Title of Entry: Sepsis: A Health System’s Journey Toward Optimal Patient Care & Outcomes

Division: Large Organizations

Award: Excellence in Care

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Executive Summary

Title of Entry: Sepsis: A Health Systems' Journey toward Optimal Patient Care and Outcomes

Evidence: Sepsis is known to be a leading cause of death in ICU's and the sixth most common reason for hospitalization in the nation with an associated cost of 20 billion dollars per year. In 2014, Our Health System's Risk Adjusted Observed to Expected (O/E) Mortality Ratio was 0.914.

Opportunity, Goals and Targets: Our Health System's target Risk Adjusted O/E Mortality Ratio of < 1.0 was achieved however, opportunity for improvement existed. Additional Opportunities were identified in the Sepsis O/E Ratios for Length of Stay, 30 Day Readmissions and Complications. In October 2015, CMS mandated the monitoring and data submission of Sepsis care and timely performance in terms of 3 hour and 6 hour measure bundles. Measure bundles included evaluation, treatment and reassessment with subsequent intervention against established measures of performance. In response, our Health System took a proactive approach by evaluating the care of patients with Severe Sepsis/Septic Shock during CY 2014. The initial target was set at 90% performance for all clinical measures.

Baseline Data: The specific time frame of April-December 2014 was chosen with analysis and aggregation in January 2015. Data was collected by RN's from the Quality Department for the three acute care hospitals within our Health System. A statistically significant sample size of 30 patients was established. One hospital achieved a sample of just 25 patients due to size and census, yielding a Health System sample total of 85 patients. The initial target of 90% was achieved in both Lactate Draws at 91.8% and in Blood Culture Draws prior to antibiotic administration at 95.3%. Opportunity for improvement was identified in Antibiotic Administration within 3 hours of Severe Sepsis diagnosis by a performance of 84.7% and in timely and appropriate Fluid Resuscitation at 30 mg/kg evidenced by a 55.3% performance in the baseline study.

Interventions: An evaluation of baseline performance included an assessment of aggregate and case by case variances. Process and System opportunities were determined to exist for each of our three acute care hospitals. Interventions were designed and implemented that targeted the continuum of care for the point of entry in the Emergency Department, to the Intensive Care Units and from all nursing care units until patient's discharge. Key interventions included: System Level Sepsis Steering Committee and Sepsis Committees at each hospital; development of a Sepsis/Severe Sepsis/Septic Shock Treatment Algorithm along with Practitioner education; design of EMR Order sets and Checklists for Practitioners; implementation of Nursing Sepsis Screening Guidelines for early Identification of Sepsis in hospitalized patients; and the development/implementation of a designated Sepsis Coordinator.

Results: Since October 2015, monitoring of Sepsis patient care and treatment was conducted according to CMS Specifications. Results of the ongoing monitoring were reviewed and shared with practitioners. As a result, improved performance was achieved in: Lactate Draws from 91.8% to 96.8 %, Antibiotic Administration from 84.7% to 97.2%, Fluid Resuscitation from 55.3% to 81.2%. Baseline and current monitoring were compared utilizing Chi-sq methodology at a 95% confidence interval. P-values were calculated for each measure. Statistical Significance of < 0.05 was demonstrated in both Antibiotic Administration, p-value 0.0001, and in Fluid Resuscitation, p-value 0.0003.

In addition to the evaluation of individual measure improvement the Health system performed hospital specific and Health System aggregate of Sepsis Measure Outcomes of Risk Adjusted Mortality, Length of Stay, (LOS), 30 Day Readmissions, and Complications. A 2 year comparison of outcome data details a favorable reduction in Risk Adjusted Observed/Expected, (O/E), Mortality Ratio from 0.914 to 0.769 with a p-value of 0.082; no significant change was seen in LOS and Readmissions, however, both categories remained favorably below the desired O/E Ratio of 1.0. The Health System's interventions did result in a reduction in Sepsis Complications reflected by an O/E Ratio that decreased from 0.429 to 0.361 with a p-value of 0.03.

Our Health Systems efforts are detailed in the following submission supported by data and graphics displayed in the 4 page submission and 3 page appendix.
Sepsis: A Health System's Journey toward Optimal Patient Care & Outcomes

1. ASSESSMENT

Severe Sepsis is a significant healthcare challenge and according to AHRQ the sixth most common reason for hospitalization in the nation with a cost of 20 billion per year. The Severe Sepsis mortality rate is more than eight times higher than mortality rates for other conditions; the leading cause of death in non-coronary ICU and 10th leading cause of death overall nationwide. Our Health System is committed to providing optimal quality, evidenced care to our patients with Sepsis in order to maximize favorable outcomes and our initiatives are described in the following document.

Baseline Data Methodology: During the period of Apr 2014 through Dec 2014, patients with the diagnosis of Severe Sepsis and Septic Shock were evaluated according to the criteria endorsed by the Surviving Sepsis Campaign. Care of patients who presented to the Emergency Department of the Health System's 3 acute care hospitals was evaluated in terms of compliance with the 3 hour Bundle for: Initial Lactate, Blood cultures, Antibiotic Selection and Administration and fluid Resuscitation. A sample size was 30 patients per hospital; the smallest hospital sample size only reached 25 patients due to a decrease in census. Results were analyzed in January 2015; aggregate results for the Health System are as follows:

<table>
<thead>
<tr>
<th>Health System Sepsis Measures Hospital A, B &amp; C Patients with Severe Sepsis and/or Septic Shock</th>
<th>Baseline Apr-Dec 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Patients Evaluated</td>
<td>85</td>
</tr>
<tr>
<td>Lactate: Percentage of lactate measured 12 hr. prior or within 3 hours of Bundle Start Time</td>
<td>91.8%</td>
</tr>
<tr>
<td>Blood Cultures: Percentage drawn prior to administration of antibiotics</td>
<td>95.3%</td>
</tr>
<tr>
<td>Antibiotic Administration: Percentage completed within 3 hours of Bundle Start Time</td>
<td>84.7%</td>
</tr>
<tr>
<td>Fluid Resuscitation: Percentage of Patients that received equal to or more than 30 mL/kg fluids</td>
<td>55.3%</td>
</tr>
</tbody>
</table>

Results from each hospital were analyzed by measure to determine any trends by practitioner; none were identified. Appendix Figure 1 displays process capability tools that were reviewed by measure /by hospital. Process Variation was identified in all measures in meeting the goal of less than 3 hour upper specification limit. Timely blood culture collection being drawn prior to the antibiotic administration showed the least degree of variance but identified inconsistencies in documentation. Issues identified included: variation on physician ordering practices, variation in ordering and documentation of fluid resuscitation and in the proper selection and timely administration of antibiotics within 3 hours of meeting SIRS criteria.

Study Limitations: In the initial collection of baseline data, the encounters were limited to severe sepsis/septic shock patients identified in the ED and transferred to the critical care unit. Retrospective data collection was performed during the baseline study period; variances were not reported and analyzed concurrently. Reassessment criteria were significantly changed by CMS in October 2015 resulting in the exclusion of CVP/SVO2 from study comparison.

Expansion of Study Focus: The original study was limited to the ED Physicians and Nursing staff along with the ICU Intensivists and ICU Nursing staff. In the current model, the scope includes the patients that develop Sepsis on the medical/surgical areas. It has the support of Senior Leadership and Management as well as the involvement of a multidisciplinary team in the identification and management of the patient with severe sepsis/septic shock.
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2. INTERVENTIONS: After assessment of our baseline Sepsis data, research evidence, practice and common cause variation, the following system and process changes were implemented with the goal to improve current practice and expand Sepsis Screening to include Medical/Surgical areas to ensure early identification and treatment of severe sepsis.

System Level:
- System—Wide Critical Care/Sepsis Steering Committee was created with major focus on Sepsis and Clinical Standards of Practice. Steering Committee membership included the following: CEO and CMO of Health System; Physician Champions and Lead Intensivists, CNO, Critical Care Directors, Chairman and Directors of the Emergency Department and System Lead for Quality Improvement.
- Designated a Sepsis Coordinator at each facility to ensure education and follow-up.

Emergency Department:
- Developed a team of engaged sepsis champions at ED Nurse and ED Physician level
- Developed ED EMR Order Sets to ensure standardization of practice
- Created electronic alerts in EMR to notify physicians when patients may be septic based SIRS criteria of vital signs, labs and other factors for early Sepsis recognition and treatment
- Developed method for reflex lactate levels to be drawn in specified time frame.
- Recognized inconsistent documentation of IV fluids from ED to ICU and developed Hand-Off Nursing -Communication to verify volume of fluids the patient received in the ED.
- Identified inconsistent documentation of vital signs after fluid administration and developed order to address vital sign frequency after IV fluid administration.

Critical Care:
- Implemented Severe Sepsis/Septic Shock Checklists to assist physicians in identification of patients with severe sepsis/septic shock and monitoring the completion of required sepsis bundle elements, Appendix Figure 2
- Designed and implemented the Sepsis/Severe Sepsis /Septic Shock Algorithm which is based on the -CMS evidence based guidelines for Assessment and Treatment Standardization, Appendix Figure 3
- Raised awareness of Sepsis initiative with CCU nurses and importance of consistent documentation.
- Monitored and provided feedback and education for variances that occurred in CCU/ICU setting.

Medical/Surgical:
- Educated the medical/surgical nurses on the sepsis continuum, and importance of early identification.
- Participated in creation Sepsis Surveillance status board in hospitals’ EMR to display SIRS criteria for nurse review.
- Developed and implemented a severe sepsis screening tool and workflow and educated the medical/surgical nurses and housestaff on use. Nurses are to screen every 12 hours using EMR status board.
- Provided education on the Sepsis protocol including case studies for Attending physicians, Residents as well as Medical/Surgical Nurses.
- Expanded Rapid Response alert process to include Sepsis and address patients with suspected septic shock on the Medical/Surgical areas.
- Provided pocket cards with Sepsis protocol information to physicians.
- Developed tools to address physician documentation on specific elements of the Sepsis core measure.

Sepsis Coordinator: Utilized experienced RNs with Quality and CMS abstraction experience for position.
- Performed concurrent and retrospective review of cases and reports variances to appropriate disciplines as an opportunity for improvement.
- Provided Sepsis Algorithms to the patient care units and physician areas and created Sepsis Screen Savers to highlight specific sepsis information on the computers throughout the hospitals.
- Presented overview of sepsis protocol at monthly Nursing education sessions.
- Participated in multidisciplinary Sepsis Meetings held to discuss variances and practitioner trends.
- Rounded daily with nursing staff to communicate variances and opportunities for improvement to nursing staff with communication tools and emailing Nursing Tip of the Week.
3. RESULTS, Current Data: 10/1/15 through 4/30/16, Appendix Figures 4 & 5

Methodology: CMS measures as detailed in the Specification Manual were utilized as measure definitions, inclusion and exclusion criteria. The current data collection included patients found to have Severe Sepsis/Septic Shock on the medical surgical floors as well as those identified in the ED. Variances were identified and involved disciplines were notified and action plans were created and put in place to improve compliance and reduce risk for future variances. Case selection was in accordance with CMS guidelines by Midas, the Health System's approved CMS vendor.

Results: Favorable performance was achieved for the CMS Measures for Initial Lactate, Blood Cultures, Antibiotic Administration and Fluid Resuscitation in comparison to the Health System Target of 90% by Hospital A, B & C. Appendix Figure 4 displays measure specifics, individual and aggregate Health System performance being favorable in comparison to target: Initial Lactate 96.8%, Blood Cultures 92.8%, Antibiotic Administration 97.2%; Fluid Resuscitation performance did not achieve desired target, compliance 81.2%.

Current performance during 10/1/15-4/30/16 was compared to the baseline data 4/1/14 - 12/31/14 and aggregated in January 2015. P-values were calculated comparing performance by measure using Chi-sq methodology at a 95% confidence interval determining statistical significance; detailed in Appendix Figure 5. Improvement from 91.8% to 96.8% was seen in the in the timeliness of the Initial Lactate but the p-value of 0.07 did not demonstrate statistical significance. Blood Cultures prior to Antibiotic Administration decreased 95.3% to 93.3% and did not demonstrate improvement, p-value 0.442. Favorable statistical improvement, p-value <0.05, was demonstrated in Antibiotic Administration by a p-value of 0.0001 and in Fluid Resuscitation with a p-value of 0.0003 even though the numerical target of 90% was not achieved.

Outcome Data: Sepsis Risk Adjusted Mortality, LOS, 30 Day Readmission and Complications Rates: 2 yr. Comparison

Methodology: Midas+ Data Vision, retrospective risk adjustment methods assisted our hospitals in evaluating Sepsis Outcomes by providing a reliable and accurate means to compare aggregate hospital performance to 800+ Midas participating facilities. The Midas+ Risk Adjustment Model assigns probabilities and expected values to individual patient encounters for the following variables: Mortality, Length of Stay, 30-day Unplanned Hospital Readmissions and Complications, with individual relative weights in terms of Observed to Expected Ratios. As detailed in the Midas definitions, the model is based on the patient’s: gender, age, diagnoses, procedures and co-morbid conditions the Risk Adjusted Model; categorizes patient into various levels of severity/intensity. Lasso Regression and cross validation are utilized by Midas in calculation of this risk adjusted model.

Health System Risk Adjusted Sepsis Outcomes, 2 Year Comparison, Appendix Figure 6

In order to compare our Sepsis Outcomes and Risk Adjusted Observed to Expected (O/E) Ratios, Sepsis Risk Adjusted Reports were formulated pulling data by each of the three hospitals for two consecutive 12 month periods: 4/2014 – 3/2015 and 4/2015 - 3/2016; the second 12 month period is the most current year of data available from the Midas Comparative Database System: annual data was used for adequate sample size. These reports detailed: Total # Patient with the diagnosis of Sepsis, # Observed, # Expected, and O/E Ratio. From our hospital specific observed and comparative data, p-values were calculated comparing O/E Ratios by Chi-sq methodology at a 95% confidence interval determining statistical significance. The data displayed in Appendix Figure 6, favorably demonstrates all aggregated health system categories were below the targeted Observed to Expected (O/E) Ratio of < 1.0 for mortality Length of Stay, 30 Day Readmissions and Complications. Analysis of Statistical Significance of change for the 2 year periods showed that there was no change in Length of Stay. Favorable improvement was seen by a decrease in O/E Ratio for Mortality and 30 Day Readmissions yet these were not statistically significant evidenced by p-values of 0.082 and 0.816 respectfully. Statistical Significance, < 0.05, was demonstrated in the analysis of Complications, p-value of 0.0361.
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4. ADAPTABILITY

The previously detailed system and process interventions were duplicated among our Health System’s three acute care facilities. This potential for adaptation of these initiatives exists for other hospitals. It is acknowledged that an assessment of a hospital current and future resources needs to be considered yet the principals can be reproduced.

Hospitals may not have access to risk adjusted outcome data from a comparative database but unadjusted rates of Mortality, LOS or GMLOS, 30 day Readmissions can be utilized to track outcomes according to national benchmarks or individually set targets based on prior performance and improvement goals.

We acknowledge opportunities for improvement exist in consistency in obtaining and documenting Blood Culture Draws prior to Antibiotic Administration; current performance ranging from 87.8% to 95.8% for our three hospitals. An additional opportunity for improvement exists in Fluid Resuscitation yet statistical improvement by a p-value of 0.0003 was demonstrated when comparing baseline to current data.

Sustaining current gains and continually improving performance will remain our Health System’s focus for the years to come. We feel that this goal will be supported by our Sepsis infrastructure and key initiatives implemented throughout 2015 and 2016; and are considered our key lessons learned. Our Sepsis program structure will support our existing model of care and provide a means to quickly adapt to future measurement and criteria changes.

Lessons Learned

The Health System’s key lessons learned that contributed to our Sepsis Program’s success included:

- **Sepsis /Severe Sepsis/Septic Shock Algorithm** which provided practitioners with visual decision logic in the evaluation, diagnosis and treatment.
- **Standardized Evidence Based Order Sets** which promoted consistency in practitioner’s in treatment in keeping with evidence based standards of care
- **Concurrent Screening by Nursing for Early Sepsis Identification** for patients on all acute nursing units promoting early recognition of sepsis
- **Peer Review by Physician Champion** who performs review and follow up of all variances giving feedback to the practitioner on a consistent basis
- **Dedicated Sepsis Coordinator** who is an experienced RN, skilled in quality measure abstraction. The Sepsis Coordinator provides awareness and focus for the care team, encourages practice that demonstrates compliance with the guidelines, and participates in the ongoing education of staff and physicians; with skills in individual and group presentations. It is the Sepsis Coordinator who provides the "glue" to our Sepsis Program by concurrently monitoring performance; communicating opportunities for improvement; sharing our results and our successes

Our Health System will continue on the journey in provision of optimal patient care with the goal of successful outcomes for decreased Mortality, LOS, Readmissions and Complications. We will continue until perfect process is achieved and sustained in keeping with our **Definition of Sepsis Quality:**

**Doing the Right Thing:** Appropriate and Timely Sepsis Decisions and Interventions

**Doing it Right:** Evidenced –based Sepsis Algorithms and Order Sets

**Every Patient /Every Time:** Consistently and Continuity by the Sepsis Program Coordinators & Physician Champions
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APPENDIX: Figure 1. Baseline Data Analysis completed 2/2015: Statistical and processes capability analysis was conducted for each measure by hospital. The following 2 examples demonstrate process variation of patient’s care that is not within the specification limits whether it is less than 3 hours for antibiotic administration or consistency in the proper volume for fluid resuscitation of 30/ml/kg.

**Process Capability of Hospital C’s Antibiotic Admin Interval < 3hrs**

- **Process Data**
  - LSL: 120
  - Target: 180
  - USL: 200
  - Sample Mean: 148.19
  - Sample N: 20
  - StDev (Within): 138.5
  - StDev (Overall): 133.359

- **Potential (Within) Capability**
  - Cp: 0.07
  - CPL: 0.07
  - CPU: 0.08
  - Cpk: 0.07

- **Overall Capability**
  - Pp: 0.07
  - PPL: 0.15
  - PPU: 0.02
  - Ppk: 0.02

**Process Capability of Hospital A’s Adequacy of Fluid Bolus (30 mL/kg)**

- **Process Data**
  - LSL: 30
  - Target: 40
  - USL: 50
  - Sample Mean: 38.815
  - Sample N: 30
  - StDev (Within): 20.001
  - StDev (Overall): 17.6759

- **Potential (Within) Capability**
  - Cp: 0.08
  - CPL: 0.15
  - CPU: 0.02
  - Cpk: 0.02

- **Overall Capability**
  - Pp: 0.09
  - PPL: 0.17
  - PPU: 0.02
  - Ppk: 0.02

**Figure 2. Physician Sepsis Monitoring Checklist: assists practitioner on the monitoring Sepsis care**

<table>
<thead>
<tr>
<th>Time frame</th>
<th>Marker</th>
<th>Completed</th>
</tr>
</thead>
</table>
| 3 hours    | Measure a lactate level  
  - If result is >2 mmol/mL, a repeat lactate level must be done within 2 hours.  
  Obtain blood cultures  
  Administer broad spectrum antibiotics  
  If hypotensive or lactate level elevated (> 4 mmol/L), resuscitate with 30 mL/kg IV crystalloid and proceed to the 6 hour bundle (below).  
  30 mL x _____ kg = ________ mL NSS or LR or other isotonic solution |       |
| 6 hours    | If hypotensive despite 30 mL/kg crystalloid *OR* lactate >4 mmol/L (SHOCK):  
  Administer vasopressors if persistently hypotensive  
  Documentation of volume status or tissue perfusion (choose ONE):  
  1. A focused physical exam documenting ALL of the following:  
     - Vital signs  
     - Cardiopulmonary exam  
     - Capillary refill evaluation  
     - Peripheral pulse evaluation  
     - Skin examination  
  2. Record the following values within 6 hours of presentation. Document interpretation of values and plan in the medical record (must be physician documentation):  
     - Central venous pressure measurement (CVP)  
     - Central venous saturation (ScVO₂) |       |

System and Process Re-design were implemented with the goal of reinforcing desired evidence-based standards

- Physician Orders in the ED EMR
- Sepsis Orders in the Inpatient EMR
- Nursing Severe Sepsis Screening for Medical Surgical Units
- Sepsis/Severe Sepsis/Septic Shock Algorithm
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APPENDIX: Figure 3. Sepsis/ Severe Sepsis/Septic Shock Algorithm

**End Organ Dysfunction**
- 
- **SIRS Criteri**a
  - HR > 90
  - T > 38°C
  - T < 36°C
  - RR > 20
  - PaCO₂ < 32
  - WBC > 12
  - WBC < 4
  - Bands > 10%

**Volume Assessment**
Choose ONE of the Two Options below:
- A focused physical exam:
  - Vital signs (all 4 must be present)
  - Cardiopulmonary exam
  - Capillary refill evaluation
  - Skin examination
  - Peripheral pulses
- OR Record both of these values within 6 hrs
  - CVP (value/interpretation/plan)
  - ScVO₂ (value/interpretation/plan)

**Figure 4. Health System's Measures for Sepsis/ Severe Sepsis /Septic Shock 10/1/2015 – 4/30/2016**

<table>
<thead>
<tr>
<th>Health System Measures Severe Sepsis/Septic Shock 10/1/2015 - 4/30/2016</th>
<th>Hospital A n=74</th>
<th>Hospital B n=68</th>
<th>Hospital C n=46</th>
<th>Health System n=188</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Lactate: 12 hr. prior or within 3 hours of Bundle Start Time</td>
<td>98.6%</td>
<td>98.5%</td>
<td>91.3%</td>
<td>96.8%</td>
</tr>
<tr>
<td>Blood Cultures: drawn prior to administration of antibiotics within 3 hours of Bundle Start Time</td>
<td>95.8%</td>
<td>92.6%</td>
<td>87.8%</td>
<td>92.8%</td>
</tr>
<tr>
<td>Antibiotic Administration: completed within 3 hours of Bundle Start Time</td>
<td>95.8%</td>
<td>98.5%</td>
<td>97.6%</td>
<td>97.2%</td>
</tr>
<tr>
<td>Fluid Resuscitation: equal to or more than 30 mL/kg fluids within 6 hours of Bundle Start Time</td>
<td>76.7%</td>
<td>75.8%</td>
<td>95.5%</td>
<td>81.2%</td>
</tr>
</tbody>
</table>
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### APPENDIX: Figure 5. Statistical Significance of Improvement Baseline to Current Performance

<table>
<thead>
<tr>
<th>Health System Sepsis Measures Hospital A B &amp; C Patients with Severe Sepsis and /or Septic Shock</th>
<th>Baseline Apr-Dec 14 Analysis 1/2015</th>
<th>Current Data 10/15-4/16</th>
<th>Statistical Significance of Improvement p-value &lt; 0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Patients Evaluated</strong></td>
<td>85</td>
<td>188</td>
<td>Method: Chi-Sq.</td>
</tr>
<tr>
<td><strong>Lactate:</strong> Percentage of lactate measured 12 hr. prior or within 3 hours of Bundle Start Time; <strong>Target 90%</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numerator</td>
<td>78</td>
<td>182</td>
<td></td>
</tr>
<tr>
<td>Denominator</td>
<td>85</td>
<td>188</td>
<td></td>
</tr>
<tr>
<td><strong>Blood Cultures:</strong> Percentage drawn prior to administration of antibiotics within 3 hours of Bundle Start Time; <strong>Target 90%</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numerator</td>
<td>81</td>
<td>168</td>
<td></td>
</tr>
<tr>
<td>Denominator</td>
<td>85</td>
<td>181</td>
<td></td>
</tr>
<tr>
<td><strong>Antibiotic Administration:</strong> Percentage completed within 3 hours of Bundle Start Time; <strong>Target 90%</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numerator</td>
<td>72</td>
<td>176</td>
<td></td>
</tr>
<tr>
<td>Denominator</td>
<td>85</td>
<td>181</td>
<td></td>
</tr>
<tr>
<td><strong>Fluid Resuscitation:</strong> Percentage of Patients that received equal to or more than 30 mL/kg fluids within 6 hours of Bundle Start Time; <strong>Target 90%</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numerator</td>
<td>47</td>
<td>69</td>
<td></td>
</tr>
<tr>
<td>Denominator</td>
<td>85</td>
<td>85</td>
<td></td>
</tr>
</tbody>
</table>

### Figure 6. Risk Adjusted Sepsis Mortality, LOS, Readmissions & Complication, 2 Year Comparison

<table>
<thead>
<tr>
<th>Health System Risk Adjusted Sepsis Outcomes 2 Year Comparison</th>
<th>Mortality</th>
<th>Length of Stay</th>
<th>30 Day Readmissions</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Observed to Expected (O/E Ratio) 4/2014 - 3/2015</strong></td>
<td>0.914</td>
<td>0.883</td>
<td>0.820</td>
<td>0.429</td>
</tr>
<tr>
<td><strong>Observed to Expected (O/E Ratio) 4/2015 - 3/2016</strong></td>
<td>0.769</td>
<td>0.884</td>
<td>0.802</td>
<td>0.361</td>
</tr>
</tbody>
</table>