GUIDELINE

Sepsis and Bacteraemia: Paediatric

Scope (Staff):	Medical, Nursing, Pharmacy
Scope (Area):	Perth Children's Hospital (PCH)

Child Safe Organisation Statement of Commitment

CAHS commits to being a child safe organisation by applying the National Principles for Child Safe Organisations. This is a commitment to a strong culture supported by robust policies and procedures to reduce the likelihood of harm to children and young people.

This document should be read in conjunction with this disclaimer

- In patients with suspected sepsis, antimicrobial therapy should be given as soon as possible, ideally within 15 minutes of sepsis recognition. Microbiological cultures must be collected and if collection of specimens for culture (e.g. lumbar puncture) is delayed, DO NOT DELAY ANTIBIOTIC ADMINISTRATION.
- Read this guideline in conjunction with the Perth Children's Hospital: Sepsis Recognition and Management
- Empiric antibiotics are listed below in the order they should be administered. The administration of ceftriaxone, cefotaxime, cefepime or gentamicin should be prioritised above vancomycin which has a longer infusion time.
- Empirical regimens are intended for initial therapy (up to 48 hours only).Therapy should be modified as soon as additional information is available.
- In children with progressive sepsis or severely unwell with sepsis despite appropriate initial empiric antibiotic therapy, reassess and reconsider source of infection, differential diagnoses and discuss broadening antimicrobial therapy with an Infectious Diseases Physician.
- **Refer to the separate ChAMP guidelines for children with presumed Meningitis and Meningoencephalitis or Fever in the Oncology patient (or non-oncology neutropenia) Guideline**

CLINICAL SCENARIO	DRUGS/DOSES Standard Protocol - including known or Suspected MRSA[a]
Sepsis in the neonate: • Beta-lactam allergy[b] is extremely rare in neonates – contact Infectious Diseases in cases of confirmed beta-lactam allergy • For neonates with suspected sepsis in the NICU refer to: Sepsis Neonatal guideline • Refer to: Microbiological Diagnostic Testing for Infections in Neonates Guideline for additional information regarding testing for key infections in neonates (e.g. Syphilis or Cytomegalovirus).	
Neonatal fever without source **OR** suspected neonatal sepsis NOT severely unwell* **(<4 weeks postnatal age)**	IV gentamicin (doses as per neonatal guidelines) **AND** IV benzylpenicillin (doses as per neonatal guidelines) **AND CONSIDER** HSV testing +/- empiric therapy[c] Refer to ASID – Management of Perinatal Infections
For patients with confirmed or suspected meningitis refer to the indication below.	ALL neonates receiving empiric antimicrobial treatment require a full work up including lumbar puncture (LP), blood culture, liver function tests and urine microscopy and culture. Refer to Perth Children's Hospital: Lumbar puncture guideline for further information regarding contraindications to LP.
Neonatal septic shock or severely unwell with sepsis* **OR** Confirmed or suspected neonatal meningitis[c] **(<4 weeks postnatal age)**	IV cefotaxime (doses as per neonatal guidelines) **AND** IV benzylpenicillin (doses as per neonatal guidelines) **AND** IV aciclovir (doses as per neonatal guidelines) if suspected HSV infection, particularly in the first 2 weeks of life[c] and/or meningoencephalitis
	ALL neonates receiving empiric antimicrobial treatment require a full work up including lumbar puncture (LP), blood culture, liver function tests and urine microscopy and culture. Do not delay antibiotic administration in severely unwell children if microbiological sample collection is delayed or unsuccessful. Refer to Perth Children's Hospital: Lumbar puncture guideline for further information regarding contraindications to LP. *Severely unwell with sepsis can be defined as any of the following: • evidence of end-organ dysfunction; • apnoeas or airway compromise requiring advanced airway management; • respiratory failure or need for invasive or non-invasive respiratory support; • shock or need for circulatory support fluid bolus/inotropes; • reduced conscious state; • coagulopathy; • need for intensive care input or admission; or • senior clinician concern that the child is "severely unwell".

CLINICAL SCENARIO	DRUGS/DOSES Standard Protocol - including known or Suspected MRSA[a]
Healthcare-Associated Neonatal Sepsis i.e. presumed serious bacterial infection with unknown source **(<4 weeks postnatal age)**	IV gentamicin (doses as per neonatal guidelines) **AND** IV vancomycin (doses as per neonatal guidelines)
	Healthcare-Associated sepsis can be defined as a patient with any of the following: • Presumed sepsis in a neonate with a central venous cathether in place for more than 48 hours. • Neonate hospitalised from birth, for more than 72 hours • Recent surgery

CLINICAL SCENARIO	DRUGS/DOSES Standard Protocol	Known or Suspected MRSA[a]	Low risk Penicillin allergy[b]	High risk Penicillin allergy[b]
Fever > 38°C without a source and with no haemodynamic instability and suspicion of bacteraemia as determined by a senior clinician **(≥4 weeks postnatal age)**	IV ceftriaxone 50 mg/kg/dose (to a maximum of 2 grams) 24 hourly	As per standard protocol		Discuss with Infectious Diseases
	Febrile children > 3 months who are well without signs of serious illness (as judged by a senior clinician) are not routinely recommended antibiotics. Observation and investigation is recommended. If meningitis is suspected, refer to ChAMP empiric guidelines: Meningitis and meningoencephalitis			
Community acquired sepsis or septic shock **(≥4 weeks postnatal age)**	IV ceftriaxone 50 mg/kg/dose (to a maximum of 2 grams) 12 hourly **IF SHOCKED, ADD** IV gentamicin[d] (refer to monograph for dose) **AND** IV vancomycin 15 mg/kg/dose (to a maximum of 750 mg) 6 hourly	As per standard protocol		Discuss with Infectious Diseases
	For ongoing treatment, discuss with Infectious diseases			

<table>
<tr><th rowspan="2">CLINICAL SCENARIO</th><th colspan="4">DRUGS/DOSES</th></tr>
<tr><th>Standard Protocol</th><th>Known or Suspected MRSA[a]</th><th>Low risk Penicillin allergy[b]</th><th>High risk Penicillin allergy[b]</th></tr>
<tr><td rowspan="2">Healthcare-Associated Sepsis i.e. presumed serious bacterial infection with unknown source
(≥4 weeks postnatal age)
Includes community acquired sepsis with a central venous access device (CVAD) in place</td><td>IV cefepime 50 mg/kg/dose (to a maximum of 2 grams) 8 hourly
AND
IV vancomycin 15 mg/kg/dose (max initial dose of 750 mg) 6 hourly
IF SHOCKED, ADD
IV gentamicin[d] (refer to monograph for dose)</td><td colspan="2">As per standard protocol</td><td>Discuss with Infectious Diseases</td></tr>
<tr><td colspan="4">For ongoing treatment, discuss with Infectious diseases</td></tr>
<tr><td>Fever in an asplenic patient</td><td>IV ceftriaxone 50 mg/kg/dose (to a maximum of 2 grams) 24 hourly
IF SHOCKED manage as per Community Acquired Sepsis</td><td>Discuss with Infectious Diseases</td><td>As per standard protocol</td><td>Discuss with Infectious Diseases</td></tr>
</table>

a. Children known or suspected to be colonised with MRSA may need to have their therapy/prophylaxis modified. Children suspected of having MRSA include:
   i. Children previously colonised with MRSA. Check for MicroAlert B or C on iCM.
   ii. Household contacts of MRSA colonised individuals
   iii. In children who reside in regions with higher MRSA rates (e.g. Kimberley, Goldfields and the Pilbara) a lower threshold for suspected MRSA should be given
   iv. Children with recurrent skin infections or those unresponsive to ≥ 48 of beta-lactam therapy. For further advice, discuss with Infectious Diseases.

b. Refer to the ChAMP Beta-lactam Allergy Guideline
   - Low risk allergy: a delayed rash (>1 hr after initial exposure) without mucosal or systemic involvement (without respiratory distress and/or cardiovascular compromise).
   - High risk allergy: an immediate rash (<1 hr after exposure); anaphylaxis; severe cutaneous adverse reaction {e.g. Drug Rash with Eosinophilia and Systemic Symptoms (DRESS) and Stevens – Johnson syndrome (SJS) / Toxic Epidermal Necrolysis (TEN)} or other severe systemic reaction.

c. Neonatal viral infections can sometimes present with neonatal sepsis. Early manifestations of neonatal herpes simplex virus (HSV) may be subtle and nonspecific. Consider HSV testing, liver function tests and **ADD** IV aciclovir for suspected HSV infection; dose as per KEMH neonatal guidelines. For further information refer to ASID perinatal guidelines (internal link)

   HSV infection may manifest as:
   - Localised skin, eye and mucous membranes disease (~45%)
   - Central nervous system (CNS) disease (~30%)
   - Disseminated disease - liver, lungs +/- CNS) (~25%)

Maternal history of HSV may be absent in >75% cases of neonatal HSV and up to 40% of neonatal HSV cases will not have vesicular skin lesions. Disseminated disease presents with viral sepsis, and may be indistinguishable from sepsis of another cause, i.e. hepatitis with elevated liver transaminitis, respiratory collapse, pneumonitis, disseminated intravascular coagulation (DIC). CNS disease may present with lethargy, poor feeding, bulging fontanel and seizures.

d. IV gentamicin: may be given as a push over 3 to 5 minutes in critically unwell patients.
   - Children ≥4 weeks – 10 years: 7.5 mg/kg/dose (to a maximum of 320 mg) 24 hourly
   - >10 years to 18 years: 6-7 mg/kg/dose (to a maximum of 560 mg) 24 hourly.
   - Therapeutic drug monitoring required if therapy extends beyond 72 hours.

Related CAHS internal policies, procedures and guidelines
Children's Antimicrobial Management Program (ChAMP) Policy (PCH Website)
ChAMP Empiric Guidelines
Sepsis recognition and management

References and related external legislation, policies, and guidelines
1. Antibiotic Writing Group (2023). eTG complete. West Melbourne, Therapeutic Guidelines Ltd.
2. Expert opinion – Paediatric Infectious Diseases Physicians

This document can be made available in alternative formats on request.

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