Surviving Pediatric Sepsis: What’s Next?

Speakers:

Scott L. Weiss, MD MSCE FCCM
Assistant Professor, Children’s Hospital of Philadelphia, University of Pennsylvania Perelman School of Medicine

Marnie Doubek, MD, FAAFP
Mother of Zachary, a pediatric sepsis survivor

This webinar is made possible with unrestricted educational support from bioMérieux, Inc.
Surviving Pediatric Sepsis: What’s Next?

Scott L. Weiss, MD MSCE FCCM
Assistant Professor of Critical Care and Pediatrics
Co-Director, Pediatric Sepsis Program
Children’s Hospital of Philadelphia
University of Pennsylvania Perelman School of Medicine

Sepsis: Across the Continuum of Care Series
April 24, 2019
<table>
<thead>
<tr>
<th>Conflict of Interest Disclosures for</th>
<th>Scott L. Weiss, MD MSCE FCCM</th>
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<tbody>
<tr>
<td>Grant/Research Support</td>
<td>National Institutes of Health</td>
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<td>Society of Critical Care Medicine</td>
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<td>Children’s Hospital of Philadelphia</td>
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<td>Consultant</td>
<td>Bristol-Meyers Squibb</td>
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<td>Stock Shareholder</td>
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<td>Other (identify)</td>
<td>Royalties – Up-To-Date</td>
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<td>Honoraria – Thermo Fisher Scientific (Procalcitonin)</td>
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<td>Honoraria – Medscape/Roche (Sepsis biomarkers)</td>
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Objectives

• Review epidemiology and symptoms of post-intensive care syndrome in childhood survivors of sepsis

• Identify risk factors for long-term functional morbidity and mortality after pediatric sepsis

• Discuss efforts to improve long-term new or residual morbidity after pediatric sepsis
Outcomes After Pediatric Sepsis

• Traditional goal of intensive care is to decrease short-term mortality

“What does it mean to survive ICU care?”
The “Sepsis Survivor”

“The early morbidity of sepsis is reflected in deranged organ function and need for ICU supportive care. However, this morbidity is not experienced by the patient but rather by the patient’s family and loved ones. After the acute illness resolves…long-term morbidity is reflected in reduced health-related quality of life [and delayed death].”
Post-Intensive Care Syndrome (PICS)

- New or worsening impairment in physical, cognitive, or mental health persisting beyond acute hospitalization

Needham et al Crit Care Med 2012
## Endpoints in Pediatric Sepsis Epidemiological Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Location</th>
<th>Endpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watson 2003</td>
<td>USA</td>
<td>Hospital Mortality</td>
</tr>
<tr>
<td>Leclerc 2005</td>
<td>Canada</td>
<td>PICU Mortality</td>
</tr>
<tr>
<td>Odetola 2007</td>
<td>USA</td>
<td>Hospital Mortality</td>
</tr>
<tr>
<td>Wolfler 2008</td>
<td>Italy</td>
<td>Hospital Mortality</td>
</tr>
<tr>
<td>Jaramillo-Bustamante 2012</td>
<td>Colombia</td>
<td>PICU Mortality</td>
</tr>
<tr>
<td>Hartman 2013</td>
<td>USA</td>
<td>Hospital Mortality</td>
</tr>
<tr>
<td>Perez 2013</td>
<td>Spain</td>
<td>Hospital Mortality</td>
</tr>
<tr>
<td>Ruth 2014</td>
<td>USA</td>
<td>Hospital Mortality</td>
</tr>
<tr>
<td>Balamuth 2014</td>
<td>USA</td>
<td>Hospital Mortality</td>
</tr>
<tr>
<td>Schlapbach 2015</td>
<td>Australia/New Zealand</td>
<td>PICU Mortality</td>
</tr>
<tr>
<td>SPROUT 2015</td>
<td>26 countries</td>
<td>Hospital Mortality</td>
</tr>
<tr>
<td>de Souza 2016</td>
<td>South America</td>
<td>PICU Mortality</td>
</tr>
<tr>
<td>Ames 2018</td>
<td>USA</td>
<td>Hospital Mortality</td>
</tr>
<tr>
<td>EUCLIDS study 2018</td>
<td>Europe</td>
<td>Hospital Mortality</td>
</tr>
<tr>
<td>Tan 2019</td>
<td>Meta-analysis</td>
<td>Hospital Mortality</td>
</tr>
</tbody>
</table>
Surviving Intensive Care

“…global awareness of critical illness as an entity that begins and ends outside of the ICU”

Angus et al *Intensive Care Med* 2003
Long-term mortality and quality of life in sepsis: A systematic review*

Bradford D. Winters, MD, PhD; Michael Eberlein, MD, PhD; Janice Leung, MD; Dale M. Needham, MD, PhD; Peter J. Pronovost, MD, PhD; Jonathan E. Sevransky, MD, MHS
Long-Term (10-Year) Mortality of Younger Previously Healthy Patients With Severe Sepsis/Septic Shock Is Worse Than That of Patients With Nonseptic Critical Illness and of the General Population

Adam Linder, MD\textsuperscript{a,b}; Daphne Guh, MSc\textsuperscript{a}; John H. Boyd, MD\textsuperscript{c}; Faith D. Walker, MD\textsuperscript{a,b}; Aslam H. Anis, PhD\textsuperscript{a,c}; James A. Russell, MD\textsuperscript{a}

HR for 10-yr mortality:
6.0 (95% CI 4.0-9.0)

Linder et al Crit Care Med 2014
Long-Term Mortality After Pediatric Sepsis

- Hospital Mortality
- 1 year Mortality

CHOP Data
Cvetkovic et al PCCM 2015
Czaja et al Pediatrics 2009
N=7,183 children with severe sepsis in Washington state
Functional Outcomes in Pediatric Severe Sepsis: Further Analysis of the Researching Severe Sepsis and Organ Dysfunction in Children: A Global Perspective Trial

Reid W. D. Farris, MD; Noel S. Weiss, MD, DrPH; Jerry J. Zimmerman, MD, PhD

Farris et al Pediatric Crit Care Med 2013
Long-Term Function After Pediatric Critical Illness: Results From the Survivor Outcomes Study

Boeddha et al Crit Care Med 2018

Mortality and morbidity in community-acquired sepsis in European pediatric intensive care units: a prospective cohort study from the European Childhood Life-threatening Infectious Disease Study (EUCLIDS)

Pinto et al Pediatric Crit Care Med 2017

- No Change: 44%
- Improved: 9%
- Lost to Follow-Up: 9%
- Died: 10%
- Deteriorated: 27%

- No Change/Improved: 48%
- Lost to Follow-up: 23%
- Deteriorated: 22%
- Died: 6%
<table>
<thead>
<tr>
<th>Outcome</th>
<th>USA</th>
<th>Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td>PICU mortality</td>
<td>22%</td>
<td>30%</td>
</tr>
<tr>
<td>Hospital mortality</td>
<td>22%</td>
<td>29%</td>
</tr>
<tr>
<td>Mod-severe disability&lt;sup&gt;1&lt;/sup&gt;</td>
<td>19%</td>
<td>18%</td>
</tr>
<tr>
<td>Death or disability</td>
<td>37%</td>
<td>43%</td>
</tr>
</tbody>
</table>

N=567

<sup>1</sup>POPC ≥ 3 and increase ≥ 1 from baseline in survivors (POPC = Pediatric Overall Performance Category)

Weiss, Fitzgerald et al AJRCCM 2015
Lin et al Pediatric Crit Care Med 2017
N=1455 PICU patients followed at 6 months

Only 27% in full health

Jones et al *Pediatrics* 2006
N=33 PICU pts 1-17 yrs followed at 3 and 6 months  
(51% sepsis)

Only 60% back to baseline
Neuropsychologic Function Three to Six Months Following Admission to the PICU With Meningoencephalitis, Sepsis, and Other Disorders: A Prospective Study of School-Aged Children*

Lorraine C. Als, PhD; Simon Nadel, FRCP; Mehrengise Cooper, FRCPCH;
Christine M. Pierce, FRCPCH; Barbara J. Sahakian, PhD, DipClinPsych, FMedSci;
M. Elena Garralda, MD, FRCPsych, FRCPCH

N=88 PICU patients 5-16 yrs followed at 3-6 months
Health-Related Quality of Life Among Survivors of Pediatric Sepsis

Elizabeth Y. Killien, MD\(^1,2\); Reid W. D. Farris, MD, MS\(^3\); R. Scott Watson, MD, MPH\(^4\); Leslie A. Dervan, MD, MS\(^5\); Jerry J. Zimmerman, MD, PhD\(^1,3\)

N=790 children with sepsis

Only 23% back to baseline
# Health-Related Quality of Life Among Survivors of Pediatric Sepsis

Elizabeth Y. Killien, MD; Reid W. D. Farris, MD, MS; R. Scott Watson, MD, MPH; Leslie A. Dervan, MD, MS; Jerry J. Zimmerman, MD, PhD

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Relative Risk</th>
<th>95% CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, yr</td>
<td>1.02/yr</td>
<td>1.01–1.05</td>
<td>0.04</td>
</tr>
<tr>
<td>Immune status</td>
<td></td>
<td>&lt; 0.001</td>
<td></td>
</tr>
<tr>
<td>Noncompromised Reference</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compromised</td>
<td>1.83</td>
<td>1.40–2.40</td>
<td></td>
</tr>
<tr>
<td>Sepsis category</td>
<td></td>
<td>0.006</td>
<td></td>
</tr>
<tr>
<td>Sepsis Reference</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe sepsis</td>
<td>1.38</td>
<td>0.82–2.31</td>
<td></td>
</tr>
<tr>
<td>Septic shock</td>
<td>1.79</td>
<td>1.24–2.58</td>
<td></td>
</tr>
<tr>
<td>Hospital length of stay</td>
<td>1.03/d</td>
<td>1.01–1.04</td>
<td>0.002</td>
</tr>
<tr>
<td>Weeks to follow-up</td>
<td>0.96/wk</td>
<td>0.92–1.01</td>
<td>0.09</td>
</tr>
</tbody>
</table>
Life After Pediatric Sepsis Evaluation (LAPSE)

- Multicenter (12 sites), longitudinal study of critically ill children with septic shock
- N=387 subjects
  - 37% had not regained baseline quality of life (PedsQL) by 12 months post-discharge
  - Physical deficits most common

Zimmerman et al SCCM Annual Congress 2018
Why does morbidity and mortality risk continue in sepsis survivors?

• Prolonged immune suppression
• Malnutrition & deconditioning
• Persistent organ dysfunction
• Post-traumatic stress
• Comorbid conditions (e.g., cancer)
Prolonged Immune Suppression After Sepsis

- Shift to an M2 macrophage phenotype (anti-inflammatory)
- Altered Toll-like receptor expression
- Impaired antigen presentation

Leave host ill-prepared to fight a new pathogen

Mathias et al Ann Surg 2017
Benjamim et al J Leuk Bio 2004
47% of survivors had at least one readmission (HALF for new infection)
Paradigm Shift – Clinical

Neonatology as one model

Angus et al *Intensive Care Med* 2003
Conceptualizing Post Intensive Care Syndrome in Children—The PICS-p Framework

Joseph C. Manning, RN, PhD; Neethi P. Pinto, MD, MS; Janet E. Rennick, RN, PhD; Gillian Colville, MPhil, CPsychol; Martha A. Q. Curley, RN, PhD

Baseline Status

Pediatric Intensive Care Experience

- Family
- Parents
- Siblings

Child

Physical Health

Cognitive Health

Emotional Health

Social Health

Developmental Impact

Trajectory of Recovery

Days to Decades

Manning et al PCCM 2018
# Functional Deficits After Pediatric Sepsis

<table>
<thead>
<tr>
<th>Domain</th>
<th>Deficits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td>Weakness, Coordination, Endurance</td>
</tr>
<tr>
<td>Cognitive</td>
<td>Memory, Attention, Academic performance</td>
</tr>
<tr>
<td>Emotional</td>
<td>Depression, Anxiety, PTSD (patient, family)</td>
</tr>
<tr>
<td>Social</td>
<td>Hyperactivity, Bullying (victim), Withdrawal</td>
</tr>
</tbody>
</table>
### SPROUT study

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Control (%)</th>
<th>Intervention (%)</th>
<th>Total N</th>
</tr>
</thead>
<tbody>
<tr>
<td>PICU mortality</td>
<td>24</td>
<td>19</td>
<td>2,118</td>
</tr>
</tbody>
</table>

Weiss, Fitzgerald et al AJRCCM 2015
Long-term Effects of Acute Interventions

<table>
<thead>
<tr>
<th>Time to Antibiotics</th>
<th>PICU Mortality (aOR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 1 hour</td>
<td>1.67 (0.35, 7.91)</td>
</tr>
<tr>
<td>&gt; 2 hours</td>
<td>2.43 (0.74, 8.0)</td>
</tr>
<tr>
<td>&gt; 3 hours</td>
<td>4.84 (1.45, 16.2)</td>
</tr>
</tbody>
</table>

Adjusted for severity of illness and comorbidities

Weiss et al. *Crit Care Med* 2014
Han et al. *Shock* 2017
Early rehabilitation to prevent postintensive care syndrome in patients with critical illness: a systematic review and meta-analysis

Ryota Fuke, Toru Hifumi, Yutaka Kondo, Junji Hatakeyama, Tetsuhiro Takei, Kazuma Yamakawa, Shigeaki Inoue, Osamu Nishida

Physical Function (SF-36PF)

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Early rehabilitation</th>
<th>Control</th>
<th>Std. Mean Difference IV, Random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kayambu 2016</td>
<td>81.8 22.2 11</td>
<td>60 20.4 19</td>
<td>4.78 [0.01, 1.58]</td>
</tr>
<tr>
<td>Morris 2016</td>
<td>56.9 3 82</td>
<td>43.6 3.1 79</td>
<td>4.01 [3.47, 4.56]</td>
</tr>
</tbody>
</table>

Total (95% CI): 93 98 100.00% 2.41 [-0.75, 5.58]

Heterogeneity: Tau² = 5.10; Chi² = 45.28, df = 1 (P < 0.0001); I² = 98%
Test for overall effect: Z = 1.43 (P = 0.15)

Fuke et al BMJ 2018
Challenges to Following Children After Discharge

• Could minimize important short-term gains
• Delayed morbidity, mortality increasingly contaminated by unrelated events
• Expensive
• Loss to follow-up
• Personnel unclear
CHOP Primary Care Survey (N=29)

Aware of long-term functional impacts of sepsis:

Trained to assess new functional disability:
What patient complaints or new problems have you seen after sepsis?
What do you assess for after sepsis?

1 week follow-up, 20-30 minutes
What barriers prevent determining morbidity after sepsis?

- Not aware pt hospitalized
- No follow-up
- Visit too short
- Lack training
- Lack experience

[Bar chart showing the frequency of each barrier]
### Parental Survey (N=7)

3/7 patients endorsed at least one new morbidity

<table>
<thead>
<tr>
<th>Domain</th>
<th>Worse/Total</th>
<th>Deficits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Physical</td>
<td>2/7&lt;sup&gt;A,B&lt;/sup&gt;</td>
<td>Endurance, walking, stairs</td>
</tr>
<tr>
<td>Emotional</td>
<td>1/7&lt;sup&gt;C&lt;/sup&gt;</td>
<td>Angry, tantrums, impulsivity, anxiety</td>
</tr>
<tr>
<td>Social</td>
<td>1/7&lt;sup&gt;A&lt;/sup&gt;</td>
<td>Playing with friends</td>
</tr>
</tbody>
</table>

<sup>A</sup> 7 yo M  
<sup>B</sup> 5 yo M  
<sup>C</sup> 4 yo F
# Pediatric Sepsis Program

**Sepsis Survivorship Workshop**  
*Children’s Hospital of Philadelphia*  
**CTRB Room 2012**  
**Friday June 1, 2018**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Description</th>
<th>Speakers</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 – 8:15 am</td>
<td>Welcome &amp; Introduction (with breakfast)</td>
<td>Fran, Julie, Scott</td>
</tr>
<tr>
<td>8:15 – 9:00 am</td>
<td>Life After Pediatric Sepsis</td>
<td>Jerry Zimmerman</td>
</tr>
<tr>
<td>9:00 – 9:30 am</td>
<td>Sepsis Morbidity – The CHOP Experience</td>
<td>Fran, Julie, Scott</td>
</tr>
<tr>
<td>9:30 – 9:50 am</td>
<td>Sepsis Morbidity – Family Experience</td>
<td>Darlene Barkman</td>
</tr>
<tr>
<td>9:50 – 10:00 am</td>
<td><strong>BREAK</strong></td>
<td></td>
</tr>
<tr>
<td>10:00 – 11:00 am</td>
<td>Panel Discussion</td>
<td>Becky Ichord (Stroke)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jill Ginsberg (Cancer)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sara DeMauro (NICU)</td>
</tr>
<tr>
<td>11:00 – 11:30 am</td>
<td>Neurobehavioral Testing</td>
<td>Nina Thomas, PhD</td>
</tr>
<tr>
<td>11:30 – 12:45 pm</td>
<td>Roundtable Discussion (with Lunch)</td>
<td>PT, OT, Speech, Education, (Possible: SW, case mgmt, coordinator, financing)</td>
</tr>
<tr>
<td>12:45 – 1:00 pm</td>
<td><strong>BREAK</strong></td>
<td></td>
</tr>
<tr>
<td>1:00 – 2:00 pm</td>
<td>Wrap-up &amp; Next Steps</td>
<td>Fran, Julie, Scott</td>
</tr>
</tbody>
</table>
Sepsis Survivorship Program

With early recognition, appropriate antibiotics, and emergency care, the majority of children who develop sepsis and septic shock are able to recover and be discharged from the hospital. Unfortunately, the effects of sepsis may not end at hospital discharge, and many survivors go on to have long-term problems with attention, managing emotions, school work and physical activity. Children who recover from sepsis also can have recurrent infections and may need to be readmitted to the hospital. Usually these symptoms are noticed within a few months after leaving the hospital, as children attempt to return to school and their usual activities. Sometimes it is not clear if these changes are because of sepsis or just being really sick, or are caused by another medical problem.

At Children’s Hospital of Philadelphia (CHOP), doctors and nurses within the Pediatric Sepsis Program have established a Survivorship Program to screen patients for potential long-term problems related to sepsis and to help families get assistance when needed. We have partnered with the Care Management Program at CHOP to support families who have children with both pre-existing medical problems and those who were healthy prior to sepsis. Our program involves meeting with families during hospitalization when possible and following up via phone or email approximately two months after discharge to screen patients for potential concerns and assist with referrals as needed.

For further information or to contact us with concerns, please email sepsis@email.chop.edu or call the sepsis survivorship nurse coordinator at 215-590-1550.

The Sepsis Survivorship Program is supported by a Department of Pediatrics Chair’s Initiative award and the Division of Emergency Medicine and Critical Care.

www.chop.edu/sepsis
CHOP Sepsis Survivorship Program

1. Identify children hospitalized with sepsis/septic shock in PICU
2. Meet with family in the PICU to provide education
PEDIATRIC SEPSIS PROGRAM

WHAT IS SEPSIS?
Sepsis occurs when the body develops an overwhelming response to an infection — such as pneumonia or a urinary tract infection — that causes organ failure. Almost any infection, if it is not stopped early, can cause sepsis.

The signs and symptoms of sepsis can include:
• Fever, shivering or feeling very cold
• High heartbeat
• Breathing fast or feeling short of breath
• Confusion, disorientation and lethargy
• Cold or pale hands and feet

In the mid-1990s, more than 90 percent of patients who developed sepsis died. With improvements in care, most patients who develop sepsis now survive. However, about one in 10 children with severe sepsis still die, and many survivors go on to have longer-term problems with attention, school work and physical activity, as well as a higher risk of recurrent infections and hospital readmission.

OUR SPECIALIZED PROGRAM
The Pediatric Sepsis Program at Children’s Hospital of Philadelphia (CHOP) is a center of expertise for pediatric sepsis. We provide infants, children and adolescents with sepsis top-notch clinical care and cutting edge research opportunities in one place.

Our multidisciplinary team is made up of specialists in pediatrics, surgery, oncology, cardiology, emergency medicine, and critical care, with contributions from physicians, nurses, respiratory therapists, pharmacists, bioinformaticians, and quality improvement specialists, among others. Every day, we’re searching for new ways to treat sepsis, offering hope for a better future for children and their families. Our team is helping to lead the international medical and scientific communities in the search for answers to key questions, including:
• What causes sepsis?
• What are the best methods for early detection of sepsis?
• What are the most effective therapies to reverse the effects of sepsis?

Our vision is that every child with a severe infection will be evaluated for sepsis and treated with the highest-quality medical and surgical care to reduce — and eventually eliminate — death and disability caused by sepsis.

LEARN MORE:
chop.edu/sepsis sepsis@email.chop.edu
CHOP Sepsis Survivorship Program

1. Identify children hospitalized with sepsis/septic shock in PICU
2. Meet with family in the PICU to provide education
3. Establish a follow-up plan
   • Primary physician, subspecialty physician
   • Chronic care management team
   • CHOP Pediatric Sepsis Program
4. Screen at 2-3 months after discharge
5. Refer as needed
   • Primary physician (with recommendations)
   • PT/OT
   • Neuropsychologist evaluation
CHOP Sepsis Survivorship Program

• 26 patients contacted
• 14 *CHOP Pediatric Sepsis Program* follow-up
  • 6 phone surveys completed
• Survey results:
  • 2/6 flagged for new problems
    • 1 referred back to primary physician
    • 1 referred to neuropsychologist
A Real Story: 8 year-old boy

• Previously healthy, treated for *staphylococcus* toxic shock syndrome

• Spoke with mother 3 months after discharge:
  • Initially: “He’s doing great!”
  • After the screening questionnaire...
    • Anxiety (general and separation)
    • Lack of attention with hyperactivity
    • Headaches
    • Sadness, insomnia
    • Difficulty with friends
Conclusions

• Sepsis is a lethal disease...preventing early mortality will always remain a primary goal

• Adverse effects of sepsis evolve over a prolonged period, certainly beyond hospital discharge
  • Key risk factors: illness severity, older age, comorbidities

• Shift clinical, research (and QI) focus from short- to long(er)-term morbidity and mortality endpoints
  • >600,000 pediatric sepsis survivors at-risk for PICS in the next decade
Thank you!

WeissS@email.chop.edu
sepsis@email.chop.edu
www.chop.edu/sepsis
After Sepsis Hits Home
A doctor mom’s story

By Marnie Doubek, MD, FAAFP
I HAVE NOTHING TO DISCLOSE

I will not be discussing investigational and/or unlabeled uses of a product
April, 2014 we had no idea what was coming…
June 7, 2014 –
How can this be my healthy son?
Zach finally out of the coma
THE IMMEDIATE CONSEQUENCES
Transferred to Children’s Specialized for Rehab
Home at last
The obvious consequences
More subtle consequences
The most subtle consequences
AND WE ARE THE LUCKY ONES!
Questions?

Scott L. Weiss, MD MSCE FCCM
Assistant Professor, Children’s Hospital of Philadelphia, University of Pennsylvania Perelman School of Medicine

Marnie Doubek, MD, FAAFP
Mother of Zachary, a pediatric sepsis survivor
Erin’s Campaign for Kids Nursing Awards

Apply Today! https://www.sepsis.org/erin
The Sepsis Coordinator Network supports ongoing communication, education and network building among health professionals passionate about improved sepsis care. Resources include:

• **Educational webinars** that highlight sepsis best practices in a variety of healthcare settings  
• **Active discussion** and **peer support** via an online forum  
• **A resource drive** with information on topics including core measures, clinical practice guidelines, patient screening, identification tools, education resources and more

All active healthcare providers are welcome to join including physicians, nurses, first responders, pharmacists, lab staff, etc.

Join now at SEPSISCOORDINATORNETWORK.ORG

Sponsors

Edwards  
Accelerate Diagnostics  
Beckman Coulter  
Wolters Kluwer  
La Jolla Pharmaceutical
Sepsis Data Abstraction: Open Forum
April 25 at 2 pm ET

Speakers:

Angela Craig, APN, MS, CCNS
Clinical Nurse Specialist for Critical Care and Sepsis Lead
Cookeville Regional Medical Center

Betty Ealey, ADN, RN
Clinical Data Abstractor
Cookeville Regional Medical Center

Michael G. Seelman, BSN, MS
Regional Quality Officer
Bon Secours Mercy Health

Marla Jones, BSN, RN
Quality Improvement Coordinator
Bon Secours Mercy Health Youngstown

Register now: www.sepsis.org/events
Sponsor Innovation webinar
May 1 at 2 pm ET

Speakers:

Stephen Claypool, MD
Medical Director of the Surveillance business
Wolters Kluwer Health

Rachel Burnside
Senior Global Marketing Manager Hematology
Beckman Coulter

Register now: www.sepsis.org/events
Maternal Sepsis Day is May 15

Maternal Sepsis Webinar
May 15 at 2 pm ET

Speakers:
Lori Olvera, DNP, RNC-OB, EFM-C
Perinatal Educator
Sutter Medical Center

Katarina Lannér-Cusin, MD, FACOG
Medical Director Women’s Services, Sutter Health
Alta Bates Summit Medical Center

Graciela Eldridge Maternal Sepsis Survivor

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