

## TexMed 2017 Quality Improvement Abstract

Please complete all of the following sections and include supporting charts and graphs in this document. Submit a total of two documents - this document and the Biographical Data and Disclosure Form to [posters@texmed.org](mailto:posters@texmed.org) by midnight March 17, 2017.

### Procedure and Selection Criteria

- Applicants should demonstrate an understanding of QI concepts through the use of quality tools, measures of success and the use and interpretation of data. Judges will use the scoring described in this matrix to identify projects to be presented at the conference, as well as, projects to be considered for the awards.
- Maximum points are delineated with a brief explanation of the content that should be included under each section. Applicants must select one of the following improvement categories into which the project best fits: patient safety, patient centered care, timeliness, efficiency, effectiveness, or equity. Applicants may describe the problem and results in narrative or graphic format.

### PROJECT NAME:

**Aligning Physician Practices with Evidence-Based Medicine: A pilot study on the effects of improving recognition and compliance with early bundle therapy in septic patients at a community hospital.**

**Institution or Practice Name: St. David's Georgetown Hospital**

**Setting of Care: Inpatient**

**Primary Author: William Jacob Cobb, MS-IV**

**Secondary Author: Ami Hanson, BSN, RN**

**Other Members of Project Team: Lawrence J. Donovan, MD; Cayla Teal, PhD; Lillian Niakan, MS-III; Cullen Soares, MS-III; Feng Zheng, MS-III; Vincent VanBuren, PhD**

**Is the Primary Author, Secondary Author or Member of Project Team a TMA member (required)?**

Yes  No

Please provide name(s): William Jacob Cobb

**Project Category:** (Choose all appropriate categories)

- |   |   |                                     |
|---|---|-------------------------------------|
| <input type="checkbox"/> Patient Safety | <input type="checkbox"/> Patient Centered Care    | <input type="checkbox"/> Timeliness |
| <input type="checkbox"/> Efficiency     | <input checked="" type="checkbox"/> Effectiveness | <input type="checkbox"/> Equity     |

**Enhanced Perioperative Recovery**

**Disaster Medicine and Emergency Preparedness**

For this poster session, TMA is looking for projects that demonstrate the six aspects of Quality Care as defined by the Institute of Medicine.

- Safe - avoids injuries to patients from care that is intended to help them
- Timely - reduces waits and delays for both those who receive care and those who give care
- Effective - based on scientific knowledge, extended to all likely to benefit, while avoiding underuse and overuse

- Equitable - provides consistent quality, without regard to personal characteristics such as gender, ethnicity, geographic location, and socioeconomic status
- Efficient - avoids waste, including waste of equipment, supplies, ideas, and energy
- Patient centered - respects and responds to individual patient preferences, needs, and values, ensuring that patient values guide all clinical decisions

## Quality Improvement (QI)

**Overview:** *Describe 1) where the work was completed; 2) a description of the issue that includes how long the issue has been going on and the impact the issue has on the organization/facility; 3) what faculty/staff/patient groups were involved, and 4) the alignment to organizational goals.*

St. David's Georgetown Hospital (SDGH) has been performing concurrent review and quarterly statistics reporting for patients with sepsis since 2015. This is in preparation for public reporting of sepsis treatment as a core measure of quality care by Centers for Medicare & Medicaid Services (CMS). Results of this analysis found areas of opportunity for improvement specifically in cases of sepsis present on admission to the emergency department, which constitute the majority of sepsis cases at SDGH. Sepsis continues to be a leading cause of morbidity and mortality in U.S. hospitals. Further, it has an increasing incidence worldwide. It is well documented that sepsis increases hospital length of stay and subsequent cost of hospitalization. Initial treatment interventions (aka bundles) have been identified that reduce mortality in sepsis. Additionally, these bundles are differentiated into a bundle to be completed within 3 hours of sepsis onset and a bundle to be completed within 6 hours of sepsis onset. 3-hour bundle elements are blood culture collection, lactic acid collection, broad-spectrum antibiotic administration after blood culture collection, and fluid resuscitation in cases of hypotension and hyperlactatemia > 4 mmol/L. While CMS has not yet released benchmark goals for tracking quality of care in septic patients, SDGH in affiliation with Hospital Corporations of America (HCA) has developed internal benchmarks relating to bundle element compliance individually and as a whole to measure the quality of care given to sepsis patients. These benchmarks include 90% compliance for each individual element of the 3-hour bundle and 65% compliance for the entire bundle.

**Aim Statement (2 points for each portion of SMART, with max points 10):** *Describe the goal of the project incorporating SMART.*

*Specific – what faculty/staff/patient groups were involved and where the work was completed*

*Measureable – numerical values that define baseline and goal*

*Actionable – what solutions/interventions were implemented*

*Realistic - able to implement solutions and sustain outcomes with given constraints*

*Time bound – what date established to reach goal by*

The emergency department at SDGH will increase sepsis intervention bundle compliance by 10% from baseline and decrease overall mortality in sepsis patients through a multi-faceted intervention, which includes education conferences on current facility practices, facilitated discussions aimed to develop possible improvements to current practices, timely auditing and feedback to those professionals on performance as well as optimization of sepsis order sets to include weight-based dosing of fluids.

**Measures of Success (5 points for describing solutions measurement and 5 points for describing outcome measurement, with max points 10):** *Describe how you measured your interventions to ensure adherence and describe how you measured your outcome.*

- Solutions Measurement:
  - Interim auditing and feedback was provided to the emergency department as a whole and to individual providers throughout the study. This allowed us to track adherence.

- Outcome Measurement:
  - Bundle element completion data (blood culture collection, lactic acid collection, antibiotic administration after collection of blood cultures, and administration of 30 ml/kg of fluid bolus in applicable cases) was collected and tracked throughout the intervention period to assess the outcome of our interventions.
  - Overall mortality, mortality in severe sepsis, and mortality in severe sepsis with shock were measured and tracked over the intervention period to assess the outcome of our interventions.

**Use of Quality Tools (5 points for appropriate tools utilized during each PDSA phase, with max points 20):** *What quality tools did you use to identify and monitor progress and solve the problem? Provide sample QI tools, such as fishbone diagram or process map, and identify which phase of the PDSA cycle each tool was utilized in. Note tools here and send as addendum with abstract form.*

- Problem: Concurrent review tracking sheets revealed opportunities for improving bundle compliance and early recognition of sepsis in the emergency department.
- Do: Fishbone diagramming was performed after in-depth analysis of the concurrent review tracking sheets in order to develop possible interventions.
- Study: After interventions were implemented, a Microsoft Excel data tool was created to continue tracking early recognition of sepsis and bundle compliance.
- Act: Interval analyses of bundle compliance and mortality were provided to the emergency department staff to give timely feedback on progress. At the end of the study period, an educational presentation was provided to emergency department staff as well as hospital administration to provide feedback on the effectiveness of the interventions as well as facilitated discussion to gain new insight into current practices and possible future interventions. Each of these tools is included in Addendum A.

**Interventions (max points 15 includes points for innovation):** *What was your overall improvement plan (include interventions and identify quick wins)? How did you implement the proposed change? Who was involved in implementing the change? How did you communicate the change to all key stakeholders? What was the timeline for the change? Describe any features you feel were especially innovative.*

- Overall Improvement Plan:
  - Improve bundle compliance by 10% from baseline through education and facilitated discussion with care providers in the ED as well as optimization of order sets to include weight-based dosing of fluids in cases of hypotension or hyperlactatemia.
  - As a function of improved bundle compliance demonstrate a decrease in mortality.
  - Due to the nature of the study (i.e. case abstraction, retrospective analysis) 'quick wins' were not able to be identified.
- Implementation of Proposed Change
  - After retrospective analysis of the concurrent review sheets and in-depth case abstraction, a multidisciplinary conference was held in which the baseline statistics were distributed and discussed. A facilitated discussion followed during which further interventions were discussed and decided upon.
  - Changes were made to the electronic medical record to include auto-calculation of weight-based dosing of fluids in instances when the order set was used.
  - A nursing sepsis screen within the electronic medical record was updated.
  - Paper chart flags were created for use in instances when the electronic nursing screen was positive. These paper flags were then given to the attending physician of the patient in an effort to facilitate communication.
- Involved Parties:
  - SDGH emergency department physicians and nursing providers.
  - SDGH quality improvement department
  - SDGH information technology department
- Communication with Key Stakeholders:

- Multidisciplinary conference in which baseline statistics were presented and a facilitated discussion was had to discuss possible interventions.
- Interim audit and feedback was provided to the emergency department periodically.
- Timeline:
  - Interventions implemented after multidisciplinary conference (9/22/16). Data abstraction resumed on 9/23/16 and continued until 12/13/16.
- Innovative Components:
  - Integrating a multidisciplinary team, including a medical student, into a quality improvement initiative at a community hospital.

**Results (max points 25):** *Include all results, using control charts, graphs or tables as appropriate. Charts and graphs must be appropriately labeled or points will be deducted. Note charts, graphs and tables here and send as addendum with abstract form.*

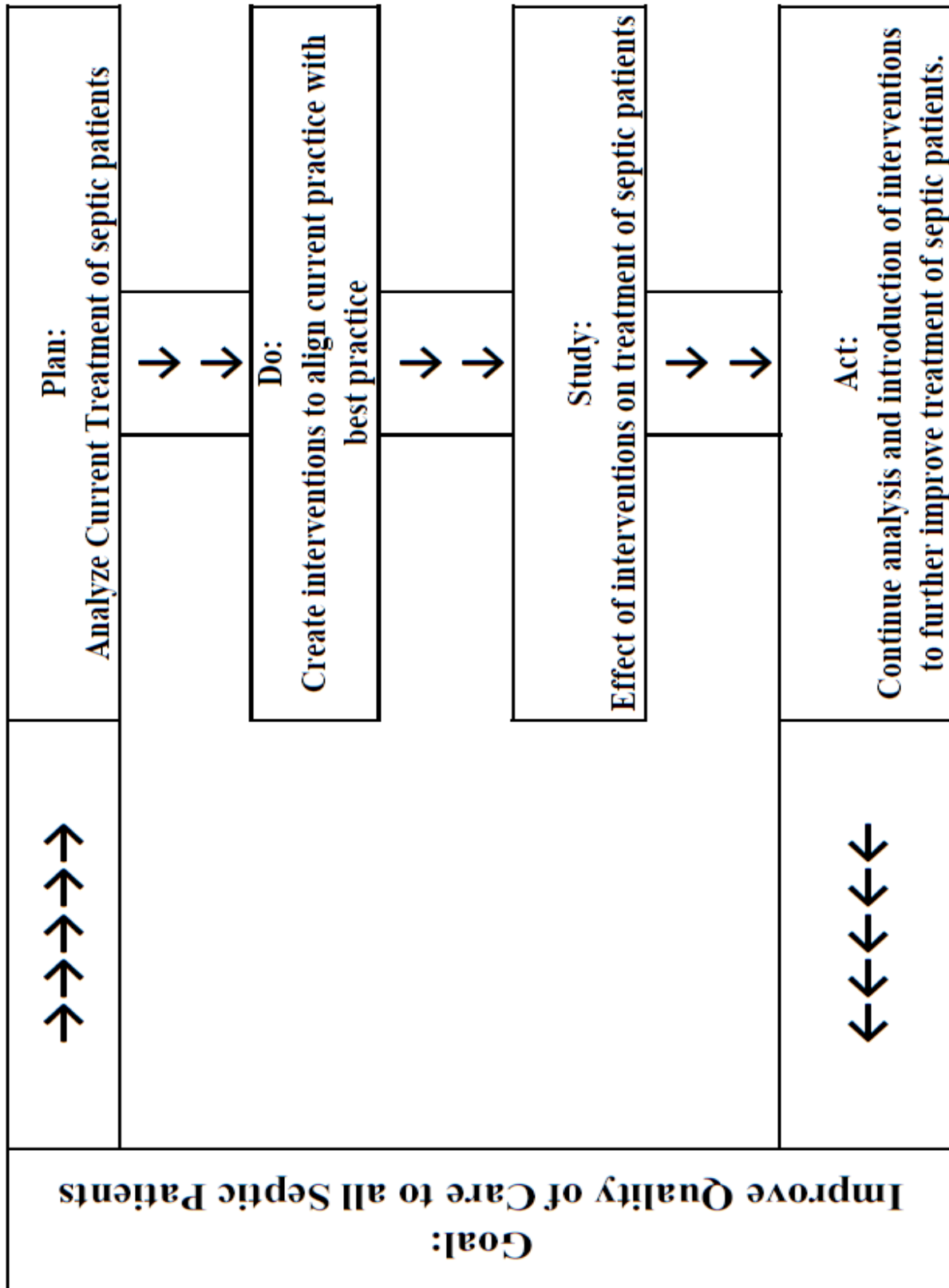
Individual bundle element compliances for blood culture collection before and after interventions were 93.3% and 92.6% respectively ( $p > 0.05$ ). Compliance with lactic acid collection before and after interventions was 95.6% and 94.4%, respectively ( $p > 0.05$ ). Antibiotic administration compliance before and after interventions was 82.2%, and 85.2% ( $p > 0.05$ ). Weight-based fluid administration compliance before and after interventions was 70% and 73.7%, respectively ( $p > 0.05$ ). Overall bundle element compliance was 66.7% and 72.2% before and after interventions, respectively. This constituted a 5.5% increase, which did not meet our goal. When cases of severe sepsis with shock were analyzed independently of cases of severe sepsis only, the overall bundle compliance increased from 50% to 72.2% ( $p > 0.05$ ) after interventions. Total mortality decreased from 24.4% to 14.81% ( $p > 0.05$ ) after interventions. Total mortality in cases of severe sepsis decreased from 17.4% to 13.9% ( $p > 0.05$ ) after interventions. Total mortality in cases of severe sepsis with shock decreased from 31.8% to 16.7% ( $p > 0.05$ ) after interventions.

**Conclusions and Next Steps (max points 20):** *Describe your conclusions drawn from this project and any recommendations for future work. How does this project align with organizational goals? Describe, as applicable, how you plan to move ahead with this project.*

- Conclusions:
  - Ongoing education related to sepsis is required for continued improvement in its treatment. Early recognition and proper utilization of early bundle therapy reduces mortality in patients with severe sepsis and severe sepsis with shock. Quality improvement initiatives can positively affect physician practice to bring them closer in line with evidence-based best practices and thereby improve patient outcomes. Though our pilot was unable to show statistically significant differences, high-powered, international studies have shown that increased bundle compliance in cases of sepsis is associated with decreased mortality. SDGH is a small community hospital with a relatively low volume of septic patients. As such, our pilot was underpowered to show statistical significance, but our data are consistent with the widely accepted notion that quality improvement initiatives positively influence bundle compliance and, thereby, decrease mortality.
- Recommendations for Future Work:
  - Continue PDSA cycle to develop new interventions to implement.
  - Continue tracking bundle compliance and mortality over time with particular focus on meeting individual bundle element compliance institutional goals.
  - Possibly expand this initiative to other hospitals in our area to gain larger sample sizes/assess generalizability of the effects of our interventions.
- Alignment with Organizational Goals:

- Individual Bundle Element Compliance Goals:
  - No significant change of individual bundle compliance for blood cultures, lactic acid collection, antibiotics, or weight-based fluid administration was noted. Internal goals were only met for lactic acid collection.
- Total Bundle Compliance Goals:
  - We showed an overall 5.5% increase in total bundle compliance. While not meeting our goal, it was an important effort to undertake for this important disease process. For both pre and post intervention analyses, we were above the internal goal of 65%
  - In cases of severe sepsis with shock, we saw a 22.2% increase in total bundle compliance. There are no internal goals for this individual measure.
- Mortality Goals:
  - We showed a 9.6% decrease in mortality overall.
  - We showed a 3.5% decrease in mortality in cases of severe sepsis only.
  - We showed an 15.1% decrease in mortality in cases of severe sepsis with shock.
- Plan to Move Ahead/Next Steps:
  - Handoff to incoming third year and fourth year medical students interested in continuing this project longitudinally.
  - Recruitment of other facilities in our area to expand our patient population and assess the generalizability of our interventions and their possible success.

PDSA Diagram:



**Concurrent Review Tracking Sheet:**

**Inpatient Sepsis Concurrent Review**

**EXCLUSIONS**

circle and Date /Time if	Directive for comfort care within 3 hours of presentation of severe sepsis? Directive for comfort care within 6 hours of presentation of septic shock? Transfer in from another acute facility? Location _____ Patients with severe sepsis who expire within 3 hours of presentation? Patients with septic shock who expire within 6 hours of presentation?	Pt wt KG=
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Sirs Criteria met?		Infection?		New organ dysfx? T3		for labs use resulted time
Date	__/__/__	Date	__/__/__	Date	__/__/__	
Time	__:	Time	__:	Time	__:	
T>100.9	WBC <4k>12K, 10% band	source		Cardio: MAP<65, ↓SBP>40	INR>1.5	
HR>90				Resp: ↑O2	Hep: Bili>2	CNS-AMS
Resp>20				Renal-Cr >2, ↓output	Met: LA>2	

**Sepsis Documentation:**

(where?) date	ED provider note / /	H&P / /	Progress Note / /	DC Summary / /
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Chief complaint:

Pertinent co-morbidity?

**Early Sepsis Bundle (Complete w/in 3 hours of diagnosis (POA) or T-3)**

	date	time given	result	time ordered	Time Zero	Yes	No
1. Blood cultures	__/__/__	__:			__:		
2. Initial Lactate level	__/__/__	__:					
3. Antibiotics	__/__/__	__:					
4. Resuscitation with 30ml/kg crystalloid fluids	__/__/__	__:	ml/Kg Goal=		3 HR time goal		
	__/__/__	__:					
	__/__/__	__:					
	__/__/__	__:					
5. Repeat Lactate level w/in 6 hours of time zero if >2	__/__/__	__:					

**Initial hypotension?** Within 6 hrs prior or 6 hrs after presentation of severe sepsis. Yes No

**Persistent hypotension?** (minimum of 2 consecutive SBP<90 or MAP <65) Yes No

**Septic Shock** 6 HR time goal Yes No

6. Vasopressors (if hypotension persists after fluid administration)					6 HR time goal	Yes	No
	Norepi/Levophed	Dopa	Vaso	Other	__:	Yes	No

7. Focused exam (includes all) (within 6 hr of time goal)

a. Vital Signs Review	see paper flowsheet OR process intervention: VS		
b. Cardiopulmonary evaluation-			
c. Capillary refill evaluation			
d. Peripheral pulse exam			
OR	e. skin exam		

(Any 2 of the following:)

Central Venous Pressure measurement (CVP)	see paperflowsheet		
Central Venous Oxygen measurement (CVBG)	see lab values		
bedside cardiovascular ultrasound	(in general we don't do here)		
passive leg raise or fluid challenge	(in general we don't do here)		

**ICU Metrics**

1. VTE Prevention: pharmacological?		
2. Stress Ulceration Prevention?		
3. Blood Utilization? Did pt. receive blood?		
4. Norepinephrine/Levophed used for first vasopressor?		

FINAL CODING	Severe Sepsis	Septic Shock				<b>Mortality?</b>
ED orders	Y N NA	IN-PT Sepsis	Y N N	Sepsis BLAST	Y N NA	Hospice ___?

Pt Label

**Fishbone Diagram:**



**Quality Tools**

**Cause and Effect Diagram**

**Description**

This template illustrates a Cause and Effect Diagram, also called a Fishbone or Ishikawa Diagram. A detailed discussion of Cause and Effect Diagrams can be found at [www.ASQ.org](http://www.ASQ.org)

**Learn About C and E Diagrams**

**Instructions**

- Enter the Problem Statement in box provided.
- Brainstorm the major categories of the problem. Generic headings are provided.
- Write the categories of causes as branches from the main arrow.

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