Saving Sepsis Patients
Protocol & Practice

Rebecca Sell, MD
UC San Diego Health Systems
Overview

• About UC San Diego
• Protocol & Process
• Dashboards
• UC System-wide Collaborative
UC San Diego Health Systems

- 2 campuses
  - Hillcrest (357 beds)
  - Thornton/SCVC (173 beds)
• Quaternary care
• “County hospital”
• Training program
  • Medical students
  • 775 intern, resident and fellow trainees
  • Additional 100+ trainees in non-ACGME accredited fellowships
Process prior to SEP-1

• ED only
• Code sepsis activated on triage by RN
• Aggressive fluids, cultures and lactate, and broad-spectrum antibiotics
• Multiple nurse champions
• Each case individually reviewed by Critical Care MD with feedback for missed cases, missed opportunities as well as successful cases
MULTI-DISCIPLINARY COMMITTEE
CMO/CNO
Infectious Diseases MD
Coding specialists
Performance Improvement and Patient Safety analysts

EMERGENCY ROOM
ED MDs
CNS
ED RN champions
Pharmacists
Information Technology

INPATIENT
Hospitalists
Critical Care MD
CNS
Critical Care RN
Pharmacists
IT
1. Improve recognition of Severe Sepsis & Septic Shock

• Nursing education
• Physician education
SCREENSAVERS

CODE SEPSIS

Two SIRS criteria and NEW suspected infection?

→ Call CODE SEPSIS: x6111!
→ Use Epic Sepsis orderset
→ Bolus 30 ml/kg
→ Blood cultures and lactate
→ Antibiotics ASAP

SIRS criteria = T >38.3 or < 36, HR >90, RR >20 or WBC >12K, < 4K or >10% bands
Early Recognition

- New suspected infection
- Plus (+) 2 SIRS Criteria:
  - Temp > 38.3°C or < 36°C
  - HR > 90 bpm
  - RR > 20

Call Code Sepsis

- All employees within acute care facilities
- x6111

Treat

- Draw lactate and blood cultures
- Administer IV fluid bolus ASAP
- Administer antibiotics within 1 hour
- Repeat lactate at 3 hours
Handouts, posters, slideshows
2. Create systems to make compliance easy

- Simplified ED and inpatient specific order-sets
- Changed the definition of abnormal lactate to comply with SEP-1
- Automated repeat lactates
- Emergency standing orders for rapid response RNs
- Automatic reminders for physician reassessment
- “dot-phrases” to ensure exam/documentation complies with SEP-1
Order-set:

**Order Sets**

- IP GEN Code Sepsis Orders

**Suggestions**

- IP CRD Cardiology Pre-Operative Orders for Day of Procedure
- IP CRD Electrophysiology Pre-Operative Orders for Day of Procedure
- IP CRD PACU Post-Left Heart Catheterization Orders
- IP CRD PACU Post-Right Heart Catheterization Orders
**IP GEN Code Sepsis Orders**

**IMPORTANT:** This order set is to be used for patients who meet criteria for **severe sepsis** only.

**SEVERE SEPSIS Criteria:**
A. Suspected source of clinical infection
   AND
B. 2 or more SIRS criteria
   i. HR > 90
   ii. Temp > 38.3°C (100.9°F) OR < 36°C (96.8°F); if immune compromised use Temp > 100.4°F
   iii. Respiration > 20 per minute
   iv. WBC > 12,000 OR < 4,000 OR 10% bands
   AND
C. Organ dysfunction due to sepsis (any one of the following):
   - SBP < 90 OR MAP < 65 OR a SBP decrease of more than 40 mmHg from the last previously recorded SBP considered normal for that patient
   - Creatinine > 2 OR urine output < 0.5 mL/kg/hr for 2 hours
   - Bilirubin > 2 mg/dL (34.2 mmol/L)
   - Platelet count < 100,000
   - INR > 1.5 OR aPTT > 60 sec
   - Lactate > 2 mmol/L (18 mg/dL)

**SEPTIC SHOCK Criteria**
A. Presence of severe sepsis
   AND
1. Tissue hypoperfusion persists in the hour after 30 mL/kg IVF
   i. SBP < 90 mmHg, OR
   ii. MAP < 65, OR
      iii. A decrease in SBP by > 40 mmHg from the last previously recorded SBP considered normal for that specific patient
   OR
2. Lactate level is ≥ 4 mmol/L

**Patient Care**

**Patient Care Orders**

- **INSERT PERIPHERAL IV**
  - STAT, ONE TIME First occurrence Today at 1600
  - Place two large bore peripheral IV lines. If such access cannot be established, contact the MD for central line placement.

- **Weight**
  - STAT, ONE TIME First occurrence Today at 1600

- **Nursing Misc Order:** Patient is a Code Sepsis patient. Please administer all antibiotics simultaneously in parallel.
  - Routine, ONE TIME First occurrence Today at 1600
  - Specify: Patient is a Code Sepsis patient. Please administer all antibiotics simultaneously in parallel.

- **Nursing Misc Order:** Contact 1st Call Provider for Reassessment after IV Fluid Bolus Completed
  - Routine, ONE TIME First occurrence Today at 1600
  - Specify: Contact 1st Call Provider for Reassessment after IV Fluid Bolus Completed

- **Record Mixed Venous O2 Saturation - Central Line Patients Only**
  - EVERY 2 HOURS for 3 occurrences
**Weight-Based Initial IV Normal Saline Bolus**

**IMPORTANT:** For patients who weigh less than 50 kg, use your best clinical judgment with regard to the amount of fluid bolus needed. An initial bolus of 30 mL/kg of normal saline is generally recommended.

- **Patient Weight 51 to 65 KG -- Normal Saline 2000 mL Bolus**
  IntraVENOUS, ONCE, Administer over 30 Minutes

- **Patient Weight 51 to 65 KG -- Lactated Ringers 2000 mL Bolus**
  IntraVENOUS, ONCE, Administer over 30 Minutes

- **Patient Weight 66 to 85 KG -- Normal Saline 2500 mL Bolus**
  IntraVENOUS, ONCE, Administer over 30 Minutes

- **Patient Weight 66 to 85 KG -- Lactated Ringers 2500 mL Bolus**
  IntraVENOUS, ONCE, Administer over 30 Minutes

- **Patient Weight Greater Than 85 KG -- Normal Saline 3000 mL Bolus**
  IntraVENOUS, ONCE, Administer over 60 Minutes

- **Patient Weight Greater Than 85 KG -- Lactated Ringers 3000 mL Bolus**
  IntraVENOUS, ONCE, Administer over 60 Minutes

- **Provider Preference Bolus Dose**
  IntraVENOUS, ONCE, Administer over 30 Minutes

- **Nursing Misc Order: IV Fluids Ordered Elsewhere**
  Routine, ONE TIME

---

**Medications - Antibiotics**

**IMPORTANT:** Hospitalized patients who develop severe sepsis may already have active orders for antibiotics. Individualize antibiotic selections based on the clinical situation, existing or recent antibiotic treatment, microbiology results, etc.

- **Antibiotics - Urinary Tract**
- **Antibiotics - Pneumonia**
- **Antibiotics - Intra-Abdominal Infection**
- **Antibiotics - Skin and Soft Tissue**
- **Antibiotics - Febrile Neutropenia**
- **Antibiotics - Line-Related Infection or Suspected Bacteremia**
- **Antibiotics - Meningitis**
- **Antibiotics - End Stage Liver Disease with Spontaneous Bacterial Peritonitis**
- **Antibiotics - Unknown Source**

---

**Labs**

- **Labs - POC**
Lactate, Blood Green Plasma Separator Tube
- STAT, EVERY 4 HOURS First occurrence Today at 1600 Last occurrence Today at 2000 for 2 occurrences
- Tube: Green Plasma Separator Tube
- Transport to the laboratory immediately on ice.

Blood Culture X2

Blood Culture Routine Blood Culture Set
- P Routine, ONCE First occurrence Today at 1600, Not recommended, >3 blood cultures sets drawn per 24 hours

Blood Culture Routine Blood Culture Set
- P Routine, ONCE First occurrence Today at 1600, Not recommended, >3 blood cultures sets drawn per 24 hours

Urinalysis with Culture Reflex, when indicated
- STAT, ONCE First occurrence Today at 1600
- P Must collect red/yellow urinalysis tube AND gray top culture tube. Culture will be added by reflex if ANY of these conditions are met: urine WBC >5, positive leukocyte esterase, OR positive urine nitrite. Add-on cultures will be rejected if reflex criteria are not met, unless approved by laboratory director.

Basic Metabolic Panel, Blood Green Plasma Separator Tube
- STAT, ONCE First occurrence Today at 1600
- Tube: Green Plasma Separator Tube

Liver Panel, Blood Green Plasma Separator Tube
- STAT, ONCE First occurrence Today at 1600
- Tube: Green Plasma Separator Tube

Phosphorus, Blood Green Plasma Separator Tube
- STAT, ONCE First occurrence Today at 1600
- Tube: Green Plasma Separator Tube

Magnesium, Blood Green Plasma Separator Tube
- STAT, ONCE First occurrence Today at 1600
- Tube: Green Plasma Separator Tube

CPK, Blood
- STAT, ONCE

LDH, Blood
- STAT, ONCE

CBC w/Diff Lavender
- STAT, ONCE First occurrence Today at 1600
- Tube: Lavender

ABG Panel, Arterial
- STAT, ONCE

Venous Blood Gas Panel
- STAT, ONCE

Prothrombin Time, Blood
- STAT, ONCE

aPTT, Blood
- STAT, ONCE

Type & Screen
- STAT, ONCE
### Nursing flowsheets

<table>
<thead>
<tr>
<th>Code Sepsis Initiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sepsis Order Set Entered</td>
</tr>
<tr>
<td>Suspected Source of Infection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code Sepsis Labs (Time Lab Acquired)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Cx Set #</td>
</tr>
<tr>
<td>Blood CX (time acquired)</td>
</tr>
<tr>
<td>Tubes Collected</td>
</tr>
<tr>
<td>Initial Lactate (time acquired)</td>
</tr>
<tr>
<td>Repeat Lactate (time acquired)</td>
</tr>
<tr>
<td>Urine CX (time acquired)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code Sepsis MD Reassessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focused Exam</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rapid Response Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Transported</td>
</tr>
</tbody>
</table>
Improving documentation of reassessment
REPEAT VOLUME STATUS & TISSUE PERFUSION ASSESSMENT

MENTAL STATUS: {MENTAL STATUS:14125}
VITAL SIGNS: BP 103/54 Pulse 90 Temp 97.7 °F (36.5 °C) Resp 25 Ht 6’ 2” (1.88 m) Wt 100 kg (220 lb 7.4 oz) SpO2 97% BMI 28.31 kg/m2
CARDIAC EXAM: {HEART EXAM:5510::“S1, S2 normal, no murmur, click, rub or gallop, regular rate and rhythm”,“chest is clear without rales or wheezing”,“no pedal edema”,“no JVD”,“no hepatosplenomegaly”}
PULMONARY EXAM: {LUNGS BRIEF EXAM:120434}
CAPILLARY REFILL: brisk and normal {YES:13081}
PERIPHERAL PULSE EVALUATION: radial {PULSE CHOICE RIGHT/LEFT:14150}
SKIN: {SKIN NORMAL BRIEF:120982}

<table>
<thead>
<tr>
<th>Lab Results</th>
<th>Value</th>
<th>Date/Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>LACTATE</td>
<td>1.6</td>
<td>10/13/2016 07:44 AM</td>
</tr>
<tr>
<td>LACTATE</td>
<td>1.8</td>
<td>10/13/2016 02:45 AM</td>
</tr>
<tr>
<td>LACTATE</td>
<td>1.6</td>
<td>10/12/2016 11:29 PM</td>
</tr>
</tbody>
</table>

If initial lactate greater than 2 mmol/L, ensure repeat drawn within 6 hours.
3. Simplify process

- Build on established systems
  - Inpatient RRT response
  - Code Sepsis in ED
UCSD and Rapid Response
## Roles & Responsibilities

<table>
<thead>
<tr>
<th>Steps in Go Green</th>
<th>Responsible Party</th>
<th>Primary RN</th>
<th>RRT RN</th>
<th>Primary MD</th>
<th>Pharm D</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV Access</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight in Kg</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIRS criteria observed</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start Sepsis flow sheet documentation in epic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time PRIMARY MD notified</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time sepsis code called</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Start Sepsis checklist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Time Code Team arrived</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Initiate Sepsis order set</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time Protocol initiated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>CXR if indicated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time BD# 1 drawn (initial)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Time BD# 2 drawn (initial)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>START 500CC BOLUS (Time and amount (30 ml/kg) of Bolus fluids given, within 30 min.), UNTIL ORDER RECEIVED FROM MD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Focused Exam after fluid resuscitation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Facilitate ABX Selection (broad spectrum or approved combo)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Facilitate ABX delivery at the bedside</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Time of FIRST vital signs; including B/P (within 1 hour of bolus)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Vasopressors (IF HTN persists within 1 hour of bolus)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Time of SECOND vital signs including B/P (after 2nd bolus within 1 hour of completion)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Time repeat Lactate #1 (3hrs)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Time Repeat Lactate #2 (6hrs)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Tissue perfusion assessment within 6 hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Complete Sepsis checklist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
### Green Means Go!

<table>
<thead>
<tr>
<th>Inpatient Code Sepsis Bedside Tool</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code Sepsis Called x6111 Time</td>
<td></td>
</tr>
<tr>
<td>Primary MD notified Time</td>
<td></td>
</tr>
<tr>
<td>RRT/Code Team Arrival Time</td>
<td></td>
</tr>
<tr>
<td>Suspected Sepsis Protocol Started (ASAP)</td>
<td></td>
</tr>
<tr>
<td>Weight in Kg</td>
<td></td>
</tr>
<tr>
<td>IV access</td>
<td></td>
</tr>
<tr>
<td>Labs (rainbow + lactate + ABG/VBG)</td>
<td></td>
</tr>
<tr>
<td>Initial lactate drawn (document failed attempts)</td>
<td></td>
</tr>
<tr>
<td>BC #1 (draw before antibiotics given! document failed attempts)</td>
<td></td>
</tr>
<tr>
<td>BC #2 (draw before antibiotics given! document failed attempts)</td>
<td></td>
</tr>
<tr>
<td>CXR if indicated</td>
<td></td>
</tr>
<tr>
<td>Repeat Lactate in 3 hours – Time Due __________</td>
<td></td>
</tr>
<tr>
<td>Repeat Lactate in 6 hours – Time Due __________</td>
<td></td>
</tr>
<tr>
<td>Fluid Bolus 30mL/kg = _____ mL Given as quickly as possible, 30 min or less</td>
<td></td>
</tr>
<tr>
<td>Antibiotics started</td>
<td></td>
</tr>
<tr>
<td><em>ADMINISTER ABX SIMULTANEOUSLY WITHIN 3 HOURS</em></td>
<td></td>
</tr>
<tr>
<td>All above data entered in Epic and displaying in Sepsis RN Flowsheet for possible hand-off.</td>
<td></td>
</tr>
<tr>
<td>Remind MD to document reassessment using <em>sespisreassess</em> (per order)</td>
<td></td>
</tr>
</tbody>
</table>

Reassess/update patient and vitals within 1 hour after fluid bolus and update MD on status.
Vital signs must include 2 BP readings within 1 hour after fluid bolus completed.
– consider Stage 2 Sepsis interventions below

<table>
<thead>
<tr>
<th>Stage 2 Sepsis - PATIENT NOT IMPROVING after 30 ml/kg bolus, consider the following</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional fluid bolus</td>
<td></td>
</tr>
<tr>
<td>ICU consult</td>
<td></td>
</tr>
</tbody>
</table>

*USE SHOCK INDEX (HR/SBP) = >1 not good*
**DO NOT FORGET FLUID INTAKE TOTAL mL IN EPIC**

**Inpatient Code Sepsis Bedside Tool is not part of the medical record.**
Please ensure all data is entered in EPIC just like Code Stroke**
Dashboards and reporting

• Collect data
• Analyze data
• Reports
Comparisons reported quarterly

- Hospital
- Wards/unit
- UC wide
- UHC/Vizient
UC Wide Collaborative

• Weekly phone calls for PIPS team
• Every other week for physician champions
• Shared comparison data