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North Shore – LIJ Health System
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STOP (Strengthening Treatment and Outcomes for Patients) Sepsis Collaborative organized in 2010

- Quality improvement initiative that supports hospitals in the early recognition and treatment of severe sepsis and septic shock
  - Protocol-based approach
  - Emergency departments and ICU
Collaborative Model

- A systematic approach to health care quality improvement
- Organizations and providers introduce, test and measure practice innovations
- Share information to accelerate learning and widespread implementation of best practices.
GNYHA/UHF Collaborative Components

- Leadership support
- Interdisciplinary teams
- Nurse and physician champions
- Expert physician consultants
- Ongoing education: live sessions, web-based
- Communication via web, teleconferences, e-mail
- Site visits
- Standardized data collection and reporting
Established in 2005

Goals
- Improve quality of patient-centered care
- Create infrastructure to sustain and spread quality improvement and patient safety initiatives
Established 2006 to convene critical care leadership to prioritize efforts to improve critical care services and patient outcomes:

- Identify and disseminate best practices
- Promote team-based training
- Develop data measurement strategies to identify areas for improvement
- Design goal-based regional initiatives
- Identify regulatory and policy issues and advocate for change.
GNYHA/UHF Critical Care Leadership Network 2006-2009

- 2 surveys of ICUs in Greater New York Region
- 3 “Critical Care Controversies” programs
- Annual ultrasound training for all 1st year CCM fellows
- Lots of meetings, robust discussion on starting collaborative
- In 2010, activist faction challenged the group: “Can we stop talking and do something?”
Early antibiotic administration and fluid resuscitation improves survival in patients with severe sepsis and septic shock.

- It’s not that complicated
- It wasn’t happening
Use of protocols for early identification and treatment of patients with severe sepsis and septic shock in the emergency department will improve process measures and reduce mortality.
STOP Sepsis Collaborative

- 57 hospitals in the region
  - 19,400 beds
  - >1 million annual discharges
- Provided education and tools to:
  - recognize patients with severe sepsis and septic shock in the Emergency Department
  - Implement resuscitation protocol
STOP Sepsis Collaborative Goals

• To reduce mortality in patients with severe sepsis and septic shock by developing and implementing a protocol-based approach to rapid identification and rapid treatment.

• To enhance communication and patient flow between the emergency department and other areas of the hospital, in particular, the intensive care units.
STOP Sepsis Collaborative: The Team

<table>
<thead>
<tr>
<th>STOP Sepsis Collaborative Hospital Project Team</th>
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<tbody>
<tr>
<td>ED Physician Lead and Nurse Lead</td>
</tr>
<tr>
<td>ICU/Critical Care Physician Lead and Nurse Lead</td>
</tr>
<tr>
<td>Quality Department Representative</td>
</tr>
<tr>
<td>RRS Team Representative</td>
</tr>
<tr>
<td>Infectious Disease Representative</td>
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<tr>
<td>Information System Specialist</td>
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<tr>
<td>Senior Leadership Representation</td>
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Is Sepsis Present? (see Evaluation for Sepsis Screening Tool)
Suspected or documented infection with two or more of the following:
- Temperature > 38.3°C (101.0°F) or < 36.0°C (96.8°F)
- Heart rate > 90/min
- Respiratory rate > 20/min or PaCO₂ < 32 mm Hg
- WBC > 12,000/mm³, < 4,000/mm³ or > 10% bands
- Unexplained altered mental status

Order organ-specific tests and Sepsis Diagnostic Panel
Initiate Antibiotics

Systolic blood pressure < 90 mm Hg or decline of > 40 mm Hg from known baseline?

- Give fluid bolus (normal saline or Ringer’s lactate), 10 ml/kg ideal body weight (IBW) over 15-30 minutes
- Measure pulse and blood pressure every 15 minutes, and continue fluid administration at 5 ml/kg IBW every 15 minutes up to a total of 30 ml/kg

Any of the following apply? (following the fluid challenge)
- Systolic blood pressure < 90 mm Hg after fluid challenge
- Venous lactate > 4 mmol/L
- > 1 organ dysfunction not known to be present at baseline and no alternative explanation

Begin Sepsis Resuscitation Bundle

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### Severe Sepsis Resuscitation Protocol: Non-Invasive

| **WHO** | Septic Patient with Lactate ≥ 4 mmol/L or MAP < 65 after 2 liters crystalloid  
| AND | Goals of care are curative |
| **INITIAL RESUSCITATION** | • Administer 20-30 ml/kg isotonic crystalloid bolus over 20 minutes  
| | • Send cultures of all likely sources of infection  
| | • Think of source control (Infected catheter? Operative intervention for infection? Drainable pus?)  
| | • Administer antibiotics to cover all likely sources of infection |
| **SpO2** | If patient’s O2 saturation is < 90% on high fIO₂ supplemental oxygen (non-rebreather mask), consider intubation and switching to invasive strategy. |

### FLUIDS

**Choose 1 Strategy**

- **Dynamic IVC Ultrasound-** Keep giving 500-1000 ml boluses of isotonic crystalloid until there is < 30% change in IVC size with inspiration.  
- **Empirc Fluid Loading-** Patients with severe sepsis/septic shock may require at least 6 liters of fluid during their acute resuscitation (first 6 hours of care).  

### RE-CHECKING MAP

- If MAP is < 65 after adequate fluid loading:  
  - Place a full sterile central line in the JI or SC vein (femoral site only if neck line not feasible);  
  - Start vasopressors; titrate to a MAP ≥65;  
  - Consider switching to invasive protocol.  

### TISSUE OXYGENATION

- Send repeat lactate when above goals are accomplished (Send a 2nd lactate at 3-hour mark, if not already sent)  
- If lactate has cleared by ≥ 10% (or is not rising if original lactate was ≤ 2 mmol/L), go to disposition  
- If lactate is rising or has cleared by < 10%, choose 1 option:  
  - If Hb < 7: transfuse 1 unit of PRBC  
  - or  
  - Additional Fluids: if patient had empiric fluid loading, give an additional liter of crystalloid  
  - or  
  - Inotropes: especially if heart appears hypodynamic on echo. If calcium is low, replete that first. If not, administer dobutamine 5-20 mcg/kg/min.  
  - or  
  - If Hb 7-10: consider transfusion. Especially in elderly patients or patients with coronary artery disease  
- Send 3rd lactate, if it still has not cleared by ≥10%, continue with the above, trending lactates every 1-2 hours until these two goals are met or switch to invasive strategy (Send 3rd lactate at the 6-hour mark, if not already sent)  

### DISPOSITION

- Patients should get ICU consultation. If not an ICU candidate, should go to appropriately monitored bed.  
- Periodically recheck patient for MAP ≥ 65, good mental status, and good urine output  
- Consider trending lactate every Q 2-4 hours. If it starts rising again, restart protocol
<table>
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<th>RE-CHECKING MAP</th>
<th>TISSUE OXYGENATION</th>
<th>DISPOSITION</th>
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  - Periodically recheck patient for MAP ≥ 65, good mental status, and good urine output  
  - Consider trending lactate every Q 2-4 hours. If it starts rising again, restart protocol |
Goal: within 6 months, 100% of participating hospitals implement a protocol or algorithm for identifying and resuscitating patients with sepsis starting in the ED and the ICUs
8,556 patients with Severe Sepsis reported through June 2012

<table>
<thead>
<tr>
<th>Protocol Use</th>
<th>#</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Non-Invasive</td>
<td>5,583</td>
<td>65%</td>
</tr>
<tr>
<td>Invasive</td>
<td>2,342</td>
<td>27%</td>
</tr>
<tr>
<td>No Response</td>
<td>631</td>
<td>7%</td>
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</tbody>
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# Sepsis Interventions

8,556 patients with Severe Sepsis reported through June 2012

<table>
<thead>
<tr>
<th>Means of Fluid Assessment</th>
<th>#</th>
<th>%</th>
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<tbody>
<tr>
<td>Empiric Fluid Loading</td>
<td>3,236</td>
<td>38%</td>
</tr>
<tr>
<td>Central Venous Pressure (CVP)</td>
<td>1,146</td>
<td>13%</td>
</tr>
<tr>
<td>IVC Ultrasound</td>
<td>147</td>
<td>2%</td>
</tr>
<tr>
<td>Other</td>
<td>301</td>
<td>4%</td>
</tr>
<tr>
<td>No Response</td>
<td>3,990</td>
<td>47%</td>
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Time of Arrival to Recognition

January 2011
Average
3 h 24 m

December 2011
Average
3 h 32 m

June 2012
Average
2 h 29 m

* N = 6,280 excluding Outliers (210)
Goal: Reduce the time of antibiotic initiation to within one hour of recognition of severe sepsis in the ED within 6 months.

* N = 7,697 excluding Outliers

(166)
Goal: Limit time to meeting sepsis resuscitation goals to 6 hours or less within 6 months.

* Monthly averages including outliers
Achievement of Mortality Goal

Goal: Improve severe sepsis mortality rates by 10% in participating hospitals.

18% absolute reduction in mortality
43% relative reduction in mortality
Most change occurred within 3 months

* N = 8,123
**STOP Sepsis Collaborative**

- Large Collaborative can be organized
- Practice changes can be implemented rapidly
- Changes associated with improvements in processes and outcomes
- Emergency Department and Critical Care clinicians can work together
**STOP Sepsis Collaborative**

**Next Steps**

- Sustain improvements
- Expand program to med-surg units
  - “Team Sepsis”
  - Integrate with Rapid Response Teams
- Pediatric STOP Sepsis Collaborative