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, microbiological cultures must be collected and antimicrobial therapy should be given as soon as possible, ideally within 15 minutes of sepsis recognition. If collection of specimens for culture (e.g. lumbar puncture) is delayed, DO NOT DELAY ANTIBIOTIC ADMINISTRATION.
- Read this guideline in conjunction with the Emergency Department Guidelines: 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.
- **Refer to the separate ChAMP guidelines for children with Presumed Meningitis and Meningoencephalitis or Fever and Suspected or Confirmed Neutropenia: Empiric Guidelines**

<table>
<tr><th colspan="2" 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 colspan="6">Neonatal viral infections can sometimes present with neonatal sepsis. Consider herpes simplex virus (HSV) testing and ADD IV aciclovir for suspected HSV infection; dose as per KEMH neonatal guidelines. For further information refer to ASID perinatal guidelines
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 skin lesions. Disseminated disease presents with viral sepsis, and may be indistinguishable from sepsis of another cause, i.e. respiratory collapse, pneumonitis, liver failure, disseminated intravascular coagulation (DIC). CNS disease presents with lethargy, poor feeding, bulging fontanel and seizures.</td></tr>
<tr><td rowspan="4">Neonatal sepsis (<4 weeks old Corrected Gestational Age)</td><td rowspan="2">Early onset neonatal sepsis
(within 72 hours of birth)
Meningitis excluded</td><td>IV gentamicin
AND
IV benzylpenicillin
doses as per neonatal guidelines</td><td>As per standard protocol</td><td colspan="2">Discuss with ID or Microbiology service</td></tr>
<tr><td colspan="4">Neonatal viral infections[c] can sometimes present with neonatal sepsis. Consider HSV testing and ADD IV aciclovir for suspected HSV infection; dose as per KEMH neonatal guidelines. For further information refer to ASID perinatal guidelines</td></tr>
<tr><td rowspan="2">Early onset neonatal sepsis
(within 72 hours of birth)
Meningitis NOT excluded</td><td>IV cefotaxime
AND
IV benzylpenicillin
doses as per neonatal guidelines</td><td>As per standard protocol</td><td colspan="2">Discuss with ID or Microbiology service</td></tr>
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<tr><td rowspan="6">Neonatal sepsis (<4 weeks old Corrected Gestational Age)</td><td rowspan="2">Late onset (hospital acquired) neonatal sepsis (≥72 hours old)</td><td colspan="4">IV gentamicin
AND
IV vancomycin
doses as per neonatal guidelines</td></tr>
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<tr><td rowspan="2">Community acquired neonatal sepsis
Meningitis excluded</td><td>IV gentamicin
AND
IV amoxicillin
doses as per neonatal guidelines</td><td>ADD
vancomycin
to standard protocol</td><td colspan="2">Discuss with ID or Microbiology service</td></tr>
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<tr><td rowspan="2">Community acquired neonatal sepsis
Meningitis NOT excluded</td><td>IV cefotaxime
AND
IV amoxicillin
CONSIDER ADDING
IV gentamicin IF haemodynamically unstable
doses as per neonatal guidelines</td><td>ADD
vancomycin
to standard protocol</td><td colspan="2">Discuss with ID or Microbiology service</td></tr>
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<tr><td rowspan="2">Sepsis</td><td rowspan="2">Community acquired sepsis with hemodynamic instability, unknown source
(≥ 4 weeks)

Contact Infectious Diseases Physician if patient is admitted to ICU.</td><td>Give as soon as possible, ideally within 15 minutes of sepsis recognition
IV ceftriaxone 50mg/kg/dose (to a maximum of 2 grams) 12 hourly as a slow IV push over 5 minutes
AND
IV gentamicin[d] (refer to monograph for dose)
Gentamicin may be given as a push over 3 to 5 minutes in critically unwell patients
CONSIDER ADDING
IV vancomycin[e] 15mg/kg/dose (to a maximum initial dose of 750mg) 6 hourly
IF:
• Gram-positive cocci are seen on Gram stain; OR
• has been recently treated with a penicillin, cephalosporin or carbapenem antibiotic OR
• patient is too unwell to undergo a lumbar puncture</td><td colspan="2">As per standard protocol</td><td>Discuss with ID or Microbiology service</td></tr>
<tr><td colspan="3">If HSV encephalitis suspected ADD IV aciclovir</td></tr>
<tr><td rowspan="2">Fever without focus</td><td rowspan="2">Fever >38˚C without a source and with no hemodynamic instability
(≥4 weeks to ≤3 months)
OR
Child ≥ 3 months old with suspicion of bacteraemia as determined by a senior clinician</td><td>IV ceftriaxone 50mg/kg/dose (to a maximum of 2 grams) 24 hourly</td><td colspan="2">As per standard protocol</td><td>Discuss with ID or Microbiology service</td></tr>
<tr><td colspan="4">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</td></tr>
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CLINICAL SCENARIO		DRUGS/DOSES			
		Standard Protocol	**Known or Suspected MRSA[a]**	**Low risk Penicillin allergy[b]**	**High risk Penicillin allergy[b]**
Sepsis	Healthcare-Associated Sepsis i.e. presumed serious bacterial infection with no known source (≥ 4 weeks): includes community acquired sepsis with central venous access device (CVAD) in place	Management of Healthcare-Associated Sepsis should take into consideration previous microbiological results. For therapeutic advice, discuss with Infectious Diseases or Clinical Microbiology services			
		Give as soon as possible, ideally within 15 minutes of sepsis recognition IV cefepime 50mg/kg/dose (to a maximum of 2 grams) 8 hourly **AND** IV vancomycin[e] 15mg/kg/dose (to a maximum initial dose of 750mg) 6 hourly **CONSIDER ADDING (as a stat dose)** IV gentamicin[d] (refer to monograph for dose) Gentamicin may be given as a push over 3 to 5 minutes in critically unwell patients	As per standard protocol		Discuss with ID or Microbiology service
Asplenia	Fever in an asplenic patient	IV ceftriaxone 50mg/kg/dose (to a maximum of 2 grams) 24 hourly **CONSIDER ADDING** IV vancomycin[e] 15mg/kg/dose (to a maximum initial dose of 750mg) 6 hourly **IF** haemodynamically unstable	Discuss with ID or Microbiology services	As per standard protocol	Discuss with ID or Microbiology services

CLINICAL SCENARIO		DRUGS/DOSES			
		Standard Protocol	**Known or Suspected MRSA[a]**	**Low risk Penicillin allergy[b]**	**High risk Penicillin allergy[b]**
Endovascular > 4 weeks old	Endocarditis or other endovascular infection; native valve or homograft	For patients with presumed endocarditis THREE sets of blood cultures should be taken from separate venepuncture sites prior to antibiotic administration.			
		IV benzylpenicillin 50mg/kg/dose (to a maximum of 2.4 grams) 4 hourly **AND** IV flucloxacillin 50mg/kg/dose (to a maximum of 2 grams) 4 hourly **AND** IV gentamicin[d] (refer to monograph for dose)	gentamicin[d] **AND** flucloxacillin[f] **AND** vancomycin[e]	gentamicin[d] **AND** cefazolin[g] **AND** vancomycin[e]	gentamicin[d] **AND** vancomycin[e]
	Endocarditis or other endovascular infection; prosthetic valve or graft	For patients with presumed endocarditis THREE sets of blood cultures should be taken from separate venepuncture sites prior to antibiotic administration.			
		IV flucloxacillin 50 mg/kg/dose (to a maximum of 2 grams) 4 hourly **AND** IV vancomycin[e] 15mg/kg/dose (maximum initial dose 750mg) 6 hourly **AND** IV gentamicin[d] (refer to monograph for dose)	As per standard protocol	gentamicin[d] **AND** cefazolin[g] **AND** vancomycin[e]	gentamicin[d] **AND** vancomycin[e]

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
    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 Microbiology or ID service
b. Refer to the ChAMP Beta-lactam Allergy Guideline
    - Low risk allergy: a delayed rash (>1hr after initial exposure) without mucosal or systemic involvement (without respiratory distress and/or cardiovascular compromise).
    - High risk allergy: an immediate rash (<1hr 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. HSV infection may manifest as:
    - Localised skin, eye and mucous membranes disease (~45%)
    - 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 skin lesions. Disseminated disease presents with viral sepsis, and may be indistinguishable from sepsis of another cause, i.e. respiratory collapse, pneumonitis, liver failure, DIC. CNS disease presents 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: 7.5mg/kg/dose (to a maximum of 320mg) 24 hourly
    - >10years to 18 years: 6-7mg/kg/dose (to a maximum of 560mg) 24 hourly.
    - Therapeutic drug monitoring required if therapy extends beyond 72 hours.
e. IV vancomycin **15mg/kg/dose** (maximum initial dose 750mg) 6 hourly via slow infusion. Therapeutic drug monitoring required.
f. IV flucloxacillin **50mg/kg/dose** (to a maximum of 2 grams) 4 hourly.
g. IV cefazolin **50mg/kg/dose** (to a maximum of 2 grams) 8 hourly (6 hourly dosing may be considered in discussion with ID).

Related CAHS internal policies, procedures and guidelines
Antimicrobial Stewardship Policy (PCH Website)
ChAMP Empiric Guidelines

References and related external legislation, policies, and guidelines

1. Antibiotic Writing Group (2021). eTG complete. West Melbourne, Therapeutic Guidelines Ltd.
2. Deep A (2020). BMJ Best Practice - Sepsis in Children, BMJ Publishing Group Limited.
3. Weiss S and Pomerantz W (2020). Septic shock in children: Rapid recognition and initial resuscitation (first hour), UptoDate.
4. Expert opinion – Paediatric Infectious Diseases Physicians

This document can be made available in alternative formats on request for a person with a disability.

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Compassion | Excellence | Collaboration | Accountability | Equity | Respect

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