Welcome to

*Sepsis Standard Work: Improving Compliance with Early Recognition and Management of Perinatal Sepsis*

The audio for today’s conference will be coming through your computer speakers. Please ensure your speakers are turned on and the volume up.

Thank you!
ACCREDITATION STATEMENTS:

CME: The Centers for Disease Control and Prevention is accredited by the Accreditation Council for Continuing Medical Education (ACCME®) to provide continuing medical education for physicians.

- The Centers for Disease Control and Prevention designates this live activity for a maximum of (1) AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

CNE: The Centers for Disease Control and Prevention is accredited as a provider of Continuing Nursing Education by the American Nurses Credentialing Center's Commission on Accreditation.

- This activity provides (1) contact hours.

CEU: The Centers for Disease Control and Prevention is authorized by IACET to offer (0.1) CEU's for this program.

CECH: Sponsored by the Centers for Disease Control and Prevention, a designated provider of continuing education contact hours (CECH) in health education by the National Commission for Health Education Credentialing, Inc. This program is designated for Certified Health Education Specialists (CHES) and/or Master Certified Health Education Specialists (MCHES) to receive up to (1) total Category I continuing education contact hours. Maximum advanced level continuing education contact hours available are 0. CDC provider number 98614.
Continuing Education Information

ACCREDITATION STATEMENTS:

CPE: The Centers for Disease Control and Prevention is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education.

- This program is a designated event for pharmacists to receive (0.1) Contact Hours in pharmacy education. The Universal Activity Number is 0387-0000-17-138-L05-P.

- Category: This activity has been designated as Knowledge-Based.

- Once credit is claimed, an unofficial statement of credit is immediately available on TCEOnline. Official credit will be uploaded within 60 days on the NABP/CPE Monitor.

For Certified Public Health Professionals (CPH)

- The Centers for Disease Control and Prevention is a pre-approved provider of Certified in Public Health (CPH) recertification credits and is authorized to offer (1) CPH recertification credits for this program.

- CDC is an approved provider of CPH Recertification Credits by the National Board of Public Health Examiners. Effective October 1, 2013, the National Board of Public Health Examiners (NBPHE) accepts continuing education units (CEU) for CPH recertification credits from CDC. Please select CEU as your choice for continuing education when registering for a course on TCEOnline. Learners seeking CPH should use the guidelines provided by the NBPHE for calculating recertification credits. For assistance please contact NBPHE at http://www.NBPHE.org.
Continuing Education Disclosure Statement

DISCLOSURE: In compliance with continuing education requirements, all presenters must disclose any financial or other associations with the manufacturers of commercial products, suppliers of commercial services, or commercial supporters as well as any use of unlabeled product(s) or product(s) under investigational use.

CDC, our planners, presenters, and their spouses/partners wish to disclose they have no financial interests or other relationships with the manufacturers of commercial products, suppliers of commercial services, or commercial supporters. Planners have reviewed content to ensure there is no bias.

Content will not include any discussion of the unlabeled use of a product or a product under investigational use.

*CDC did not accept commercial support for this continuing education activity.*
Continuing Education Information

PROGRAM DESCRIPTION:
This webinar will discuss the need for protocols for early recognition and management of maternal sepsis. The barriers and resistance of implementation of sepsis bundles must be addressed for our vulnerable pregnant population.

OBJECTIVES:
- Describe infection control techniques that reduce the risk and spread of healthcare-associated infections (HAI).
- Identify unsafe practices that place patients at risk for HAIs.
- Describe best practices for infection control and prevention in daily practice in healthcare settings.
- Apply standards, guidelines, best practices, and established processes related to safe and effective medication use.

SPECIFIC OBJECTIVES FOR THIS ACTIVITY:
- Effectively implement the OB sepsis screen in the perinatal setting using adjusted parameters for SIRs criteria in the pregnant population.
- Identify the importance of implementing protocols for early recognition and management of perinatal sepsis.
- Identify the barriers to implementation of sepsis bundles in early recognition and management of perinatal sepsis and how to overcome them.
Sepsis Standard Work: Improving Compliance with Early Recognition and Management of Perinatal Sepsis

May 17, 2017
Before We Get Started...

To submit a question:
• Use the “Chat” window, located on the lower left-hand side of the webinar screen.
• Questions will be addressed at the end of the webinar, as time allows.

To ask for help:
• Please press the “Raise Hand” button, located on the top left-hand side of the screen.

To hear the audio:
• Please ensure your speakers are turned on with the volume up - the audio for today’s conference should be coming through your computer speakers.

The speakers’ slides were e-mailed before the webinar and will also be provided to participants in a follow-up e-mail.
American Nurses Association

- Represents the interests of the nation’s 3.6 million nurses
- Has long-standing involvement in infection prevention and control

Dr. Seun Ross
ANA, Director of Nursing Practice & Work Environment
Why are nurses significant in infection control?

- Uniquely qualified to recognize and prevent infections like sepsis.
Preventing CAUTI—A Leading Cause of Sepsis

NursingWorld.org/ANA-CAUTI-Prevention-Tool
Preventing Infections through Early Mobility

NursingWorld.org/MainMenuCategories/Workplace/Safety/Healthy-Work-Environment/SafePatient
Nurses on the Frontlines of Infection Prevention

NursingWorld.org/ANA-APIC

Hospital-Acquired Infections
Personal Protective Equipment
Emerging Infections
Hand Hygiene
NICE Network

NursingWorld.org/InfectionPreventionControlEducation

Infection Control Resources

In-Person Training Opportunities

Webinars
Sepsis Standard Work:
Improving Compliance with Early Recognition and Management of Perinatal Sepsis

Elizabeth Rochin, PhD, RN, NE-BC
Vice President, Nursing
Association of Women’s Health, Obstetric and Neonatal Nurses (AWHONN)
Maternal Sepsis on a Global Scale

Maternal sepsis is the leading cause of maternal death, accounting for 15% of maternal deaths worldwide. In the United States and the United Kingdom, maternal sepsis is considered to be the leading cause of death in the Peripartum period.

Associations for Sepsis in the Maternal Population

Demographics
• Advanced Maternal Age
• African-American race
• Medicaid Insurance

History
• Preterm Delivery
• Postpartum Hemorrhage
• Stillbirth
• Cesarean Section
• Endometritis
• Cerclage
• Retained Products
• Multiple Gestation

CDC Pregnancy Mortality Surveillance System

Maternal Deaths (all cause) per 100,000 Live Births
2011-2013

- White Women: 12.1
- Black Women: 40.4
- Women of Other Races (Latina, Asian, PI, AI, AN): 16.4
Incidence of Maternal Sepsis in the United States

50,000,000 Obstetric visits were reviewed

No significant change pre-delivery

Rate of post-delivery sepsis increased 148% between 1998-1999 and 2008-2009

Postpartum Discharge Education:
Early Detection of Potential Complications

SAVE YOUR LIFE:
Get Care for These POST-BIRTH Warning Signs

Call 911 if you have:
• Pain in chest
• Obstructed breathing or shortness of breath

Call your healthcare provider if you have:
• Seizures
• Thoughts of hurting yourself or your baby

Tell 911 or your healthcare provider:
“I had a baby on ____________ and I am having ____________.”

GET HELP
• My Healthcare Provider Call:
• Hospital Close to me:

©2016 Association of Women’s Health, Obstetric and Neonatal Nurses
Early Recognition is Key to Successful Treatment

✔ Prevention is key
✔ Sepsis may be difficult to identify early in pregnant women, particularly those in labor (symptoms may be similar)
  ✔ Training and simulation
  ✔ Strong interdisciplinary teamwork
✔ Communication strategies, such as Code Sepsis OB

©2016 Association of Women's Health, Obstetric and Neonatal Nurses
Lauren Epstein, MD MSc
Medical Officer, Epidemiology Research And Innovations Branch
Division of Healthcare Quality Promotion
CDC Vital Signs Report

Making Health Care Safer
Think sepsis. Time matters.

80% of deaths from sepsis are preventable if health care providers acting quickly and effectively.

Sepsis is a medical emergency. This is one of the most common causes of hospitalization in the United States. Early recognition and treatment are critical in improving outcomes.

Problem:
Sepsis is deadly when it's not quickly recognized and treated.

Certain infections and conditions can lead to sepsis:
- Certain infections, such as pneumonia, urinary tract infections, and blood infections can lead to sepsis.
- Certain conditions, such as diabetes and chronic kidney disease, can increase the risk of sepsis.

What Can Be Done?
The Federal government is:
- Working with partners to improve access to anticlotting health services, including infection prevention, vaccination, chronic disease management, appropriate antibiotics, and care management.
- Developing guidelines for the management of sepsis in hospitals.
- Providing funding for research on sepsis.

Healthcare providers can:
- Prevent infections, follow infection control recommendations, educate patients and families, and use appropriate antibiotics.
- Educate patients and their families about the signs of sepsis and how to prevent it.
- Report cases of sepsis to the CDC.

Common infections can lead to sepsis:
- Urinary tract infection
- Bloodstream infection
- Skin and soft tissue infection
- Pneumonia
- Abdominal infection

What else can be done:
- Improved access to health care services, including vaccination and education on sepsis prevention.
- Support for research on sepsis.
- Collaboration with other health care providers and organizations to improve outcomes.

CDC Vital Signs Report
Vital Signs: Epidemiology of Sepsis: Prevalence of Health Care Factors and Opportunities for Prevention

Shannon A. Novosad, MD1,2; Mathew R.P. Sapiano, PhD2; Cheri Grigg, DVM1,2; Jason Lake, MD1,2; Misha Robyn, DVM1,4; Ginwah Dumyati, MD3; Christina Felsen, MPH3; Debra Blog, MD4; Elizabeth Dufort, MD4; Shelley Zansky, PhD4; Kathryn Wiedeman, MPH2; Lacey Avery, MA5; Raymund B. Dantes, MD2; John A. Jernigan, MD2; Shelley S. Magill, MD2; Anthony Fiore, MD2; Lauren Epstein, MD2

On August 23, 2016, this report was posted as an MMWR Early Release on the MMWR website (http://www.cdc.gov/mmwr).

Abstract

Background: Sepsis is a serious and often fatal clinical syndrome, resulting from infection. Information on patient demographics, risk factors, and infections leading to sepsis is needed to integrate comprehensive sepsis prevention, early recognition, and treatment strategies.

Methods: To describe characteristics of patients with sepsis, CDC and partners conducted a retrospective chart review in four New York hospitals. Random samples of medical records from adult and pediatric patients with administrative codes for severe sepsis or septic shock were reviewed.

Results: Medical records of 246 adults and 79 children (aged birth to 17 years) were reviewed. Overall, 72% of patients had a health care factor during the 30 days before sepsis admission or a selected chronic condition likely to require frequent medical care. Pneumonia was the most common infection leading to sepsis. The most common pathogens isolated from blood cultures were Escherichia coli in adults aged ≥18 years, Klebsiella spp. in children aged ≥1 year, and Enterococcus spp. in infants aged <1 year; for 106 (33%) patients, no pathogen was isolated. Eighty-two (25%) patients with sepsis died, including 65 (26%) adults and 17 (22%) infants and children.

Conclusions: Infection prevention strategies (e.g., vaccination, reducing transmission of pathogens in health care environments, and appropriate management of chronic diseases) are likely to have a substantial impact on reducing sepsis. CDC, in partnership with organizations representing clinicians, patients, and other stakeholders, is launching a comprehensive campaign to demonstrate that prevention of infections that cause sepsis, and early recognition of sepsis, are integral to overall patient safety.
Sepsis most often occurs in people:
- Over the age of 65, or infants less than one year of age.
- With chronic diseases (such as diabetes) or weakened immune systems.

Sepsis is most often associated with infections of the lung, urinary tract, skin, or gut.

Common pathogens that cause sepsis are *Staphylococcus aureus*, *E. coli*, and some types of *Streptococcus*.

Even healthy infants, children and adults can develop sepsis from an infection, especially if it is not treated properly.
CDC Vital Signs Report

- Sepsis begins outside of the hospital for nearly 80% of patients.

- **7 in 10 patients** with sepsis had recently interacted with healthcare providers or had chronic diseases requiring frequent medical care.

- *Vital Signs* report demonstrates that there are opportunities to better prevent infections and recognize sepsis early to save lives.
What Can Healthcare Providers do?

Sepsis Prevention

**Sepsis Recognition and Treatment**

- **Think sepsis** by knowing sepsis signs and symptoms to identify and treat patients early.
- **Act fast** if sepsis is suspected.
- **Reassess** patient management and antibiotic therapy.
Next Steps

- Expanding the project to 10 sites throughout the US using CDC’s Emerging Infections Program Network.
  - Data collection is currently underway.
  - Further characterize underlying characteristics of patients with sepsis and septic shock.
Next Steps

• A national sepsis educational effort to improve sepsis prevention, early suspicion/recognition, and timely treatment.

• Launch: Fall 2017

• Anticipated outcomes:
  • Increase awareness of sepsis and importance of infection prevention.
  • Increase awareness of need for rapid recognition and prompt treatment.
Thank You

https://www.cdc.gov/vitalsigns/sepsis/index.html

Lauren Epstein, MD MSc
Medical Officer, Epidemiology Research and Innovations Branch
Division of Healthcare Quality Promotion
Email: xdd0@cdc.gov

For more information, please contact Centers for Disease Control and Prevention

1600 Clifton Road NE, Atlanta, GA 30333
Telephone: 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
Visit: www.cdc.gov | Contact CDC at: 1-800-CDC-INFO or www.cdc.gov/info

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.
Featured Speakers

Katarina Lanner-Cusin, MD
Medical Director Women’s Services, Sutter Health, Alta Bates Summit Medical Center, Berkeley, California

Lori Olvera, DNP, RNC-OB, EFM-C
Bedside Nurse, Anderson Lucchetti Women’s and Children Hospital; Sutter Health
EARLY RECOGNITION OF MATERNAL SEPSIS

Presented by:
Dr. Katarina Lannér-Cusin
Lori Olvera DNP, RNC-OB, EFM-C
Objectives

1. Effectively implement the OB Sepsis Screen in the perinatal population using adjusted parameters for Systemic Inflammatory Response (SIR)

2. Identify the importance of implementing protocols for early recognition and management of perinatal sepsis

3. Identify the barriers to implementation of sepsis bundles in early recognition and management of perinatal sepsis and how to overcome them
History of Sepsis and the Perinatal Population

- 2001 Rivers Study
- 2004 Sepsis Guidelines
- The Perinatal Population
- CMS Measure

Causes of Pregnancy-Related Death In the United States, 2006-2010

- Cardiovascular disease: 14.6%
- Infection/sepsis: 13.6%
- Noncardiovascular disease: 12.7%
- Cardiomyopathy: 11.8%
- Hemorrhage: 11.4%
- Thrombotic pulmonary embolism: 9.6%
- Preeclampsia/eclampsia: 9.4%
- Cerebrovascular accident: 6.2%
- Amniotic embolism: 5.3%
- Anesthesia complications: 0.7%

Notes: The cause of death is unknown for 4.7% of all pregnancy-related deaths. "Noncardiovascular disease" refers to endocrine, hematologic, immunologic, and renal conditions.

www.cdc.gov


- Cardiovascular disease: 15.5%
- Other medical non-cardiovascular disease: 14.5%
- Infection/sepsis: 12.7%
- Hemorrhage: 11.4%
- Cardiomyopathy: 11.0%
- Thrombotic pulmonary embolism: 9.2%
- Hypertensive disorder of pregnancy: 7.4%
- Cerebrovascular accident: 6.6%
- Amniotic fluid embolism: 5.5%
- Anesthesia complications: 0.1%

www.cdc.gov
Severe Sepsis and Septic Shock
Adult population Sutter Sacramento
Implementation of Sepsis Screening
Pregnancy and Sepsis

Incidence:

– Septic Shock is rare in pregnancy 0.002-0.01%
  • Of all septic patients, 0.3-0.6% are pregnant
– Overall increase in severe sepsis and septic shock due to changes in demographics of pregnant women:
  • Advanced maternal age
  • Obesity
  • Diabetes
  • Placental abruption
  • Placental abnormalities
  • Assisted Reproductive Technology (ART)
  • Emerging Infections Diseases

Pregnant Patients need to be included in our Sepsis Protocols!

“Pregnancies complicated by severe sepsis and septic shock are associated with increased rates of preterm labor, fetal infection, and preterm delivery. Sepsis onset in pregnancy can be insidious and patients may appear deceptively well before rapidly deteriorating with the development of severe shock, multiple organ dysfunction syndrome, or death. The outcome and survivability in severe sepsis and septic shock in pregnancy are improved with early detection, prompt recognition of the source of infection, and targeted therapy”

What does the literature say.....

- Sepsis is one of the top four causes of maternal mortality
- Pregnant women are more vulnerable to infection and susceptible to serious complications
- Screening protocols are needed for early recognition and management of maternal sepsis
- All perinatal staff must be trained on early recognition and management of maternal sepsis

Why do we need Protocols for Early Recognition?

- Early recognition and treatment of maternal sepsis will improve survival, decrease length of stay, and length of stay in the ICU.
- Delay in diagnosis and treatment of sepsis has been shown to increase mortality.

The Sutter Health Sepsis Initiative
Perinatal Population

Goal:

Reduce morbidity and mortality from severe sepsis and septic shock

Strategies:

– Early recognition and treatment
– Prevent mother and baby harm: A chance to alter outcome
– Use of Standard Work-An approach adopted from manufacturing to healthcare to reduce
  1) variation in care ("I like 3 lactates in 4 hours")
  2) errors of omission ("I forgot to order a repeat lactate")
What Can We Do?

Improve recognition of sepsis in the Perinatal population

Adopt best practices

Provide recommended care

BEST PRACTICES:

– Based on organizations with lowest sepsis mortality
– Protocol driven, early recognition, ICU level care
Code Sepsis in OB: Let’s Intervene before it hits!
Systemic Inflammatory Response

Definition

A clinical manifestation resulting from an insult, infection, or trauma, that includes a body-wide activation of immune and inflammatory cascades
Why SIRS can KILL in Sepsis*

Insult → Cascade Activation Mediator Release →

Vasodilation → Capillary Permeability → Cellular Activation → Coagulation

NORMAL
Protect host
Limit extent of injury
Promote rapid healing

ABNORMAL
Circulatory Collapse
Hypoperfusion
Death

*https://www.youtube.com/watch?v=o5sYBUarpml
Perinatal Parameters

Because of the physiology of pregnancy, the screening criteria was adjusted for perinatal population

• Increase in blood volume increases maternal heart rate by 10-20 bpm
• Minute volume (RR x Tidal Volume) increases 50% due to an increase in respiratory rate and tidal volume
• The position of the diaphragm decreases lung volume and increases the respiratory rate
• Increase in WBC (leukocytosis) in labor and immediate postpartum
• Increase in perfusion to the kidneys causes a decrease in the creatinine level
<table>
<thead>
<tr>
<th>SIRS CRITERIA Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adult Screening Criteria</strong></td>
</tr>
<tr>
<td>- Temp &gt; 38°C (100.4°F) or &lt; 36°C (96.8°F)</td>
</tr>
<tr>
<td>- HR &gt; 90 bpm</td>
</tr>
<tr>
<td>- Resp Rate &gt; 20 breaths/minute</td>
</tr>
<tr>
<td>- WBC &gt; 12,000, &lt; 4,000 or &gt; 10% immature neutrophils</td>
</tr>
<tr>
<td>- Blood glucose &gt; 140 mg/dl in the absence of diabetes</td>
</tr>
<tr>
<td>- New mental status change</td>
</tr>
</tbody>
</table>
Sepsis Syndrome

- SIRS
- SIRS + Infection
- Suspicion of Infection
- Temp > 38°C (100.4°F) or < 36°C HR > 110 RR > 24 WBC > 15,000 or < 4,000 or > 10% bands

- Sepsis
- Sepsis + End Organ Damage
- Severe Sepsis
- Hypotension Despite Fluid Resuscitation OR Lactate > 3.9
- Septic Shock
- Severe Sepsis + Hypotension

Sutter Health Sepsis Initiative
We Plus You
<table>
<thead>
<tr>
<th></th>
<th>Sutter Health</th>
<th>Dignity</th>
<th>ACOG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>&gt;38/100.4 or</td>
<td>&gt; 38/100.4F or</td>
<td>&gt;38/100.4 or</td>
</tr>
<tr>
<td></td>
<td>&lt; 36/96.8F</td>
<td>&lt;36/96.8F</td>
<td>&lt; 36/96.8F</td>
</tr>
<tr>
<td>FHR</td>
<td></td>
<td>&gt;160 BPM</td>
<td></td>
</tr>
<tr>
<td>Maternal Heart Rate</td>
<td>&gt; 110 bpm</td>
<td>&gt;110 bpm</td>
<td>&gt; 110 bpm</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td>&gt; 24 breaths per min</td>
<td>&gt;24 breaths per min</td>
<td>&gt; 24 breaths per min</td>
</tr>
<tr>
<td>White Blood Cell Count</td>
<td>&gt; 15,000</td>
<td>&gt;15,000</td>
<td>No recommended value</td>
</tr>
<tr>
<td></td>
<td>&lt; 4,000</td>
<td>&lt;4,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10% Bands</td>
<td>10% Bands</td>
<td></td>
</tr>
<tr>
<td>Altered Mental Status</td>
<td>AMS present</td>
<td>AMS present</td>
<td>AMS present</td>
</tr>
<tr>
<td>Glucose</td>
<td>&gt;140 in absence of DM</td>
<td>&gt;140 in absence of DM</td>
<td>No recommended value</td>
</tr>
</tbody>
</table>
Sepsis Syndrome

- **Suspicition of Infection**
- **SIRS**
  - **SIRS + Infection**
  - **Sepsis**
- **Severe Sepsis**
  - **Sepsis + End Organ Damage**
  - **Septic Shock**
    - Hypotension Despite Fluid Resuscitation OR Lactate > 3.9
    - **Severe Sepsis + Hypotension**

**Sutter Health Sepsis Initiative**

Temp > 38°C (100.4°F) or < 36°C HR > 110 RR > 24
WBC > 15,000 or < 4,000 or > 10% bands
## Organ Dysfunction

<table>
<thead>
<tr>
<th></th>
<th>Surviving Sepsis Campaign</th>
<th>Sutter Health Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Respiratory</strong></td>
<td>Respiratory: ↑ O2 requirements to maintain SpO2 &gt;90% or PaO2/FiO2 ratio &lt;300</td>
<td>SpO2 &lt;92%</td>
</tr>
<tr>
<td><strong>Urine Output</strong></td>
<td>Low Urine Output &lt;0.5 ml/kg/hr. &gt;2 hours</td>
<td>≤30 ml/hour for 2 hours</td>
</tr>
<tr>
<td><strong>Creatinine</strong></td>
<td>Creatinine &gt;2.0 mg/dl</td>
<td>Creatinine &gt;1.5 mg/dl</td>
</tr>
<tr>
<td><strong>Altered Mental Status</strong></td>
<td>Altered Mental Status</td>
<td>Altered Mental Status</td>
</tr>
<tr>
<td><strong>Blood Pressure MAP</strong></td>
<td>SBP &lt; 90mmHg or 40mmHg below the base line or MAP &lt;65 mmHg</td>
<td>SBP &lt;90mmHg or 40mmHg below the base line or MAP &lt;65 mmHg</td>
</tr>
<tr>
<td><strong>Platelets</strong></td>
<td>Platelet &lt;100,000</td>
<td>Platelet count &lt;100,000</td>
</tr>
<tr>
<td><strong>Lactate</strong></td>
<td>Lactate &gt;2</td>
<td>Lactate &gt;2</td>
</tr>
<tr>
<td><strong>Bilirubin</strong></td>
<td>Bilirubin &gt;2 mg/dl</td>
<td>Bilirubin &gt;2 mg/dl</td>
</tr>
<tr>
<td><strong>Coagulopathy</strong></td>
<td>Coagulopathy (INR &gt;1.5 or PTT &gt;60 secs)</td>
<td>Coagulopathy (INR &gt;1.5 or PTT &gt;60 secs)</td>
</tr>
</tbody>
</table>
Sepsis Syndrome

- SIRS
  - SIRS + Infection

- Sepsis

- Severe Sepsis
  - Sepsis + End Organ Damage

- Septic Shock
  - Severe Sepsis + Hypotension

- Hypotension Despite Fluid Resuscitation OR Lactate > 3.9

Suspicion of Infection

Temp > 38°C (100.4°F) or < 36°C HR > 110 RR > 24
WBC > 15,000 or < 4,000 or > 10% bands
Dismissing Abnormal SIRS as a Decoy

1. Abnormal SIRS criteria are often seen and disregarded in postpartum states
2. **Fever** due to elevated metabolic demand
3. **Tachycardia** due to relative hypovolemia
4. **Leukocytosis** due to stress of delivery
5. Even mild **hypotension** can be dismissed in the possibly **hypovolemic**, young woman with physiologically low blood pressure
How did we implement early recognition as part of our standard work?
Implementation of Standard Workflow

- A Multidisciplinary Team
- Physician Education First
- Inter-professional Education
- A new perinatal sepsis physician order set
- Physician & RN Champions
Initiate Sepsis screening every shift (Nursing Staff)
Create Protocols with SIRS criteria for Maternal Sepsis
Early intervention implemented for all patients who screen positive
Arrival of Rapid Response Team, intensivist evaluation as needed
OB physician notification
# Standard Work

## Standard Work Instruction Sheets

**Sepsis: Perinatal Area**

<table>
<thead>
<tr>
<th>STEP NO.</th>
<th>OPERATOR</th>
<th>TASK DESCRIPTION</th>
<th>TOOLS/ SUPPLIES REQUIRED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OB RN</td>
<td>• Take vitals per order and record in EHR</td>
<td>• EHR</td>
</tr>
</tbody>
</table>
| 1        | OB RN    | • **Complete Sepsis Screen** for the following:  
  - On Admission/ OB Triage  
  - Perform Shift Assessment and document screening  
    - L&D/AP-Within 2 hrs of shift start  
    - Postpartum-Within 4 hrs of shift start  
  - BPA fire  
  - Change in patient condition (change vital signs, new SIRS criteria, new organ dysfunction including altered mental status, new S/Sx, lab test) | • EHR Sepsis Summary |
|          |          | **Positive Sepsis Screen**/Sepsis Alert |                            |
| 2        | OB RN    | • **Screen positive** for Sepsis/Severe Sepsis (i.e. criteria 1+2 or 1+2+3 or 1+3)  
  1. Suspected infection  
  2. 2 or more signs of SIRS  
  3. New sign of organ dysfunction  
  • OB RN call PBX operator; Operator page RRT RN and RT (Activate Sepsis Alert)  
  • Call OB Charge nurse  
  • RRT arrives at bedside (ICU RN/Resp Therapy) | • EHR Sepsis Summary |
| 3        | OB RN    | • **OB RN Give report to RRT Nurse**  
  S = New positive sepsis screen with or without hypotension  
  B = Name of patient, age, admit dx, hospital day number, hx, code status  
  A = Vital signs, level of consciousness (LOC), labs, physical symptoms  
  R = Recommend to validate positive sepsis screen |                            |
|          | RRT RN   | • **RRT RN performs the following** | • EHR Sepsis              |
Sepsis Alert

Infection + Sepsis Screen

Call Sepsis Alert

SEVERE SEPSIS Bundle

If SBP <90 or lactate >3.9

Code Sepsis 6 Hour Bundle

ICU

Rapid Response Team at Bedside
- Lab tests: CBC, CMP, lactate, blood culture
- Broad spectrum antibiotics
- IVF (30ml/kg), if hypotensive
- Radiology and Pharmacy on alert
- Notify OB, ICU physician

- Broad spectrum antibiotics, if not already administered
- IV Fluids 30ml/kg for Lactate 2 – 3.9
- Repeat lactate every 3 hours until lactate < 2
- Urinary catheter for Strict I&O
- SpO2 and oxygen per protocol
Code Sepsis
6 Hour Bundle

- RN Notifies OB-Physician
- OB Physician assesses for criteria for septic shock
- SEPTIC SHOCK Present
- OB Physician notifies ICU Physician
- Consult for ICU transfer
- OB and ICU Physicians coordinate transfer
- Patient to ICU
Sutter Health
Maternal Sepsis

The impact of implementation at Sutter Medical Center Sacramento and Central Valley Sutter Health
The Source of Infection in Perinatal Patients Diagnosed with *Sepsis* during Pregnancy Sutter Medical Center Sacramento April 2014-January 2015

<table>
<thead>
<tr>
<th>Source of Infection</th>
<th>Frequency (N=99)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chorioamnionitis</td>
<td>45</td>
<td>46.4 %</td>
</tr>
<tr>
<td>Pyelonephritis</td>
<td>14</td>
<td>14.4 %</td>
</tr>
<tr>
<td>Endometritis</td>
<td>5</td>
<td>5.2 %</td>
</tr>
<tr>
<td>Urinary Tract Infection</td>
<td>5</td>
<td>5.2 %</td>
</tr>
<tr>
<td>Unknown</td>
<td>29</td>
<td>29 %</td>
</tr>
</tbody>
</table>
# Sepsis, Severe Sepsis and Septic Shock

**Sutter Medical Center Sacramento**  
April 2014-January 2015

<table>
<thead>
<tr>
<th></th>
<th>Observation</th>
<th></th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sepsis Screen Positive</td>
<td>0.024%</td>
<td>Screen Positive, confirmed</td>
<td>98%</td>
</tr>
<tr>
<td></td>
<td>99/4000</td>
<td></td>
<td>97/99</td>
</tr>
<tr>
<td>Severe Sepsis</td>
<td>0.012%</td>
<td>Severe Sepsis Screen Positive</td>
<td>48.5%</td>
</tr>
<tr>
<td></td>
<td>47/4000</td>
<td></td>
<td>47/97</td>
</tr>
<tr>
<td>Septic Shock</td>
<td>0.002%</td>
<td>Septic Shock Screen Positive</td>
<td>7.2%</td>
</tr>
<tr>
<td></td>
<td>7/4000</td>
<td></td>
<td>7/97</td>
</tr>
</tbody>
</table>
Our patients are young and healthy, did not look septic
The bundles would result in over-treatment
Risk of Pulmonary of Edema
Women with epidurals have fevers
Lactate is normally elevated in the laboring woman
No Sepsis Screening during second stage of labor
Let’s Begin the Campaign to promote Early Recognition and Management of Maternal Sepsis
Any Questions?

Think Sepsis. Save a Life.
References

Question and Answer Session

Please submit your questions via the chat window, located on the lower left-hand side of the webinar screen.
Before We End Today’s Webinar...

Continuing Education

- Detailed instructions for taking the post-test and evaluation will appear on your screen as soon as today’s webinar concludes.
  - [www.cdc.gov/tceonline](http://www.cdc.gov/tceonline); Access Code: WC0517
  - If you are listening to this webinar as a recording, please check the Tune in to Safe Healthcare webinar page for instructions for claiming continuing education.

- If you exit out of the webinar prior to taking the post-test and evaluation, you can access the continuing education information in an email that will be sent to you following today’s webinar.

THANK YOU