Using Performance Measure Results for Data-Driven Quality Improvement

Sepsis Recognition and Care

Advocate Condell Medical Center
Objectives

• This presentation will provide:
  • Historical perspective of the development of a systematic evidence based performance improvement process (Severe Sepsis)
  • Discuss the role of multidisciplinary teams in quality improvement
  • Identify the significance of support vertically as well as horizontally through the organization
  • A description of how data drove the improvement processes for the components of a comprehensive severe sepsis response
  • Discuss utilization and impact of electronic medical record solution
    • Screening
    • Documentation
    • Power Plans vs. Sepsis Advisor
  • Conversion from outcome measurements based on SCCM Surviving Sepsis Campaign to the CMS Sep-1 Core Measure
  • Describe the process of spreading success and opportunities for improvement in quality improvement projects
Components to Success

• Leadership
• Tools
  – Process
  – Data Collection
• Communication
• Education
• Participation in “collaboratives”/outside opportunities
• Flexibility to scope (build from local to system)
Swiss Cheese Effect

One person can only achieve 80%

Add one more layer
People can achieve 98%

Add one more layer
People can achieve 99%
Starting Point

• Systematic approach to define and measure understood by the entire organization
  • Define – Measure – Analyze – Improve – Control (DMAIC)
  • Plan – Do – Act – Study (PDSA)
• Building the Team
  • Start with “Champions” who can demonstrate expert knowledge
    • ICU Intensivist
    • ICU Nurse Manager
    • System Resources – Clinical Effectiveness
  • Local senior organizational leaders to support process for success and reduction of barriers
    • Vice President of Medical Management
    • Vice President of Patient Care Services
    • Director of Quality Improvement
PDSA Cycle

- **Start Small**
- **Build knowledge through sequential testing**
- The sequence
  - Test → Implement → Spread

Fine tuning the change based on what you learned!
Multidisciplinary Sepsis Taskforce

Organizational Placement (Sub-committee of ICU Committee)

– Raeann Fuller, ICU Nurse Manager
– Elizabeth Wade, Performance Improvement Coordinator
– Director Medical Care Management
– ICU Intensivist
– Emergency Department Physician
– Hospitalist/Attending Physicians
– Director(s) of Nursing
– Medical Surgical Inpatient Nurse Manager(s)
– Director of Pharmacy
– Pharmacist
– Director/Manager of Laboratory Services
– Emergency Department Nurse(s) (Clinical Informatics Liaison)
– Critical Care Nurse(s)
– Medical Surgical Nurses
– Director/Manager Clinical Informatics
Move from Local to System September – November, 2014

• Feedback from all ten Advocate hospitals
• Focused questions related to current sepsis processes and data collection
• Participation from:
  – Physicians
  – APNs
  – Nursing Directors and Managers
  – Staff RNs from ED, Critical Care, Med-Surg
  – Pharmacists
  – Quality specialists
  – Informatics Analysts
What did we find?

• Sepsis awareness high, but variation in sepsis infrastructure at each site
• Nurses were very well versed in care interventions at many sites
• Nurses verbalized frustration with knowing the guidelines but unable to engage physicians to implement in timely manner
• Significant variation in screening processes in ED and in-house units
• Significant variation in Sepsis Alert process
• Physician practice varies greatly
• Fear of appropriate fluid resuscitation
• Documentation & coding issues continue
• Accountability & feedback are key
• Minimal data collection due to substantial resource intensity

**Bottom line:** We fail to treat sepsis with the same urgency and consistency in practice that we employ with STEMI and stroke, yet all three are time sensitive conditions

The site visit feedback supports our hypothesis that significant variation and lack of urgency needs to be addressed in order to improve care of our sepsis population within our system.
# Site Sepsis Programs

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Site Sepsis Team</th>
<th>Sepsis Screen in ED</th>
<th>Sepsis Protocol</th>
<th>Every patient, every shift, every day</th>
<th>Time Zero</th>
<th>Care Connection</th>
<th>Handoff ED to ICU</th>
<th>Sepsis Alert</th>
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<tbody>
<tr>
<td>1</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Verbal over phone</td>
<td>*RN takes pt to floor</td>
<td>RRT only</td>
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<td></td>
<td>X</td>
<td>X</td>
<td>Verbal</td>
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<td>RRT only</td>
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<td>X</td>
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<td>Sepsis Response Team</td>
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<tr>
<td>4</td>
<td>X</td>
<td>ED screens every pt as of 10/1</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>SBAR</td>
<td></td>
<td>RRT only</td>
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<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td>Face to Face</td>
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<td>RRT only</td>
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<td>Verbal</td>
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<td>RRT only</td>
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<td>X</td>
<td></td>
<td>Telephone report</td>
<td>*ICU RN comes to ED if patient is complex</td>
<td>RRT only</td>
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<td>X</td>
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<td></td>
<td>ICU RN comes to ED</td>
<td>Verbal report to floor</td>
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<td>Archived</td>
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<td>Verbal</td>
<td>*ED RN brings ICU patient to unit</td>
<td>RRT Only</td>
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<tr>
<td>10</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td>Verbal</td>
<td>*ED RN brings ICU patient to unit</td>
<td>X</td>
</tr>
</tbody>
</table>

*Had Sepsis Response Team few years ago, but no longer is implemented.*

*have Sepsis Response Team, but Staff usually call RRT*
“Tools” Process

- Bedside Tools
- EMR Integration
- Institutional Response – Sepsis Alert
- ALERT Nurse
“Tools” – Screening
"Tools" Documentation

...Sepsis physician note
Sepsis Alert Process

- **Disease Specific RRT**
  - House wide response (ED, Outpatient and Inpatient)
  - Call to the ICU Charge Nurse 27-2777
  - Patient Assessment by ICU Charge Nurse
  - ICU Charge Nurse Collaboration with Intensivist
  - Orders if appropriate
  - Collaboration with appropriate physician based on patient location
  - Audible ALERT for Medical Surgical patients **IF** they need CCP and base labs
    - Laboratory
    - Pharmacy
    - Respiratory Therapy
Patient presents with Sepsis Symptoms and/or Lighthouse Alert Fires

Sepsis Early Recognition Tool printed from Optio and Completed

Notify ICU Charge RN

ICU Charge RN discusses the case with Intensivist to determine course of action

(-) Screen

Rescreen patient in 2 hours

Complete Sepsis Power Form

(+ Screen

ICU Charge Re-screen Patient

Critical Result Form Completed

ICU Charge RN to complete required sepsis documentation*

Intensivist to determine patient placement

Call Audible Sepsis Alert if bundled care not completed (IF ONLY Lactate is needed call Respiratory Care)

Intensivist to Complete the Sepsis Advisor

ICU Charge RN to complete required sepsis documentation*

Transfer to ICU

Rescreen patient in 2 hours

Severe Sepsis/Shock Bundled Care:
1. Lactate Level
2. Blood Cultures
3. Broad Spectrum Antibiotics
4. Fluids-30ml/kg if hypotensive OR Lactate >4

Sepsis Alert will fire to the Physician and RN: Sepsis Alert = 2 SIRS criteria + one organ dysfunction + Infection Source

*Required Sepsis Documentation
1. Sepsis Power Form
2. Critical Result Form
3. PIEP Note

03/16/2015
ICU Emergency Response
2012-2016

Number of Responses

<table>
<thead>
<tr>
<th>Year</th>
<th>Inpt Code Blue</th>
<th>Inpt Code Neuro</th>
<th>Sepsis Alert</th>
<th>RRT</th>
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<td>2012</td>
<td>65</td>
<td>293</td>
<td>602</td>
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<td>2013</td>
<td>74</td>
<td>612</td>
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<td>2014</td>
<td>82</td>
<td>32</td>
<td>768</td>
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<td>2015</td>
<td>62</td>
<td>57</td>
<td>513</td>
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<td>2016</td>
<td>51</td>
<td>19</td>
<td>256</td>
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</table>

(Q.1-Q.2)
ALERT Nurse for Condell

- Always
- Launch
- Early
- Rapid
- Treatment

*Goal: Development of Sepsis Coordinators for each Advocate Hospital Site*
Communication and Education

• Overall Multidisciplinary Teams
• Ad hoc for special situations i.e. Lactate process
• Results Every Where and Often
  – ICU Committee (nursing and medicine)
  – Emergency Department (nursing and medicine)
  – Quality Medical Oversight Council
  – System level
    • Sepsis collaborative
    • Critical Care
    • Key Result Area
What do These People Have in Common?

They all died from sepsis

Make it Real!!!!!
Hospital Sepsis Mortality Index-APACHE

Source: APACHE Data eICU
# System Sepsis Dashboard

## Condell

### ALL SEPSIS

<table>
<thead>
<tr>
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<tr>
<td>Percentage of Sepsis Shock</td>
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<td>18.3%</td>
<td>12.2%</td>
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<td>13.4%</td>
<td>14.5%</td>
<td>22.1%</td>
<td>16.7%</td>
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<td>53.3%</td>
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<td>0.93</td>
<td>0.83</td>
<td>0.84</td>
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<td>0.86</td>
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<td>-1.3%</td>
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<td>Mortality Index</td>
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<td>1.11</td>
<td>0.27</td>
<td>1.20</td>
<td>2.12</td>
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<td>Mortality Rate</td>
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<td>22.0%</td>
<td>5.2%</td>
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<td>1.27</td>
<td>0.41</td>
<td>0.67</td>
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<td>Readmission Rate</td>
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<td>4.4%</td>
<td>11.0%</td>
<td>5.3%</td>
<td>6.9%</td>
<td>15.9%</td>
<td>4.7%</td>
<td>0.0%</td>
<td>11.7%</td>
<td>0.4%</td>
<td>-20.2%</td>
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</table>
Sepsis Core Measure Compliance
-Sep-1

Oct-15: 75%
Nov-15: 55%
Dec-15: 78%
Jan-16: 75%
Feb-16: 64%
Mar-16: 60%
Apr-16: 33%
May-16: 47%
Jun-16: 58%
Jul-16: 29%
Aug-16: 43%
Sep-16: 43%

Target = 75%
Advocate System Sep-1 Compliance Oct’15-Jun’16

Better
Summary of Outliers-All Patients
September-2016

**Severe Sepsis Outlier**
September 2016: Four Outliers

- No Fluids (Clinical Decision/ED)-Two Cases
  - Both cases ESRD on HD.
  - One case with lactate=4.2 and no fluids after consulting with nephrology
  - One case with isolated entry of SBP=89 then WNL

- No Initial Lactate (Inpatient/T4)

- No Repeat Lactate (Shared by ED and ICU)

**Septic Shock Outliers**
September 2016: No Cases Meeting Criteria
3-Hour Bundle
Average Time From Time Zero to Antibiotic-All Patients

Minutes

Oct-15: n=8, Avg: 147
Nov-15: n=7, Avg: 89
Dec-15: n=10, Avg: 147
Jan-16: n=6, Avg: 94
Feb-16: n=10, Avg: 85
Mar-16: n=9, Avg: 89
Apr-16: n=9, Avg: 82
May-16: n=9, Avg: 80
Jun-16: n=11, Avg: 118
Jul-16: n=8, Avg: 80
Aug-16: n=7, Avg: 60
Sep-16: n=7, Avg: 62

Average Time to Antibiotics
Median Time to Antibiotic
Target < 180 Minutes
Stretch Target< 60 mins

Better
Top 10 Safety Goal
Repeat Lactate Done

<table>
<thead>
<tr>
<th>Month</th>
<th>n</th>
<th>Repeat Lactate Done</th>
<th>Target = 100%</th>
</tr>
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<tbody>
<tr>
<td>Oct'15</td>
<td>7</td>
<td>86%</td>
<td></td>
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<tr>
<td>Nov'15</td>
<td>6</td>
<td>83%</td>
<td></td>
</tr>
<tr>
<td>Dec'15</td>
<td>7</td>
<td>86%</td>
<td></td>
</tr>
<tr>
<td>Jan'16</td>
<td>3</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Feb'16</td>
<td>4</td>
<td>100%</td>
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<td>Mar'16</td>
<td>6</td>
<td>83%</td>
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<tr>
<td>Apr'16</td>
<td>8</td>
<td>75%</td>
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<td>May'16</td>
<td>6</td>
<td>83%</td>
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<td>Jun'16</td>
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<td>Aug'16</td>
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<tr>
<td>Sep'16</td>
<td>7</td>
<td>86%</td>
<td></td>
</tr>
</tbody>
</table>

Better
Sepsis Alert

Sepsis Alert Called (Number of Patients)

Number of Alerts

Sepsis Alert Called (Number of Patients)

Advocate Condell Medical Center
Sepsis Alert
Patient Met Severe Sepsis Criteria

Percent Met Severe Sepsis Criteria

- Target > 50%

Sepsis Bundle Checklist Completion
July 2016: 31%
Aug 2016: 76%.
<table>
<thead>
<tr>
<th>Month</th>
<th>Patients (n)</th>
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<tbody>
<tr>
<td>Sept-15</td>
<td>10</td>
</tr>
<tr>
<td>Oct-15</td>
<td>7</td>
</tr>
<tr>
<td>Nov-15</td>
<td>7</td>
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<td>Dec-15</td>
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<td>Apr-16</td>
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<td>Jun-16</td>
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<td>Jul-16</td>
<td>11</td>
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<tr>
<td>Aug-16</td>
<td>7</td>
</tr>
<tr>
<td>Sep-16</td>
<td>5</td>
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</tbody>
</table>

Percent of Sepsis Alerts called for Patients with Severe Sepsis:

- **Target = 90%**
- **Stretch Target = 100%**

- Sept-15: 90%
- Oct-15: 71%
- Nov-15: 43%
- Dec-15: 40%
- Jan-16: 56%
- Feb-16: 86%
- Mar-16: 78%
- Apr-16: 82%
- May-16: 79%
- Jun: 71%

The chart shows the percentage of sepsis alerts called for patients with severe sepsis, with a goal to reach at least 90% and ideally 100%.
Sepsis Screening
Every Nurse...Every Day...Every Shift

Screen Once in 24-hours: 66%
Screen Q Shift: 48%
Checklist completed for positive screen: 42%

Q Shift Screening
W3=0%
W4=60%
E2=50%
T3=60%
T4=10%

Sept 2016
n=38
Emergency Department Sepsis Powerplan Rollout Project

August 15, 2016

System Kick Off Meeting
Agenda

• Review the reason for action
• Discuss key stakeholders and site teams
  – System versus site roles and responsibilities
  – Getting the word out
• Discuss high-value communication tools and go-live support
• Metrics to understand the impact
• Review timeline / milestones from today to go-live on October 16, 2016
Participation in Collaboratives

• IMPACT Study – International sepsis prevalence
• SCCM Medical Surgical Sepsis Collaborative
• Michigan Health and Hospital Association

• Provides comparative process analysis
• Increased exposure to process solutions
• Pride in your accomplishments
Changes we tested and implemented; barriers we have found

Screening
• EMR screening process is not currently working BUT nurse screening continues on paper each shift.

Developing nursing protocols
• We currently have power sets in the EMR.
• Power plans are not used consistently in med/surg.

SCCM Collaborative
Changes we tested and implemented; barriers we have around

**Partnering with physicians for response**
- Strong support of medical leadership
- Strong ED support
- Increased ICU support
- Need to improve collaboration with Hospitalists.

**Partnering with others like ED, Response Team, Pharmacy**
- We have a strong collaboration with Lab, Pharmacy, Respiratory Care and the ED.
- We need to improve the collaboration with the Hospitalist groups.
- Strong collaboration between ED, Med/Surg and the ICU charge RN—the sepsis alert process works.

**SCCM Collaborative**
We were surprised to learn . . .

- That all 4 cases of sepsis on the floor, the staff nurses recognized the sepsis and triggered the alert.
- Appropriate labs were obtained prior to the sepsis alert.
- In 3 of the 4 cases broad spectrum antibiotics were already on-board.

SCCM Collaborative
Advocate and Advocate Condell’s Efforts

• 2006:
  • Early Sepsis Recognition Tool (paper)
  • Severe Sepsis Order Set
  • Implemented ScVO2 monitoring
  • Nursing and Emergency Physician education

• 2007
  • Sepsis Task Force and Education
  • Nursing and Emergency Physician education
  • VHA Sepsis Initiative (2007 – 2010)

• 2010 – 2011
  • Advocate Cerner Lighthouse Build meetings
  • Nursing and Emergency Physician education
  • Right Care Right Now Orientation education
  • Sepsis Alert with the ICU Charge Nurse
    – Disease specific RRT
    – To provide systematic response, evaluation and treatment of severe sepsis and septic shock.
    – House wide (Emergency Department, Outpatient, Inpatient)
Advocate and Advocate Condell’s Efforts

• 2013
  • Nursing and Emergency Physician education
  • IMPACT International Sepsis Study
    • Updated all materials and standards to the most recent SCCM Guidelines
    • Cerner Sepsis Lighthouse Solution beta testing began
      – Severe Sepsis Power Plan
      – Emergency Department
      – Intensive Care
      – Antibiotic Advisor/Vasopressor Advisor

• 2014
  • SCCM Medical Surgical Sepsis Collaborative
  • Nursing and Emergency Physician education
  • Revision of the Early Sepsis Recognition Tool (paper)
  • Reimplementation of Lighthouse
    – New Medical Surgical Power Plan
    – Desensitization of the triggers,
    – Medical Surgical audible sepsis alert,
    – Severe Sepsis report cards (ED, Inpatient, Composite)
Advocate and Advocate Condell’s Efforts

• 2015
  • Advocate System Sepsis Collaborative and dashboard development
  • New Cerner Lighthouse Solution implemented system wide
  • Updated all materials and standards to the most recent SCCM Guidelines
  • SIRS and Severe Sepsis Algorithms
  • Completion of SCCM Medical Surgical Collaborative
  • December Nursing and Emergency Physician education
  • Development of the ALERT Nurse
Advocate and Advocate Condell’s Efforts

• 2016
  • Michigan Health and Hospital Association Sepsis Collaborative
  • Quarterly Nursing Education and Development of Lunch and Learns
  • Change in data collection to meet Sep – 1 Core Measure
  • Development of “…Sepsis” for ease of physician documentation
  • System and local assessment of lactate measure challenges/auto order
  • Development of Inpatient sepsis nursing ad hoc committee
  • Development of Advocate Pediatric sepsis teams through the Children’s Hospitals

• Coming in 2017
  • Conversion of ALERT Nurse to Advanced Practice Nurse coverage
  • Compliance with Gabby’s Law
Advocate Condell Medical Center
Lives Saved thru Evidenced Based Sepsis Care

2011-2016
106 Lives Saved

Source: APACHE Hospital Sepsis Mortality Index
Thank You and Questions

What do These People Have in Common?

Sepsis truly is...

They all died from sepsis

A search and rescue mission, with a stop watch