Development of a Standardized Pediatric Septic Shock Pathway and Integration with a National Collaborative

Sara Fenstermacher RN, MSN, CPN
Lori Rutman, MD, MPH
Seattle Children's Hospital
Disclosure Statement

- We do not have any conflict of interest, nor will we be discussing any off-label product use.

- This class has no commercial support or sponsorship, nor is it co-sponsored.
Objectives

1. Differentiate between Systemic Inflammatory Response Syndrome (SIRS), sepsis and septic shock
2. Describe basic pathophysiology of sepsis
3. Discuss signs and symptoms of sepsis
4. Anticipate interventions for patients who have symptoms of sepsis
Sepsis – A Global Health Perspective

Sepsis

A global burden

~ 27 000 000
people per year develop sepsis

~ 19 000 000
people per year survive

Survivors may face lifelong complications

~ 8 000 000
people per year die

~ 6 000 000
neonates and children under five die of sepsis

Maternal Death
Sepsis is one of the most common causes

Everybody
can develop sepsis following an infection

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Basic Pathophysiology of Sepsis

Immune response to an infection:

- Immune cells, particularly macrophages, recognize and bind to a pathogen → this leads to activation of the inflammatory response through cytokines
Basic Pathophysiology of Sepsis

Pro-inflammatory and anti-inflammatory mediators regulate the inflammatory processes:

- Binding to the cell wall to flag the pathogen
- Chemotaxis attracts other macrophages and neutrophils to the site
- Pathogen cell lysis – destroys cell membranes
- Antigen meets antibodies
- Phagocytosis of dead tissues/cells
- Recruitment of reparative cells
Basic Pathophysiology of Sepsis

If the mediators are able to balance each other and the infection is overcome, homeostasis will be restored and healing begins.
SIRS vs Sepsis

SIRS = Systemic Inflammatory Response Syndrome
An inflammatory response caused by a non-specific origin
Basic Pathophysiology of Sepsis

Sepsis = An uncontrolled inflammatory response caused by an infection
Basic Pathophysiology of Sepsis

SIRS = Systemic Inflammatory Response Syndrome

Sepsis = Uncontrolled Inflammatory Response due to infection
- Cellular death
- Hypotension due to vasodilation, leaky capillaries and dysregulation of the metabolic system
- End organ failure
SIRS vs. Sepsis

Recognize when SIRS is occurring in your patient → activate a team to start treating the potential causes → assume cause is an infectious agent unless another sources is already identified
What would be signs/symptoms of SIRS?

• Fever or hypothermia
• Abnormal capillary refill
• Abnormal skin exam
• Abnormal mental status
• Abnormal pulses
• Vital sign abnormality based on age
  • Tachycardia
  • Tachypnea
<table>
<thead>
<tr>
<th></th>
<th>WARM shock</th>
<th>COLD shock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peripheral perfusion</td>
<td>Warm/flushed</td>
<td>Cold/clammy/cyanotic/mottled</td>
</tr>
<tr>
<td>Capillary refill</td>
<td>Brisk/flash; &lt;2 sec</td>
<td>Delayed; &gt;2 sec</td>
</tr>
<tr>
<td>Pulse</td>
<td>Bounding</td>
<td>Weak/thready</td>
</tr>
<tr>
<td>Heart rate</td>
<td>↑</td>
<td>↑ or ↓</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>May be normotensive</td>
<td>Usually hypotensive</td>
</tr>
<tr>
<td>Pulse pressure</td>
<td>Widened</td>
<td>Narrow</td>
</tr>
</tbody>
</table>
Septic Shock Pathway
High Reliability Pediatric Septic Shock Quality Improvement Initiative and Decreasing Mortality

Roni D. Lane, MD, a Tomohiko Funai, MS, b Ron Reeder, PhD, b Gitte Y. Larsen, MD, MPH c

BACKGROUND AND OBJECTIVE: Septic shock impacts mortality, morbidity, and healthcare costs. A quality improvement (QI) initiative was launched to improve early recognition and timely treatment of patients with septic shock in a pediatric emergency department (PED). Our primary aim was to describe the longitudinal effectiveness of the program, iterative changes in clinical practice, and associated outcomes.

Patients receiving bundle compliant care;

mortality rate – 1.2%

Patients not receiving bundle compliant care;

mortality rate – 4.2% (p<0.001)
Clinical Standard Work (CSW) has 3 components:

- Documented approach to diagnosis, management and treatment
  - Based in evidence
  - Team consensus when evidence not available

- The care is hard-wired, making it easy to do the right thing

- Outcomes are measured and owned by someone, who assures the continual improvement of the care for this condition
Pathway: Patient flow chart

Septic Shock v.3.0

**Patient Flow Map**

- **Patient presents to the ED with fever and/or concern for infection and ED sepsis score ≥ 3**

  **Provider Assessment:** Is the patient ill appearing?

  - **Yes**
    - **Well appearing patients should be placed on the appropriate ED or NW pathway for their underlying condition (e.g., ED HemOnc/BMT Suspected Infection, ED Suspected Central Line Infection, ED Neonatal Sepsis)**
  
  - **No**
    - **Use the ED Suspected Septic Shock pathway for all ill appearing patients including HemOnc/BMT, Central Line Infection and Neonates**

**ED Septic Shock Pathway**

- **Inpatient Admit Criteria**
  - Resolution of hypotension and no ongoing signs of sepsis after ≤ 40 mL/kg NS bolus
  - First dose antibiotics administered
  - RISK to follow

- **Previously healthy > 30 days**
  - Admit to General Medicine
  - Follow General Fever Pathway
  - Use inpatient septic shock plan

- **Previously healthy < 30 days**
  - Admit to General Medicine
  - Follow Neonatal Fever Pathway
  - Use inpatient Neonatal 0-30 days plan

- **HemOnc/BMT, Suspected Infection**
  - Admit to Cancer Care Unit (CCU)
  - Follow HemOnc/BMT Suspected Infection Pathway
  - Use inpatient Suspected Infection Admit Plan

- **Central Line Infection**
  - Admit to General Medicine/GI Transplant
  - Follow Central Line Infection Pathway
  - Use inpatient Central Line Infection Plan

**Signs & Symptoms of Sepsis**
- Hypotension (MAP < 90 percentile for age)
- Tachycardia
- Poor perfusion
- Reduced urine output
- Tachypnea, new oxygen requirement
- Mental status changes

**RISK RN role**

Huddle within 60 minutes to determine disposition (ICU vs acute care)

**For questions concerning this pathway, contact ApplyPathwayFeedback@seattolec.org**

Last Updated: December 2010
Next Expected Revision: December 2021
Pathway: ED Suspected Sepsis

Inclusion criteria and urgent care transfer

Clearly defined time goals for first 60 minutes of care

Hyperlinks to reference tables or supporting evidence

**Septic Shock v.3.0**

**PHASE I**

**Suspected Septic Shock (ED)**

**Inclusion Criteria**
- Any patient with clinical concern for sepsis/septic shock OR
- Temperature 103°F or greater AND ED attending/fellow assessment with concern for sepsis/septic shock

**Exclusion Criteria**
- None

**Urgent Care Transfer Recommendations**
- Concern for sepsis shock
- Initiate ALO bundle
- Provider to Provider handoff
- Continue pathway while waiting for transfer

**Acute Hypotension**

- BP < 90/60 mmHg
- CVP < 4 mmHg
- SVR < 350

**Septic Shock**

- BP < 90/60 mmHg
- CVP < 4 mmHg
- SVR < 350

**Resuscitation Goal (Minimum)**

<table>
<thead>
<tr>
<th>Critical Hypotension</th>
<th>Hypotension</th>
<th>Resuscitation Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>MAP ≤ 1% for age</td>
<td>MAP ≤ 5% for age</td>
</tr>
<tr>
<td>0-30 days</td>
<td>32</td>
<td>≤ 39</td>
</tr>
<tr>
<td>30-90 days</td>
<td>37</td>
<td>≤ 44</td>
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<tr>
<td>91 days-1 year</td>
<td>41</td>
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<td>&gt;1-2 years</td>
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<tr>
<td>&gt;10-13 years</td>
<td>47</td>
<td>≤ 55</td>
</tr>
<tr>
<td>&gt;13 years</td>
<td>48</td>
<td>≤ 57</td>
</tr>
</tbody>
</table>

**ICU Transfer Criteria**
- Recurrent hypotension despite >40mL/kg fluid resuscitation in the last 12 hours
- Fluid resuscitation includes either crystalloid or colloids
- Hypotension (MAP < 55 percentile for age)
- Clinical situation not appropriate for ongoing fluid resuscitation
- Defined as underlying cardiac disease, liver disease, existing fluid overload, impaired renal function
- Lactate > 4 or base excess < -4 mmol/L
- Sustained change in mentation or orientation (>15 minutes)
- Patient requires continuous ICU monitoring or ICU level respiratory support

**Inpatient Admit Criteria**
- Resolution of hypotension AND no ongoing signs of sepsis after ≥ 40 mL/kg
- Fluid dose antibiotics administered
- RISK to follow
ED “trigger tool” and Sepsis Score

**Inclusion Criteria**

- Any patient with clinical concern for sepsis/septic shock OR
- **ED Sepsis Score** of 3 or greater AND ED attending/fellow assessment with concern for sepsis/septic shock

**Exclusion Criteria**

None
Use of the PDSA Cycle

Hunches
Theories
Ideas

Changes That Result in Improvement
ED Screening Data

P Chart: Proportion of Patients with Fever on 1st Vitals with Sepsis Score Completed

Long term Goal = 90%

Opportunity for improvement

Percent

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%


14%
ED Screening

• 6/2017: 60-90 day goal @ IPSO meeting

*Increase completion of ED-based sepsis screening tool in at-risk patients from baseline of 5-15% to ≥50% over next 3 months (by Oct 2017).*
Figure 1. Emergency department sepsis screening key driver diagram

**SMART Aim**

*Increase completion of ED-based sepsis screening tool in at-risk patients from baseline of 5-15% to ≥50% by 10/2017.*

**Drivers**

- **IT structure:** Clarity/ease of use of Powerform
- **Process:** Positive screen & huddle
- **Culture:** Provider/RN belief that screening is valuable

**Interventions/ Ideas**

- Modify powerform: sepsis-risk assessed on vital sign page; forcing function to complete form if high-risk condition documented
- Modify powerform to allow completion if unable to obtain blood pressure
- Modify powerform to require nurse to verify huddle with attending or fellow if score is ≥3
- Develop electronic checklist to be completed at time of bedside huddle
- “First 5-minutes” low-fidelity simulations
- RN education via job aid and email; treats for RN with highest completion/shift
- MD/NP education via email and presentation at division meeting
- MD metrics/feedback: include % at risk sepsis patients screened on your shifts
- ED safety briefs: Include sepsis-patient related safety story 1x/week (x7 weeks); include weekly metrics at beginning of brief (% at risk patients screened)
- Patient and family engagement: Signs in ED rooms or lobby “Does your child have a fever or are you concerned for an infection? Ask your nurse if he/she should be screened for sepsis.”
Streamlined text and moved up in RN intake process
YELLOW = mandatory field

Moved “None” to last position

Turns YELLOW if checked above; sepsis form opens
Sepsis Score

Pulls through from last page

Added “unable to obtain” BP (and still completes score)

Added RN acknowledgement of attending/fellow notification

Turns YELLOW if score > 2
Ad Hoc Sepsis Score

Sepsis Score - Reassessment

Risk for Sepsis - check all that apply (carried forward)
- Hypersensitivity/Toxin overdose
- Malnutrition/Severe protein deficiency
- Intravascular access
- Bone marrow transplantation
- Medically complex patient
- Nervous/0-6 years or young
- Ill appearing
- None

Risk for Sepsis "Other" Comment (carried forward)

Last Challenged Vital Signs
- Temperature: 37.4 degC
- P: 138
- R: 38
- BP: O -
- SPO2: 91%

Assessed with high-risk condition
- Yes

Temperature
- Less than 36 degC
- 36.1-38.4 degC
- Greater than 38.5 degC

Hypotension
- Systolic and Diastolic Normal
- Systolic Less than 90
- Systolic Less than 72
- MAP Less than 70
- Unable to obtain

Tachycardia
- HR Less than or equal to 130
- HR Greater than 130

Tachypnea
- RR Less than or equal to 40
- RR Greater than 40

Capillary Refill
- Normal
- Slower than or equal to 2 second in cold shock
- Flash (less than 1 second) in warm shock

Mental Status
- Normal
- Altered (e.g., irritability, inattention, or decreased LOC)

Pulse
- Normal
- Decreased/weak
- Bounding

Skin Exam
- Normal
- Mottled/mottled in cold shock
- Ruffled/rapidly in warm shock
- Rigid (peeling skin other than face)

Total Score

If score > 2, attending or fellow must be notified. Handle to determine if Sepsis Pathway is needed.

Acknowledged

Click "Acknowledged" if field is yellow

In Progress
ED Screening

Figure 2. P-chart: Proportion of febrile patients with sepsis scores completed in the emergency department

- Septic shock pathway (v1) implementation Oct 2015
- RN reminders & education June 2016
- Sepsis score powerform revision Oct 2016
- Revised septic shock pathway implementation Dec 2016
- IPSO Kick-off meeting Feb 2017
- Sepsis score powerform revision & ED Implementation team 90-day aim to improve screening June 2017

Goal: >50%
Pathway: Inpatient Admit

Intended for patients who are treated for suspected sepsis in ED but do not meet ICU admit criteria.

Phases:
- PHASE IIB: Admit from ED to Inpatient for Septic Shock

Inclusion Criteria:
- Any patient who is admitted to a service other than the ICU on Septic Shock Pathway

Exclusion Criteria:
- None

Increased vital sign frequency and RISK RN follow up

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**Inpatient Admit**

Intended for patients who are treated for suspected sepsis in ED but do not meet ICU admit criteria.

**Increased vital sign frequency and RISK RN follow up**
Pathway: Inpatient New Sepsis

Intended for patients who develop **new or evolving sepsis** while admitted to **any** clinical service.

Same time goals as ED; performed in setting of RRT.

Huddle within 60 minutes to determine disposition.
Order set: Inpatient New Sepsis phase

- HemOnc BMT Abx Sepsis (Planned Pending)
- Non-HCBST Central Line Abx Sepsis (Planned Pending)
- Neonatal (0-30 days) Fever Abx Sepsis (Planned Pending)
- Necrotizing Soft Tissue Abx Sepsis (Planned Pending)
- Standard Empiric Abx Sepsis (Planned Pending)

New Sepsis/Septic Shock Inpatient Plan, Inpatient New Sepsis (Planned Pending)

Ordersets
- USE THIS FOR PATIENTS WITH CONCERN FOR NEW SEPSIS/SEPTIC SHOCK
- CLICK LEFTMOST ICON to review Septic Shock pathway
- Last modified: 12/14/2016
- Clinical owner: Lori Rutman, MD and Darren Migla, MD
- Target age group: All
- INCLUSION CRITERIA: Any patient with 1) clinical deterioration AND 2) concern for new or evolving sepsis/septic shock
- Follow Septic Shock Pathway
- If patient meets any of the following Exclusion Criteria, uncheck Follow Pathway order above and check Exclude from Septic Shock Pathway
- EXCLUSION CRITERIA: Using Plan for a different diagnosis.
- Exclude from Septic Shock Pathway

Laboratory
- CBC + Diff
- Electrolytes
- BUN
- Creatinine
- Magnesium Serum
- Phosphorus Serum
- C Reactive Protein
- EPOC Lactate
- EPOC vBG
- EPOC Ionized Calcium Level
- Glucose checks at bedside
- AST (SGOT)
- ALT (GPT)
- Prothrombin Time + INR

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Redefining hypotension

HemOnc BMT Suspected Infection: Inpatient v6.0

Approval & Citation

Inclusion Criteria
Any Hematology/Oncology/BMT patient with concern for infection OR
- Fever (Temp ≥ 38.3°C, or greater than 38°C for more than 1 hour) AND
- Recent Myelosuppressive chemotherapy with neutropenia (defined as ANC <200/mm³ or dropping ANC), OR presumed/functional neutropenia as determined by the HemOnc/BMT provider.

Exclusion Criteria
Benign Hematology Condition
Sickle Cell Anemia
Under 1 month old

Summary of Version Changes

Signs & Symptoms of Sepsis
- Hypotension (MAP ≤ 5th percentile for age)
- Tachycardia
- Poor perfusion
- Reduced urine output
- Tachypnea/new oxygen requirement
- Mental status changes

Are There Signs & Symptoms of Evolving Sepsis? (includes any hypotension with MAP ≤ 5th percentile AND provider concern for sepsis/sepsis shock)

- Yes, initiate team huddle
- Off Pathway

- No

Labs
- CBC with diff
- Blood cultures: aerobic, anaerobic, fungal from all lumens of central venous catheter
- Other diagnostic tests as clinically indicated
- Urinalysis and culture: clean catch NO catheterization
- Rapid Respiratory Virus PCR
- Chest X-ray

Administer Empiric Antimicrobials
``Do not delay first dose for any diagnostic evaluations with the exception of blood cultures``

- BMT
  - Refer to “INDIVIDUALIZED ANTIMICROBIAL PLAN” in CIS “Care Plan” folder.
  - Or if no individualized antibiotic plan present in CIS:
    - Start Meropenem
  - OR, Ceftazidime

- HemOnc
  - Start Ceftazidime
  - OR, Cefepime for patients with AML, infant ALL, relapsed ALL with recent high dose etoposide, history of S. viudans, or Ceftazidime allergy

Activate Inpatient New Septic Shock Pathway and call RRT

Do not delay fluid resuscitation!
Redefining hypotension

<table>
<thead>
<tr>
<th>Age</th>
<th>Critical Hypotension</th>
<th>Hypotension</th>
<th>Resuscitation Goal (Minimum)</th>
<th>Normotension (Median for Age)</th>
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</thead>
<tbody>
<tr>
<td>0-30 days</td>
<td>MAP ≤ 1% for age</td>
<td>MAP ≤ 5% for age</td>
<td>MAP ≥ 10% for age</td>
<td>MAP = 50% for age</td>
</tr>
<tr>
<td>30-90 days</td>
<td>32</td>
<td>≤ 39</td>
<td>≥ 42</td>
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<td>≥ 60</td>
<td>74</td>
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<tr>
<td>&gt;13 years</td>
<td>48</td>
<td>≤ 57</td>
<td>≥ 61</td>
<td>76</td>
</tr>
</tbody>
</table>

Resolution of hypotension = Two blood pressure measurements obtained 15 minutes apart with MAP ≥ 10 %ile
Rescue events

Distribution of days between rescue events before and after modified sepsis pathway go-live

Median days between events increased from 16 to 37 days!!!
Standardized question for Risk RN at all RRT events
Re: need for sepsis pathway

Would this patient benefit from increased monitoring in the ICU? Does the care of this patient exceed provider or nursing resources on the floor? Should this patient be on the **Sepsis Pathway**?
Pathway: ICU

**Emphasis on continuous reassessment and monitoring response to therapies**

**ICU Admission**
- If the following have not already occurred:
  - Oxygen by face mask
  - Obtain 2 points of IV access
  - Obtain laboratory studies per pathway
  - Administer 1 antibiotic within 1 hour of shock identification

**Monitor response to vital signs targets & goals**
- ICU fluid resuscitation: 40-60 mL/kg or 2L in the first hour
- Order appropriate antibiotics for specific pathogens
- Correct hypoglycemia, hypocalcemia

**Fluid Resuscitation Shock**
- Consider central line, arterial line, Foley

**Warm Shock**
- Titrate norepinephrine
- Consider epinephrine, vasopressin
- PRBC if Hgb <10g/dL
- Consider intubation

**Cold Shock; Low BP**
- Titrate epinephrine
- Consider norepinephrine, dobutamine
- PRBC if Hgb <10g/dL
- Consider intubation, BNP, ECHO

**Cold Shock; Normal BP**
- Titrate epinephrine
- Consider norepinephrine, dopamine if SCvO2 <70% or lactate elevated
- PRBC if Hgb <10g/dL
- Consider intubation, BNP, ECHO

**Catecholamine Resistant Shock**
- Give stress-dose hydrocortisone
- Evaluate for:
  - Pericardial effusion
  - Pneumothorax
  - Intra-abdominal hypertension
  - Primary cardiac dysfunction

**Consider ECLS**

**ICU to Inpatient Transfer Criteria**
- Weaned off of inotropic support
- Not requiring ICU level of respiratory support
- Hemodynamically stable

**Defines ICU to inpatient transfer criteria**
PDSA over time

2013
- ED joins PSSC
- Paper trigger tool and sepsis algorithm in ED

2015
- CSW Septic Shock Pathway and order set v.1
- ED trigger tool converted to electronic nursing Powerform

2016
- Revision of ED Septic Shock Score Trigger
- New Sepsis Septic Shock Inpatient Phase
- Revision of Hem-Onc Neutropenic fever pathway to shunt ill appearing patients to septic shock pathway

2017 +
- Sepsis Collaborative Bundles
  - Prevention
  - Recognition
  - Diagnostic Evaluation
  - Resuscitation / Stabilization
  - De-escalation
  - Patient & Family engagement
  - Optimize Performance

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Next steps

• IPSO collaborative
  • Refinement of population definitions for data extraction
  • Development of inpatient screening tool
  • Involvement of patient and family experience team
  • Expansion to community sites, pre-hospital providers

• Ongoing PDSA cycles/improvement efforts
  • Tiered response system?
  • New phase for HemOnc clinics?
• Reduce mortality and hospital-onset severe sepsis by 75% by 2020.
  • Mastering appropriate and timely **diagnosis and treatment of severe sepsis.**
  • Mastering **recognition of non-severe sepsis** to prevent escalation to severe sepsis.

• Creating effective sepsis response systems hospital-wide: **ED, ICU, oncology, & general care** that are data driven, based on best evidence, and grounded in **improvement science.**

• Improve outcomes and avoid the high costs of advanced care.
IPSO: 44 Charter Hospitals

Hospital Bed Count
- 200+ Beds
- 150-199 Beds
- <150 Beds
Practice Scenarios
Scenario #1

13 yo male, coming from outside clinic

PRELIMINARY (TO BE REMOVED WHEN FINAL)

**PMH:** mcc, cp

**HPI:** pcp already spoke w/ortho. concern for R septic knee. knee is swollen, tender, dec ROM also has sunburn on top it. labs show elevated wbc, crp. normal esr. pt is irritable and febrile but non toxic.

**Meds Today date/time** (Verify With referring provider’s documentation): none

**Vitals:** BP 108/72, HR142, sats 92/RA, T100.5
<table>
<thead>
<tr>
<th>Case 1 KP</th>
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<tbody>
<tr>
<td>38</td>
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<tr>
<td>130 (H)</td>
</tr>
<tr>
<td>20</td>
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<td>98</td>
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<tr>
<td>Room air</td>
</tr>
<tr>
<td>139 (H)</td>
</tr>
<tr>
<td>90 (H)</td>
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<tr>
<td>103</td>
</tr>
<tr>
<td>90-99%ile *</td>
</tr>
<tr>
<td>99 * (H)</td>
</tr>
<tr>
<td>99 * (H)</td>
</tr>
<tr>
<td>Right arm</td>
</tr>
<tr>
<td>Small adult</td>
</tr>
<tr>
<td>Fussy/irritable</td>
</tr>
</tbody>
</table>
Case 1 KP

Pulses 2+
Flash capillary refill
Irritable
Breath sounds clear
Next Steps?

- Notify Provider
- Anticipate IV placement and labs
- Fluid bolus
- Antibiotics
## Case 2

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Heart Rate</th>
<th>Respiratory Rate</th>
<th>Oxygen</th>
<th>Condition</th>
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<td>39.2</td>
<td>190 (H)</td>
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<td>98</td>
<td>Room air</td>
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<td>80-90%ile *</td>
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<td>72</td>
<td>79</td>
<td>Left leg</td>
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<td>Fussy/irritable</td>
<td>Infant</td>
<td></td>
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</tr>
<tr>
<td>Mottled</td>
<td>3 seconds</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Case 2

PRELIMINARY (TO BE REMOVED WHEN FINAL)

**PMH:** PHC – full term delivery

**HPI:** admitted yesterday with pylo and bilat hydonephritis after presenting with bilous emisis and fever on PIV ceftriaxone, feeding well remain febrile @ 38.8 this am, yesterday wbc 19.3, crp>12, na 127, today 131

CXR normal.

**Meds Today date/time:** (Verify With referring provider’s documentation): tylenol @ 0822 64 mg, Ceftriaxone yesterday @ 1838 220 mg.

**Vitals:**
RN report Brenda, @ 1150 Alert and lusty, good cry. pale mottled when crying. 100% 140-170’s 38.8 – last temp 99.

Emesis overnight.
breastfed baby. janet is mom

Voided 3 times
PIV D4NS 17ml/hr. R AC. saline lock in L foot.
75 ml, 45 ml. of uop. Moves all extremeties. A. Barnet, RN

update @ 1340: EMS report, fever 100.7, but sleeping comfortably in transport – A. McKenna, RN
Case 2

Sepsis Score

Risk for Sepsis - check all that apply
- Malignancy/Immunocompromise/Sickle Cell Disease
- Bone marrow transplant/solid organ transplant
- Indwelling central line or catheter
- Medically complex patient
- Neonate (30 days or younger)
- Other (please add comments below)

Risk for Sepsis - check all that apply

Last Chated Vital Signs

Assessed with high-risk condition.

06/06/18 11:37
T(temporal): 37.1 degC
P: 156
R: 44
BP: 125/62 (75) -- Left leg
SPO2: 98

Temperature
- Less than 36 DegC
- 36 - 38.4 DegC
- Greater than 38.4 DegC

Hypotension
- SysBP and MAP Normal
- NAP Less than 49
- SysBP Less than 70
- NAP Less than 49 and SysBP Less than 70
- Unable to obtain

Tachycardia
- HR Less than or equal to 190
- HR Greater than 190

Tachypnea
- RR Less than or equal to 60
- RR Greater than 60

Capillary Refill
- Normal
- Greater than or equal to 3 second in cold shock
- Flash (less than 1 second) in warm shock

Mental Status
- Normal
- Abnormal (irritability, lethargy or decreased LOC)

Pulse
- Normal
- Decreased/weak
-Bounding

Skin Exam
- Normal
- Notted/cool in cold shock
- Flushed, ruddy in warm shock
- Red/peeling skin (other than face)

Total Score

If score > 2, attending or fellow must be notified.
Huddle to determine if Sepsis Pathway is needed.

Acknowledged
Case 2

What are you concerned about?  What are next steps?

• Notify Provider
• Anticipate labs
• Acetaminophen
• Fluid bolus
• Antibiotics
8 yo medically complex, trach-dependent female comes in for evaluation of tachycardia, mottling, and lethargy. On arrival, she is noted to be cyanotic with significant mottling. Tachycardic to 150s with hypotension concerning for sepsis. On exam she is unresponsive to painful stimuli. Tachycardic. Significantly delayed cap refill to 5-6 sec centrally. Weak femoral pulses. Mottled skin with no petechiae or rash. Lactate elevated at 6.1. She was given 60 cc/kg IVF for dehydration and sepsis. Given Hydrocortisone stress dose. CTX given for presumed septic shock. The patient had improvement in HR to 120s and increase in BP after IVF. The case was discussed with the PICU who evaluated the patient in the ED and advised addition of vancomycin for broader sepsis coverage.

Timeline:
1454 – registered and brought to a room (internal response called and transferred to resus.)
1500 – HR 155, BP 86/41, temp 36.3, O2sat 72%, cap refill 6 seconds
1510 – bolus 1 and changed out trach with leak
1511 – stress dose steroids
1519 – bolus 2, HR 138, BP 61/51, O2sat 100%
1524 – ceftriaxone, lactate 6.1 (had a positive trach culture)
1535 – bolus 3, HR 131, BP 96/35
1549 – to PICU...