BOTTOM LINE RECOMMENDATIONS:

Sepsis

Sepsis is a systemic response to infection; it is a leading cause of morbidity and mortality worldwide[1]. Early recognition, aggressive resuscitation (fluids, metabolic correction, antibiotics) and escalation of care (vasoactive medications) are key to improving patient outcomes.

See the **TREKK Sepsis PedsPac** for bedside tools to aid in recognition and management of pediatric severe sepsis.

EARLY RECOGNITION OF SEVERE SEPSIS

- Clinical triad: temperature change (hypo/hyperthermia), altered mental status and impaired perfusion (capillary refill >2 sec, SpO2 <92%, mottled skin, cold extremities) in the setting of suspected/proven infection.
- A triage screening poster is available to identify patients with possible sepsis.
- Sepsis is a clinical diagnosis; laboratory investigations are supportive and should not delay treatment initiation.
- Hypotension is a late finding in pediatric sepsis and a sign of decompensated shock.
- Alert your pediatric referral centre if you have a patient with suspected severe sepsis.

MANAGEMENT PRIORITIES FOR SEVERE SEPSIS/SEPTIC SHOCK

EARLY VASCULAR ACCESS

- Secure two vascular access sites.
- Intraosseous (IO) access should be secured when intravenous (IV) access has not been achieved after two attempts. In situations where rapid IV access may be difficult, IO access should occur concurrently with IV attempts to minimize delay to vascular access.

EARLY AGGRESSIVE FLUID RESUSCITATION

- Rapid administration of normal saline boluses of **20 mL/kg** over 5-10 minutes.
- Give boluses via push-pull technique (i.e. filling large syringe with normal saline from IV bag and pushing through IV tubing) or rapid/Level 1 infuser (patient must be ≥ 20 kg with large bore IV, at least 22 gauge or larger to use rapid infuser)[2].

A regular IV pump is NOT sufficient.

- Boluses may need to be repeated up to **60 mL/kg or more**.
- Titrate fluids to therapeutic endpoints (see Page 2).
- Carefully monitor for signs of fluid overload (i.e. crackles on auscultation, hepatomegaly) or signs of cardiogenic shock (i.e. murmur, persistent shock despite fluid resuscitation).

EARLY METABOLIC CORRECTION

- High flow O2 using 10-15 Lpm via non-rebreather mask.
- Check for and correct low glucose (common in infants) and low calcium (see your PedsPac Dosing Binder or contact your local pediatric referral centre for guidance). If glucose ≤ 2.6 mmol/L, give 5mL/kg D10W rapid push IV, then start D10W IV @ 5mL/kg/hr (MAX 250 mL/hr). Recheck bedside glucose in 5 minutes.

EARLY ANTIBIOTIC THERAPY

- Broad spectrum antibiotics should be administered **within 1 hour of recognition of sepsis.**
- Antibiotics should **NEVER** be delayed to obtain cultures.
- Children < 3 months - **Ampicillin (75 mg/kg/dose) + Cefotaxime (100 mg/kg/dose, MAX 2 g/dose).**
- Children > 3 months - **Ceftriaxone (100 mg/kg/dose, MAX 2 g/dose) IV q24h + Vancomycin if suspect meningitis (15 mg/kg/dose, MAX 1 g/dose) IV q6h.**

EARLY DISCUSSION WITH PEDIATRIC REFERRAL CENTRE REGARDING:

- Initiation and selection of vasoactive medications.
- Considerations for intubation and ventilation.
- Administration of blood products.
- Steroid (catecholamine resistant shock)

EARLY ESCALATION OF CARE

- If signs of shock persist (abnormal perfusion and/or hypotension) despite resuscitation with 40 mL/kg of isotonic fluids, prepare inotrope infusion, as indicated below, and administer if no improvement after total 60 mL/kg of fluids.
  - For cold shock (↓ perfusion, ↓ pulses): **epinephrine** (0.05 mcg/kg/min IV, titrate up by 0.02 mcg/kg/min to effect).
  - For warm shock (↑ pulse pressure, bounding pulses): **norepinephrine** (0.05 mcg/kg/min IV, titrate up by 0.02 mcg/kg/min to effect).
  - **Dopamine** (10 mcg/kg/min IV) may be started initially if readily available and there is any delay with administering epinephrine or norepinephrine.

THERAPEUTIC ENDPOINTS

- Normalization of capillary refill (< 2 seconds), pulses, pulse pressure (diastolic BP should be 2/3 systolic BP), mental status, urine output **(>1 mL/kg/hr).**

SOURCE IDENTIFICATION

- Identification of the source of infection should **NEVER** delay resuscitation and administration of antibiotics.
- Blood culture, urine culture (via catheter) and chest x-ray are standard investigations.
- CSF culture may be considered in patients who are hemodynamically stable with no altered LOC or focal neurological signs that may suggest the need for head imaging prior to lumbar puncture.

The purpose of this document is to provide healthcare professionals with key facts and recommendations for the diagnosis and treatment of sepsis in children. This summary was produced by the sepsis content advisors for the TREKK Network, Dr. Graham Thompson of the Alberta Children's Hospital Research Institute and Dr. Mona Jabbour of the Children's Hospital of Eastern Ontario, and uses the best available knowledge at the time of publication. However, healthcare professionals should continue to use their own judgment and take into consideration context, resources and other relevant factors. The TREKK Network is not liable for any damages, claims, liabilities, costs or obligations arising from the use of this document including loss or damages arising from any claims made by a third party. The TREKK Network also assumes no responsibility or liability for changes made to this document without its consent. This summary is based on:

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2. Parker MJ & Manan A. Translating Resuscitation Guidelines into Practice: Health Care Provider Attitudes, Preferences and Beliefs Regarding Pediatric Fluid Resuscitation Performance. *PLoSOne*. 2013;8(3).
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