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Date: August 31, 2011

Title: Quest for Excellence Award Application: Early Detection and Management of
               Sepsis

Overview

Criteria 1 – Leadership and Planning/Human Resources

Sepsis is a toxic response to infection that kills 215,000 Americans each year. American hospitals spend approximately $20 billion each year combating sepsis while 40% of the patients diagnosed with severe sepsis do not survive (Sepsis Alliance, 2011). The following narrative and graphics documents the process improvement effort of Great Plains Regional Medical Center (GPRMC) to reduce severe sepsis mortality utilizing evidence based medicine. GPRMC is a 116-bed acute care hospital located in North Platte, Nebraska. All 800+ employees are dedicated to provide health care that is safe, timely, efficient, equitable, and patient centered.

Annually, representatives from Medical Staff, Nursing, Administration, Quality, and Risk Management, with input from staff, develop a list of potential process improvement projects and then use a matrix to prioritize the projects. The matrix includes volume, risk, opportunity for breakthrough improvement, as well as the applicability to the Management Action Plan. Sepsis detection and management was included because the hospitalists identified an opportunity to improve care of patients with symptoms of systemic inflammatory response syndrome (SIRS) and sepsis.   Based on the priority matrix score, early detection and management of severe sepsis was selected as a project. Following Board approval, work began on the project in March 2010.

Criteria 2 - Patient/Community Focus

An interdisciplinary team was chartered to implement a process that identifies early sepsis and manages severe sepsis/septic shock using evidence based methodology. The team members are listed below:

Team Members	Role on Team	Job Title	Department
Rosanne Trumbull, RN	Leader	Hospitalists Coord	Hospitalists
Bill Marsh	Member	Director	Laboratory
Wanda Cooper, RN	Member	Manager	Emergency/ICU
Libby Milroy	Member	Director	Education
Lynn Saner	Member	Staff Education	Education
Mary Bendig	Member	Manager	ICU
Barb Eshleman	Member	Director	Case Management
Kim Gaasch	Member	Clinical Pharmacy Services Coordinator	Pharmacy
Dr. Brittan	Member	Physician	Family Practice
Dr. Vuksanovic	Physician Champion	Physician	Hospitalist
Billie Fear	Member	RN,Clinical Applications Coordinator	Information Systems
Laurie Ryan	Facilitator	Director	Performance & Clinical Outcomes

GPRMC also enlisted the help of Bryan-LGH as a resource and to help provide initial education to nursing staff and physicians. Without the resources they provided, GPRMC would not have been able to implement this program in a five-month time frame.

The team identified the following issues:

- No organized assessment tool for screening patients

- Staff knowledge deficit regarding symptoms of sepsis

- No standardized orders to treat patients with severe sepsis/septic shock

In addition, review of GPRMC 2009 data revealed a 50% mortality rate (18 deaths/ 36 patients) with a severe sepsis/septic shock diagnosis. The team set a goal of reducing the mortality rate to 25% within 12 months of implementation.

Using the PDSA (Plan, Do, Study, Act) process improvement methodology the team began its work. Development of a screening tool and staff education were addressed as one improvement activity and the development of a protocol for the treatment of sepsis was another.   Below is the screening tool and education action plan.

Describe the first test of change:	Person Responsible	When to be done
Implementation of early sepsis screening	Sepsis PI Team	July 5, 2010
List the tasks needed to set up this test of change	Person Responsible	When to be done
Screening tool for adult inpatient	Sepsis PI Team	June 24, 2010
Screening tool for emergency patient	ED Manager	July 15, 2010
Clinical Staff Educators (CSEs) training	ICU Manager	June 7- 11, 2010
Staff education	CSE's	July 28-30, 2010
Pocket Cards, SIRS Posters	Director of Education	June 17, 2010
Development of screening tool in Allscripts	Clinical Application Coordinator	July 14, 2010
Kick-off		June 24, 2010
Go live		August 2, 2010

The screening tool has three levels. The preliminary level asks five questions related to infection: suspected or documented infection, patient on anti infective therapy, patient has pneumonia, white cells present in normally sterile fluid, or perforated hollow organ. If any of the questions are answered yes, then temperature, heart rate, respiratory rate and WBC count are compared against criteria for possible SIRS. If two or more SIRS criteria are met, the physician is notified and the third level of questions is answered to assess for acute organ dysfunction. If any of the organ dysfunction criteria is met, the physician and the Rapid Response Team are called.

The screening tool was built into Allscripts, the electronic clinical documentation system. It was incorporated into the workflow by adding it to the admission assessment and

admission order sets. This ensured that all patients had an initial sepsis screen and a physician order for sepsis screening every 12 hours. The sepsis screen is repeated at the beginning of each 12- hour shift or whenever the patient's condition changes. As the nurse completes the sepsis screen on line, electronic messages prompt the nurse to continue the screening as long as the data indicates the progression of sepsis. Initially the staff had to review the lab results within the chart to be able to answer the screening questions. With updates to Allscripts, the bacterial culture and white blood cell count fields were able to be automatically populated from lab results available in another section of the electronic medical record.   This change resulted in increased accuracy in the screening process and reduced the time searching for key lab values.

Staff training was completed using the various methodologies for adult learners. The Clinical Staff Educators (CSEs) were trained by the ICU manager in a classroom-style setting using a PowerPoint presentation that addressed the physiology of sepsis, treatment, case studies, the importance of screening and early intervention, as well as training on the screening tool. A quiz was used to assess competency. The CSEs in turn presented the information to their respective nursing areas. Education was provided in the nursing areas over the course of several days and at varying times with food provided.   This strategy has proven to be successful in getting the maximum amount of nurses to attend. In addition, a training module for ongoing education in NetLearning was created. NetLearning is education software that can be used to provide education and document successful completion of competencies. Sepsis pocket cards were given to staff and sepsis posters displayed in the nursing areas. Sepsis education is also provided to new hires as part of department orientation. GPRMC is associated with Mid-Plains

Community College LPN and RN nursing programs and the nursing students are provided the sepsis education. Bryan-LGH provided speakers for the official kick-off for both nursing and medical staff.   Dr. Vuksanovic, the physician champion, also provided medical staff with education on the sepsis protocol . The go live date was August 2, 2010. To celebrate the go live, ice cream treats were available to all staff with the theme of " Stop Sepsis Cold."

At the same time treatment protocols were being developed. Below is the action plan.

Describe the 2nd test of change:	Person Responsible	When to be done
Sepsis Protocols	Physician Champion	August 1, 2010
List the tasks needed to set up this test of change	Person Responsible	When to be done
Develop Sepsis Protocol based on evidence based research	Physician Champion	May 2010
Protocol formatted per policy	Clinical Pharmacy Services Coordinator	May 2010
Protocol approvals- P&T, Medical Executive, and Medical Staff	Clinical Pharmacy Services Coordinator/ Physician Champion	June 2010
Medical Staff Education on Sepsis	Physician Champion and the Hospitalist Program Director	June 2010

Drs. Vuksanovic and Smith developed sepsis protocols for use in the ED and ICU/PCU based on best practices. After review by the team and the Pharmacy and Therapeutics Committee, the protocol was taken to the Medical Executive Committee and entire Medical Staff for review and approval.

As part of GPRMC's vision to become the regional health care destination for West Central Nebraska, Rosanne Trumbull, the hospitalist coordinator, has presented GPRMC's sepsis story to the nursing homes in the community and educated their staffs on sepsis. In September, Rosanne is scheduled to give presentations to critical access hospitals in the service region on sepsis.

Criteria 3 – Process Management/Organizational Performance Results

Immediately after implementation, as a process level measure, 100% chart audits were performed by Case Management. The audits were used to determine whether screens were being done and, when appropriate, physicians were being notified. The results were reported back to the team as information to be shared with their respective areas. By week nine post implementation, the audits were being completed every 12 hours 97% of the time and the physician was being notified 100% of the time. The audit process was changed to random review by the hospitalist coordinator with immediate feedback to staff as needed.

Early in the implementation staff attitude was a barrier due to the additional work created by doing the screening and because of the number of repeat notification calls to physicians which resulted in negative feedback from the physicians. The form was adapted to reduce unnecessary physician notification with staff education on the change. Based on feedback from the nurses, the electronic record was changed to make the screens more user-friendly.

The mortality rate for severe sepsis/septic shock has been tracked since implementation.
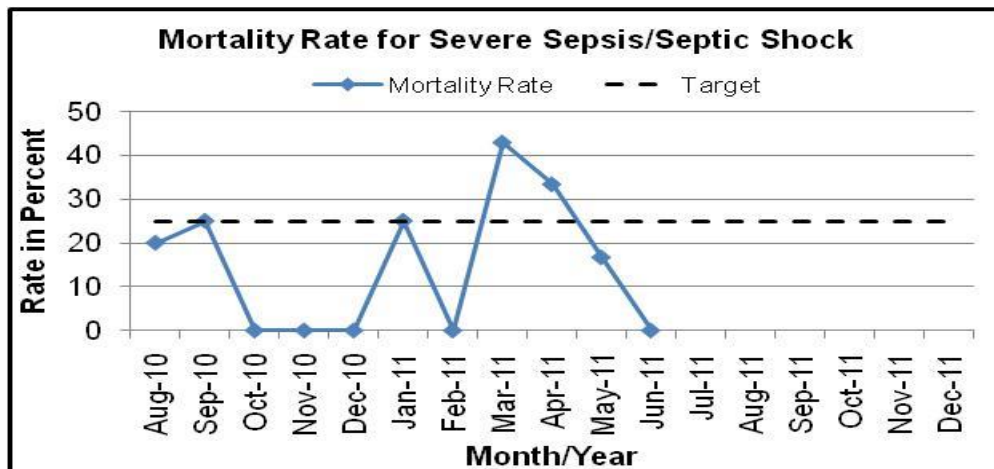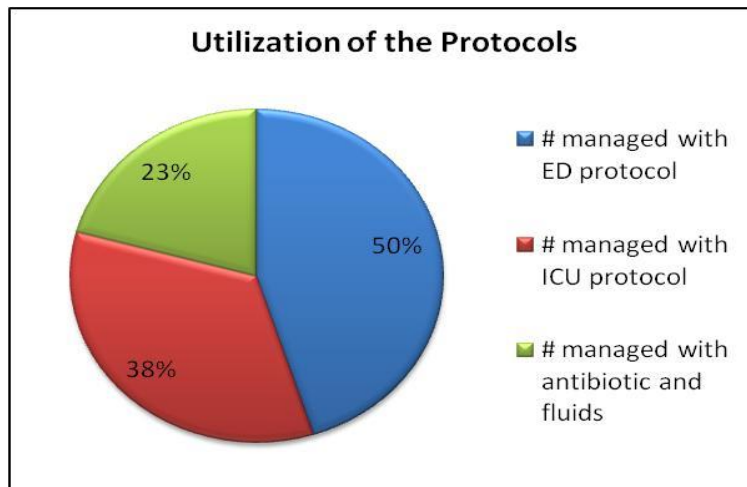
As shown in the graph above, GPRMC exceeded the target of reducing the mortality rate to 25%. The mortality rate for the eleven months since implementation is at 16%. This represents 50 patients with eight deaths. GPRMC is identifying almost 50% more patients with sepsis using the screening tool compared to the volume before implementing the tool.

The length of stay and average charges were reviewed as part of the project. Diagnosis codes were used to identify patients to include in data collection. Data in the graphs below show a decrease in the length of stay (LOS) and charges for both septicemias and severe sepsis. The team predicted that outcome. The septic shock length of stay and charges were expected to remain the same based on severity of the disease process. A patient with a 30-day hospitalization increased the average length of stay as well as the average charges for septic shock.
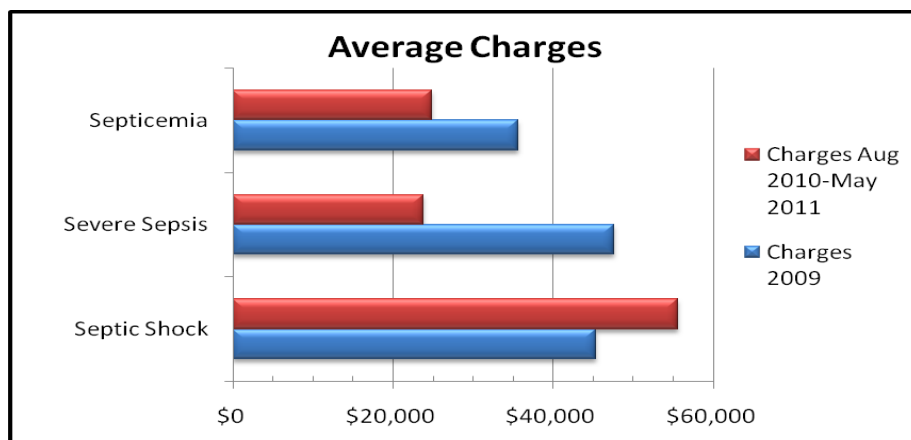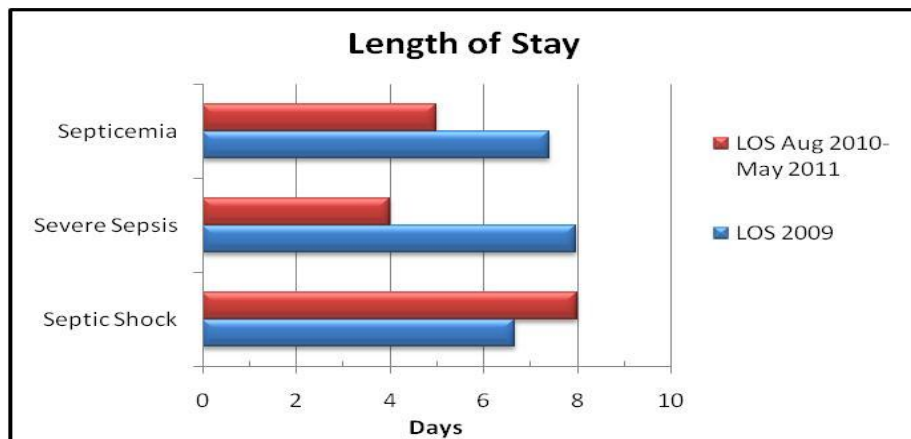
Review of the patient charts for severe sepsis/septic shock showed that, with the exception of one patient whose symptoms were masked by his cardiac condition, all of the patients were either admitted with a sepsis diagnosis or identified through the screening process.

The first six months of protocol utilization data showed that 50% of the sepsis patients were managed using the ED protocol, 38% were managed with the ICU protocol, and 23% were managed with fluids and antibiotics. The percentage is greater than 100 because both the ICU and ED protocols were used on three patients. See graph below.

Utilization of the Protocols

- # managed with ED protocol — 50%
- # managed with ICU protocol — 38%
- # managed with antibiotic and fluids — 23%

Reflections on what went well with the project:

- Active administrative support: The Chief Operations Officer set clear expectations for implementation and accountability of the team members.

- Multiple training sessions and options: Training sessions were taken to the staff in their work units, rather than in meeting rooms. The frequency and time of the sessions allowed for maximum staff participation.

- Development of additional screening tools: The team recognized the need and developed pediatric and neonatal sepsis screening tools.

- Utilization of the electronic documentation system to "hardwire" the process: By including the sepsis screen in the admission assessment and developing flow sheets for the 12-hour assessment, the screens were incorporated into the standard workflow. Enhancements within the application to auto populate some of the screening fields also made it easier for staff to complete.

- Celebrating the success of the team: Quarterly updates on the progress of the team and then PowerPoint presentations at three and six months post implementation on the interventions, results, and patient stories were provided to the Hospital and Board Quality Committees, Department Directors, and the Board of Directors. Results of the process level and outcome measures and patient success stories were provided regularly to the team to share with the staff.   The project kick-off also had local media coverage.

- Story telling: A great way to engage staff is to tell patient stories. An example of a success story was a patient in the Behavior Health Services (BHS) Unit. The BHS nurses faithfully did the screens despite their patient population not typically being candidates for sepsis. The patient was on an antibiotic for a urinary tract infection, but the antibiotic was not effective resulting in a positive sepsis screen.   The patient was successfully treated in the ICU and was able to return to BHS within three days.
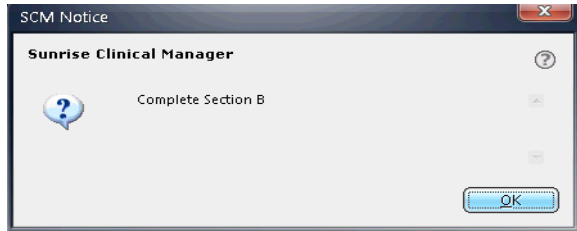
- Physician Champion: Having a physician champion as well as support from the Vice President of Medical Affairs and the hospitalists was crucial to obtaining buy-in of physicians to respond to positive sepsis screens and use of protocols.

- Promoting sepsis education in the service region: Providing area nursing homes with sepsis education and increasing awareness of sepsis is a benefit to their residents. Serving as a resource for early detection and management of sepsis for critical access hospitals provides a service to patients throughout the region.

GPRMC has successfully implemented evidence based practices that has reduced patient deaths. The data over time supports that the changes are sustainable. This initiative is a shining example of GPRMC's mission to provide the kind of health care we would want for our families, in partnership with those we serve.

Attachment A- Screen shots of the electronic Adult Sepsis Screen Tool: Section A

When Section A is positive for possible infection the nurse is directed to continue assessment for SIRS by the electronic prompt at right.

Section B--Systemic Inflammatory Response Syndrome (Contains Unsaved Data)		
☐ Temperature		
	(degrees F)	*102.5*
	(degrees C)	
	Site	
TEMPERATURE		
	greater than or equal to 100.4F or less than or equal to 96.8F	*yes*
☐		
	Heart Rate (bpm)	*96*
HEART RATE		
	greater than 90 beats per minute	*yes*
☐ Resp Rate		*22*
	(breaths/min)	
RESPIRATORY		
	greater than 20 breaths per minute	*yes*
	WBC Count	25.6
WHITE BLOOD CELL COUNT		
less than or equal to 4,000 per cmm or greater than or equal to 12,000 per cmm		*yes*
	Did you check 2 or more yes boxes in section B?	*yes*
Physician Notification		
	Physician Notified	*yes (please specify wh.* ▶
	Physician already aware of positive sepsis screen	*no*
	Need to notify physician if condition deteriorates	*yes*
	Date and Time Physician Notified	*08-30-11 07:15*
	Staff member that called physician	*A Trumbull RN*
	New orders given	*yes*
	Physician Not Notified	

When Section B is positive for SIRS the nurse is directed to complete section C to assess for severe sepsis and the presence of acute organ dysfunction by the electronic prompt at right.

SCM Notice

Sunrise Clinical Manager ⑦

? Discuss Cultures, source control, appropriate antibiotic coverage and fluid administration with physician; Ask physician for CBCD, CRP, and blood cultures; COMPLETE SECTION C.

OK

Electronic Adult Sepsis Screen continued: Section C

Section C--Acute Organ Dysfunction (Contains Unsaved Data)	
To continue to section C findings must be:	
1) New onset or a deterioration in status (outside of this patient's normal)	
2) Secondary or resulting from sepis	
3) Not attributed to other conditions	
☐ Noninvasive Blood Pressure	
Systolic/Diastolic (mmHg)	90 / 40
Mean (mmHg)	56
Source	
CARDIOVASCULAR	
Systolic BP less than or equal to 90mm HG or mean arterial pressure less than o▶	yes
RESPIRATORY	
Increasing O2 demand (two sequential increases and greater than 5LPM with a	yes
RENAL	
Low urine output less than 0.5ml/kg/hr for 1 hour despite adequate fluid reusu▶	no
METABOLIC	
pH less than 7.30 or Lactate greater than 2.2 mEq/L	no
HEMATOLOGIC	
Platelet count of less than 100,000 per cmm or INR greater than 1.1 or PTT grea	yes
HEPATIC	
ALK PHOS, ALT or AST greater than 2X the upper limit of normal?	yes
CENTRAL NERVOUS SYSTEM	
Altered consciousness or a reduced Glasgow Coma score?	yes
Did you check at least one yes box in section C?	yes
Physician Notification	
Physician Notified	yes (please specify wh▶
Physician already aware of positive sepsis screen	yes
Need to notify physician if condition deteriorates	yes
Date and Time Physician Notified	08-30-11 07:30
Staff member that called physician	A Trumbull RN
New orders given	yes
Physician Not Notified	
Reason that physician and rapid response team NOT called	

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When Section C is positive for acute organ dysfunction the nurse is directed to notify physician, call RRT and anticipate transfer to ICU/PCU.

SCM Notice

Sunrise Clinical Manager

NOTIFY PHYSICIAN; CALL RAPID RESPONSE TEAM and anticipate transfer to ICU/PCU.

OK