**Septic Shock v5.0**

**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?

  - 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)

  - Yes → Use the ED Suspected Septic Shock pathway for all ill appearing patients including HemOnc/BMT, Central Line Infection and Neonates

**ED Septic Shock Pathway**

- Use ED Suspected Septic Shock Plan
- Antibiotics and blood cultures for specific populations included

**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 [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

**Minute 60 Huddle:** Does patient meet Inpatient admit criteria?

- YES → Concern for evolving sepsis
- NO → Does NOT meet Inpatient Admit criteria

**Minute 60 Huddle:** Concern for evolving sepsis?

- YES → Use the ED Suspected Septic Shock pathway for all ill appearing patients including HemOnc/BMT, Central Line Infection and Neonates
- NO → Any admitted patient with concern for new or evolving septic shock

**RISK RN to follow all patients admitted with concern for sepsis**

**Concern for evolving sepsis**

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

**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: May 2018
Next Expected Revision: December 2021
Septic Shock v5.0

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

**Activate Septic Shock Pathway**

- Place 2 large bore PIVs if no central line
- Consider PIV in patients with central line
- If 2 unsuccessful IV attempts: consider IO

**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 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

**Initial Fluid Resuscitation**
- Administer 1st bolus of 20mL/kg normal saline rapidly over 20 minutes OR LESS
- Consider 5-10mL/kg boluses if concern for fluid intolerance (cardiac/renal dysfunction)
- Give stress dose steroids if known adrenal insufficiency

**Ongoing Resuscitation**
- Administer 2nd and 3rd bolus of 20mL/kg normal saline rapidly over 20 minutes OR LESS until perfusion improves or unless rales or hepatomegaly develop
- Order vasoactive/inotropic drips
- Consider blood products as indicated
- *BMT patients: consider vasoactive/ inotropic drips after 2nd NS bolus

**Respiratory Support**
- Consider ET intubation for ongoing respiratory distress or altered mental status

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

**Explanation of Evidence Ratings**
- Correct glucose and calcium
- Notify ICU
- Bedside Huddle (ED, ICU, +/- Hospitalist)

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

**SHOCK TIME GOALS**
- Time Zero = ED Septic Shock Pathway Activation

- 15 min
  - Assess airway, breathing, circulation
  - Provide supplemental oxygen
  - Reassess vital signs every 5 minutes
  - Order appropriate antibiotics

- 30 min
  - Consider PIV in patients with central line
- If 2 unsuccessful IV attempts: consider IO

- 60 min
  - Order appropriate antibiotics
  - Reassess vital signs every 5 minutes
  - Provide supplemental oxygen

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Septic Shock v5.0

PHASE IIA ICU

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

**Exclusion Criteria**
- None

---

**ICU Admission**

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

**Monitor response 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**

---

**Return to Phase I**

---

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Last Updated: May 2018
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

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Next Expected Revision: December 2021

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

---

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

**Exclusion Criteria**
- None

---

**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

---

**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

---

**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

---

**Explanation of Evidence Ratings**

---

**Summary of Version Changes**

---

**Medical Disclaimer**

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**For questions concerning this pathway, contact SepticShock@seattlechildrens.org**

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**Last Updated: May 2018**

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**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
## 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 cefotaxime</td>
<td>Acyclovir if HSV work up performed</td>
</tr>
<tr>
<td></td>
<td>Consider ampicillin and gentamicin if CSF pleocytosis not &gt; 20 WBC/mm per pathway recommendations</td>
<td></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>HemOnc BMT Suspected Infection Patients</td>
<td>If HemOnc Patient: Cefazidime or Cefepime, per pathway; If BMT Patient: Meropenem</td>
<td>Cefepime OR meropenem per pathway recommendations</td>
</tr>
<tr>
<td></td>
<td>&quot;PLUS</td>
<td>If concern for severe skin or perineal infection, consider use of “ED Necrotizing Soft Tissue Infection Plan&quot;</td>
</tr>
<tr>
<td></td>
<td>Consider adding gentamicin and vancomycin if hypotension despite 40 cc/kg NS or sooner if ill appearing and/or signs of severe sepsis.**PLUS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Consider adding clindamycin or metronidazole if suspected perineal or intra-abdominal infection, respectively (unless receiving meropenem)</td>
<td></td>
</tr>
<tr>
<td>Central Line Infection (not for HOS/BMT)</td>
<td>Cefepime OR meropenem per pathway recommendations</td>
<td>Ciprofloxacin AND linezolid per pathway recommendations</td>
</tr>
<tr>
<td></td>
<td>&quot;PLUS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Consider adding gentamicin AND vancomycin if ill appearing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;PLUS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Consider adding fluconazole per pathway recommendations</td>
<td></td>
</tr>
</tbody>
</table>
“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 MAP ≤ 1% for age</th>
<th>Hypotension MAP ≤ 5% for age</th>
<th>Resuscitation Goal (Minimum) MAP ≥ 10% for age</th>
<th>Normotension (Median for Age) MAP = 50% for age</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-30 days</td>
<td>32</td>
<td>≤ 39</td>
<td>≥ 42</td>
<td>57</td>
</tr>
<tr>
<td>30-90 days</td>
<td>37</td>
<td>≤ 44</td>
<td>≥ 47</td>
<td>62</td>
</tr>
<tr>
<td>91 days-1 year</td>
<td>41</td>
<td>≤ 48</td>
<td>≥ 52</td>
<td>68</td>
</tr>
<tr>
<td>&gt;1-2 years</td>
<td>41</td>
<td>≤ 48</td>
<td>≥ 53</td>
<td>70</td>
</tr>
<tr>
<td>&gt;2-4 years</td>
<td>41</td>
<td>≤ 50</td>
<td>≥ 55</td>
<td>70</td>
</tr>
<tr>
<td>&gt;4-6 years</td>
<td>43</td>
<td>≤ 51</td>
<td>≥ 56</td>
<td>70</td>
</tr>
<tr>
<td>&gt;6-10 years</td>
<td>46</td>
<td>≤ 54</td>
<td>≥ 58</td>
<td>72</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
### Clinical Goals for Initial Resuscitation

<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; Femoral CVL, PICC and Broviac</td>
</tr>
<tr>
<td></td>
<td>12-15 cm H2O (mechanical ventilation)</td>
<td>measurements less reliable, but trends 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 delivery (ref: Puskarich et al, Resuscitation, 2011)</td>
</tr>
<tr>
<td>Central Venous Oxygen Saturation (ScvO2)</td>
<td>≥ 70% (Note: Elevated ScvO2 (&gt; 80%) may occur in sepsis due to &quot;cytopathic hypoxia&quot; despite ongoing shock)</td>
<td>Most accurately measured from CVL with tip at the SVC-RA junction or long femoral line with tip near RA</td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>Hgb ≥ 10 g/dL (for patients in shock - ScvO2 &lt; 70%, lactate &gt; 4 mmol/L)</td>
<td>Hemoglobin is a primary determinant of O2 delivery; thus, anemia should be treated in shock. Patients NOT in shock may tolerate a lower Hgb level of 7</td>
</tr>
<tr>
<td>Mental Status</td>
<td>Alert and appropriate for age</td>
<td>Lethargy, confusion, agitation is one sign of poor end-organ perfusion</td>
</tr>
<tr>
<td>Capillary Refill</td>
<td>&lt; 2 seconds</td>
<td>Flash capillary refill can be seen in warm shock, delayed capillary refill can be seen in cold shock</td>
</tr>
</tbody>
</table>
## Warm Shock & Cold Shock

<table>
<thead>
<tr>
<th></th>
<th><strong>WARM shock</strong></th>
<th><strong>COLD shock</strong></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>

Seattles Children's Hospital + Research + Foundation

Return to Phase I  Return to Phase IIA  Return to Phase IIB  Return to Phase IIC
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>
</table>
| 1  | Was the provider notified or aware of the RRT?                           | Yes / No   | • Providers and residents are not automatically notified of an RRT  
• The patient's primary team should be aware of an RRT                                           |
| 2  | Was a statement made to ask if the patient would benefit from increased monitoring in the ICU? | Yes / No   | Patients may not need immediate “ICU level intervention” but could benefit from being in the ICU where monitoring is heightened and resources are available more quickly than on acute care |
| 3  | If the patient was not transferred to the ICU, was there a clear plan of care that was documented on the whiteboard in the patient’s room? | Yes / No, N/A (ICU Transfer) | • Specific timeline of when to re-escalate care  
• Time when RISK RN will come to reassess  
• Visible to all staff and patient/family on the whiteboard  
• Assure patient is on RISK dashboard and RRT is charted in iView |
|    | total                                                                     | Yes / No   | Must have a yes or N/A circled for all questions                                                      |

**Patient Label:**
Send to: Julie Ho, Nursing Quality, FA 2114
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
Rapheus 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:

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CE Analyst
Holly Clifton, MPH
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CIS Analyst
Heather Marshall
Librarian
Jackie Morton, MLIS
Program Coordinator
Kristyn Simmons

Executive Approval:

Sr. VP, Chief Medical Officer
Mark Del Beccaro, MD
Sr. VP, Chief Nursing Officer
Susan Heath, RN, MN, NEA-BC
Surgeon-in-Chief
Bob Sawin, MD


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
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 (5/16/18):** Updated the recommendations for empiric therapy from pip/tazo to cefepime.
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 Seattle Children’s Healthcare System 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 records 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


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