HQIC Community of Practice Call

Implementation and Improvement Tips of Sepsis Bundles

February 10, 2022
Welcome!

Who’s in the Room?

Shaterra Smith
Social Science Research Analyst - Division of Quality Improvement Innovation Models Testing
iQuality Improvement and Innovations Group
Center for Clinical Standards and Quality CMS
Agenda

• Introduction
• Today’s Topic – **Implementation and Improvement Tips of Sepsis Bundles**
• Presentations by:
  - John Lawrence, Inova Mount Vernon Hospital, Alexandria, VA
  - Jodi Griffin, Mosaic Medical Center, Maryville, Missouri
• Open Discussion/Q&A
• Closing Remarks
As You Listen, Ponder...

• What excites you the most about the information provided? What information can you leverage to help expand opportunities in your communities?
• What actions will you take as a result of the call?
• Where can you begin with your facility to continue to ensure safety, and a true patient-centered approach as you engage collaboratively with others?
• Which activities do you have underway that will allow for you to expand and push forward to build on action in the next 30 days? 90 days?
Meet Your Speakers

John Lawrence, RN, BSN, CPHQ, SCRN
Sepsis Coordinator
Inova Mount Vernon Hospital

Jodi Griffin, RN, BSN
Quality Improvement Coordinator,
Mosaic Medical Center
Implementation and Improvement Tips of Sepsis Bundles

February 10, 2022
Agenda

1. Bundle Basics
2. Raising Awareness
3. Addressing Barriers
4. Success Factors/Facilitators
5. Keeping Things in Perspective
6. Questions
Founded in 1976, Inova Mount Vernon Hospital is a 237-bed community hospital in Alexandria, VA, offering patients convenience and state-of-the-art care in a unique healing environment.
Bundle Basics
Problem

- Sepsis is a dysregulated host response to an infection and is considered a medical emergency.
- Time is of the essence. For patients with septic shock, mortality may increase by over 7% for every hour that antibiotics are delayed (Kumar et al., 2006)
Summary of SEP-1

**Within 3 Hours of Presentation:**
- Measure initial lactate level
- Obtain blood cultures prior to antibiotic administration
- Start broad-spectrum (or other) antibiotic(s)
- Start 30mL/kg fluid bolus for hypotension or lactate ≥4

**Within 6 Hours of Presentation:**
- Re-measure lactate if initial lactate >2.0
- Re-assess BP after fluids are complete
- Start vasopressors for hypotension unresponsive to fluid bolus = “septic shock”
- If persistent hypotension after fluids or lactate ≥4, provider re-assesses and documents volume status and tissue perfusion assessment

<table>
<thead>
<tr>
<th>COVID-19 with mild ARDS</th>
<th>COVID-19 with mod to severe ARDS</th>
<th>Rescue/adjunctive therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DO:</strong> Vt 4-8 ml/kg and Pplat &lt; 30 cm H₂O</td>
<td><strong>CONSIDER:</strong> Higher PEEP PEEP should be tailored to individual response</td>
<td><strong>CONSIDER:</strong> If prone, high Ppl asymmetry NMBA infusion for 24 h</td>
</tr>
<tr>
<td><strong>DO:</strong> Investigate for bacterial infection</td>
<td><strong>CONSIDER:</strong> NMBA boluses to facilitate ventilation targets</td>
<td><strong>CONSIDER:</strong> Prone ventilation 12 - 16 h</td>
</tr>
<tr>
<td><strong>DO:</strong> Target SpO₂ 92% - 96%</td>
<td><strong>CONSIDER:</strong> If PEEP responsive Traditional recruitment maneuvers</td>
<td><strong>CONSIDER:</strong> A trial of inhaled nitric oxide STOP if no quick response</td>
</tr>
<tr>
<td><strong>CONSIDER:</strong> Conservative fluid strategy</td>
<td><strong>CONSIDER:</strong> Prone ventilation 12 - 16 h</td>
<td><strong>CONSIDER:</strong> V-V ECMO or referral to ECMO center follow local criteria for ECMO</td>
</tr>
<tr>
<td><strong>CONSIDER:</strong> Empiric antibiotics</td>
<td><strong>CONSIDER:</strong> If prone, high Ppl asymmetry NMBA infusion for 24 h</td>
<td></td>
</tr>
</tbody>
</table>

**DON'T DO:** Staircase recruitment maneuvers

Mod = moderate
ARDS = adult respiratory distress syndrome
Pplat = plateau pressure
SpO₂ = peripheral capillary oxygen saturation
PEEP = positive end-expiratory pressure
NMBA = neuromuscular blocking agents
ECMO = extracorporeal membrane oxygenation
SEP-1 is publicly reported at Medicare.gov
Raising Awareness
Our Journey with Sepsis

- **January 2013**
  - Formed ED Team

- **December 2013**
  - Started Screening in ICU

- **March 2014**
  - Screening in IMCU

- **October 2015**
  - Housewide Screening SEP-1 Begins

- **January 2017**
  - New Escalation Plan with TeleICU Support

- **November 2018**
  - MEWS Rollout

- **January 2021**
  - Sepsis Value Improvement Project (VIP)
When It Comes to Sepsis: **THINK PINK!**

- Checklists are in the back of the MSET notebook on the crash cart.
- Use the checklist as an SBAR tool to talk to the physician about what the patient needs.
Staff Education Examples

1. Education rollout in 2017 across the entire health system for both RNs and clinical technicians
2. Annual nursing and clin tech skills fair/competency
3. 30 minutes at new employee orientation for RNs and clin techs
4. 20-minute onboarding with all new ED and hospitalist providers
5. Ongoing coaching of front-line staff
What is sepsis?

- What if whole body experiences an inflammatory response at once?
  - This is a Systemic Inflammatory Response Syndrome or “SIRS”
  - This is abnormal and bad
  - Massive vasodilation → Drop in blood pressure → Tissues don’t get oxygen → Lactic begins to go up

Teach the “why” behind the bundle
Sepsis badge buddy given to all nurses and clin techs
ED sepsis compliance dashboard shared each week

2021 IMVH ED Sepsis Dashboard

ED Weekly Sepsis Compliance

Recent Failouts
1. Two lactates ordered. First was normal and second was elevated. Third should have been ordered at the follow-up.
2. Patient boarding in ED with hypotension. Low BP, lactate had been drawn but was over 6 hours prior and was normal. With new onset organ dysfunction (low BP, need new lactate).
3. Lactate of 2.3. Repeat lactate was ordered but not drawn in ED.

Celebrations
- Antibiotics given in less than 90 minutes: None
- Boarding in ED: None
- Pneumonia: Michell De La Peña
- Hypotension: None
- Stroke: None
- Septic Shock: None
- Ongoing: None

Confidentiality: Disclosure prepared for Hospital Department to maintain confidentiality and quality of healthcare services. Protected under VH Code APA 8.48 8-11.
Staff and students at IMVH heard from a sepsis survivor at a 2018 Sepsis Lunch & Learn
**Detecting and treating sepsis for our inpatients can be challenging.**

It’s true – the ED and inpatient are two different worlds. But here are some elements of a successful sepsis team:
- Physician-nurse collaboration
- Careful clinical assessment (“sepsis until proven otherwise”)
- Consistent use of order sets

**In turn, what can we do?**
- Be responsive. Nurses are required to screen for sepsis and may call requesting orders to meet the sepsis bundles.*
- For patients with infection or low-severity sepsis, be vigilant for organ dysfunction that could signal severe sepsis.
- For severe sepsis or septic shock, use one of these order sets: **SUSPECTED SEPSIS ORDERS** or **CRITICAL CARE ADMIT TO ICU**

### Sepsis Bundle Compliance (May-July)

<table>
<thead>
<tr>
<th></th>
<th>ED</th>
<th>Inpatient</th>
</tr>
</thead>
<tbody>
<tr>
<td>70%</td>
<td></td>
<td>30%</td>
</tr>
</tbody>
</table>

**3-HOUR BUNDLE**
- Initial lactic
- Blood cultures
- Broad spectrum antibiotic
- 30 mL/kg fluid bolus if lactic >=4 or SBP <90 (or MAP <65)

**6-HOUR BUNDLE**
- Repeat lactic (if initial >=2)
- Septic shock exam (.sepsiscms), if lactic >=4 or vasopressors required
- Vasopressors, if refractory hypotension after fluid bolus
Addressing Barriers
Top Bundle Barriers

Poll Results from August 2021:

1. Documentation of elements in the EHR
2. Fluids
3. Blood cultures before antibiotics
4. Physician buy-in
Barriers

- Keep bundle tools simple
- Our success with tracking bundle elements has been done almost entirely on paper for last 5+ years
- Of course order sets in EHR have been key
Barriers, continued

- A proactive approach has helped us with blood cultures
  - We do not wait for patients to meet severe sepsis criteria to start the bundle
  - We order blood cultures on every ED patient receiving IV antibiotics who will be admitted
- Patients receiving the 30 mL/kg fluid bolus has been more challenging
  - We encourage providers to order the full amount from the beginning or to clarify in documentation why another approach was taken
  - Ultimate goal is to achieve organ perfusion by maintaining MAP
Smartphrases allow the provider to clarify diagnoses and plan of care.

**Initial Sepsis Documentation:**
At 1836 on 08/16/21, I suspect the patient to meet severe sepsis criteria due to a lactate >2. This timestamp also applies to every infectious and/or SEP-1-related diagnosis in Clinical Impression or MDM sections of this note.

**Fluid Management**
An initial bolus <30 mL/kg was given because a 30 mL/kg bolus of crystalloid fluids would be detrimental or harmful for the patient despite hypotension. The patient has stage V or GFR < 15 mL/min or ESRD. I performed a sepsis focused physical examination and reassessment on 07/28/21 at 2053.
Fluid Management

• “One of the most important principles of managing complex septic patients is the need for a detailed initial assessment and ongoing re-evaluation of the response to treatment.”
• To avoid over- and under-resuscitation, fluid administration beyond the initial resuscitation should be guided by careful assessment of intravascular volume status and organ perfusion.”
• “Dynamic measures have demonstrated better diagnostic accuracy at predicting fluid responsiveness compared with static techniques. Dynamic measures include passive leg raising combined with cardiac output (CO) measurement, fluid challenges against stroke volume (SV), systolic pressure or pulse pressure, and increases of SV in response to changes in intrathoracic pressure.” (Evans et al., 2021, p. e1076).
Aligning SEP-1 compliance with patient outcomes is at times a matter of documentation.
Suspected Sepsis Orders

Lab Orders

- **Inova Lab Orders**
  - Timed Lactic Acid Panel
  - Blood Culture X 2
  - CBC and differential
    - STAT, Once
  - Comprehensive metabolic panel
    - STAT, Once

Bolus Fluids

- **Inova Fluid Bolus Orders**

  30 mL/kg bolus is only required if patient has hypotension or lactic acid >=4 due to sepsis. Ideal body weight may be used if BMI is documented >30.

  - sodium chloride 0.9 % bolus ($)
    - 30 mL/kg, Intravenous, Administer over 60 Minutes, Starting 8/16/21
Medication - Unidentified Source

Consider gentamicin/tobramycin if septic shock (lactate greater than or equal to 4 mmol/L or hypotension despite fluids) or if patient has received antibiotics within the last 90 days.

Gentamicin/tobramycin 7 mg/kg x 1 dose if CrCl 30 mL/min or greater (order random level 6-12 hours after dose).

Gentamicin/tobramycin 2 mg/kg x 1 dose if CrCl less than 30 mL/min OR acute kidney injury.

- Inova Unidentified Source

Medication - Suspected Source

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- Inova Pneumonia Antimicrobials
- Inova Intra-abdominal Infection
- Inova Bacterial Meningitis (Community Acquired)
- Inova Bacterial Meningitis (Immunocompromised and/or g
- Inova UTI - Community Acquired
- Inova UTI - Hospital/SNF/Catheter Related
- Inova Skin/Skin Structure Infection
- Inova Skin/Skin Structure Infections - Immunocompromised or DM Foot
- Inova Neutropenic Fever

Inova UTI - Community Acquired

- cefTRIAXone IV
- levoFLOXacin +/- gentamicin IV (severe beta-lactam allergy)
- meropenem +/- gentamicin IV (history of ESBL/MDRO)
Currently working to implement an electronic version of the checklist in EHR with a timer.
Creating a process map of your current vs. ideal state can help you identify barriers.
Success Factors/ Facilitators
Success Factors/Facilitators

• Having a sepsis coordinator, even part-time, has been key
  – Permanent position allows for succession planning
• Short feedback cycle for fallouts and successes
  – Value of concurrent reviews
• Leadership, accountability and support of CMO and medical directors (ED, hospitalists) has been critical
  – Emergency physician group allows me to attend quarterly meetings to give updates
• Regular sepsis committee meetings for last 5+ years
  – Role of interprofessional collaboration
• 24/7 support from TeleICU for inpatient nurses on all units
# Sepsis Coaching Record

<table>
<thead>
<tr>
<th>Date</th>
<th>1. SIRS 2 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Name</td>
<td>2. Infection Documentation</td>
</tr>
<tr>
<td>MRN</td>
<td>3. Organ Dysfunction</td>
</tr>
<tr>
<td>Location</td>
<td>Severe Sepsis Presentation Time</td>
</tr>
<tr>
<td>Employee(s)</td>
<td>Sepsis Screen Positive in Triage? □ Yes □ No</td>
</tr>
<tr>
<td>Provider(s)</td>
<td>Secondary Screen Completed? □ Yes □ No □ N/A</td>
</tr>
<tr>
<td></td>
<td>Copy of Sepsis Checklist Received? □ Yes □ No</td>
</tr>
</tbody>
</table>

**Description of Event:**

- Your patient met severe sepsis criteria, but no lactate was drawn or it was drawn late (not drawn within 3 hours).
- Blood cultures were not drawn before antibiotics. If there were any barriers to drawing cultures, documentation could not be found.
- Your patient did not receive broad-spectrum antibiotic coverage within 3 hours of severe sepsis presentation.
- A repeat lactate was not drawn within 6 hours of severe sepsis. The recommended timing is to redraw a repeat lactate within 1-2 hours of the initial lactate.
- Your patient had hypotension (SBP <90 or MAP <65) or a lactate of 4 or more, but a 30 mL/kg bolus was not initiated within 3 hours. If the provider orders individual boluses, instead of a single order with the total amount, the "start time" is considered when the final bolus, which completes the required amount, is begun. (Example: Patient needs 2500 mL and orders are written for 1000 mL, 1000 mL and 500 mL; start time is when the last bolus for 500 mL is started. If a single order for 2500 mL is entered, start time is when first bolus hung. Don’t forget to label boluses with pink stickers “Bag: ___ of ____”), if the provider is concerned about fluid overload, patient refusal must be documented or palliative care consulted. Ideal body weight may be used if BMI is greater than 30. Have the provider document this.
- Two BPs were not recorded during the hour after the 30 mL/kg fluid amount finished. The finish time was (Because a stop time was not entered in Epic, the end time was calculated using the duration specified in the order.)
- The provider’s note did not contain the statement, “Sepsis exam performed after fluids started.” This statement is required when a patient receives the 30 mL/kg fluid bolus. Provider may also use sepsis.c.sms Smart Phrase.
- Vasopressor was not started within 8 hours of septic shock presentation, if patient had persistent hypotension after 30 mL/kg bolus.
- Other notes:
Celebrate Successes

• Each month we recognize a nursing Sepsis Star
• They receive a gold star pin
Keeping Things in Perspective
Keeping Things in Perspective

- SEP-1 is useful process measure for developing sepsis programs.
- SEP-1 serves as a catalyst for improvements in patient care – including interdisciplinary collaboration, staff education, order sets and early warning systems. (Mukherjee & Evans, 2017)
• In addition to compliance with SEP-1, nursing leaders should examine other variables and processes that may impact outcomes, for example
  – More aggressive antibiotic goals (<1 hour)
  – Timely source control (surgical interventions)
  – More nuanced fluid management and assessment of fluid responsiveness, etc.

• Pay attention to near misses and harm from other causes
• What do *you* consider a fallout?
Mortality vs. SEP-1 Compliance

IMVH Sepsis Mortality vs. SEP-1

*Data from the Vizient Clinical Data Base used by permission of Vizient, Inc. All rights reserved.
Focus on Early Antibiotic Administration

Surviving Sepsis

Don’t delay: Early antibiotics improve sepsis survival!

Kumar et al., 2006, p. 1592

Process: Antibiotic Times

ED Median Door to Antibiotic for Severe Sepsis & Septic Shock
(Inset: Best June Times)

Provider | RN | Minutes
----------|-----|--------
SC        | KW  | 13     
BO        | BS  | 28     
RE        | KR  | 31     
SC        | LV  | 32     
RE        | BP  | 36     
MH        | BP  | 41     
AR        | SH  | 43     
RE        | EJ  | 48     
MH        | RC  | 49     
SC        | ED  | 55     
CO        | BP  | 56     
BO        | CA  | 57     

Provider | RN | Minutes
----------|-----|--------
Jul 2020  |     |        
Aug 2020  |     |        
Sep 2020  |     |        
Oct 2020  |     |        
Nov 2020  |     |        
Dec 2020  |     |        
Jan 2021  |     |        
Feb 2021  |     |        
Mar 2021  |     |        
Apr 2021  |     |        
May 2021  |     |        
Jun 2021  |     |        
Sepsis Presentation for the February 2022 HQIC Community of Practice Call
• Monthly Sepsis Team Meeting – hospitalist, ER provider and front-line nurses having joined the team
• Reworked the Sepsis Flow Sheet (see slide #5)
• Process for documenting IV stop times on the inpt side
• Fall-outs reviewed monthly at dept staff mtgs, Nurse Practice Council and the Medical Staff Quality Affairs mtg
• Sending WOW notes to the providers and nurses whose pts pass the Sep-1 measure (see next slide)
• Real time chart reviews on Sepsis pts
• Work with providers on documentation opportunities
Good work!

Thank you,

Jodi AIC
### Maryville Sepsis Tracking Tool

<table>
<thead>
<tr>
<th>Sepsis</th>
<th>Severe Sepsis</th>
<th>Organ Dysfunction (Check)</th>
<th>Date/Time Completed</th>
</tr>
</thead>
</table>
| • 2 or more SIRS criteria  
• Suspected infection | • Sepsis is  
• 3 or more Organ Dysfunction | SBP < 90 mmHg or MAP < 65 mmHg  
PCT < 10,000 per microliter  
INR > 1.5 or PTT > 60  
Bilirubin > 2 mg/dL  
Creatinine > 2 mg/dL  
Need for Mechanical Ventilation - CPAP, IPPV, or Intubation  
Lactate > 2 mmol/L  
UOP < 0.5 ml/kg/hr for 2 hours | |

### Sepsis Shock
- Lactate ≥ 4 mmol/L OR
- Severe sepsis with persistent or new hypotension in the 1 hour after IVF fluid completion

### Complete within 3 Hours
- Place order (not ED) Sepsis Treatment Order Set—Maryville
- Obtain patient weight (avoid stated weight)
- Initial lactate drawn
- 2 sets of blood cultures. It is recommended to obtain 2 sets of blood cultures prior to antibiotic administration, however, if time constraint, the first antibiotic can be initiated after the first blood culture
- Antibiotics initiated
- Initiate fluid bolus 30 ml/kg if SBP < 90 or MAP < 65, on initial lactate ≥ 4, or provider documentation of septic shock (BMI > 50 use ideal body weight)
- Document accurate IVF Stop Times when bolus is completed

### Complete within 6 Hours
- If initial lactate ≥ 4, repeat lactate ≥ 4 within 6 hours, ideally after fluid bolus
- Use appropriate resuscitation for persistent hypotension following fluid resuscitation
- Follow exam by MD/PA/PN or CVP, SvO2, Echo, or Fluid Challenge completed

<table>
<thead>
<tr>
<th>ED Provider</th>
<th>ED Nurse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitalist</td>
<td>Med-Surg Nurse</td>
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**Discussion**

- What excites you the most about the information provided? What information can you leverage to help expand opportunities in your communities?
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- Where can you begin with your facility to continue to ensure safety, and a true patient-centered approach as you engage collaboratively with others?
- Which activities do you have underway that will allow for you to expand and push forward to build on action in the next 30 days? 90 days?
Final Thoughts
Join Us for the Next Community of Practice Call!

Join us for the next Community of Practice Call on March 10, 2022 from 1:00 – 2:00 PM ET

We invite you to register at the following link:
https://zoom.us/webinar/register/WN_ASl_l3p_TEyx_VY YYFFeA

You will receive a confirmation email with login details.
Thank You!

Your opinion is valuable to us. Please take 4 minutes to complete the post event assessment here: post assessment 2.10.22

We will use the information you provide to improve future events.