

2014 Gage Awards

Reference #	7492574
Status	Complete
Name of hospital or health system	Bellevue Hospital Center
Name of project	Bellevue Hospital Sepsis Team
CEO name	Steven Alexander
CEO approval	Check here to confirm that your CEO approves of this project being submitted for a 2014 Gage Award
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Within which of the two categories does your application best align?	Quality

<p>1. Provide a brief description of the project. (This section should resemble an abstract for a poster presentation or an abstract for a peer reviewed journal. Include an objective, data sources, study design, findings, and conclusions.)</p>	<p>Severe sepsis and septic shock are common, expensive, and deadly conditions. Severe sepsis has a reported hospital mortality rate of approximately 20% and septic shock has reported hospital mortality rates between 40-60%. Ample evidence now exists to show that early recognition through systematic screening and early intervention with timely fluid resuscitation and antibiotics, along with hemodynamic support in appropriate patients can dramatically improve patient survival. The Surviving Sepsis Campaign, an international effort to improve the care of patients with sepsis developed sepsis bundles, the application of which has been associated with decreased mortality. Despite the consistent demonstration of decreased mortality, adherence to sepsis bundles remains relatively low and hospital mortality for patients with severe sepsis and septic shock remains high.</p> <p>To improve recognition of patients with severe sepsis and septic shock in the emergency department and on inpatient units, we implemented systematic screening of patients for severe sepsis and septic shock. To facilitate rapid intervention in patients with a positive screen, we developed a hospital-wide sepsis response team. The process was led by an interdisciplinary and interdepartmental group with representatives from Critical Care, Emergency Medicine, Information Technology, Internal Medicine, Laboratory Services, Pharmacy, Quality Management and Surgery. Consensus was achieved on a clinical protocol for management of patients with severe sepsis and septic shock with development of a "Sepsis Alert" and "Sepsis Response Team" to facilitate adherence to the elements of the Surviving Sepsis Campaign bundles. Implementation required several steps, including: integration of routine screening for signs/symptoms of sepsis into nursing workflow, formation of a Sepsis Team to respond to the bedside of patients with suspected sepsis, ongoing staff education and training, and provider feedback on each case. Adherence to the all elements of the 3 and 6 hour Surviving Sepsis bundles was collected on each patient.</p> <p>Over the 18 months since implementation for patients presenting to the emergency department, there has been marked and continuing improvement in adherence to sepsis bundles. Compliance with 3 hour bundle elements has increased: lactate measurement improved from 25% to 100%, antibiotics given improved from 73% to 94%, and 30 ml/kg fluid given improved from 29% to 47%. Compliance with blood cultures before antibiotics has remained high throughout the process. In the 10 months since implementation on the inpatient units, similar improvements have been observed. Lactate measurement improved from 66% to 80%, antibiotics given improved from 66% to 70%, and 30 ml/kg fluid given improved from 0% to 50%. Hospital mortality (including discharge to hospice) for patients with an ICD-9 discharge diagnosis of severe sepsis or septic shock has decreased from 45% in 2011 to 31% in 2012 and 33% in the first 3 quarters of 2013.</p>
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2. Describe the methods use in this project. Include where, why, and how the project was accomplished.

Bellevue Hospital Center is the oldest public hospital in the United States and serves a large, diverse, and predominantly medically underserved population. Among this patient population, Bellevue has approximately 500 cases of severe sepsis and septic shock as identified by ICD-9 code per year. Due to the substantial data available in the published literature that severe sepsis and septic shock are associated with high risk of death, and the evidence that this risk can be reduced through the implementation of sepsis bundles, Bellevue Hospital implemented a hospital-wide sepsis team beginning in 2012.

An inter-professional group of hospital leaders from Critical Care, Emergency Medicine, Information Technology, Internal Medicine, Laboratory Services, Pharmacy, Quality Management and Surgery convened to establish consensus on a clinical protocol for the identification and management of patients with severe sepsis. Implementation of the protocol occurred through several steps. Key implementation steps included:

- Establishing stakeholder “buy-in” through inclusion in the protocol development process
- Integration of routine screening for signs/symptoms of sepsis into nursing workflow
- Development of an electronic sepsis alert for those who screened positive for possible sepsis
- Formation of a Sepsis Team to respond to the bedside of patients with suspected sepsis. The Sepsis Team assesses response to initial management, assists with triage to most appropriate unit, brings antibiotics to the patient’s bedside during sepsis alert
- Ongoing staff education and training
- Data collection and weekly review of all cases by the sepsis committee
- Feedback given via template to each provider (physicians and nurses) involved in each case including whether bundle elements met or not met
- Iterative adjustments to protocol as needed
- Phased implementation hospital-wide, beginning in the emergency department and then going to inpatient units
- Phased implementation focusing first on 3 hour bundle implementation, followed by focus on 6 hour bundle implementation.

Compliance with 3 and 6 hour Surviving Sepsis Campaign bundles (listed below) is collected on each patient with severe sepsis or septic shock. This data allows for patient and case level feedback to each provider.

3 Hour Bundle:

- Measure Lactate
- Obtain blood cultures before antibiotics
- Administer broad spectrum antibiotics
- Administer 30ml/kg IVF for hypotension or lactate >4mmol/dl

6 Hour Bundle:

- Apply vasopressors (for hypotension that does not respond to initial fluid resuscitation) to maintain a mean arterial pressure (MAP) ≥ 65 mm Hg;
- In the event of persistent arterial hypotension

	<p>despite volume resuscitation (septic shock) or initial lactate ≥ 4 mmol/L (36 mg/dL):</p> <ul style="list-style-type: none"> oMeasure central venous pressure (CVP) oMeasure central venous oxygen saturation (ScvO₂); •Remeasure lactate if initial lactate was elevated.
<p>3. Describe the results of the project. What data was used to support improvement results?</p>	<p>Implementation of sepsis bundles, and the Bellevue Sepsis Team has resulted in substantial improvement in compliance with the elements of the evidence-based Surviving Sepsis Campaign bundles. For patients presenting to the emergency department with severe sepsis or septic shock, compliance with 3 hour bundle elements has improved dramatically. Lactate measurement improved from 25% to 100%, antibiotics given within 3 hours improved from 73% to 94%, and 30 ml/kg fluid given within 3 hours improved from 29% to 47%. Compliance with drawing blood cultures prior to antibiotics for patients presenting to the emergency department started and has remained greater than 85% throughout the project. The average time to lactate result available has decreased from 88 minutes to 63 minutes. The average time to antibiotic administration has decreased from 157 minutes to 80 minutes and the average time to 30ml/kg fluid administration has decreased from 360 minutes to 170 minutes.</p> <p>For patients who developed severe sepsis or septic shock on an inpatient unit, compliance with 3 hour bundle elements has also improved. Lactate measurement improved from 66% to 80%, antibiotics given within 3 hours improved from 66% to 70%, and 30 ml/kg fluid given within 3 hours improved from 0% to 50%. The average time to antibiotic administration has decreased from 150 minutes to 70 minutes and the average time to 30ml/kg fluid administration has decreased from 600 minutes to 136 minutes.</p> <p>Hospital mortality (including discharge to hospice) for patients with an ICD-9 discharge diagnosis of severe sepsis or septic shock has decreased from 45% in 2011 to 31% in 2012 and 33% in the first 3 quarters of 2013 (see attachment).</p>
<p>3A. Attachment, if applicable (Only graphically displayed data such as charts will be accepted. Data should include baseline and improvement data)</p>	<p>BHCGageAwardattachment.pptx (196k)</p>

<p>4. Describe what happened as a result of the project. Was the improvement related to the intervention? Can the project be duplicated by other organizations?</p>	<p>This project demonstrates the feasibility and success of implementation of evidence-based sepsis bundles in a large public hospital that serves a diverse and medically underserved population. As a result of this project we have noted a marked increase in compliance with evidence based sepsis bundles and an associated decrease in hospital mortality in adult patients at Bellevue Hospital. Although we cannot prove causality in this observational quality improvement project, the timing of the decrease in observed mortality correlates with the development and implementation of the Bellevue Sepsis Team. Notably the development and implementation of the Bellevue Sepsis Team was accomplished without the addition of supplemental resources. It was implemented with existing staff and through the commitment of the clinical and administrative champions of the project. We have found feedback to providers about individual cases to be a vital element in the improvement process at Bellevue. We believe the project described in this application could be applied in other hospitals and potentially in other settings such as long-term acute care hospitals or even chronic care facilities. The model of a screening all patients for signs and symptoms of severe sepsis and septic shock and implementing a sepsis response team could readily be applied to other organizations with anticipated benefit in patient outcome.</p>
<p>5. Describe how patients, families, and if appropriate, community was included in the work.</p>	<p>Patients and families are encouraged by all staff to speak up about any concerns they have about their or their family member's medical care, including any signs of change. In the future, as this project continues, we plan to further involve patients and families in the early recognition of severe sepsis by developing and disseminating patient educational materials about the signs and symptoms of sepsis and what to do if they are concerned. The early signs of sepsis can be subtle, and may be more readily apparent to those who know a patient the best, so we anticipate that as this project progresses and matures, that patients and their families will be vital partners in facilitating the early recognition of sepsis.</p>
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