Sepsis Gap Analysis Results and Next Steps at your Facility Part 2

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Quality Excellence Leader
St. Joseph Mercy Hospital
Ann Arbor, Michigan

SEPSIS ALLIANCE
Suspect Sepsis. Save Lives.

SEPSIS COORDINATOR NETWORK
Resources and Guidance for Improved Outcomes

Founding Sponsor

Network Sponsors

ACCELERATE DIAGNOSTICS
Beckman Coulter
La Jolla Pharmaceutical
Edwards
About Sepsis Alliance

- Founded in 2007
- Nation’s leading sepsis organization
- Working in all 50 states
- Sepsis.org – 2.5 million visits a year
- Focus on:
  - Public awareness
  - Provider education
  - Survivor support
  - Advocacy
- Partnership

Dr. Carl Flatley
It’s About TIME™, a national initiative

When it comes to sepsis, remember **IT’S ABOUT TIME**. Watch for:

- **T**emperature higher or lower than normal
- **I**nfection may have signs and symptoms of an infection
- **M**ental decline confused, sleepy, difficult to rouse
- **E**xtremely ill “I feel like I might die,” severe pain or discomfort

www.SepsisItsAboutTime.org
SCN activities support ongoing communication, education and network building among health professionals passionate about improved sepsis care. Activities include:

- Educational webinars that highlight sepsis best practices in a variety of healthcare settings
- Active discussion and peer support via an online community
- Training and education opportunities
- Resource drive to find information on a range of topics, including core measures, clinical practice guidelines, patient screening and identification tools, education resources and more

Our Mission
To provide sepsis best-practice resources and guidance to sepsis coordinators and all health professionals across the country

JOIN NOW AT SEPSISCOORDINATORNETWORK.ORG
Sepsis Gap Analysis
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Sepsis Solutions International LLC
Disclosures

Angela Craig

• Nurse Consultant with Edwards Lifesciences.
• Speaker Bureau: ELS
• Baxter KOL Team

Pat Posa

• Consultant-Michigan Hospital Association Keystone Center
• Consultant-HRET Hospital Improvement Innovation Network (HIIN)
At the end of the webinar you should be able to:

1. Describe common gaps when evaluating current state of sepsis care in a facility

2. Discuss current gaps between the evidence and your hospital’s sepsis program

3. Prioritize and plan your next actions to improve your sepsis program
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 CQI\

Rapid Improvement

Hand Washing

VAE (VAP) Bundle
Non-vent HAP
CAUTI
CLABSI

Infection Prevention

Documentation Improvement ~ Accurate Coding

Adapted from: Sepsis Solutions International

1Continuous Quality Improvement
## Gap Analysis: TIER 1

<table>
<thead>
<tr>
<th>COMPONENTS</th>
<th>YES</th>
<th>NO</th>
<th>NA</th>
<th>Action Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physician and nursing leadership participate in action planning for sepsis initiatives</td>
<td></td>
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</tr>
<tr>
<td>Multidisciplinary team in place and monthly meetings (providers, nursing, quality, care management, etc) from various care areas, ED, ICU, Med Surg, Perinatal, pediatrics</td>
<td></td>
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<tr>
<td>Executive sponsor receives regular data reports and provides feedback</td>
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<tr>
<td>Sepsis Team is part of reports to Critical care or quality structure in hospital</td>
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<tr>
<td>Managing sepsis is aligned with hospital’s quality, safety or organizational goals</td>
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<tr>
<td>Baseline data collection completed for process and outcome data</td>
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</table>

### Dedicated Sepsis resource/ Sepsis Coordinator

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
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</thead>
<tbody>
<tr>
<td>Dedicated Sepsis Resource in place (in comments identify title)</td>
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<tr>
<td>FTE allocation/ time commitment to sepsis role</td>
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<tr>
<td>Site/ sites supported</td>
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<tr>
<td>Other responsibilities in the role</td>
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</tbody>
</table>
## Gap Analysis: TIER 2

### Identification/Screening

| Category                        | Is a screening process completed consistently as designed? | All ED patients are screened/assessed for sepsis in triage? | All ICU patients are screened/assessed for sepsis upon admission and every shift – describe process | All med surg patients are screened/assessed for sepsis upon admission and every shift – describe process | All OB patients are screened/assessed for sepsis upon admission and every shift – describe process | All pediatric patients are screened/assessed for sepsis upon admission and every shift – describe process | Does the process include specific actions by nurse when a positive screen is obtained? | Rapid Response Team (RRT) process in place for sepsis
If yes describe process in comments, if no describe response expectations to positive screening or sepsis identification |
<table>
<thead>
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<td>ED</td>
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<td>ICU</td>
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<tr>
<td>INPATIENT UNITS</td>
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<td>PERINATAL</td>
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</tbody>
</table>
Summary of Chat

• Challenges—
  – physician and leadership engagement and support
  – Getting nurse driven protocols approved
  – Fluids for patients with ESRD or HF

• Sepsis screening is part of the nurses daily assessment
  – To prevent false positives—have second nurse validate a positive screen

• Important to define next steps for patients who screen positive for severe sepsis
Infection Prevention

VAE (VAP) Bundle

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Early Screening with Tools and Triggers

Implementation of the Sepsis Bundles

Measuring Success CQI

Rapid Improvement

Hand Washing

VAE (VAP) Bundle

CAUTI

BSI

Infection Prevention

Documentation Improvement ~ Accurate Coding

Adapted from: Sepsis Solutions International

1Continuous Quality Improvement
## Gap Analysis: TIER 3

<table>
<thead>
<tr>
<th>Implementing the Bundles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sepsis order sets are in place and utilized by providers (CPOE/Paper)</td>
</tr>
<tr>
<td>Sepsis provider documentation tools are in place and utilized to meet SEP-1 requirements</td>
</tr>
<tr>
<td>Communication between physician and nurses related to diagnosis and treatment plan specific for sepsis; handoffs readily incorporate appropriate sepsis language</td>
</tr>
<tr>
<td>Appropriate utilization of central lines; adequate skill and resource to place them when clinical criteria met</td>
</tr>
<tr>
<td>Able to get lactate levels in one hour or less Able to get antibiotics in one hour for ICU, 3 hours for ED</td>
</tr>
<tr>
<td>Process in place for reassessment of volume status and tissue perfusion for septic shock patients</td>
</tr>
<tr>
<td>Identify resistance/barriers to components of bundles and developed solutions (fluid resus, blood cultures before antibiotics, repeat lactate, etc.)</td>
</tr>
</tbody>
</table>
Identify Gaps in Application of Evidence

• Set performance targets
  – IE: 90% compliance with obtaining lactates in 3 hours

• Prioritize area to work on first
  – Focus on screening and the 3 hour bundle first then move to the 6 hour bundle

• Understand the ‘why’ there are gaps
  – “go and see”—walk the process, talk with front line staff
  – Cause and effect—Fishbone

• Define action plan—
  – Can use IHI Model for Improvement
  – PDCA—tests of change
What is your biggest gap for Tier 3 in your facility?

A. Not reaching targeted goals for each of the processes in the 3 hour bundle
B. Not reaching targeted goals for each of the processes in the 6 hour bundle
C. Not understanding ‘why’ you are not meeting your targets
D. Administering the appropriate amount of fluid
E. Other (document in chat box)
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.*

Sepsis coding is increasing but is accurate. More aggressive treatment seen from 2003 to 2013


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 can including vital signs, cardiopulmonary, capillary refill, pulse and skin findings. Or document sepsis reassessment completed

Or one of the following (for core measure after July, 2018)
- Measure CVP
- Measure ScvO2
- Bedside cardiovascular ultrasound
- Dynamic assessment of fluid responsiveness with passive leg raise or fluid challenge
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)
Duration of hypotension before initiation of effective antimicrobial therapy is the critical determinant of survival in human septic shock

* 2,154 septic shock patients

* Effective antimicrobial administration within the 1st hour of documented hypotension was associated with increased survival in patients with septic shock.

* Each hour of delay over the next 6 hours was associated with an average decrease in survival of 7.6% (range 3.6-9.9%)
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%)
Antibiotics Challenges

➢ Appropriate initial antibiotics
  ➢ Guide for providers recommending the appropriate antibiotic based on whether hospital or community acquired, source and your hospital’s antibiogram

➢ Turnaround time---from indication to hanging
  ➢ ED vs ICU vs Floor

➢ Understand your current process and where the gaps are

➢ Make antibiotics rapidly available

➢ Factors that showed delay administration
  ➢ Higher APACHE, older, presence of co-morbidities, HLOS before hypotension, dx of pneumonia, admin to academic hospitals & transfer from medical wards

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>
<tr>
<td>P Value</td>
<td>&lt;.001</td>
<td>0.02</td>
<td></td>
</tr>
</tbody>
</table>

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

Early Fluid Resuscitation is Key

Increased Fluid Administration in the First Three Hours of Sepsis Resuscitation Is Associated With Reduced Mortality
A Retrospective Cohort Study
Sarah J. Lee, MD, MPH; Kannan Ramar, MBBS, MD; John G. Park, MD, FCCP; Ognjen Gajic, MD, FCCP; Guangxi Li, MD; and Rahul Kashyap, MBBS

*Corresponding Author. E-mail: deilisman@gmail.com.

Increased Fluid Administration in the First Three Hours of Sepsis Resuscitation Is Associated With Reduced Mortality
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Sarah J. Lee, MD, MPH; Kannan Ramar, MBBS, MD; John G. Park, MD, FCCP; Ognjen Gajic, MD, FCCP; Guangxi Li, MD; and Rahul Kashyap, MBBS

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

Multicenter Implementation of a Treatment Bundle for Patients with Sepsis and Intermediate Lactate Values

Vincent X. Liu1,2, John W. Morehouse2, Gregory P. Marelich2, Jay Scule3, Thomas Russell3, Melinda Skeath3, Carmen Adams3, Gabriel J. Escobar1,2, and Alan Whippy2

1Kaiser Permanente Division of Research, Oakland, California; 2The Permanente Medical Group, Oakland, California; and 3Kaiser Foundation Hospitals and Health Plan, Oakland, California

American Journal of Respiratory and Critical Care Medicine Volume 193 Number 11 | June 1 2016

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

Daniel E. Leisman, BS1,2; Chananya Goldman, MD4; Martin E. Doerfler, MD5,6; Kevin D. Masick, PhD6; Susan Dries, RN, PhD; Eric Hamilton, BA7; Mangala Narasimhan, DO7; Gulrukh Zaidi, MD7; Jason A. D’Amore, MD1; John K. D’Angelo, MD1,2

Critical Care Med October 2017 • Volume 45 • Number 10

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

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 *
  - **Intubated/mechanically ventilated**
    - Rapid infusion of 30 ml/kg crystalloid *
    - Total of 30 ml/kg with frequent reassessment of oxygenation

- **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.

*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; oxyHgb = 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
Sepsis Practice Collaborative Model
4 Tier Process for Program Implementation

1. Organizational Consensus that Severe Sepsis Must be Managed Early and Aggressively
2. Early Screening with Tools and Triggers
3. Implementation of the Sepsis Bundles
4. Measuring Success

CQI

Continuous Quality Improvement

Adapted from: Sepsis Solutions International

Infection Prevention

- Hand Washing
- VAE (VAP) Bundle
- CAUTI
- BSI

Documentation Improvement ~ Accurate Coding

1Continuous Quality Improvement
## Gap Analysis: TIER 4

<table>
<thead>
<tr>
<th>COMPONENTS</th>
<th>YES</th>
<th>NO</th>
<th>NA</th>
<th>Action Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement/Continuous Improvement</td>
<td></td>
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<tr>
<td>Define real time method for tracking patients (i.e., severe sepsis patient log)</td>
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<tr>
<td>Define concurrent review process for core measure and core measure defect review process</td>
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<tr>
<td>Sepsis Coordinator rounds in clinical areas to answer questions and ensure appropriate implementation of the bundles</td>
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<tr>
<td>Provide a sample of topics for the team meeting</td>
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<tr>
<td>Do you have a way to know your data elements that fall out each month and a process for follow up?</td>
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<tr>
<td>Do you have a process to address deviations from evidence based care processes with physicians, nurses, and other clinical staff</td>
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<tr>
<td>Education</td>
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<td>Provider Education completed – Define in status column</td>
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<td>Nursing Education completed – Define is status column</td>
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<tr>
<td>General Sepsis Education – Define in column</td>
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<tr>
<td>Tools to assist bedside staff have been implemented (i.e., algorithm, clinical pathway, pocket cards, etc.)</td>
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</tbody>
</table>
Gap Analysis: TIER 4

What do you perceive to be the biggest challenge in Tier 4?

A. Lack of using your process and outcome data to identify opportunities for improvement?
B. Lack of feedback to the appropriate people who did not implement the protocol to reach the goals
C. Lack of analyzing your outcome data?
D. Other (document in the chat box)
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/Septic Shock Feedback Report - MICU

The purpose of this report is to give feedback on the below listed patient recently treated for Severe Sepsis/Septic 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 recommendation template listed below in a timely manner can significantly reduce mortality of our Severe Sepsis and Septic 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 at ______________.

<table>
<thead>
<tr>
<th>Patient Name</th>
<th>FDN</th>
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<tbody>
<tr>
<td>ED Arrival Date &amp; Time</td>
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<tr>
<td>ED RN</td>
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<tr>
<td>ED Physician</td>
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<tr>
<td>ED Resident</td>
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<tr>
<td>Floor Arrival Date, Time, &amp; Unit</td>
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<tr>
<td>Pt Transferred From</td>
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<td>ICU Arrival Date &amp; Time</td>
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<tr>
<td>Attending</td>
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<tr>
<td>Resident</td>
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<tr>
<td>RN</td>
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<tr>
<td>PRISM Score</td>
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<td>Severe Sepsis</td>
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<td>Septic Shock Time (Time Zero)</td>
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<td>Severe Sepsis Septic Shock Clinical Pathway</td>
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<td>Code Sepsis Pages</td>
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<tr>
<td>Date/Time Central Line Insertion</td>
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<tr>
<td>Date/Time Criteria 3IF</td>
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<tr>
<td>Date/Time Criteria Organ Dysfunc</td>
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<table>
<thead>
<tr>
<th>Sepsis Quality Indicators</th>
<th>Date &amp; Time</th>
<th>Result</th>
<th>Goal Met (Y/N)</th>
<th>Goal</th>
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</thead>
<tbody>
<tr>
<td><strong>Lactic Acid</strong></td>
<td></td>
<td>Drawn within 3h of Severe Sepsis (Look 6hrs Prior)</td>
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<tr>
<td><strong>Blood Cultures before Antibiotics</strong></td>
<td></td>
<td>Drawn before ABX (Look 48hrs Prior)</td>
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<tr>
<td><strong>Broad-Spectrum Antibiotics</strong></td>
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<td>Hung within 3h of Severe Sepsis (Look 24hrs Prior)</td>
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</tr>
<tr>
<td><strong>30mL/kg Fluid Bolus</strong></td>
<td></td>
<td>As Fast As Possible. Infused within 3h of Severe Sepsis. (Goal = Y/N if Hypotensive, LA ≥ 4. OR Septic Shock)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Weight in kg:</strong></td>
<td></td>
<td>At least one BP documented</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Check BP in hour after conclusion of 30mL/kg fluid bolus</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Central Line Placed. If Requires Vasopressors</strong></td>
<td></td>
<td>Placed within 2h of Vasopressor Start</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vasopressor Started for SBP &lt; 90 or MAP ≤ 65mmHg</strong></td>
<td></td>
<td>Started 1hr of Persistent Hypotension After Initial Fluid Bolus</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CMS Requirement- Vasopressor Started for SBP &lt; 90 or MAP ≤ 65mmHg</strong></td>
<td></td>
<td>CMS Requirement-Started within 6h of Septic Shock</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Repeat Focused Exam by MD/AP (VS, Cardiopulm, Cap Refill, Peripheral Pulse, AND Skin Findings) OR 2 Measures (CVP, ScvO2, Bedside Cardiovascular Ultrasound, SV Optimization with Fluid Challenge/Passive Leg Raise)</strong></td>
<td></td>
<td>Documented within 6h of Septic Shock</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Repeat Lactic Acid</strong></td>
<td></td>
<td>Repeat within 6h of Severe Sepsis ≥ 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments:
Success relies on a complex set of tasks being completed in a limited amount of time.

Requires data collection and analysis to determine the bottleneck(s).

Must analyze the workflow for patients arriving in the ED as well as those who become septic after hospitalization.

QI/PI teams are a great resource when available.

Multiple tools have proven successful.

Some examples of diagnostic tools used for analysis, and the “therapeutic” tools developed out of the analysis.
Perform a “Go See” with ED and ICU staff and draw a Current State Map for the septic patient flow

- Include Customer & Requirements, Supplier & Inputs, major steps, technology, information flow, rework loops, delays, and data boxes with job titles

If there is no septic patient presenting, consider:

- Interviewing the people who would be involved in the sequence of the septic patient flow: ask them to demonstrate what they would do if they were working with a septic patient
- Simulating a patient: choose one of the staff to “be” a septic patient and observe the simulated treatment as the patient progresses to ICU management
Sepsis Patient Flow Template: Walk Ins

1. List the process steps below each box
2. For each process step include job title of persons performing the step
3. For each queue quantify the delay time (D/T)
4. Then total each to get L/T for the overall process

Total L/T to diagnosis:

% bundle use:
- Labs:
- Meds:
- IV’s:
- Monitoring:
- CVP:
- MAP:
- ScvO2:
- SV:
- Echo:

If bundle is not used, describe these resuscitation components

Highlight the steps with the biggest issues

Customer Requirements:

Supplier Inputs:

ER
Assess
Diagnose
Resuscitate

% pt. screened:

Query Pt.
Perform Assessment

Walk Ins

Walk Ins

ICU

## Current State Issues

<table>
<thead>
<tr>
<th>Process Box &amp; Issue</th>
<th>Top 2 reasons why</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1a, 1b</td>
</tr>
<tr>
<td>2</td>
<td>2a, 2b</td>
</tr>
<tr>
<td>3</td>
<td>3a, 3b</td>
</tr>
<tr>
<td>4</td>
<td>4a, 4b</td>
</tr>
</tbody>
</table>
Why is the initial 30ml/kg fluid bolus not being given

**Themes:**
1. Knowledge and comfort in using protocol
2. Accepting when physician doesn’t want to do protocol without going up chain of command
3. Fear of fluid in elderly, ESRD and CHF
4. Blame hypotension on other conditions
5. Unassertive RN staff

**Communication**
- Poor between residents and nursing staff
- Responses from physicians: 
  - Physician aware and don’t respond and RN just accept it
  - Communication breakdown RN-RN shift report
- Not sure what they received on another unit
- Takes too long for physician to come and see the patient

**Material**
- Need to elicit support of CNL and charge nurse/nurse coordinators

**Environment/EMR**
- Staff busy with more than one patient
- Getting orders in and charting in MAR (should treat like a code and chart later)
- Physical support especially on staff
- Lack of documentation when fluid actually given

**Process/critical thinking**
- New interns
- Staff not aware of sepsis protocol—doesn’t require physician order
- Unassertive RN staff—at advanced beginner stage
- Not properly using screening tool
- Fear of fluid overload of renal or CHF patients (RNs and doctors)
- Lack of education on appropriate fluid needed
- Physician not familiar with protocol and not consulting with senior
- Give fluid over long period of time or just increase IV rate

**Policy**
- Appropriate labs not drawn/ordered
- Appears cardiogenic not sepsis
- "his BP has been low before" accept low BP as normal
- Unaware of baseline BP
- Delay in identifying change in condition
- Infection not suspected—other causes pursued
- Blame hypotension on other conditions or source (i.e. sedation)
- Physician pushback
- Nurse/doctor hesitant because being diureased
- Patient who hover or have unclear presentation

**Initial Fluid bolus (30ml/kg) not given in 3 hrs**
- Not trusting high lactate and continue to recheck
- Patient not symptomatic with low BP
- RN not sure where plts on pathway
- SBP >90 but MAP < 65—Rn doesn’t knower might be in shock
- New RN’s lack of starting fluids on someone where no fluids are running
- Doctors order small amt of fluid
- Staff knowledge deficit
- Nurse like exact orders in EMR before starting interventions—causes delays

**People/knowledge**
The PDSA Cycle for Learning and Improvement

1. **PLAN**
   - Set objective
   - Ask questions and make predictions (why)
   - Plan to carry out the cycle and data collection (who, what, where, when)

2. **DO**
   - Carry out the plan
   - Document problems and unexpected observations
   - Collect and begin data analysis

3. **STUDY**
   - Analyze the data
   - Compare data to predictions
   - Summarize what was learned

4. **ACT**
   - What changes are to be made?
   - Next cycle?
### Planning a Test of Change

**Worksheet Example**

<table>
<thead>
<tr>
<th>SMALL TEST OF CHANGE</th>
<th>WHAT do you need to test this idea?</th>
<th>WHO will be involved in the tests?</th>
<th>HOW will you inform participants?</th>
<th>WHERE will the test occur?</th>
<th>WHEN will the test occur?</th>
<th>HOW will you know it is successful?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test routine screening on medical unit</td>
<td>Paper screening form that includes looking for infection, SIRS and organ dysfunction</td>
<td>3 staff nurses on the medical unit</td>
<td>Meet with 3 staff nurses to review the tool and process</td>
<td>9E medical unit</td>
<td>Week of June 5th</td>
<td>Screening tool was completed correctly without any confusion and same result is obtained by staff nurse and sepsis team member</td>
</tr>
</tbody>
</table>

When will you compare what happened to your prediction? Week of June 12th

When will you decide what to do next? Try it with all the nurses on the day shift and night shift for one week

<table>
<thead>
<tr>
<th>SMALL TEST OF CHANGE</th>
<th>What did you predict will happen?</th>
<th>What happened?</th>
<th>What did you learn?</th>
<th>What are the next steps?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routine sepsis screening</td>
<td>Screening form/process will be easy to follow and result in a correct screen</td>
<td>Screening process was easy and the results were correct</td>
<td>Nurses like having clear direction on the form for what to do with a positive screen for severe sepsis</td>
<td>Expand the test of change to the rest of the day shift and the night shift</td>
</tr>
</tbody>
</table>
What other challenges are you facing?
What questions do you have?
Contact Information

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Ann Arbor, MI
patposa07@gmail.com
Sepsis Solutions International LLC

Angela Craig
APN, MS, CCNS
Clinical Nurse Specialist/ICU
Cookeville Regional Medical Center
Cookeville, TN
acraig@crmchealth.org
## Sepsis Gap Analysis and Action Steps

<table>
<thead>
<tr>
<th>COMPONENTS</th>
<th>YES</th>
<th>NO</th>
<th>NA</th>
<th>Action Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organizational Commitment/ Team</strong></td>
<td></td>
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<tr>
<td>Physician and nursing leadership participate in action planning for sepsis initiatives</td>
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</tr>
<tr>
<td>Multidisciplinary team in place and monthly meetings (providers, nursing, quality, care management, etc) from various care areas, ED, ICU, Med Surg, Perinatal, peds</td>
<td></td>
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<tr>
<td>Executive sponsor receives regular data reports and provides feedback</td>
<td></td>
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<tr>
<td>Sepsis Team is part of reports to Critical care or quality structure in hospital</td>
<td></td>
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<tr>
<td>Managing sepsis is aligned with hospital’s quality, safety or organizational goals</td>
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<tr>
<td>Baseline data collection completed for process and outcome data</td>
<td></td>
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<tr>
<td><strong>Dedicated Sepsis resource/ Sepsis Coordinator</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dedicated Sepsis Resource in place (in comments identify title)</td>
<td></td>
<td></td>
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<tr>
<td>FTE allocation/ time commitment to sepsis role</td>
<td></td>
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<tr>
<td>Site/ sites supported</td>
<td></td>
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<tr>
<td>Other responsibilities in the role</td>
<td></td>
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<tr>
<td><strong>Identification/ Screening</strong></td>
<td></td>
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</tr>
<tr>
<td>Early alert or warning system/process in place in the ED or describe triggers for sepsis screening:</td>
<td></td>
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</tr>
<tr>
<td>ED</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICU</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>INPATIENT UNITS</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>PERINATAL</td>
<td></td>
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</tr>
<tr>
<td>PEDIATRICS</td>
<td></td>
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</tr>
<tr>
<td>Is a screening process completed consistently as designed?</td>
<td></td>
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</tr>
<tr>
<td>All ED patients are screened/ assessed for sepsis in triage?</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>All ICU patients are screened/ assessed for sepsis upon admission and every shift – describe process</td>
<td></td>
<td></td>
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<tr>
<td>All med surg patients are screened/ assessed for sepsis upon admission and every shift – describe process</td>
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<td></td>
<td></td>
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<tr>
<td>All OB patients are screened/ assessed for</td>
<td></td>
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</tbody>
</table>
## Gap Analysis

**Components**

<table>
<thead>
<tr>
<th>Components</th>
<th>YES</th>
<th>NO</th>
<th>NA</th>
<th>Action Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sepsis upon admission and every shift – describe process</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All pediatric patients are screened/assessed for sepsis upon admission and every shift – describe process</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Does the process include specific actions by nurse when a positive screen is obtained?</td>
<td></td>
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<tr>
<td>Rapid Response Team (RRT) process in place for sepsis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If yes describe process in comments, if no describe response expectations to positive screening or sepsis identification</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Implementing the Bundles**

<table>
<thead>
<tr>
<th>Implementing the Bundles</th>
<th>YES</th>
<th>NO</th>
<th>NA</th>
<th>Action Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sepsis order sets are in place and utilized by providers (CPOE/Paper)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Sepsis provider documentation tools are in place and utilized to meet SEP-1 requirements</td>
<td></td>
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</tr>
<tr>
<td>Communication between physician and nurses related to diagnosis and treatment plan specific for sepsis; handoffs readily incorporate appropriate sepsis language</td>
<td></td>
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<tr>
<td>Appropriate utilization of central lines; adequate skill and resource to place them when clinical criteria met</td>
<td></td>
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<tr>
<td>Able to get lactate levels in one hour or less</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Able to get antibiotics in one hour for ICU, 3 hours for ED</td>
<td></td>
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</tr>
<tr>
<td>Process in place for reassessment of volume status and tissue perfusion for septic shock patients</td>
<td></td>
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</tr>
<tr>
<td>Identify resistance/barriers to components of bundles and developed solutions (fluid resus, blood cultures before antibiotics, repeat lactate, etc.)</td>
<td></td>
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</tr>
<tr>
<td>Do you have the tools you need to optimize fluid based on hemodynamics?</td>
<td></td>
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<tr>
<td>Do you have the ability to know time to antibiotic?</td>
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</tr>
</tbody>
</table>

**Measurement/Continuous Improvement**

<table>
<thead>
<tr>
<th>Measurement/Continuous Improvement</th>
<th>YES</th>
<th>NO</th>
<th>NA</th>
<th>Action Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define real time method for tracking patients (i.e., severe sepsis patient log)</td>
<td></td>
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<tr>
<td>Define concurrent review process for core measure and core measure defect review process</td>
<td></td>
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<tr>
<td>Sepsis Coordinator rounds in clinical areas to answer questions and ensure appropriate</td>
<td></td>
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</tbody>
</table>
### Gap Analysis

<table>
<thead>
<tr>
<th>COMPONENTS</th>
<th>YES</th>
<th>NO</th>
<th>NA</th>
<th>Action Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>implementation of the bundles</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Provide a sample of topics for the team meeting</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Do you have a way to know your data elements that fall out each month and a process for follow up?</td>
<td></td>
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</tr>
<tr>
<td>Do you have a process to address deviations from evidence based care processes with physicians, nurses, and other clinical staff</td>
<td></td>
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</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provider Education completed – Define in status column</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nursing Education completed – Define is status column</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Sepsis Education – Define in column</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Tools to assist bedside staff have been implemented (i.e., algorithm, clinical pathway, pocket cards, etc.)</td>
<td></td>
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</tr>
</tbody>
</table>
Challenges: New Sepsis Definitions
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)
Sepsis 3:
Singer et al, JAMA 2016. PMID: 26903338

- **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 $\geq 22$
- Altered Mental Status
- Systolic BP $\leq 100$ mmHg

SOFA
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.

- Late recognition:
  - “Sepsis is a problem only when life-threatening organ dysfunction is already present fails to recognize the spectrum of the illness, minimizes the importance of infection to its evolution and as its principal driver and devalues systemic host response as a harbinger of the onset of organ failure.”

- 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 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

Sepsis Screening and Nurse Driven Protocols
November 14 at 2 pm ET

Amy Sprague, DNP, RN, ACNS-BC, CCRN
Patient Safety Manager
Indianapolis VA Medical Center

Cairn Ruhumuliza, MSN, RN
Sepsis Coordinator
McLaren Northern Michigan Hospital

Lily Popkin, BSN, MSN, RN
Sepsis Coordinator
Lutheran Medical Center
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