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
  - Use the ED Suspected Septic Shock pathway for all ill appearing patients including HemOnc/BMT, Central Line Infection and Neonates
  - Use ED Suspected Septic Shock Plan
  - Antibiotics and blood cultures for specific populations included

- No
  - Well-appearing patients should be placed on the appropriate ED CSW pathway for their underlying condition (e.g. ED HemOnc BMT Suspected Infection, ED Suspected Central Line Infection, ED Neonatal Fever)
  - Previously healthy > 30 days
    - Admit to General Medicine
    - Follow [Admit from ED Septic Shock Pathway](#)
    - Use Inpatient Septic Shock Plan
  - Previously healthy < 30 days
    - Admit to General Medicine
    - Follow [Neonatal Fever Pathway](#)
    - Use Inpatient Fever Neonatal 0-30 days Plan
  - *HemOnc/ BMT* Suspected Infection
    - Admit to Cancer Care Unit
    - Follow [HemOnc/BMT Suspected Infection Pathway](#)
    - Use HemOnc Suspected Infection Admit Plan
  - *Central Line Infection*
    - Admit to General Medicine/GI Transplant
    - Follow [Central Line Infection Pathway](#)
    - Use Admit orders + Central Line Infection Plan

Does NOT meet Inpatient Admit criteria

- Admit to ICU
- Follow [ICU Septic Shock Pathway](#)
- Use PICU/CICU Septic Shock Admit Plan
- Antibiotics, blood cultures for specific populations included in sub plans

Concern for evolving sepsis

- Call RRT or Code Blue
- Follow [Inpatient New Septic Shock Pathway](#)
- Use Inpatient New Septic Shock Plan

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

Minute 60 Huddle: Does patient meet Inpatient admit criteria?

- YES
  - RISK RN to follow all patients admitted with concern for sepsis

- NO
  - Any admitted patient with concern for new or evolving septic shock

Signs & Symptoms of Sepsis

- Hypotension(MAP ≤ 5th percentile for age)
- Tachycardia
- Poor perfusion
- Reduced urine output
- Tachypnea/ new oxygen requirement
- Mental status changes
PHASE I
Suspected Septic Shock (ED)

**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

**Urgent Care Transfer Recommendations**
- Concern for septic shock
- Initiate ALS transfer
- Provider to Provider handoff
- Continue pathway while waiting for transfer

**Activate Septic Shock Pathway**
- Assess airway, breathing, circulation
- Provide supplemental oxygen
- Reassess vital signs every 5 minutes
- Order appropriate antibiotics

**Access/Labs**
- EPOC: VBG, lactate, iCa
- POCT glucose
- Electrolytes, Magnesium, Phosphorus
- BUN, Creatinine
- Blood cultures
- CBC + diff
- CRP
- Consider ABO/RhD and antibody

**Administer Antimicrobials**
- Previously healthy patients: ceftriaxone (+vancomycin if history of/concern for MRSA)
- Appropriate antibiotics for specific populations:
  - HemOnc/BMT Suspected Infection (HOBSI)
  - Central Line Infection
  - Neonatal Fever (0-30 days)
- Consider history of resistant organisms

**Initiate vasactive/inotropic drips for Fluid Refractory Shock**
- Epinephrine for *cold shock*
- Norepinephrine for *warm shock*
- Titrate drips to resuscitation goals
- Consider broadening antibiotic coverage as indicated

**ICU Transfer Criteria**
- Recurrent hypotension despite > 40mL/kg fluid resuscitation in the last 12 hours
- Fluid resuscitation includes either crystalloid or colloid
- Hypotension (MAP ≤ 5th percentile for age)
- Clinical situation not appropriate for ongoing fluid resuscitation
- Defined as underlying cardiac disease, lung disease, existing fluid overload, impaired renal function
- Lactate ≥ 4 or base excess < - 4 mmol
- Sustained change in mentation or perfusion (>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
- First dose antibiotics administered
- RISK to follow

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

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Last Updated: October 2019
Next Expected Revision: December 2021
PHASE IIA
ICU

Inclusion Criteria
- Any patient admitted to the ICU with concern for septic shock

Exclusion Criteria
- None

If the following have not already occurred:
- Oxygen by face mask
- Obtain 2 points of IV access
- Obtain laboratory studies per pathway
- Assure 1st antibiotic infused within 1 hour of shock identification
- IV fluid resuscitation: 40mL/kg or 2L in the first hour
- Order appropriate antibiotics for specific populations
- Correct hypoglycemia, hypocalcemia

ICU Admission

Monitor response to vital sign targets & clinical goals

Infection source control
Repeat fluid boluses

Fluid Refractory 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 milrinone, dobutamine if SCVO2 <70% or lactate elevated
- PRBC if Hgb <10g/dL
- Consider intubation, BNP, ECHO

Catecholamine Resistant Shock
- Consider 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

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Last Updated: October 2019
Next Expected Revision: December 2021
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

Patient placed on RISK dashboard
- Vital signs Q 2 hours x 8 hours

RISK Nurse Monitoring
- RISK dashboard monitoring
- RISK nurse Inpatient evaluation
- RISK nurse determines time on dashboard
- RRT activation for signs of clinical deterioration

Continued Sepsis Care
- Continue appropriate antibiotics for specific populations x 48 hours
- Follow cultures daily, switch to narrow-spectrum antibiotics as indicated
- Discontinue antibiotics after 48 hours if cultures negative and clinically improving
- Advance diet as tolerated
- Continue maintenance IV fluids if indicated

ICU Transfer Criteria
- Recurrent hypotension despite > 40mL/kg fluid resuscitation in the last 12 hours
- Fluid resuscitation includes either crystalloid or colloid
- Hypotension (MAP ≤ 5th percentile for age)
- Clinical situation not appropriate for ongoing fluid resuscitation
- Defined as underlying cardiac disease, lung disease, existing fluid overload, impaired renal function
- Lactate ≥ 4 or base excess < - 4 mmol
- Sustained change in mentation or perfusion (>15 minutes)
- Patient requires continuous ICU monitoring or ICU level respiratory support

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

Call RRT for signs of sepsis that require ICU presence within 30 minutes

Call code blue for imminent cardiac or pulmonary failure or neurologic emergency

Return to Flow  Return to Phase I  Return to Phase IIA
PHASE IIC: Inpatient New Septic Shock

### Inclusion Criteria
- Any patient with clinical deterioration AND concern for new or evolving sepsis/septic shock

### Exclusion Criteria
- None

### GOALS
- Rapid Bedside Assessment
  - Primary team huddle to activate Septic Shock pathway
  - Call RRT
  - Appropriate antibiotics for specific population
- Labs
  - EPOC: Electrolytes, VBG, lactate, iCa
  - Bedside Glucose
  - Blood cultures
  - CBC + diff
  - CRP
  - Magnesium, Phosphorus
  - BUN, Creatinine
  - Consider ABO/RhD and antibody
- Administer Antimicrobials
  - Previously healthy patients: ceftriaxone (+vancomycin if history of/concern for MRSA)
  - Appropriate antibiotics for specific populations:
    - HemOnc/BMT Suspected Infection (HOBSI)
    - Central Line Infection
    - Neonatal Fever (0-30 days)
    - Consider history of resistant organisms
- RISK Team Re-evaluation
  - Well-appearing patients, who do not meet ICU transfer criteria, may stay on Inpatient unit and are placed on RISK dashboard for reassessment

### Rapid Bedside Assessment
- Does patient meet RRT criteria?
- Correct glucose and calcium
- Consider surgical consult for source control

### OFF PATHWAY
- Assess airway, breathing, circulation
- Provide supplemental oxygen
- Place on continuous monitor, reassess vital signs every 15 minutes
- Appropriate antibiotics for specific population

### Access/Initial Fluid Resuscitation
- Consider PIV in patients with central line if additional access is needed
- Administer 1st bolus of 20 mL/kg normal saline rapidly over 20 minutes or less
- Consider 5-10 mL/kg boluses if concern for fluid intolerance (cardiac/renal dysfunction)

### Ongoing Resuscitation
- Administer 2nd bolus of 20mL/kg normal saline rapidly over 20 minutes OR LESS
- Order vasoactive/inotropic drips as indicated
- Consider blood products as indicated
  - BMT patients: consider vasoactive/inotropic drips after 2nd NS bolus

### Transfer to ICU
- Initiate vasoactive/inotropic drips for Fluid Refractory Shock
- Epinephrine for cold shock
- Norepinephrine for warm shock
- Titrate drips to resuscitation goals
- Consider broadening antibiotic coverage as indicated

### ICU Transfer Criteria
- Recurrent hypotension despite > 40mL/kg fluid resuscitation in the last 12 hours
- Fluid resuscitation includes either crystalloid or colloid
- Hypotension (MAP ≤ 5th percentile for age)
- Clinical situation not appropriate for ongoing fluid resuscitation
- Defined as underlying cardiac disease, lung disease, existing fluid overload, impaired renal function
- Lactate ≥ 4 or base excess < - 4 mmol
- Sustained change in mentation or perfusion (>15 minutes)
- Patient requires continuous ICU monitoring or ICU level respiratory support

---

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Last Updated: October 2019
Next Expected Revision: December 2021
Pediatric Sepsis Score: Adapted from the Pediatric septic shock collaborative patient identification tool. Currently validated for ED use only.

One point is given for presence of each concerning symptom:
- High risk condition (immunocompromised/central line)
- Vital sign abnormalities based on age:
  - Temperature
  - Hypotension
  - Tachycardia
  - Tachypnea
- Abnormal capillary refill
- Abnormal mental status
- Abnormal pulse
- Abnormal skin exam
Job Aid: Clinical Indication for Urgent Inotropic/Vasoactive Support in the ED, PICU, and CICU

Fluid Refractory Shock / Inotropic Support (Hypotension, CEF Septic Shock Pathway)

CVL Access

Access Type: • PIV • CVL

PIV Access (Q Preferred)

Vasoactive/Inotropic Order

Lower Risk Extravasation Infusions: Milrinone

High-Risk Extravasation Infusions: • EPINEPHrine • NOREpinephrine • DOPlamine

Titrated Range for PIV Infusions: EPINEPHrine 0.01 – 0.1 mcg/kg/min MAX
NOREpinephrine 0.01 – 0.1 mcg/kg/min MAX
DOPlamine 5 – 10 mcg/kg/min MAX

Every 15 Minutes Assessment:
- Perform Vital Signs and Physical Assessment
- Titrle vasoactive/inotropic medication to goal MAP
- Assess PIV Site for signs and symptoms of an infiltration using Touch, Look, Compare (TLC)
- For extravasation, administer ordered Phentolamine and refer to Intravenous (IV) Line Infiltration and Extravasation Assessment and Treatment P&P
- For Extravasation:
  - IV Fluid Carrier (KVO or at MIW)
  - Ensure Standard IV Fluid Carrier with Vasoactive/Inotropic Infusion

For Extravasation: RN Med Req
- Phentolamine and Request IM Team to Administer

Do Not Transition PIV Infusion/Fluids to a CVL line. Recommend setting up a new line to prevent CLABSI risk.

Huddle Required If:
- 6 hours of PIV Admin of Vasoactive/Inotropic Infusion Reached
- MAX dose reached
  Recommend CVL Placement

Notify Provider For:
- Worsening Physical Assessment Findings
- < 5th Percentile for MAP 5 Minutes After last Titration
- Patient requires MAX dose via PIV
- PIV Infiltrate

Peripheral Acceptable Concentrations:
- EPINEPHrine infusion 0.032 mg/mL
- NOREpinephrine infusion 0.032 mg/mL
- DOPlamine infusion 1.6 mg/mL

Return to Flow

Return to Phase I

Return to Phase IIA

Return to Phase IIB

Return to Phase IIC
# Antibiotic Selection by Patient Population

<table>
<thead>
<tr>
<th>Patient Population</th>
<th>Antibiotic selection</th>
<th>Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previously healthy &lt; 30 days</td>
<td>Ampicillin and cefazidime. Consider ampicillin and gentamicin if CSF pleocytosis not &gt; 20 WBC/mm per pathway recommendations</td>
<td>Acyclovir if HSV work up performed</td>
</tr>
<tr>
<td>Previously healthy &gt; 30 days</td>
<td>Ceftriaxone</td>
<td>Consider vancomycin for patients with known history of MRSA</td>
</tr>
<tr>
<td>Hematopoietic Cell Transplant (HCT/BMT) and HemOnc Suspected Infection patients</td>
<td><strong>Cefazidime</strong> (or meropenem if already on cefazidime) <strong>PLUS</strong> Consider adding gentamicin and vancomycin if hypotension despite 40 cc/kg NS or sooner if ill appearing and/or signs of severe sepsis. <strong>PLUS</strong> Consider adding clindamycin or metronidazole if suspected perineal or intra-abdominal infection, respectively (unless receiving meropenem)</td>
<td>Cefepime OR meropenem per pathway recommendations If concern for severe skin or perineal infection, consider use of &quot;ED Necrotizing Soft Tissue Infection Plan&quot;</td>
</tr>
<tr>
<td>Pre-transplant patient-specific ID antibiotic plan may override these standard recommendations</td>
<td><em>Piperacillin-Tazobactam OR meropenem per pathway recommendations <strong>PLUS</strong> Consider adding gentamicin AND vancomycin if ill appearing <strong>PLUS</strong> Consider adding fluconazole per pathway recommendations</em></td>
<td>Ciprofloxacin AND linezolid per pathway recommendations</td>
</tr>
<tr>
<td>Central Line Infection (not for HOSI/BMT)</td>
<td><em>Piperacillin-Tazobactam OR meropenem per pathway recommendations <strong>PLUS</strong> Consider adding gentamicin AND vancomycin if ill appearing <strong>PLUS</strong> Consider adding fluconazole per pathway recommendations</em></td>
<td>Ciprofloxacin AND linezolid per pathway recommendations</td>
</tr>
</tbody>
</table>

---

**Return to Flow**

- Return to Phase I
- Return to Phase IIA
- Return to Phase IIB
- Return to Phase IIC
“Individualized Antibiotic Plan” (IAP)

- Care Plan for BMT patients that specifies which antibiotics the patient should receive
- Accessed on Patient Summary Page, or in CIS Care Plan Folder
- If no IAP exists, meropenem is default empiric therapy for BMT patients.
“Individualized Antibiotic Plan” (IAP) can be accessed directly from Patient Summary page.
“Individualized Antibiotic Plan” (IAP)

Or the IAP is found in the Care Plan Folder from “Documents and Notes”
## Definition of hypotension & resuscitation goals

<table>
<thead>
<tr>
<th>Age</th>
<th>Critical Hypotension</th>
<th>Hypotension</th>
<th>Resuscitation Goal (Minimum)</th>
<th>Normotension (Median for Age)</th>
</tr>
</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>
<td>57</td>
</tr>
<tr>
<td>91 days-1 year</td>
<td>37</td>
<td>≤ 44</td>
<td>≥ 47</td>
<td>62</td>
</tr>
<tr>
<td>&gt;1-2 years</td>
<td>41</td>
<td>≤ 48</td>
<td>≥ 52</td>
<td>68</td>
</tr>
<tr>
<td>&gt;2-4 years</td>
<td>41</td>
<td>≤ 50</td>
<td>≥ 53</td>
<td>70</td>
</tr>
<tr>
<td>&gt;4-6 years</td>
<td>43</td>
<td>≤ 51</td>
<td>≥ 55</td>
<td>70</td>
</tr>
<tr>
<td>&gt;6-10 years</td>
<td>46</td>
<td>≤ 54</td>
<td>≥ 56</td>
<td>70</td>
</tr>
<tr>
<td>&gt;10-13 years</td>
<td>47</td>
<td>≤ 55</td>
<td>≥ 60</td>
<td>74</td>
</tr>
<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

### Suggested Severe Sepsis/Septic Shock Resuscitation Goals

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Target</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Arterial Pressure (MAP)</td>
<td>Age-related (see table above)</td>
<td>Arterial Monitoring preferred</td>
</tr>
<tr>
<td>Urine Output (UOP)</td>
<td>&lt; 30 kg; &gt; 1 ml/kg/hr</td>
<td>Inadequate urine output is one sign of poor end-organ perfusion</td>
</tr>
<tr>
<td></td>
<td>≥ 30 kg; ≥ 30 ml/hr</td>
<td></td>
</tr>
<tr>
<td>Central Venous Pressure (CVP)</td>
<td>8-12 cm H2O (natural airway)</td>
<td>Most accurately measured from CVL with tip at the SVC-RA junction;</td>
</tr>
<tr>
<td></td>
<td>12-15 cm H2O (mechanical ventilation)</td>
<td>Femoral CVL, PICC and Broviac measurements less reliable, but trends</td>
</tr>
<tr>
<td></td>
<td></td>
<td>may be useful</td>
</tr>
<tr>
<td>Lactate</td>
<td>&lt; 4 mmol/L or ≥ 10% decrease every 2 hours</td>
<td>Elevated lactate &gt; 4 mmol/L may be sign of shock with inadequate oxygen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>delivery (ref: Puskarich et al., Resuscitation, 2011)</td>
</tr>
<tr>
<td>Central Venous Oxygen Saturation</td>
<td>≥ 70%</td>
<td>Most accurately measured from CVL with tip at the SVC-RA</td>
</tr>
<tr>
<td>(ScvO2)</td>
<td>Note: Elevated ScvO2 (&gt; 80%) may occur in</td>
<td>junction or long femoral line with tip near RA</td>
</tr>
<tr>
<td></td>
<td>sepsis due to &quot;cytopathic hypoxia&quot; despite ongoing shock</td>
<td>Hemoglobin is a primary determinant of O2 delivery; thus, anemia should</td>
</tr>
<tr>
<td></td>
<td></td>
<td>be treated in shock. Patients NOT in shock may tolerate a lower: Hgb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>level of 7</td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>Hgb ≥ 10 g/dL (for patients in shock -</td>
<td>Lethargy, confusion, agitation is one sign of poor end-organ perfusion</td>
</tr>
<tr>
<td></td>
<td>ScvO2 &lt; 70%, lactate &gt; 4 mmol/L)</td>
<td></td>
</tr>
<tr>
<td>Mental Status</td>
<td>Alert and appropriate for age</td>
<td></td>
</tr>
<tr>
<td>Capillary Refill</td>
<td>&lt; 2 seconds</td>
<td>Flash capillary refill can be seen in warm shock, delayed capillary</td>
</tr>
<tr>
<td></td>
<td></td>
<td>refill can be seen in cold shock</td>
</tr>
</tbody>
</table>
## Warm Shock & Cold Shock

<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>
Bedside Huddle

- ED Providers, PICU +/- hospitalist or relevant subspecialty team should attend the huddle
- Assess patient, review response to first 60 minutes of ED care
- Determine disposition: Does patient meet inpatient criteria (Normotensive after ≤ 40mL/kg NS boluses, well appearing with reassuring labs, first dose antibiotics administered)
  - IF no ➤ admit to PICU and use PICU septic shock order set
  - IF yes ➤ admit to appropriate inpatient team (general medicine, hemonc, GI)
    - Patients admitted to inpatient teams will be placed on the RISK dashboard
# Rapid Response Team (RRT) K-Card Audit

<table>
<thead>
<tr>
<th>#</th>
<th>Data Point</th>
<th>Circle one</th>
<th>Coaching Tip</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Was the provider notified or aware of the RRT?</td>
<td>Yes / No</td>
<td>- Providers and residents are not automatically notified of an RRT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- The patient's primary team should be aware of an RRT</td>
</tr>
<tr>
<td>2</td>
<td>Was a statement made to ask if the patient would benefit from increased monitoring in the ICU?</td>
<td>Yes / No</td>
<td>- Patients may not need immediate &quot;ICU level intervention&quot; but could benefit from being in the ICU where monitoring is heightened and resources are available more quickly than on acute care</td>
</tr>
<tr>
<td>3</td>
<td>If the patient was not transferred to the ICU, was there a care plan that was documented on the whiteboard in the patient’s room?</td>
<td>Yes / No N/A</td>
<td>- Specific timeline of when to re-escalate care</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Time when RISK RN will come to reassess</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Visible to all staff and patient/family on the whiteboard</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Assure patient is on RISK dashboard and RRTs charted in iView</td>
</tr>
<tr>
<td></td>
<td>total</td>
<td></td>
<td>Compliant with all elements? Yes / No Must have a yes or N/A circled for all questions</td>
</tr>
</tbody>
</table>

**Patient Label:**
Send to Julie Ho, Nursing Quality, PA 1114

---

[Return to Flow]

[Return to Phase I] [Return to Phase IIA] [Return to Phase IIB] [Return to Phase IIC]
BMT Patients

- Begin fluid resuscitation with 20 ml/kg crystalloid or colloid
  - Consider smaller bolus volume (5-10ml/kg) in patients with known or suspected cardiac dysfunction
- Order vasoactive medications early
- If not clinically improving after 40 ml/kg start vasoactive medications
Approved by the CSW Septic Shock Team for 12/14/16 go-live date

CSW Sepsis/Septic Shock Team:

Emergency Department, Owner: Lori Rutman, MD
ICU, Stakeholder: Reid Farris, MD, MS
ICU, Stakeholder: Silvia Hartman, MD
HemOnc, Stakeholder: Kasey Leger, MD
HemOnc, Stakeholder: Jennifer Wilkes, MD
HemOnc, Stakeholder: Leah Kroon, CNS
Emergency Department, CNS: Sara Fenstermacher, CNS
Emergency Department, CNS: Elaine Beardsley, CNS
Clinical Pharmacy: Rochelle Legg, PharmD
Pharmacy Informatics: Raphaeus Villanueva, PharmD
Medical Unit, CNS: Coral Ringer, MN, CNS
Emergency Department, Stakeholder: Eileen Klein, MD, MPH
Emergency Department, Stakeholder: Ron Kaplan, MD
ICU, Stakeholder: Jerry Zimmerman, MD
RISK team/ICU Stakeholder: Joan Roberts, MD
Central Line Infection Pathway Owner: Mathew Kronman, MD
Antimicrobial Stewardship Committee: Dan Pak, MD, Scott Weissman, MD
Pediatric Chief Residents, Stakeholder: Allison LaRoche, MD

Clinical Effectiveness Team:

Consultant: Darren Migita, MD
Project Manager: Pauline Ohare, MBA
CE Analyst: Holly Clifton, MPH
CIS Informatician: Mike Leu, MD, MS, MHS
CIS Analyst: Troy McGuire, MD
Librarian: Heather Marshall
Program Coordinator: Jackie Morton, MLIS

Clinical Effectiveness Leadership:

Medical Director: Darren Migita, MD
Operations Director: Karen Rancich Demmert, BS, MA


Please cite as:
This pathway was developed through local consensus based on published evidence and expert opinion as part of Clinical Standard Work at Seattle Children’s. Pathway teams include representatives from Medical, Subspecialty, and/or Surgical Services, Nursing, Pharmacy, Clinical Effectiveness, and other services as appropriate.

When possible, we used the GRADE method of rating evidence quality. Evidence is first assessed as to whether it is from randomized trial or cohort studies. The rating is then adjusted in the following manner (from: Guyatt G et al. J Clin Epidemiol. 2011;4:383-94.):

- Quality ratings are **downgraded** if studies:
  - Have serious limitations
  - Have inconsistent results
  - If evidence does not directly address clinical questions
  - If estimates are imprecise OR
  - If it is felt that there is substantial publication bias

- Quality ratings are **upgraded** if it is felt that:
  - The effect size is large
  - If studies are designed in a way that confounding would likely underreport the magnitude of the effect OR
  - If a dose-response gradient is evident

Guideline – Recommendation is from a published guideline that used methodology deemed acceptable by the team.

Expert Opinion – Our expert opinion is based on available evidence that does not meet GRADE criteria (for example, case-control studies).

**Quality of Evidence:**
- ⭐⭐⭐⭐ High quality
- ⭐⭐⭐⭐ Moderate quality
- ⭐⭐⭐ Low quality
- ⭐⭐⭐⭐ Very low quality
- Guideline
- Expert Opinion

To Bibliography
Return to Flow
Return to Phase I
Return to Phase IIA
Return to Phase IIB
Return to Phase IIC
Summary of Version Changes

Version 1.0 (10/7/2015): Go live

Version 2.0 (2/12/16): Clarification of clinical findings indicative of warm vs. cold shock added; updates to hypotension and resuscitation goals to reflect hospital standards; clarification of indication for RRT vs. code blue

Version 3.0 (12/14/16): New Septic Shock Inpatient Plan update; Revision of Septic Shock Score Trigger; Inclusion of BMT in Hem/Onc Suspected Infection pathway (renamed Hem/Onc/BMT Suspected Infection - HOBSI)

Version 4.0 (5/22/17): Updated MAP to include Normotension Median for Age (50 % ile). Added verbiage “Resolution of hypotension = Two blood pressure measurements obtained 15 minutes apart with MAP >=10 %ile”


Version 5.0 (5/18/18): Updated the recommendations for empiric therapy from pip/tazo to cefepime.

Version 6.0 (9/5/18): Updated PHASE IIA to separate PICU/CICU Sepsis/Septic Shock Plan, including peripheral pressors.

Version 7.0 (10/16/19): Cefotaxime is no longer available and has been replaced with ceftazidime. Sepsis Antibiotic Chart updated.
Medical Disclaimer

Medicine is an ever-changing science. As new research and clinical experience broaden our knowledge, changes in treatment and drug therapy are required.

The authors have checked with sources believed to be reliable in their efforts to provide information that is complete and generally in accord with the standards accepted at the time of publication.

However, in view of the possibility of human error or changes in medical sciences, neither the authors nor SCHS nor any other party who has been involved in the preparation or publication of this work warrants that the information contained herein is in every respect accurate or complete, and they are not responsible for any errors or omissions or for the results obtained from the use of such information.

Readers should confirm the information contained herein with other sources and are encouraged to consult with their health care provider before making any health care decision.
Search Methods, *Sepsis*, Clinical Standard Work

Studies were identified by searching electronic databases using search strategies developed and executed by a medical librarian, Jackie Morton. Searches were performed in April, 2015. The following databases were searched – on the Ovid platform: Medline (2012 to date), Cochrane Database of Systematic Reviews (2012 to date); elsewhere – Embase (2012 to date), Clinical Evidence, National Guideline Clearinghouse, TRIP (2012 to date) and Cincinnati Children’s Evidence-Based Care Guidelines.

Retrieval was limited to humans (any age) and English language. In Medline and Embase, appropriate Medical Subject Headings (MeSH) and Emtree headings were used respectively, along with text words, and the search strategy was adapted for other databases using their controlled vocabularies, where available, along with text words. Concepts searched were sepsis and specific laboratory diagnostic procedures or antibiotic therapeutics. Additional searches for concepts not specific to sepsis were Rapid Sequence Intubation (RSI) and sedation, anesthetic, paralytic or pain agents and lastly the use and number of peripheral intravenous lines. All retrieval was further limited to certain evidence categories, such as relevant publication types, Clinical Queries filters for diagnosis and therapy, index terms for study types and other similar limits.

An additional consensus document was identified by team members and added to results.

**Identification**

233 records identified through database searching

1 additional record identified through other sources

**Screening**

234 records after duplicates removed

234 records screened

167 records excluded

**Eligibility**

67 records assessed for eligibility

56 full-text articles excluded,
5 did not answer clinical question
46 did not meet quality threshold
4 removed for other reasons
1 was a duplicate

**Included**

11 studies included in pathway

Flow diagram adapted from Moher D et al. BMJ 2009;339:bmj.b2535

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Texas Children's Hospital Evidence-Based Outcomes Center. Recognition and Initial Management Septic Shock Review Summary. . Updated 2015 JanuaryPDF.