Using your Voice: Advocating for Change to Decrease Sepsis Mortality Across the Continuum

Angela Craig  APN, MS, CCNS
Clinical Nurse Specialist
Critical Care
Cookeville Regional Medical Center
Cookeville, TN
acragi@crmchealth.org

Pat Posa RN, BSN, MSA, CCRN-K, FAAN
Quality Excellence Leader
St. Joseph Mercy Hospital
Ann Arbor, MI
patposa07@gmail.com
Sepsis Solutions International LLC

Kathleen M. Vollman RN, MSN, CCNS, FCCM, FCNS, FAAN
Clinical Nurse Specialist/Educator/Consultant
ADVANCING NURSING LLC
Sepsis Solutions International LLC
kvollman@comcast.net
Northville, Michigan
www.vollman.com

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Disclosures

Angela Craig
- Consultant-Tennessee Hospital Association
- Nurse Consultant with Edwards Lifesciences, speakers bureau
- Baxter – Key opinion leader (KOL)
- Consultant-Q-Source & Atom Alliance

Pat Posa
- Consultant-Michigan Hospital Association Keystone Center
- Consultant-HRET Hospital Improvement Innovation Network (HIIN) Subject matter expert: CAUTI, CLABSI, HAPU, Sepsis, Safety culture

Kathleen Vollman
- Consultant-Michigan Hospital Association Keystone Center
- Subject matter expert HRET: CAUTI, CLABSI, HAPU, Sepsis, Safety culture
- Consultant and speaker bureau:
  - Sage Products LLC
  - Eloquest
  - Baxter
Overview-Objectives

• Summarize the four-tier process for effective sepsis program development and implementation across the continuum of care.
• Examine the evidence for the sepsis bundles and share proven strategies to resolve barriers in implementation and measurement.
• Discuss strategies to prevent long term sequelae from sepsis
Poll: Who do we have in the audience?
Sepsis is an Epidemic

- Affects >1 million Americans per year
- Leading cause of in-hospital mortality
- $33.16 Billion/year
- 8.7% of aggregate hospital costs

- 700 people die each day from sepsis in the U.S.
- Every 2 minutes someone dies of sepsis in U.S.

- AHRQ: accessed 06/27/2016
Have We Achieved the Mortality Outcomes our Patients Deserve?

- Septic shock mortality is 38-42%
- Severe sepsis mortality is 28-32%
- Sepsis readmissions are 30-35%

(CMS data)

Is it Good Enough?
GAP Analysis
Infection Prevention

VAE (VAP) Bundle
Organizational Consensus that Severe Sepsis Must be Managed Early and Aggressively
Implementation of the Sepsis Bundles
Early Screening with Tools and Triggers
Measuring Success CQI

CQI
Hand Washing
VAE (VAP) Bundle (CLABSI)
Non-vent HAP
CAUTI

Infection Prevention

Documentation Improvement
~ Accurate Coding

Adapted from: Sepsis Solutions International
1. Define Sepsis Program Goal and aligned with organizational goals
2. Identify Executive sponsor
3. Collect Baseline Data—essential step
4. Develop sepsis team (do we have all the right people here?) and schedule monthly (minimum) meeting for at least 6 months
5. Identify nursing and physician champions in ED and ICU and ensure champions attend team meeting
   – Create a sepsis coordinator position to oversee program
6. Begin to define action plan and timeline for program development and implementation
Poll: Does your hospital have a sepsis coordinator?
Impact of Sepsis Coordinator

HCA added sepsis coordinators to all facilities (FTE was based upon sepsis volume)

- Severe sepsis/septic shock mortality dropped from 22% to 15%
- Bundle compliance improved to 61%
- Other key elements initiated were order sets, sepsis alerts, routine screening, sepsis champions and community outreach

Sepsis Coordinator Network
- 1,682 members
- 1,448 hospitals and facilities
  www.sepsisalliance.org

Presentation at Colorado Hospital association Sepsis Program
Angela will look for sepsis coordinator involved in sepsis coordinator network
Pat Posa, 4/29/2019
Role of the Sepsis Coordinator

- Facilitates implementation/evaluation of the Sepsis program including all systems necessary for the multidisciplinary approach throughout the continuum of care.
- Makes regular rounds on sepsis patients to evaluate appropriateness of orders, treatment plans, nursing intervention, physician documentation and compliance with the Sepsis bundle
- Utilizes currently available reports to identify sepsis cases and facilitates data collection process and assesses and analyzes outcomes.
- Collaborates with frontline staff to identify on-going care concerns related to sepsis care
- Collaborates with leadership and colleagues in identifying sepsis quality of care issues
Role of the Sepsis Coordinator

- Determines baseline compliance with physician documentation and compliance with the Sepsis bundle.
- Provides real time/detailed feedback to all clinical providers and departments and scheduled updates to the Sepsis Collaborative Team and work groups.
- Assist the rapid response team and other hospital staff, when necessary, if dealing with a patient situation
- Conducts sepsis organizational tracers to identify quality and safety issues.
- Analyze data to identify trends and issues, also use improvement tools to assist with problem solving and action planning.
- Provides formal and informal education to medical and clinical staff.
- Maintains knowledge of current trends and developments in the sepsis management, fields of quality, and safety.
combine slide 14 and 15
have examples of job description
add slide about sepsis alliance sepsis coordinator resource

Patricia J. Posa, 4/30/2018
Infection Prevention

VAE (VAP) Bundle
Organizational Consensus that Severe Sepsis Must be Managed Early and Aggressively

Early Screening with Tools and Triggers

Implementation of the Sepsis Bundles

Measuring Success

CQI¹

Rapid Improvement

4 Tier Process for Program Implementation

Hand Washing

VAE (VAP) Bundle
CAUTI
CLABSI

Non-vent HAP

Infection Prevention

Documentation Improvement
~ Accurate Coding

Adapted from: Sepsis Solutions International

¹Continuous Quality Improvement
Tier II: Screening for Severe Sepsis
Milestones and Checklist

• Routine screening process for ED, rapid response team, ICU and house wide
• Develop audit process to evaluate compliance and effectiveness
• Ensure screening process has clear “next steps” defined for nursing staff

If you don’t screen you will miss patients that may have benefited from the interventions

2. Schorr C. et al Journal of Hospital Medicine, 2016;11:S32-S39
Sep-2 Definitions (used by CMS and coders)

- **Infection**
- **Sepsis**: infection plus 2 or more SIRS
- **Severe Sepsis**: infection plus 2 or more SIRS plus new organ dysfunction
- **Septic Shock**: severe sepsis with a lactic acid greater than or equal to 4mmol/L OR continued hypotension (systolic BP<90 or 40mmHg decrease from their baseline) after initial fluid bolus (30ml/kg)
### PATIENT CARE UNIT SEVERE SEPSIS SCREENING TOOL

**Directions:** The screening tool is for use in identifying patients with severe sepsis. Screen each patient upon admission, once per shift and PRN with change in condition.

<table>
<thead>
<tr>
<th>Date:</th>
<th>Time:</th>
</tr>
</thead>
</table>

#### I. SIRS - Systemic Inflammatory Response Syndrome (two or more of the following):
- Temperature greater than or equal to 100.4°F or less than or equal to 95°F
- Heart Rate greater than 90 beats/minute
- Respiratory Rate greater than 20 breaths/minute
- WBC greater than or equal to 12,000/mm^3 or less than or equal to 5,000/mm^3 or greater than 10,000/mm^3
- Blood glucose greater than 140 mg/dL in non-diabetic patient

**If check two of the above, move to III**

#### II. Infection (one or more of following):
- Suspected or documented infection
- Antibiotic therapy not prophylactic

**If check none of above – Negative screen for severe sepsis (Please initial) – answer infection question NO in III**

**If check one of above – answer infection question YES in III**

#### III. Organ Dysfunction (change from baseline):
- Respiratory: SaO2 less than 90% OR increasing O2 requirements
- Cardiovascular: SBE less than 60 mmHg OR 40 mmHg less than baseline OR MAP less than 65 mmHg
- Renal: urine output less than 0.5 ml/kg/hr; creatinine increase of greater than 0.5 mg/dl from baseline
- CNS: altered consciousness (not related to primary neuro pathology)
- Glasgow Coma Score less than or equal to 12
- Hematologic: platelets less than 100,000; INR greater than 1.5
- Hepatic: Serum total bilirubin greater than or equal to 3 mg/dl
- Metabolic: Serum lactate acid greater than or equal to 2 mmol/L

**Negative screen for severe sepsis (Please initial)**

**If check one in section III or a severe sepsis alert fires, patient has screened positive for severe sepsis**

1. Call rapid response team
2. Call physician, physician assistant or nurse practitioner and implement urgent measures protocol
3. Initiate or ensure IV access (2 large bore IV’s if no central access)
4. Obtain a venous blood gas (peripheral draw), serum lactate acid, CBC if it has been greater than 12 hrs since last test, two sets of blood cultures (if greater than 24 hours since last set)
5. If patient is hypotensive: Give crystallized (NEF) fluid bolus – 30 mL/kg over one hour or as fast as possible until hypotension resolved, unless known EF is less than 35% or adverse treatment for heart failure

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**For Lactate acid 2.2 or Initial hypotension that responded to the 30 mL/kg fluid bolus, initiation transfer to ICU**

**For Lactate acid 2.3 or Initial hypotension that responded to the 30 mL/kg fluid bolus, initiation transfer to ICU**

---

**YES**

- Activate CODE SEPSIS
- Initiate transfer to ICU

**NO**

- Initiate Intermediate Care Severe Sepsis Bundle on back and complete interventions

---

**Meanwhile, continue crystalloidal resuscitation of 350-1000 mL boluses if hypotensive after the initial bolus – per physician order**

**Initiate the Septic Shock Pathway and complete interventions**

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**RN Signature, Initial Date & Time:**
Electronic Routine Screening

Sepsis Screening Tool

Retrieval Script includes;
SIRS, Organ Dysfunction and Sepsis Screening Tool

Temp <36 C (96.8 °F) or Temp > 38.3 (101 °F)

Negative SEVERE Sepsis Screen — occurs when criteria for positive screen is not met.

Positive SEVERE Sepsis Screen Occurs when one selection is chosen once one Organ Dysfunction is identified.

Automatically defaults to a Positive SEVERE Sepsis Screen.

SEVERE Sepsis Screen is activated
Poll: What areas are you currently performing routine screening? check all that apply
• **Sepsis** is: ‘life-threatening organ dysfunction caused by a dysregulated host response to infection’
  
  – Sepsis-3 does away with:
    • SIRS criteria (sepsis is pro- and anti-inflammatory)
    • Severe sepsis (sepsis = the old severe sepsis)
    • Antiquated concepts: sepsis syndrome; septicemia

• **Sepsis**: infection plus 2 or more SOFA (Sequential Organ Failure Assessment) points

• **Septic shock**: vasopressor-dependent hypotension + lactate >2

Sepsis-3 includes clinical criteria to predict life-threatening disease
qSOFA: (have 2 or more of these, then evaluate for SOFA)

- Respiratory Rate $> 22$
- Altered Mental Status
- Systolic BP $\leq 100$ mmHg

**Table 1. Sequential [Sepsis-Related] Organ Failure Assessment Score**

<table>
<thead>
<tr>
<th>System</th>
<th>Score</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Respiration</strong></td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\text{PaO}_2/\text{FiO}_2$, mm Hg (kPa)</td>
<td></td>
<td>$\geq 400$ (53.3)</td>
<td>$&lt; 400$ (53.3)</td>
<td>$&lt; 300$ (40)</td>
<td>$&lt; 200$ (26.7) with respiratory support</td>
<td>$&lt; 100$ (13.3) with respiratory support</td>
</tr>
<tr>
<td><strong>Coagulation</strong></td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platelets, $\times 10^3/\mu$L</td>
<td></td>
<td>$\geq 150$</td>
<td>$&lt; 150$</td>
<td>$&lt; 100$</td>
<td>$&lt; 50$</td>
<td>$&lt; 20$</td>
</tr>
<tr>
<td><strong>Liver</strong></td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bilirubin, mg/dL (μmol/L)</td>
<td></td>
<td>$&lt; 1.2$ (20)</td>
<td>$1.2$-$1.9$ (20-32)</td>
<td>$2.0$-$5.9$ (33-101)</td>
<td>$6.0$-$11.9$ (102-204)</td>
<td>$&gt; 12.0$ (204)</td>
</tr>
<tr>
<td><strong>Cardiovascular</strong></td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAP $\geq 70$ mm Hg</td>
<td></td>
<td>MAP $&lt; 70$ mm Hg</td>
<td>Dopamine $&lt; 5$ or dobutamine (any dose)</td>
<td>Dopamine $5.1$-$15$ or epinephrine $\leq 0.1$ or norepinephrine $\leq 0.1$</td>
<td>Dopamine $&gt; 15$ or epinephrine $&gt; 0.1$ or norepinephrine $&gt; 0.1$</td>
<td></td>
</tr>
<tr>
<td><strong>Central nervous system</strong></td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glasgow Coma Scale score</td>
<td></td>
<td>15</td>
<td>13-14</td>
<td>10-12</td>
<td>6-9</td>
<td>$&lt; 6$</td>
</tr>
<tr>
<td><strong>Renal</strong></td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creatinine, mg/dL (μmol/L)</td>
<td></td>
<td>$&lt; 1.2$ (110)</td>
<td>$1.2$-$1.9$ (110-170)</td>
<td>$2.0$-$3.4$ (171-299)</td>
<td>$3.5$-$4.9$ (300-440)</td>
<td>$&gt; 5.0$ (440)</td>
</tr>
<tr>
<td>Urine output, mL/d</td>
<td></td>
<td>$&lt; 500$</td>
<td>$&lt; 200$</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Abbreviations:** $\text{FiO}_2$, fraction of inspired oxygen; MAP, mean arterial pressure; $\text{PaO}_2$, partial pressure of oxygen.

*Adapted from Vincent et al.*

Notes:
- Catecholamine doses are given as μg/kg/min for at least 1 hour.
- Glasgow Coma Scale scores range from 3-15; higher score indicates better neurological function.
Challenges with New Sep-3 Definitions

- SIRS not part of the definition:
  - the most appropriate use for SIRS is that its presence prompts an immediate search for both infection, as its possible source, and organ dysfunction, as its possible companion

- Doesn’t recognize ‘cryptic shock’

- People will begin to use qSOFA as a screening tool
  - qSOFA and SOFA are predictors of mortality; they are not a test of early sepsis at risk to progress to organ failure

- Only their predictive ability for mortality and prolonged ICU stay have been evaluated, not their utility in reducing mortality

“As the physician say of hectic fever, that in the beginning of the malady it is difficult to detect but easy to treat, but in the course of time, having been neither detected nor treated in the beginning, it becomes easy to detect but difficult to treat”

Niccolo Machiavelli, 14th Century

Poll: If you are screening, are you only using known or suspected infection, greater than or equal to 2 qSOFA or > 2 SOFA
Infection Prevention

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Measuring Success CQI¹

Sepsis Practice Collaborative Model
4 Tier Process for Program Implementation

Hand Washing

VAE (VAP) Bundle
Non-vent HAP
CAUTI
CLABSI

Infection Prevention

Documentation Improvement
~ Accurate Coding

¹Continuous Quality Improvement

Adapted from: Sepsis Solutions International
Components of TIER III Milestones and checklist

• Understand current process for caring for septic shock patients
  • ‘Go and See’ work
  • Baseline data
• Order sets
• Common Barriers/Issues: identified Gaps from ‘Go and See’ work
• Educational plan
• Implementation plan
  • Unit champions
  • Prospective rounding
  • Independent checks
TO BE COMPLETED WITHIN 3 HOURS OF TIME OF PRESENTATION †:

1. Measure lactate level
2. Obtain blood cultures prior to administration of antibiotics
3. Administer broad spectrum antibiotics
4. Administer 30ml/kg crystalloid for hypotension or lactate ≥4mmol/L

† “time of presentation” is defined as the time of earliest chart annotation consistent with all elements severe sepsis or septic shock ascertained through chart review.
Time Zero

• Will always be when the chart annotation suggests signs and symptoms are all present.
• May be from nursing charting/screens, lab flow sheets, physician documentation, order sets, anything with a time stamp.
• Will = triage time if all signs and symptoms are present at triage.
• *It does not require MD documentation of the clock starting and relying on this alone in the ED would likely result in late clock starts.*

Slides courtesy of Sean Townsend
TO BE COMPLETED WITHIN 6 HOURS OF TIME OF PRESENTATION:

5. Apply vasopressors (for hypotension that does not respond to initial fluid resuscitation) to maintain a mean arterial pressure (MAP) ≥65mmHg.

6. In the event of persistent hypotension after initial fluid administration (MAP < 65 mm Hg) or if initial lactate was ≥4 mmol/L, re-assess volume status and tissue perfusion and document findings according to table 1.

7. Re-measure lactate if initial lactate elevated.
TABLE 1
DOCUMENT REASSESSMENT OF VOLUME STATUS AND TISSUE PERFUSION WITH:

Either
• Repeat focused exam (after initial fluid resuscitation) by licensed independent practitioner including vital signs, cardiopulmonary, capillary refill, pulse and skin findings.

Or one of the following:
• Measure CVP
• Measure ScvO2
• Bedside cardiovascular ultrasound
• Dynamic assessment of fluid responsiveness with passive leg raise or fluid challenge
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Adapted from: Sepsis Solutions International

1Continuous Quality Improvement
Tier IV: Measurement
Milestones and Checklist

- Define outcome and process data elements that will be collected
- Develop and implement a data collection process
- Revise and update goals and action plan as needed
- Execute implementation plan
- Continuous improvement

- Sepsis management is now a CMS core measure
- Compliance is All or None—so all measure on the 3 and 6 hour bundles (that the patient qualifies for) need to be met in the appropriate timeframe to be compliant

Public reporting began July 2018 (based on 2017 Q1-3)
Poll: What is your current % all or none compliance with the core measures.
National Performance on Sepsis Bundles

CMS Sep-1 Presentation, Dec, 2018
>99% of hospitals reporting these measures

All or none compliance
3 hour bundle compliance
(lactate, blood culture, antibiotics)
6 hour Severe Sepsis bundle compliance (repeat lactate)
Septic Shock 3-Hour bundle compliance (30ml/kg fluid bolus)
Septic Shock 6-Hour bundle compliance (vasopressors)
Septic Shock 6-Hour bundle compliance (reassessment)
Latest National Mortality Data

Passed Bundle Compliance: Mortality 21.7%
Failed Bundle Compliance: Mortality 30.3%

25% RRR in mortality by being compliant with Sep 1 bundles

Rivers, E & Townsend S. Presented at SCCM San Diego CA, Feb 2019
Poll: What are the major challenges you are having with your sepsis program?
Challenges
Challenges with the Bundles

• Timely antibiotics
• 30ml/kg fluid bolus
• Repeat lactate
• Sepsis reassessment
• 3723 patients at 138 hospitals in seven countries (all patients from the PROCESS, PROMIS and ARISE trials)

• Prior to randomization >92% of patients were identified early, and provided the 3 hour bundle (including 2L of fluid and antibiotics—given within 70 minutes of presentation to ED)

• No difference in 90 day mortality between EGDT and Usual Care groups

• Authors stated: “It remains possible that general advances in the provision of care for sepsis and septic shock, to the benefit of all patients, explain part or all of the difference in findings between the trial by Rivers et al. and the more recent trials”
• In 2013, New York began requiring hospitals to follow protocols for the early identification
• April 2014 to June 30, 2016
• 49,331 patients at 149 hospitals
• 82.5% had the 3-hour bundle completed within 3 hours (median time was 1.3 hrs)
• Longer time to completion of the 3 hour bundle was associated with higher risk-adjusted in-hospital mortality as well as longer time to administration of antibiotics (14% higher for both)

• Risk adjusted mortality decreased from 28.8% to 24.4% (p<0.001)
• Risk adjusted mortality decreased by 5% for every 10% increase in compliance with the 3 and 6 hour bundle

Levy, M. AJRCC. Dec. 2018
Antibiotics are Key

Each elapsed hour between presentation and antibiotic administration was associated with a 9% increase in the odds of mortality with sepsis of all severity strata.

Increased Time to Initial Antimicrobial Administration Is Associated With Progression to Septic Shock in Severe Sepsis Patients

- Each hour until initial antimicrobial administration was associated with a 8% increase in progression to septic shock.
- Patients who progressed to shock had significant increase in hospital LOS (18.7 days vs 9.66 days) and mortality (30.1% vs 7%)

VINCENT X. LIU1, VIKRAM FIELDING-SINGH2, JOHN D. GREENE1, JENNIFER M. BAKER1, THEODORE J. IWASHyna3, JAY BHATTACHARYAa, AND GABRIEL J. ESCOBARb

1Kaiser Permanente Division of Research, Oakland, California; 2Department of Anesthesia and Perioperative Care, University of California San Francisco, San Francisco, California; 3Center for Clinical Management Research, VA Ann Arbor Health System, Ann Arbor, Michigan; 4Division of Pulmonary and Critical Care, Department of Internal Medicine, University of Michigan, Ann Arbor, Michigan; and 5Primary Care and Outcomes Research, Stanford University, Stanford, California

American Journal of Respiratory and Critical Care Medicine Volume 196 Number 7 | October 1 2017

BRISTOL B. WHILES, BS1; AMANDA S. DEIS, MS1; STEVEN Q. SIMPSON, MD2
Fluid Boluses

- How fast should they be given?
  - Gravity or pressure bag, not by infusion pump
- What about dialysis patients?
- What about patients with CHF or low EF?

Fluid bolus is given rapidly, IV wide open, pressure bag if necessary; goal is 500ml every 15-30 minutes.
Heart Failure—Going to Flood My Patient Not Based in Evidence

• Rivers et al Study: % Ventilated Patients

<table>
<thead>
<tr>
<th>Hours after start of Therapy</th>
<th>0-6</th>
<th>7-72</th>
<th>0-72</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Therapy</td>
<td>53.8%</td>
<td>16.8%</td>
<td>70.6%</td>
</tr>
<tr>
<td>Early Goal Directed Therapy</td>
<td>53%</td>
<td>2.6%</td>
<td>55.6%</td>
</tr>
</tbody>
</table>

P Value: <.001, 0.02

Chronic coexisting conditions-CHF:
Control 30.2%
EGDT 36.7%

Early Fluid Resuscitation is Key

↑ mortality with later fluid administration 13.3% (30 minutes) versus 16.0% (31 to 60 minutes) versus 16.9% (61 to 180 minutes) versus 19.7% (>180 minutes)

After adjusting for confounders, the higher proportion of total fluid received within the first 3 hrs was associated with decreased hospital mortality
Early Fluid Resuscitation is Key

Decrease in hospital mortality was observed primarily in patients with heart and/or kidney failure (p<0.04) who received at least 2 liters fluid resuscitation for severe sepsis with lactate between 2.1-3.9.

Patterns and Outcomes Associated With Timeliness of Initial Crystalloid Resuscitation in a Prospective Sepsis and Septic Shock Cohort

Early fluid initiation (30-120 minutes) was associated with significantly lower hospital mortality, mechanical ventilation, ICU admission, LOS and ICU days & no harm seen to the patients.
Application of Fluid Resuscitation in Adult Septic Shock

Sepsis-induced hypotension or lactate ≥ 4 mmol/L
(Based on SSC bundle and CMS threshold)

No high flow oxygen and No ESRD on dialysis or CHF

Rapid infusion of 30 ml/kg Crystalloid*

Pneumonia or ALI with high flow oxygen requirements

Not intubated/mechanically ventilated

Consider intubation/mechanical ventilation to facilitate 30 ml/kg crystalloid *

If no Total of 30 ml/kg with frequent reassessment of oxygenation

If yes Rapid infusion of 30 ml/kg crystalloid *

ESRD on hemodialysis or CHF

Total of 30 ml/kg crystalloid* with frequent reassessment of oxygenation

*Administer 30 ml/kg crystalloid within first 3 hours

Considerations post 30ml/kg crystalloid infusion

1. Continue to balance fluid resuscitation and vasopressor dose with attention to maintain tissue perfusion and minimize interstitial edema
2. Implement some combination of the list below to aid in further resuscitation choices that may include additional fluid or inotrope therapy
   - blood pressure/heart rate response,
   - urine output,
   - cardiothoracic ultrasound,
   - CVP,ScvO2,
   - pulse pressure variation
   - lactate clearance/normalization or
   - dynamic measurement such as response of flow to fluid bolus or passive leg raising
3. Consider albumin fluid resuscitation, when large volumes of crystalloid are required to maintain intravascular volume.

Ali=acute lung injury; CHF=congestive heart failure; CMS=US Centers for Medicare and Medicaid Services; CVP=central venous pressure; ESRD=end stage renal disease; kg=kilograms; ml=milliliters; oxyhemoglobin; ScvO2=superior vena cava oxygen saturation

Repeat Lactate Strategies

- Repeat lactate can be drawn anytime after fluid bolus
- Reflex lactate for any initial lactate greater than 2
- 2\textsuperscript{nd} lactate order included when first one is ordered
Reassessment

- Requirement changes in July, 2018 for CMS
  - Still a requirement for physician/APP to reassess volume status and tissue perfusion, just no requirement to state how that reassessment occurred or what the outcome of the assessment was
  - IE: “perfusion reassessed; “sepsis reassessment done”
  - Only need to do one out of 2 of the reassessment measurement (CVP, ScvO2, Echo, dynamic responsiveness)
- Strategies to comply with documentation requirements
  - Standard provider note or dot phrase
  - Expect that whomever orders the 30ml/kg fluid bolus is responsible for the reassessment documentation
  - Part of a sepsis checklist
Other Challenges and Barriers

- Physician buy-in
- Data measurement/routine feedback
Challenges with Physician Buy In

- Cook book medicine
- “I know I can treat them better” or “I have been treating this patient my whole career”
- “I don’t have enough time”
Strategies to Address Buy In

- Use hospital sepsis mortality data and nationally data to show it makes up the majority of deaths
- Strong informal leaders connect individually
- Identify who’s opinion they would respect and provide discussion or feedback
- Individual physician data on patients treated including bundle compliance
- Quick turn around time on data to change behavior
Data Measurement and Use of Data
What outcome and process data should be collected and reviewed?

- Understand your volume of sepsis, severe sepsis and septic shock—look at mortality, LOS, cost, readmission
- Stratify your data by:
  - POA, non-POA
  - Medical vs surgical
  - Discharge disposition
  - Sepsis severity
- Process Metrics
  - Overall SEP-1 compliance
  - 3 hour bundle compliance
  - Each individual element compliance
### Feedback to Individual Providers

**Severe Sepsis/Sepsic Shock Feedback Report - MICU**

The purpose of this report is to give feedback on the below listed patient recently treated for Severe Sepsis/Sepsic Shock, and to emphasize the current quality improvement initiative related to Sepsis. We welcome your input and clinical expertise on opportunities that might help us improve on any of these measures.

Performing all the elements within the resuscitation bundles listed below in a timely manner can significantly reduce mortality of our Severe Sepsis and Sepsic Shock patients. Thank you for your dedication and care for these patients. If you have any questions, please contact Dr. __________, MICU Sepsis Champion or Dr. __________, ED Quality Coordinator or Emily C. Swain, Sepsis Program Leader.

<table>
<thead>
<tr>
<th>Patient Name:</th>
<th>FIN:</th>
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<tbody>
<tr>
<td>ED Arrival Date &amp; Time:</td>
<td>ED RN:</td>
</tr>
<tr>
<td>ED Physician:</td>
<td>ED Resident:</td>
</tr>
<tr>
<td>Floor Arrival Date, Time, &amp; Unit:</td>
<td>Pt. Transferred From:</td>
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<tr>
<td>ICU Arrival Date &amp; Time:</td>
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<tr>
<td>Attending:</td>
<td>Resident:</td>
</tr>
<tr>
<td>RN:</td>
<td>PRISM Score:</td>
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<tr>
<td>Severe Sepsis:</td>
<td>Sepsic Shock Time (Time Zero):</td>
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<tr>
<td>Severe Sepsis/Sepsic Shock Clinical Pathway:</td>
<td>Code Sepsis Page(s):</td>
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<tr>
<td>Date/Time Catheter Site Infection:</td>
<td></td>
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<tr>
<td>Date/Time Catheter Sepsis</td>
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<tr>
<td>Date/Time Catheter Organ Dysf</td>
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</tbody>
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#### Sepsis Quality Indicators

<table>
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<tr>
<th>Date &amp; Time</th>
<th>Result</th>
<th>Goal Met (Y/N)</th>
<th>Goal</th>
</tr>
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**3 Hour Measures**

**Lactic Acid**

- Drawn within 3h of Severe Sepsis (Look 6hrs Prior)

**Blood Cultures before Antibiotics**

- Drawn before ABX (Look 48hrs Prior)

**Broad-Spectrum Antibiotics**

- Hung within 3h of Severe Sepsis (Look 24hrs Prior)

**30mL/kg Fluid Bolus**

- Weight in kg:
- As Fast As Possible. Infused within 3h of Severe Sepsis (Goal = Y/N if Hypotensive, LA ≥ 4, OR Sepsic Shock)

**Check BP in hour after conclusion of 30mL/kg fluid bolus**

- At least one BP documented

**Central Line Placed, If Requires Vasopressors**

- Placed within 2h of Vasopressor Start

**6 Hour Measures**

**Vasopressor Started for SBP < 90 or MAP ≤ 65mmHg**

- Started 1hr of Persistent Hypotension After Initial Fluid Bolus

**CMS Requirement - Vasopressor Started for SBP < 90 or MAP ≤ 65mmHg**

- CMS Requirement - Started within 6h of Sepsic Shock

**Repeat Focused Exam by MD/AP (VS, Cardiopulm, Cap ReoH, Peripheral Pulse, AND Skin Findings) OR 2 Measures (CVP, SvO2, Bedside Cardiovascular Ultrasound, Sw Optimization with Fluid Challenge/Passive Leg Raise)**

- Documented within 6h of Septic Shock

**Repeat Lactic Acid**

- Repeat within 6h of Severe Sepsis >2

Comments:
What’s New
Recent Studies

Use of balanced fluids in critically ill adults resulted in a lower rate of the composite outcome of death from any cause, new renal replacement therapy or persistent renal dysfunction than use of saline.

Angiotensin II effectively increases blood pressure in patients with vasodilatory shock that did not respond to high doses of conventional vasopressors.
Objective was to determine if a peripheral perfusion–targeted resuscitation during early septic shock in adults is more effective than a lactate level–targeted resuscitation for reducing mortality. 28-day mortality was not reduced targeting peripheral perfusion versus lactate normalization (p=.06)

Early center study, 310 patients evaluating early norepinephrine in septic shock. Early norepinephrine was significantly associated with increased shock control by 6 hours along with fluid therapy

Early Use of Norepinephrine in Septic Shock Resuscitation (CENSER) : A Randomized Trial
Chairat Permpikul1, M.D., et.al.
Coming Attractions!!
• Recognition of sepsis
• Both sepsis and septic shock are viewed as medical emergencies
• Require rapid dx and tx

http://www.survivingsepsis.org/Bundles/Pages/default.aspx
add information related to letter put out in January 2019
Pat Posa, 4/29/2019
Clover Study
Crystalloid Liberal or Vasopressors Early Resuscitation in Sepsis

Hypothesis
• Restrictive (vs liberal) fluid treatment strategy during the 1st 24hr of resuscitation for sepsis-induced hypotension will reduce 90-day in hospital mortality
  "conservative" (vasopressor first followed by rescue fluids)
  VERSUS
  "liberal" (fluids followed by rescue vasopressors)
  Will reduce 90 day in-hospital mortality in sepsis induced hypotension

Method
• Multicenter, randomized prospective phase 3 trial
• Intervention: protocolized fluid titration strategies for up to 24 hours
• Sample: 2,320 patients planned to enrollment
• Primary outcome: 90 day inpatient mortality
• 50 Hospitals—acute and critical care (part of Petal Network)

Enrollment to be completed by June 2021
VICTAS Trail: Vitamin C, Thiamine and Steroid in Treatment of Sepsis

• Multi-center, randomized, placebo-controlled, double-blind clinical trial
  – Expected 2000 patients
  – Patients with sepsis & shock or respiratory failure
    • Vasopressors
    • HFNC, NIV, IMV
  – Vit C, Thiamine vs. Placebo in patients on steroids

• Outcome Measurements
  – Vasopressor free days
  – Ventilator free days
  – 30 day mortality

Enrollment to be completed by Oct 2021

Going beyond the hospital walls

it's all about the early

- Partner with EMS
  - Have them screen and begin fluids for hypotension, possibly draw lactic acid

- Partner with PCPs and medical and surgical homes to educate on severe sepsis

- Partner with Extended Care Facilities and Home Care to educate on sepsis and implement early identification and management
  - [www.mpro.org/sepsistoolkit](http://www.mpro.org/sepsistoolkit)
Preventing Long Term Sequelae from Sepsis
Post-sepsis syndrome describes physical and/or long-term effects that affects up to 50% of people who survive sepsis. Longer term effects of sepsis include:

- Sleep disturbance including insomnia
- Experiencing nightmares, hallucinations, flashbacks and panic attacks
- Muscle and joint pains which can be severe and disabling
- Extreme tiredness and fatigue
- Inability to concentrate
- Impaired mental (cognitive) function
- Loss of confidence and self-belief
- Post ICU Syndrome (PICS)

**PICS** is defined as new or worsening impairment in physical, cognitive, or mental health status arising and persisting after hospitalization for critical illness.
Post Sepsis Syndrome

- People who have suffered from severe sepsis and especially those treated in an intensive care unit are at greatest risk of suffering post-sepsis syndrome.

- “60 percent of hospitalizations for severe sepsis were associated with worsened cognitive and physical function among surviving older adults. The odds of acquiring moderate to severe cognitive impairment were 3.3 times higher following an episode of sepsis than for other hospitalizations.”

- Sepsis survivors may be more at risk for developing other infections both viral and bacterial

Iwashyna, T. JAMA 2010; Mukherjee, S SHOCK 2012
Cognitive Impairment: Sepsis

**Before Sepsis**

% survivors cognitively impaired

-3 years  -1 year  +1 year  +3 years

**After Sepsis**

- Mild Cognitive Impairment
- Moderate/Severe Cog Impairment

p<0.001

Iwashyna T, JAMA 2010;304:1787-1794
Functional Trajectories by Baseline Functioning

**ADL:** walking, dressing, bathing, eating, getting into and out of bed and toileting

**IADL:** preparing a hot meal, shopping for groceries, making telephone calls, taking medicines, and managing money

Iwashyna T, JAMA 2010;304:1787-1794
Cause of Post Sepsis Syndrome

- Response to systemic inflammation
- Brain, muscle and nerve injury from inflammation, ischemia and ischemia-reperfusion
- Poor perfusion, blood clots
- End organ damage
Prevention of Post Sepsis Syndrome and PICS

- Early identification and treatment of sepsis
- ABCDEF bundle
- Early psychologic intervention
- ICU diaries
- Post-discharge follow-up programs

ASSESS, PREVENT & MANAGE PAIN
BOTH SAT & SBT
CHOICE OF SEDATION
DELIRIUM
EARLY MOBILITY
FAMILY ENGAGEMENT

www.iculiberation.org
Keys to Success

- Team in place with key stakeholders overseeing implementation
- Project coordinator with lead clinical staff on each unit
- Sepsis resource/coordinator rounds frequently on units
- Strong physician leadership on team
- Reminders to staff through use of bedside sepsis tools/checklist
- Empowerment of nursing staff to prevent errors
- Administrative support to help manage barriers
- Review data monthly to identify opportunities for improvement-real time follow up whenever possible
- Provider specific feedback or report cards related to performance
- Support from a collaborative

EDUCATION, DATA, COACHING, EDUCATION……
Contact Information

Pat Posa RN, BSN, MSA, FAAN
Quality Excellence Leader
St. Joseph Mercy Hospital
Ann Arbor, MI
patposa07@gmail.com
Sepsis Solutions International LLC

Kathleen M. Vollman RN, MSN, CCNS, FCCM, FCNS, FAAN
Clinical Nurse Specialist/Educator/Consultant
ADVANCING NURSING LLC
Sepsis Solutions International LLC
kvollman@comcast.net
Northville, Michigan
www.vollman.com

Angela Craig APN, MS, CCNS
Clinical Nurse Specialist/ICU
Cookeville Regional Medical Center
Cookeville, TN
acraig@crmchealth.org