facility may never know the additional elements missed that put your patient in the denominator. Sep-1 is “all or nothing”, meaning NO PARTIAL CREDIT. Essentially, the measure stopped at the first element missed and this was the feedback the hospital received. Compliance is only complete if all elements of the Sep-1 bundle are included based on severity. This was our starting point, along with numerous questions to QualityNet, utilization of the NHA sepsis toolkit, webinars through the Surviving Sepsis Campaign, Sepsis Alliance forums, and emails to collaborating hospitals.

With our strategic plan in place and a better understanding of the Sep-1 measure, we started collecting baseline data to determine next steps and barriers to success. Initial small groups (3-4 people) discussed outliers, order sets, and electronic medical record (EMR) optimization. Collaboration with a neighboring hospital was beneficial in determining how to collect the data to make it “meaningful”. This involved a simple excel file with patient names, accounts, admission source, lists of each individual bundle element, and medical professionals

involved with the care. Organization of these elements made it easy to share outliers and education with staff. Stratifying the data by admission source, we found that most of our patients meeting Sep-1 bundle requirements were arriving through the emergency room, making this our target area for process improvement. Preventing the continuum of sepsis to shock and furthermore, patient mortality, was a driver to increasing our bundle compliance.

Our root causes for gaps included education and optimization of the EMR: Recognizing the septic patient, using the term “sepsis”, antibiotic approaches, buy-in on fluid resuscitation, documentation, timing of the repeat lactate, and inpatient placement. We also had the privilege to participate in the Nebraska Hospital Association (NHA) cohort gap analysis that included guest speakers and collaboration between many hospitals.

Additional data items have been added the meaningful data slides that now include antibiotic times (arrival, time zero, and order), emergency room specific data, admission sepsis screen accuracy, severity, length of stay, discharge disposition, sepsis education, and readmissions. Collection of this information has led to additional work groups and collaborations. This is shared with utilization review, the sepsis task force team, emergency department and hospitalist meetings, QIRM, and within hospital-wide email updates.

Criteria 3-Process Improvement Methods

Our taskforce uses the Plan-Do-Study-Act/Adjust (PDSA/A) method due to the continuous cycle that reiterates our call to action: Improve overall patient safety, specifically sepsis care with an aim to increase Sep-1 compliance to 70% for 2022. Studies have shown

great strides in mortality with improvements to the bundle criteria.² Breakdown of our cycle includes understanding the measure, early screening, implementation of bundles, tracking meaningful data, clinical documentation (CDI) accuracy, and prevention. For each of our process improvement ideas, we identified a lead and discussed at monthly task force meetings. For example, one of our identified needs was a breakdown of why the fluid bolus was not given. Was this due to lack of education, fear of fluid overload on our vulnerable populations, communication between providers and nursing staff? At this point, the fluid resuscitation has evolved, but initial data showed issues with boluses being calculated, ordered effectively, and signed off real-time. If the fluid bolus is ordered via multiple amounts vs one target order, the abstractor must take the “last bag hung” as the crystalloid fluid start time. These tips for success and understanding are found within the specific sepsis specification manual from CMS. Education on crystalloid fluid types, amounts, and vulnerable populations has also been given to providers. The most recent update being that colloids can now be counted in the crystalloid fluid target if given at rates greater than 125ml/hr.

A critical action item in the PDSA/A cycle was to implement a screening tool within the EMR to screen our adult 18+ population for evidence of severe sepsis. This was our real system redesign that has fueled the process improvement goal of early identification. Our informatics and quality team worked diligently to provide sepsis surveillance and screening within the EMR. This has allowed real-time tracking and feedback of patients on the quality side, but also flags the provider and nursing status boards. This is nurse driven with options to choose suspected or

² van Zanten AR, Brinkman S, Arbous MS, et al. Guideline bundles adherence and mortality in severe sepsis and septic shock. *Crit Care Med.* 2014;42(8):1890–8.

documented infection, systemic inflammatory response syndrome (SIRS) criteria, and organ dysfunction (all based on Sep-1 CMS bundle criteria and definitions). We found that our EMR needed adjusting to fit the CMS criteria, which was not the case in the pre-built Meditech sepsis screen. If the patient screens positive, the patient is flagged on surveillance and status boards. This is completed during initial emergency triage, on admission, every shift, and prn with condition change. The nurse has access to an associated data tab, also built by informatics with the latest vital signs and laboratory results. A sepsis tool can be utilized for a resource if needed that can be printed directly from the sepsis screen. Discussion of having risk stratification built into the system was brought to our attention, however, our current model has been proven to work. Our screening is nurse driven, while the ordering of bundle criteria is provider driven. Continued optimization of the EMR has been provided by adding canned text, reflexing repeat lactate, and calculating body mass index (BMI) and ideal body weight (IBW) for all patients.

We elected not to proceed with an alert system, but utilize our emergency department as the forefront in sepsis care. Keeping it simple, while also recognizing “time is tissue” was our objective. As medical professionals, we’ve become acutely aware of all the approaches one could take to screen for sepsis, however, some of these are more of a predictive tool.³ The sepsis alliance summits were key to recognizing the goal...early recognition! Therefore, our facility elected to keep SIRS in the forefront of sepsis screening. The emergency department has been instrumental in the collaboration regarding orders sets, understanding the measure, and

³ [Serafim R, Gomes JA, Salluh J, Póvoa P. A Comparison of the Quick-SOFA and Systemic Inflammatory Response Syndrome Criteria for the Diagnosis of Sepsis and Prediction of Mortality: A Systematic Review and Meta-Analysis. Chest 2018; 153:646.](#)

early screening and treatment of this population. Handoff to the hospitalist group post-emergency care has proven to be beneficial with a team approach to documentation and care.

Laboratory and pharmacy have also provided ongoing ideas for process improvement. Lab has taken a direct role in ensuring the repeat lactic is drawn, even when the patient is in less-than-ideal circumstances. Our current blood culture order to draw time is 32 minutes for 2022! We will also have in-house urine cultures this fall that will allow for improved time to identification. Our lead pharmacist has updated order sets and helped educate nursing on the importance of real-time infusion times to aid in the monitoring of patients after the fluid bolus. One example of this collaboration has been the addition of wording such as “calculate based on IBW due to obesity” on sepsis order sets for those patients with BMI>30. Our emergency and hospitalist providers have been educated on the many options they have available for fluid boluses to adequately take care of our most vulnerable populations. Antimicrobial stewardship has been a recent discussion in our taskforce meetings, as pharmacy plans to give additional source specific recommendations to our providers.

Adjusting and revising per the PDSA/A cycle continues to improve overall sepsis care. CMS presents a new version update for the Sep-1 bundle every six months. This can be key for improving compliance and buy-in. For example, fluid has come a long way from the 30ml/kg mandate for all patients meeting initial hypotension or lactate ≥ 4 to the current state of choosing a target option for ANY reason the provider chooses (with supporting documentation). The last update v5.12 includes the maternal population, for which CMS has recognized and validated the physiological differences for pregnant 20 weeks through 3 days post-delivery. Keeping up with these changes is an important part of organizational success.

Medical professionals make decisions with the patient's best interest in mind. Our preceptor class at KRMC says it best. "Adults learn best when they understand WHY the learning is important." Specific education for sepsis has included many facets including all inpatient nursing staff at the annual skills fair, an outreach virtual presentation "It takes a village," facility specific HealthStream modules, maternal sepsis care, provider lunch and learns, badge buddies with documentation tips, and continued outlier feedback. As of 2021, all nurse residents are also educated in facility specific sepsis nursing care. A sepsis backpack escape has been an easy way to educate and includes real patient data in a race to save your patient with known comorbidities. Nurses work together to solve puzzles and locks within different compartments (see details below). This year our annual skills fair will include an escape, with a small part designated to sepsis care for location of resources and screening for condition changes. Infection control has provided education on criteria for obtaining urine samples, conducted hand hygiene audits (FYI our onboarding employee health nurse checks-off 100% of new nurses), and has an upcoming mandatory training with external catheters due to our high urinary catheter days. It's truly a team approach to the PDSA/A model for prevention and continued education regarding sepsis care.

For those interested in the sepsis backpack escape, the goal is to save the patient in the quickest amount of time after review of the bundle elements. Our patient is an elderly female with comorbidities that include congestive heart failure, obstructive sleep apnea with CPAP at night who presents with confusion. The race starts with solving a letter lock with _____ recognition (early). Solving the letter lock allows the large backpack to be opened, revealing a large tacklebox. To open the tacklebox, the participants must find time zero _____ using

patient data that shows provider documentation of suspected infection and multiple vital signs from the last few hours. This patient exhibits infection (note time), SIRS criteria of elevated respiratory rate and temperature (note earliest time of 2), and hypotension (note time) to solve number lock. The tacklebox holds many different items to help and potentially confuse the players. A blank puzzle is found that must be put together and solved by shining the black light on the correct side. This puzzle gives the player the correct choice when choosing fluid resuscitation from the provider, as we just found out the patient had initial hypotension with (2) blood pressures that were SBP<90 or MAP<65. Discussion of fluid choices results are 30ml/kg, Ideal body weight, and the new target fluid option (this has been modified using v5.12). Calculation of the weight x30ml/kg is the answer to the number lock ____ that opens a smaller box asking the players to shout out the name of lab that MUST be drawn, in addition to blood cultures and giving antibiotics (lactate). The lock on the smaller outside pocket of the backpack __ is solved with a clue in the small box asking the minimum rate of fluid resuscitation (while we want the fluid bolused, and potentially 2 bags hanging at once-fluids MUST at minimum be at 126ml/hr to count towards fluid resuscitation). The last clues focus on a set of questions to open the last metal case ____ to save your patient. These focus on the comorbidities, other reasons for potential lactic elevation, WHY the patient required the fluid bolus, and additional labs that could be related to organ dysfunction.

Pinpointing sepsis as an initial focus in this quality coordinator role has helped shape the quality improvement for other projects branching out other areas including abstraction, education, hospital-wide mortality, blood utilization, monitoring of core measures, and working with clinical documentation for final coding.

Criteria 4-Results

It is with great honor that we share these results with our colleagues at KRMC and the NHA. Since 2019, KRMC has seen an overall shift in compliance by approximately 30 percentage points! We know that these small changes led to really big changes in patient care by looking at our monthly data dashboard, but it wasn't until this year that we analyzed the overall length of stay and mortality (see results) that is a reflection of the hospital-wide efforts to improve sepsis care while positively impacting our patients and community. It is exciting that our results are displayed on care compare for the community to see our sepsis efforts.

Outcomes:

Sep-1 measure compliance (2019) 49%, (2020) 60%, (2021) 65%, (CY 2022) current 78%.

Mortality (2019) 16.7%, (2020) 16.5%, (2021) 12.9%, (2022) 13.9%

Note: (2021) 15.5% of Sep-1 patients met septic shock criteria, while CY 2022 has had 32% YTD.

Length of stay for Sep-1 patients meeting bundle requirements (2021) 4.61 days vs 7.27 days for those who did not meet measure requirements and (CY 2022) 5.79 days vs 7.29 days.

Patients discharging home from severe sepsis/septic shock has increased 10% from 2019, at a current rate of 55%.

Readmission rates have increased from 2019/2020-this is an active agenda item. Our current rate is 13.6% for those meeting severe sepsis/septic shock. Readmissions have been studied in the context of performance measurement for pneumonia, heart failure, and acute myocardial infarction, but post-sepsis studies are lacking. Sepsis is now on the readmission team agenda. Care management has added our sepsis patients to their discharge follow-up phone call list.

Additional readmission strategies have included follow-up appointment timing with PCP of one week, ID consults, Pulmonary consults, and early PT/OT consults.

Average antibiotic times from time zero (42 min) and order to antibiotic (23 min).

Collaborative accomplishments also include monthly sepsis taskforce meetings, current dashboard with monthly percentages, outliers/QualityNet queries discussed as team, continued process improvement, and NEW to 2022 LOS, readmissions, DC disposition, and antibiotic/blood culture average times.

Criteria 5-Lessons learned, Replicability, Sustainability

Keeping sepsis as an action item on the QIRM agenda for two years with a continuous PDSA/A model has allowed optimization of individual elements and collaboration of multiple groups within the hospital. Identification started back in late 2020, while 2022 has allowed our achievements to progress. Analyzing readmissions, collaboration with clinical documentation, and antimicrobial stewardship will continue to be focus areas. Differing definitions of sepsis has proved to be difficult for financial claims. Timely feedback (outliers and successes) and monthly reporting will gauge our success.

Knowing it doesn't take fancy equipment and systems to meet Sep-1 compliance shows outlying smaller facilities that improvements can be made for our patients with roundtable discussion, early identification, and good assessment skills. However, I will put a caveat to having a wish list item (Starling monitor)! KRMC has been blessed with engaged leadership, providers, and nurses who advocate and maintain a passion for ensuring quality and safety for our patients.