Queensland Government

PAEDIATRIC Sepsis Pathway

Facility: .....

(Affix identification label here)

URN:

Family name:

Given name(s):

Address:

Date of birth: Sex: ☐ M ☐ F ☐ I

Clinical pathways never replace clinical judgement. Use this pathway in children younger than 16 years. 16–18 year olds may use the adult or paediatric sepsis clinical pathway.

Sepsis is infection with organ dysfunction. Sepsis is a MEDICAL EMERGENCY.

SCREEN AND RECOGNISE

Screening initiated: DD / MM / YY HH : MM (24hr)

Could it be sepsis?

☐ Signs of infection or history and evidence of fever or hypothermia

PLUS ANY of the following

☐ Looks sick or toxic
☐ Parental, carer or clinician concern
☐ Re-presentation with same illness
☐ Immunocompromised*
☐ Altered behaviour or reduced level of consciousness
☐ Age younger than 3 months
☐ Sepsis admission within the last 30 days
☐ Aboriginal or Torres Strait Islander person

*For Oncology patients refer to *'Management of Suspected Neutropenic Sepsis Pathway (SW796)'*

↓ YES

Document full set of observations in CEWT including blood pressure and AVPU

↓ THEN

Does the patient have ANY features of severe illness?

☐ Severe respiratory distress, tachypnoea or apnoea (CEWT respiratory score 3)
☐ Severe tachycardia (CEWT heart rate score 3)
☐ Hypotension (CEWT blood pressure score ≥2)
☐ Altered AVPU
☐ Poor skin perfusion or cold extremities
☐ Lactate ≥2mmol/L (if known)

Other laboratory features of severe illness (if known):

☐ Low platelets ☐ Elevated creatinine ☐ Elevated INR or bilirubin ☐ Elevated CRP

These laboratory tests are not mandatory

↓ YES

Patient is highly likely to HAVE sepsis or septic shock
- Immediate senior medical review or call Retrieval Services Queensland (RSQ) 1300 799 127
- Immediate monitoring in close observation area

↓ THEN

↓ NO

Do you still suspect sepsis?

↓ YES

Patient MAY have sepsis
- Targeted history and examination
- Obtain senior medical review or consider calling RSQ

↓ THEN

↓ NO

Patient UNLIKELY to have sepsis now
- Reassess and escalate as indicated

↓ THEN

Senior medical review attended: HH : MM (24hr)

Does the senior clinician think sepsis is likely?

☐ **Yes** – sepsis **with** shock ☐ **Yes** – sepsis **without** shock ***OR*** ☐ **Unlikely** sepsis

NO →

☐ Give Paediatric Sepsis Checklist to parent or carer *(tear off back page)*

↓ YES

Sepsis has been diagnosed by a senior medical doctor
Start resuscitation and treatment for sepsis NOW *(next page)*
Escalate to MET, PICU, ICU or RSQ 1300 799 127

Signature Log

Every person documenting in this clinical pathway must supply a sample of their initials and signature below

Initials	Signature	Print name	Role

v2.00 - 11/2023
WINC Code: 1NY42186
SW1205

Queensland Government

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ACUTE RESUSCITATION TREATMENT BUNDLE

Complete actions 1–6 within:
1 hour of recognition of shock or where there is high likelihood of sepsis
3 hours to administer antimicrobials where there is less likelihood of organ dysfunction and sepsis. Prioritise timely collection of all relevant microbiological samples according to suspected source

1. Notify the Senior Medical Officer or RSQ for review • Refer to Consultant Paediatrician • Notify Nursing Team Leader or Senior Nurse on call	☐ **Consultant notified**
2. Monitor oxygen saturations and maintain 94% or greater	☐ **Oxygen saturations maintained**
3. IV or intraosseous access and blood culture • Obtain intraosseous access after two failed attempts at IV cannulation • Take blood culture (2–6mL) prior to antibiotics • Take lactate, VBG and blood glucose level • Take FBC, CRP, Chem20, coagulation studies and when possible, all appropriate cultures	☐ **Blood cultures obtained** ☐ **Lactate taken**
4. Commence appropriate IV or intraosseous antibiotics • Check allergies and presence of MRSA risk factors • Prescribe antibiotics according to the guidelines in Tables 1 and 2 • Give intramuscular antibiotics if failed IV or intraosseous access **Suspected source of infection:** ☐ Sepsis where meningitis possible *OR* bacterial meningitis ☐ Sepsis (source unknown, but bacterial meningitis excluded) ☐ Febrile neutropenia (refer to '*Management of Suspected Neutropenic Sepsis Pathway [SW796]*') ☐ Toxic Shock Syndrome ☐ Intra-abdominal ☐ Urinary ☐ Cellulitis, skeletal or soft tissue ☐ Central venous access device ☐ Pneumonia	☐ **Antibiotic commenced**
5. Commence fluid resuscitation • Administer rapid isotonic fluid bolus IV or intraosseous 10–20mL/kg; assess response • Consider repeating up to 40–60mL/kg isotonic fluid within first hour • Observe for signs of fluid overload (hepatomegaly) • If hypoglycaemic, then give 2mL/kg glucose 10% • Consider second IV or intraosseous access	☐ **Fluid bolus commenced**
6. Consider inotropic support and prepare early • Consider IV or intraosseous adrenaline infusion if no or limited improvement in haemodynamic status after 40–60mL/kg of fluid • Prepare adrenaline (epinephrine) infusion by diluting 1mg (1mL of 1:1000) to 50mL with sodium chloride 0.9% or glucose 5%; commence infusion at 0.1–0.5 microgram/kg/min *(see CREDD infusion chart for equivalent mL/hr for child's weight)* • Call PICU, ICU or RSQ 1300 799 127	☐ **Inotrope considered**

BEREAVEMENT

Refer to CHQ Bereavement Service (1800 080 316) or email CHQ_Bereavement@health.qld.gov.au

☐ Offer for family to spend time with child after death
☐ Ensure sepsis is documented on the death certificate
☐ Inform Sepsis Care Coordinator of sepsis related death
☐ Arrange follow-up meeting to discuss events of hospitalisation

REASSESS

Does the patient have ANY persistant signs of sepsis within 15 minutes following the treatment bundle?

☐ Tachypnoea (CEWT respiratory score ≥2)
☐ Tachycardia (CEWT heart rate score ≥2)
☐ Hypotension (CEWT blood pressure score ≥2)
☐ Lactate ≥2mmol/L
☐ Altered AVPU
☐ Poor skin perfusion; capillary refill ≥3 seconds or cold extremities
☐ Urine output less than 1mL/kg/hr

YES

Deteriorating or persistent signs of sepsis
• Escalate via local policy
• Notify Senior Medical Officer and call PICU, ICU or RSQ 1300 799 127
• Follow Sepsis Management Plan *(next page)*

NO

Resolving signs of sepsis
• De-escalate as per local policy
• Continue to review and reassess patient for signs of deterioration
• Follow Sepsis Management Plan *(next page)*

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Sepsis Management Plan

DETERIORATING OR PERSISTENT SIGNS OF SEPSIS Level of care: Critical	RESOLVING SIGNS OF SEPSIS Level of care: Inpatient

COMMUNICATE

Discussions with family to include:
- Explanation of sepsis
- Parent and carer information sheet (tear off *Information for Parents* page at back)
- Family questions
- Goals of care
- Social work, welfare support and other allied health services
- Indigenous Health Liaison Officers (IHLO)
- Interpreter supports

Discussions with family to include:
- Explanation of sepsis
- Parent and carer information sheet (tear off *Information for Parents* page at back)
- Family questions
- Social work and welfare support
- Indigenous Health Liaison Officers (IHLO)
- Interpreter supports

MONITOR

Continuous:
- SpO_2
- Respiratory rate
- Heart rate
- Arterial blood pressure (if required)

15 minutes:
- AVPU
- Capillary refill time
- Non-invasive blood pressure

60 minutes:
- Strict fluid balance
- Urine output
- Temperature (until resolved)

4 hourly:
- Lactate
- Venous blood gas
- Blood sugar level
- Temperature (once resolved)

Continuous:
- SpO_2
- Respiratory rate
- Heart rate

60 minutes:
- Blood pressure
- Strict fluid balance
- Temperature (until resolved)
- Urine output

4 hourly:
- AVPU
- Temperature (once resolved)

REASSESS

Patients may move between streams according to clinical response. Patients who are deteriorating or have persistent signs of sepsis require more frequent monitoring. Obtain senior medical officer advice on changing sepsis management plan stream.

Clinically reassess after interventions, monitored vital sign changes or every 60 minutes as a minimum:
- Tachypnoea (CEWT respiratory score ≥2)
- Tachycardia (CEWT heart rate score ≥2)
- Hypotension (CEWT blood pressure score ≥2)
- Altered AVPU
- Poor skin perfusion; capillary refill ≥3 seconds or cold extremities
- Urine output less than 1mL/kg/hr
- Lactate ≥2mmol/L (4 hourly)

If deteriorating or persistent signs of sepsis are still present:
- Escalate via local policy
- Notify Senior Medical Officer and call PICU, ICU or RSQ 1300 799 127

Clinically reassess after interventions, monitored vital sign changes or every 60 minutes as a minimum:
- Tachypnoea (CEWT respiratory score ≤1)
- Tachycardia (CEWT heart rate score ≤1)
- Hypotension (CEWT blood pressure score ≤1)
- Improving AVPU
- Improved skin perfusion; capillary refill <3 seconds or warm extremities
- Urine output greater than or equal to 1mL/kg/hr

After 12 hours, if no intervention reassess every 4 hours

After 24 hours, if no intervention follow local de-escalation policy

INVESTIGATE

Collect relevant outstanding microbiology samples:
- ☐ Urine
- ☐ CSF (when stable)
- ☐ Stool
- ☐ Respiratory
- ☐ Blood cultures
- ☐ Other relevant sources (e.g. surgical specimens following source control)

Collect relevant outstanding microbiology samples:
- ☐ Urine
- ☐ CSF
- ☐ Stool
- ☐ Respiratory
- ☐ Blood cultures
- ☐ Other relevant sources (e.g. surgical specimens following source control)

CONTINUE to next page

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Sepsis Management Plan *(continued)*

DETERIORATING OR PERSISTENT SIGNS OF SEPSIS Level of care: Critical	RESOLVING SIGNS OF SEPSIS Level of care: Inpatient
ANTIMICROBIAL OPTIMISATION	
• Reconsider source and need for source control • Review microbiology results in consultation with laboratory • Review appropriateness of antimicrobial cover and consider additional risk factors • Consider ID expert guidance as per local referral pathway. QCH oncall service available Ph: 07 3068 1111 • Ensure Therapeutic Drug Monitoring where appropriate	• Review microbiology results in consultation with laboratory • Review appropriateness of antimicrobials and consider de-escalation, targeting or cessation
DOCUMENT	
Antimicrobial Stewardship: ☐ Document confirmed or suspected source of infection in health record ☐ Document plan to continue, change or cease antimicrobials • Consider longer-term central IV access if required • Review antimicrobial allergy history if applicable and refer to ID or immunology for assessment **Other documentation:** ☐ Document sepsis in health record ☐ Document when patient is seen by Sepsis Care Coordinator ☐ Document variations to assist future optimisation of the pathway	**Antimicrobial Stewardship:** ☐ Document confirmed or suspected source of infection in health record ☐ Document plan to continue, change or cease antimicrobials • Review antimicrobial allergy history if applicable and refer to ID or immunology for assessment **Other documentation:** ☐ Document sepsis in health record ☐ Document when patient is seen by Sepsis Care Coordinator ☐ Document variations to assist future optimisation of the pathway
HANDOVER AND DISCHARGE	
Handover to ward: ☐ Document psychosocial support required in health record (e.g. social work, IHLO, interpreter) ☐ Document clinicians involved in handovers in the health record • Involve parents and carers in handover and provide information • Handover to also include provisional sepsis diagnosis, comorbidities, management plan for medicines and medical conditions	**Discharge planning:** • Give resources to family • Identify GP and document in health record • Discuss supports required with family and GP • Consider nurse navigator, hospital in the home or other referral • Give local patient experience survey to family

RESOURCES

Clinical:
- Queensland Paediatric Sepsis Program clinical resources for health professionals
- Children's Resuscitation Emergency Drug Dosage Guide (CREDD). Consider using CREDD for weight adjusted dosing measurements
- National Sepsis Clinical Care Standard, including discharge planning guide, GP letter template and other resources
- Surviving Sepsis Campaign Guidelines January 2020

Family:
- Queensland Paediatric Sepsis Program family resources
- Find an Aboriginal Community Controlled Health Organisation (ACCHO) near you

Bereavement:
- Children's Health Queensland Bereavement Service

Table 1: PAEDIATRIC Empiric Prescribing Guidelines for Community Acquired Sepsis

- Where appropriate, screen patient for additional risk factors such as vaccination status, recent travel, multi-drug resistant organisms, immunocompromise, animal exposure, antenatal exposure or water-exposed soft tissue or skeletal infections. Contact paediatric ID specialist or microbiologist for advice
- Antimicrobial should be assessed with culture results and ID or microbiology at **24 to 48** hours of antimicrobial therapy

Suspected source of infection		Initial, empirical antibiotic regimen	Immediate severe type hypersensitivity (e.g. anaphylaxis) to first line antimicrobial)**
Febrile neutropenia		Oncology patients: please refer to *'Management of Suspected Neutropenic Sepsis Paediatric Pathway'* Non-oncology patients: please manage as per the *'Paediatric Sepsis Pathway'* (below)	
Septic shock requiring inotropes		• ALL sources: *ADD* Gentamicin* *PLUS* Vancomycin to empirical regime where not already recommended • EXCEPT in North Queensland if risk factors for melioidosis (wet season or flooding) *REPLACE* Cefotaxime with Meropenem and *ADD* Vancomycin where not already recommended	
Sepsis where Meningitis possible *OR* Bacterial Meningitis		**Neonates and infants up to 2 months of age**	
		• cefOTAXIME IV *PLUS* Ampicillin (*OR* Amoxicillin) IV	• cefOTAXIME IV
		Infants and children older than 2 months of age	
		• cefOTAXIME (*OR* cefTRIAXONE) IV	• ciPROFLOXAcin IV *PLUS* Vancomycin IV
		If Gram positive cocci in CSF	
		• cefOTAXIME (*OR* cefTRIAXONE) IV *PLUS* Vancomycin IV	• ciPROFLOXAcin IV *PLUS* Vancomycin IV
		All ages – if encephalitis suspected: *ADD* Aciclovir IV	
Sepsis (source unknown, but bacterial meningitis excluded)		**Neonates and infants up to 2 months of age**	
		• Ampicillin (*OR* Amoxicillin) IV *PLUS* Gentamicin* IV	• cefOTAXIME IV
		If at risk of nmMRSA	
		• Ampicillin (*OR* Amoxicillin) IV *PLUS* Gentamicin* IV *PLUS* linCOMYCIN (*OR* Clindamycin) IV	• cefOTAXIME IV *PLUS* linCOMYCIN (*OR* Clindamycin) IV
		Infants and children older than 2 months of age	
		• cefOTAXIME (*OR* cefTRIAXONE) IV	• ciPROFLOXAcin IV *PLUS* Vancomycin IV
		If at risk of nmMRSA	
		• cefOTAXIME (*OR* cefTRIAXONE) IV *PLUS* linCOMYCIN (*OR* Clindamycin) IV	• ciPROFLOXAcin IV *PLUS* Lincomycin (*OR* Clindamycin) IV
		If at risk of multi-resistant MRSA	
		• cefOTAXIME (*OR* cefTRIAXONE) IV *PLUS* Vancomycin IV	• ciPROFLOXAcin IV *PLUS* Vancomycin IV
Bacterial Pneumonia (Community acquired)		**Neonates and infants up to 2 months of age**	
		• Ampicillin (*OR* Amoxicillin) IV *PLUS* Gentamicin* IV	• cefOTAXIME IV
		Infants and children more than 2 months of age	
		• Benzylpenicillin IV	• cefOTAXIME (*OR* cefTRIAXONE) IV
		Severe pneumonia (requiring PICU admission)	
		• All ages: cefOTAXIME IV	• ciPROFLOXAcin IV *PLUS* Vancomycin IV
		If empyema *OR* S. aureus (including nmMRSA) pneumonia suspected	
		• cefOTAXIME (*OR* cefTRIAXONE) IV *PLUS* linCOMYCIN (*OR* Clindamycin) IV	• ciPROFLOXAcin IV *PLUS* Lincomycin (*OR* Clindamycin) IV
		If life threatening pneumonia/empyema *OR* multi-resistant MRSA suspected	
		• cefOTAXIME (*OR* cefTRIAXONE) IV *PLUS* linCOMYCIN (*OR* Clindamycin) IV *PLUS* Vancomycin IV	• ciPROFLOXAcin IV *PLUS* linCOMYCIN (*OR* Clindamycin) IV *PLUS* Vancomycin IV
Intra-abdominal source		• Ampicillin (*OR* Amoxicillin) IV *PLUS* Gentamicin* IV *PLUS* Metronidazole IV	• cefOTAXIME (*OR* cefTRIAXONE) IV *PLUS* Metronidazole IV
Urinary source		• Ampicillin (*OR* Amoxicillin) IV *PLUS* Gentamicin* IV	• Gentamicin* IV
Severe cellulitis or skeletal or soft tissue infection		**All ages and Hib immune, with skeletal infection, periorbital cellulitis with a skin source *OR* severe cellulitis**	
		• Flucloxacillin IV	• linCOMYCIN (*OR* Clindamycin) IV
		If younger than 5 years of age and NOT Hib immune, with skeletal infection, periorbital cellulitis *OR* orbital cellulitis (all ages)	
		• cefOTAXIME IV	• ciPROFLOXAcin IV PLUS linCOMYCIN (*OR* Clindamycin) IV
		If at risk of nmMRSA	
		• *ADD* linCOMYCIN (*OR* Clindamycin) IV to appropriate therapy as above	• ciPROFLOXAcin IV *PLUS* linCOMYCIN (*OR* Clindamycin) IV
		If at risk of multi-resistant MRSA	
		• *ADD* Vancomycin IV to appropriate therapy as above	• ciPROFLOXAcin IV *PLUS* Vancomycin IV
		Suspected necrotising fasciitis	
		• cefOTAXIME IV *PLUS* Vancomycin IV *PLUS* linCOMYCIN (*OR* Clindamycin) IV *PLUS* consider IVIG 2g/kg	• Meropenem IV *PLUS* Vancomycin IV *PLUS* linCOMYCIN (*OR* Clindamycin) IV
		If external wound/inoculation associated with necrotising fasciitis	
		• Meropenem IV *PLUS* Vancomycin IV *PLUS* linCOMYCIN (*OR* Clindamycin) IV	• Meropenem IV *PLUS* Vancomycin IV *PLUS* linCOMYCIN (*OR* Clindamycin) IV
		Open fractures with severe tissue damage and contamination	
		• Piperacillin/Tazobactam IV	• ciPROFLOXAcin IV *PLUS* linCOMYCIN (*OR* Clindamycin) IV
Central venous access device source		**Consider removal of device**	
		• Piperacillin/Tazobactam IV *PLUS* Vancomycin IV	• cefTAZIDIME IV *PLUS* Vancomycin IV
Toxic shock syndrome		• ceFAZolin IV *PLUS* Lincomycin (*OR* Clindamycin) IV *PLUS* Vancomycin *PLUS* consider IVIG 2g/kg	• Vancomycin IV *PLUS* Lincomycin (*OR* Clindamycin) IV

* If Pseudomonas aeruginosa is cultured, seek ID advice on appropriate directed therapy.

** The recommendations provided for immediate type hypersensitivity in this table are for an **initial** dose only in the emergency treatment of sepsis. Please contact a paediatric ID specialist for any subsequent dosing.

- For more information, and **ongoing** prescribing information please refer to *'CHQ Paediatric Antibiocard: Empirical Antibiotic Guidelines'* and the *'CHQ guideline: Empiric antibiotic guidelines for Paediatric Intensive care unit (PICU)'*.

Table 2: PAEDIATRIC Antimicrobial Dose Recommendations for Sepsis by Age

- Term neonates >36 weeks post-menstrual age to adolescents.
- For premature neonates, refer to NeoMedQ, ANMF or Neofax; available via CKN or QCH Guidelines.

Antimicrobial	Dose recommendation by age (normal renal function)	
Aciclovir IV	Birth to 3 months of age	• 20mg/kg IV 8 hourly
	Older than 3 months of age and less than 12 years of age	• 500mg/m^2 (maximum 1g) IV 8 hourly
	12 years of age and older	• 10mg/kg (maximum 1g) IV 8 hourly
Ampicillin (*OR* Amoxicillin) IV	Neonates	• Week 1 of life: 50mg/kg IV 12 hourly • Week 2–4 of life: 50mg/kg IV 8 hourly • Meningitis: 100mg/kg/dose (on ID advice)
	Older than 1 month of age	• 50mg/kg (maximum 2g) IV 6 hourly
Benzylpenicillin IV	Neonates	• Week 1 of life: 60mg/kg IV 12 hourly • Week 2–4 of life: 60mg/kg IV 8 hourly
	Older than 1 month of age	• 60mg/kg (maximum 2.4g) IV 6 hourly
cefaZOLin IV	Neonates	• Seek ID/specialist advice
	Older than 1 month of age	• 50mg/kg IV 8 hourly (maximum 2g)
cefOTAXIME IV or IM* for neonate	Neonates	• Week 1 of life: 50mg/kg IV/IM 8 hourly • Week 2–4 of life: 50mg/kg IV/IM 6 hourly
	Older than 1 month of age	• 50mg/kg (maximum 2g) IV/IM 6 hourly
cefTRIAXONE IV or IM*	Neonates	• cefTRIAXONE contra-indicated (risk of kernicterus) – use cefOTAXIME
	Older than 1 month of age	• 50mg/kg (maximum 2g) IV/IM 12 hourly
cefTAZIDIME IV	Neonates	• 50mg/kg IV 12 hourly
	Older than 1 month of age	• 50mg/kg (maximum 2g) IV 8 hourly
ciPROFLOXAcin IV	Neonates	• Seek ID/specialist advice
	Older than 1 month of age	• 10mg/kg (maximum 400mg) IV 8 hourly
Clindamycin IV	Neonates	• 7mg/kg IV 8 hourly
	Older than 1 month of age	• 10mg/kg (maximum 600mg) IV 6 hourly
Flucloxacillin IV	Neonates	• Week 1 of life: 50mg/kg IV 12 hourly • Week 2–3 of life: 50mg/kg IV 8 hourly • Week 4 of life: 50mg/kg IV 6 hourly
	Older than 1 month of age	• 50mg/kg (maximum 2g) IV 6 hourly
Gentamicin IV	Neonates	• Week 1–4 of life: 5mg/kg IV once daily
	Older than 1 month and less than 10 years of age	• 7.5mg/kg IV once daily (maximum 320mg)
	10 years of age and older	• 7mg/kg IV once daily (maximum 700mg)
	ALL ages: perform Therapeutic Drug Monitoring (TDM) – dose based on Adjusted body weight (neonates or renal impairment, check trough pre-2nd dose)	
linCOMYCIN IV	Neonates	No neonatal dosing recommendation for linCOMYCIN – use Clindamycin IV
	Older than 1 month of age	• 15mg/kg (maximum 1.2g) IV 8 hourly
Meropenem IV	All ages	• 40mg/kg (maximum 2g) IV 8 hourly
Metronidazole IV	Neonates	• 15mg/kg IV load, then 7.5mg/kg IV 8 hourly
	Older than 1 month of age	• 7.5mg/kg (maximum 500mg) IV 8 hourly
Piperacillin/ Tazobactam IV (dose based on piperacillin component)	Neonates	• Week 1 of life: 100mg/kg IV 12 hourly • Week 2–4 of life: 100mg/kg IV 8 hourly
	Older than 1 month of age	• 100mg/kg (maximum 4g) IV 6 hourly
Vancomycin IV	Neonates	• Week 1 of life: 15mg/kg IV 12 hourly • Week 2–4 of life: 15mg/kg IV 8 hourly
	Older than 1 month of age	• 15mg/kg (maximum 750mg) IV 6 hourly
	ALL ages: perform TDM – dose based on Actual body weight	

**Prioritise IV/IO access and administration wherever possible. Intramuscular antibiotic administration in sepsis may result in subtherapeutic doses due to reduced muscular perfusion.*

References:
1. Antibiotic Therapeutic Guidelines (Oct 2021). Therapeutic Guidelines Committee, North Melbourne, Victoria. Available on CKN
2. AMH Children's Dosing Companion [Online]. Adelaide: Australian Medicines Handbook Pty Ltd; 2020. Last updated July 2022. Available on CKN.
3. The Australasian Neonatal Medicines Formulary (ANMF) [Online]. Accessed 6 Oct 2022. Last updated 11/10/22. Available on CKN.
4. Neofax 2022. Micromedex Healthcare solutions. Truven Health Analytics. US. Available on CKN.
5. NeoMedQ Neonatal Medicines [Online]. Accessed 6 Oct 2022. Last updated Aug 2019. Available on CKN.
6. BNF for Children 1/10/22. BMJ Group, London, UK. Available on CKN.

Table 3: PAEDIATRIC Antimicrobial Administration Guidelines for Community Acquired Sepsis

- Commence IV antibiotics as soon as possible after blood cultures have been taken. Do not delay antibiotic administration while awaiting blood test results.
- If multiple IV antimicrobial orders are prescribed, administer in order of shortest to longest infusion times to ensure completed as quickly as possible.
  For example:
  » Septic shock requiring inotropes: inject IV cefotaxime over 3–5 minutes, followed by IV gentamicin over 30 minutes, followed by IV vancomycin over 60 minutes.
- Ensure adequate saline flush between incompatible agents.
- **Where possible use separate dedicated lines for resuscitation fluid and for medications.** If not possible, pause either the antibiotic or the resuscitation fluid to administer. You may administer via Y-site, but not concurrent delivery.
- Use CREDD where this is the locally recommended resource.

Antimicrobial (tradename/ brand)	Strength (powder volume) [volume]	Reconstitution	Final concentration PIV = Peripheral IV CVL = Central	Intravenous (IV) administration	Compatible IV fluids	Additional information
Aciclovir *(DBL)* **Intravenous**	25mg/mL *[10mL; 20mL]*	• Reconstitution not required	• PIV: Dilute to 5mg/mL • CVL: 25mg/mL	• Infuse over 60 minutes	• Sodium Chloride 0.9% • Glucose 5% • Hartmann's • Plasma-Lyte via Y-site	• Extravasation risk • Ensure adequate hydration
Amoxicillin *(Fisamox, Ibiamox, Amoxil)* **Intravenous**	1g *(0.8mL)*	• Water for injection • Add 9.2mL to 1g vial (100mg/mL)	PIV or CVL: • Dilute to 50mg/mL or weaker	• Infuse over 30 minutes	• Sodium Chloride 0.9% • Glucose 5%, 10% via Y-site • Hartmann's	• Flush well between aminoglycosides • Rapid IV injection may cause seizures
AMPicillin *(Austrapen, Auspen, Ibimicyn)* **Intravenous**	500mg *(0.3mL)* 1g *(0.7mL)*	• Water for injection • Add 4.7mL to 500mg vial • Add 9.3mL to 1g vial *(100mg/mL)*	PIV or CVL: • Undiluted; 100mg/mL • Dilute to 30mg/mL for infusion	• 50mg/kg UP TO ≤500mg: Inject undiluted over 3–5 minutes • 100mg/kg ***OR*** >500mg: Infuse over 15–30 minutes	• Sodium Chloride 0.9% • Glucose 5%, 10% • Ringer's via Y-site	• Flush well between aminoglycosides • Rapid IV injection may cause seizures
Benzylpenicillin *(BenPen)* **Intravenous**	600mg *(0.4mL)* 1.2g *(0.8mL)* 3g *(2mL)*	• Water for injection • Add 1.6mL to 600mg vial • Add 3.2mL to 1.2g vial • Add 8mL to 3g vial *(300mg/mL)*	• PIV: Dilute to 60mg/mL • CVL: Undiluted; 300mg/mL	• Infuse over 30 minutes	• Sodium Chloride 0.9% • Glucose 5% • Plasma-Lyte via Y-site	• Flush well between aminoglycosides • Rapid IV injection may cause electrolyte imbalance and seizures
CefaZOLin *(AFT, Hospira, Sandoz, Alphapharm)* **Intravenous**	1g *(0.5mL)*	• Water for injection • Add 9.5mL to 1g vial *(100mg/mL)*	PIV or CVL: • Undiluted; 100mg/mL • Dilute to 20mg/mL for infusion	• Inject undiluted over 3–5 minutes; ***OR*** • Infuse over 10–60 minutes	• Sodium Chloride 0.9% • Glucose 5%, 10% • Hartmann's • Plasma-Lyte via Y-site	• Flush well between aminoglycosides
cefOTAXIME *(Sandoz, DBL)* **Intravenous *OR* Intramuscular**	*1g (0.4mL)* *2g (1mL)*	• Water for injection IV: • Add 4.6mL to 1g vial • Add 9mL to 2g vial *(200mg/mL)*	PIV or CVL: • Undiluted; 200mg/mL • Dilute to 60mg/mL for infusion	• Inject undiluted over 3–5 minutes; ***OR*** • Infuse over 15–30 minutes	• Sodium Chloride 0.9% • Glucose 5% , 10% • Hartmann's	• Flush well between aminoglycosides • More rapid injection may cause cardiac arrhythmias
		IM: • Add 2.6mL to 1g vial • Add 5mL to 2g vial *(330mg/mL)*	IM: • Undiluted; 330mg/mL	• Refer to *'CHQ-PROC-01039 Medication administration for guidelines for Maximal Amounts of solutions to be Injected into Muscle Tissue'*		
cefTAZIDIME *(Sandoz, AFT)* **Intravenous**	1g *(0.9mL)* 2g *(1.8mL)*	• Water for injection • Add 5mL to 1g vial • Add 10mL to 2g vial *(170mg/mL)*	PIV or CVL: • Undiluted; 170mg/mL • Dilute to 40mg/mL for infusion	• Inject undiluted over 3–5 minutes; ***OR*** • Infuse over 15–30 minutes	• Sodium Chloride 0.9% • Glucose: 5%, 10% • Hartmann's • Plasma-Lyte via Y-site	• Flush well between aminoglycosides
CefTRIAXone *(AFT, Alphapharm, Hospira)* **Intravenous *OR* Intramuscular**	*1g (0.6mL)*	• Water for injection IV: • Add 9.4mL to 1g vial *(100mg/mL)*	PIV or CVL: • Dilute to 40mg/mL	• Dilute and inject over 5 minutes; ***OR*** • Infuse over 30 minutes	• Sodium Chloride 0.9% • Glucose 5%, 10% • Incompatible with Hartmann's & Ringer's	• Flush well between aminoglycosides, or calcium containing solutions • Not recommended for use in neonates
		IM: • Add 2.3mL to 1g vial *(350mg/mL)*	IM: • Undiluted; 350mg/mL	• Refer to *'CHQ-PROC-01039 Medication administration for guidelines for Maximal Amounts of solutions to be Injected into Muscle Tissue'*		

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Table 3 *(continued)*

Antimicrobial (tradename/ brand)	Strength (powder volume) [volume]	Reconstitution	Final concentration PIV = Peripheral IV CVL = Central	Intravenous (IV) administration	Compatible IV fluids	Additional information
Ciprofloxacin *(Aspen, DBL)* **Intravenous**	2mg/mL *[100mL]*	• Reconstitution not required	PIV or CVL: • Undiluted; 2mg/mL • Dilute to 1mg/mL	• Infuse over 60 minutes	• Sodium Chloride 0.9% • Glucose: 5%, 10% • Hartmann's • Plasma-Lyte via Y-site	• Extravasation risk • Ensure adequate hydration
Clindamycin *(Mylan, Dalacin C)* **Intravenous**	*150mg/mL [4mL]*	• Reconstitution not required	PIV or CVL: • Dilute to 18mg/mL or weaker	• Infuse over 20–60 minutes • Maximum infusion rate: 20mg/kg/hr or 30mg/minute	• Sodium Chloride 0.9% • Glucose: 5%, 10% • Hartmann's • Plasma-Lyte via Y-site	• Rapid IV injection may cause hypotension and cardiac arrest
Flucloxacillin *(Flucil, Flubiclox, Hospira)* **Intravenous**	500mg (0.4mL) 1g *(0.7mL)*	• Water for injection • Add 9.6mL to 500mg vial • Add 19.3mL to 1g vial (50mg/mL)	PIV or CVL: • Undiluted; 50mg/mL or dilute to convenient volume	• Infuse over at least 30 minutes • May give over 3–5 minutes (phlebitis risk)	• Sodium Chloride 0.9% • Glucose 5% • Hartmann's • Plasma-Lyte via Y-site	• Extravasation risk • Flush well between aminoglycosides
Gentamicin *(Pfizer)* **Intravenous**	40mg/mL *[2mL]*	• Reconstitution not required	PIV or CVL: • Dilute to 10mg/mL or weaker	• Infuse over 30 minutes	• Sodium Chloride 0.9% • Glucose: 5%, 10% • Hartmann's • Plasma-Lyte via Y-site	• Therapeutic drug monitoring (TDM) required • Rapid IV injection may cause ototoxicity • Flush well between cephalosporins and penicillin
Lincomycin *(Lincocin, SXP)* **Intravenous**	300mg/mL *[2mL]*	• Reconstitution not required	PIV or CVL: • Dilute to 10mg/mL or weaker	• ≤1g: Infuse over 60 minutes • >1g: Maximum infusion rate 1g/hour	• Sodium Chloride 0.9% • Glucose 5%, 10% • Hartmann's • Plasma-Lyte via Y-site	• Rapid IV injection may cause hypotension and cardiac arrest
Meropenem *(DBL, Kabi, Ranbaxy)* **Intravenous**	500mg *(0.4mL)* 1g *(0.9mL)*	• Water for injection • Add 9.6mL to 500mg vial • Add 19.1mL to 1g vial *(50mg/mL)*	PIV or CVL: • Undiluted; 50mg/mL or dilute to convenient volume	• Inject undiluted over 3–5 minutes; ***OR*** • Infuse over 15–30 minutes	• Sodium Chloride 0.9% • Glucose 5%, 10% • Plasma-Lyte via Y-site	
Metronidazole *(DBL, Claris, Sandoz)* **Intravenous**	5mg/mL *[100mL]*	• Reconstitution not required	PIV or CVL: • Undiluted; 5mg/mL or dilute to a convenient volume	• Infuse over 20–30 minutes	• Sodium Chloride 0.9% • Glucose 5% • Hartmann's via Y-site • Plasma-Lyte via Y-site	
Piperacillin/ Tazobactam *(DBL, AFT, Kabi, Tazocin EF)* **Intravenous**	Piperacillin 4000mg Tazobactam 500mg; *(3mL)*	• Water for injection • Add 17mL to 4/0.5g vial *(200mg/mL)*	PIV or CVL: • Dilute to 90mg/mL or weaker	• Infuse over 30 minutes	• Sodium Chloride 0.9% • Glucose 5% • Hartmann's via Y-site (AFT, Tazocin EF only) • Plasma-Lyte via Y-site	• Flush well between aminoglycosides • Concentrations expressed as piperacillin component
Vancomycin *(DBL, AN, Vancocin CP, Alphapharm)* **Intravenous**	500mg; 1g (powder volume negligible)	• Water for injection • Add 10mL to 500mg vial • Add 20mL to 1g vial *(50mg/mL)*	• PIV: Dilute to 5mg/mL or weaker • CVL: Dilute to 10mg/mL or weaker	• Infuse over 60–120 minutes	• Sodium Chloride 0.9% • Glucose 5%, 10% • Hartmann's • Plasma-Lyte via Y-site	• TDM required • Extravasation risk • If Red Man Syndrome occurs, slow infusion rate

References: 1. The Royal Children's Hospital Paediatric Injectable Guidelines, June 2020, Melbourne, Australia. Available on CKN.
2. Burridge, N., Ed. (2022). The Australian Injectable Drugs Handbook 8th edition. Collingwood, The Society of Hospital Pharmacists of Australia. Available on CKN.

SEPSIS

Information for parents, carers and families of children with sepsis

What is sepsis?

Sepsis happens when the body has an extreme response to an infection and starts to injure its own tissues and organs. Sepsis can be triggered by any infection (viral, fungal, bacterial) but most commonly occurs with bacterial infections of the brain, lungs, bladder, kidneys, abdomen, skin and soft tissues.

Care for your child in hospital

Your child's healthcare team team will provide urgent treatments including:

- Insertion of a cannula, collection of blood tests and administration of antibiotics.
- Give fluids and other medicines, via a cannula, to support your child's circulation.
- Monitor your child's response to treatment.
- Consult with a sepsis expert.
- Arrange for transfer to the most appropriate place for your child's care which may be a general ward or Paediatric Intensive Care Unit (PICU).

There will be many people in your child's healthcare team, which may include doctors, nurses and a social worker. You are your child's key support and advocate; let your healthcare team know about your child's condition, their progress and any changes that concern you.

Your healthcare team should talk to you about:

- **What a diagnosis of sepsis means for your child in the short, medium and long term.**
- **Plans for your child's treatment, who will provide this care and their response to treatment.**
- **What to expect during your child's recovery.**
- **How to inform the healthcare team if you are concerned your child is getting worse.**
- **Support you can receive in hospital.**

Ryan's Rule

You and your family will be informed about your child's treatment options and involved in decisions about their care. If you have concerns that your child's health condition is getting worse or not improving, discuss this initially with the healthcare team. You can also search 'Ryan's Rule' on the Children's Health Queensland website to learn about raising concerns.

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Queensland Government

Support for your family in hospital

Dealing with a complex health issue like sepsis and a hospital admission can be stressful and challenging for all family members. Speak to your child's healthcare team about ways to access additional support which may include:

- Social workers who can provide help to adjust and manage your child's health condition and admission.
- Welfare workers who can provide practical support with accommodation, finances, travel, and social needs.

Children and medical procedures

It is common for children to struggle with some medical procedures. Reassure your child of your support. It helps children to know what is going to happen, why the procedure needs to happen and who will be involved. For more ideas, scan this QR code and read our blog on supporting your child through a procedure.

Cultural support

Let your healthcare team know if you need:

A translator or interpreter.

An Aboriginal and Torres Strait Islander Liaison Officer.

Sepsis resources

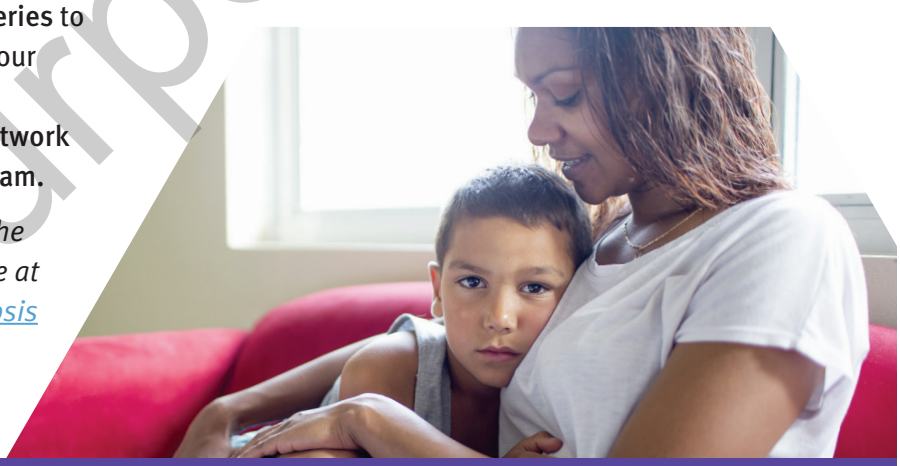
Sepsis on the Children's Health Queensland website has information for families including:

- **'Journeying through Sepsis' video series** to support you through each stage of your child's sepsis journey.
- **Paediatric Sepsis Family Support Network**
- **Paediatric Sepsis Peer Mentor Program.**

For more information visit Sepsis on the Children's Health Queensland website at www.childrens.health.qld.gov.au/sepsis or scan the QR code below.

Questions you could ask your child's healthcare team

- What will my child's treatment be?
- Who will provide this treatment?
- How will my child be affected by sepsis and it's treatment?
- What complications of sepsis and the treatment should I be aware of?
- How did my child become unwell with sepsis?
- Who is my main contact person within the hospital for my child's care?
- What should I expect as my child recovers in hospital after the initial critical care for sepsis?
- How can I escalate my concerns if my child is getting worse?
- What supports are available to me, my child and my family in hospital?
- What should I expect with my child's recovery after discharge from hospital?
- What are the potential long-term impacts of my child's sepsis diagnosis?
- Is my child likely to come back to hospital?
- What are signs my child is getting unwell again, and when should we return to hospital or our GP?
- What supports are available to my child and our family following discharge from hospital?



Illnesses can change – trust your gut feeling. Even if your child has recently had sepsis, if you think they may have sepsis again come back to hospital and ask 'Could it be sepsis?'.

Visit www.childrens.health.qld.gov.au/sepsis

Could it be SEPSIS

Sepsis is a **medical emergency** and needs immediate treatment.

Sepsis happens when the body has an extreme response to an infection and starts to injure its own tissues and organs. Sepsis can damage many parts of the body and can result in death. The best chance of getting better from sepsis is to treat it quickly.

Knowing if your child has sepsis can be difficult because many of the symptoms in the beginning are the same as mild infections. The difference is that your child's symptoms don't improve or may worsen.

Sepsis is rare, but any child can develop sepsis and we all need to know what to look out for.

You know your child best, so **trust your gut feeling**. If your child is more unwell than ever before or this illness is different from other times – ask your doctor or nurse **"Could it be sepsis?"**.

Any ONE of these symptoms may mean your child is very unwell and could have sepsis:

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Paediatric Sepsis checklist

If you think your child is not getting better, or they are getting sicker, trust your gut feeling.
Tick the boxes that apply to your child and ask your doctor or nurse **"Could it be sepsis?"**.

Temperature

- ☐ Shivering or shaking with a fever
- ☐ Low temperature (less than 36°C)
- ☐ For child older than 3 months, high temperature (more than 38°C) for 5 days or more
- ☐ For baby 3 months or younger, any high temperature (more than 38°C)

Breathing

- ☐ Grunting noises when breathing
- ☐ Working harder to breathe – sucking under the ribs or caving in of the breast bone
- ☐ Nostrils that move in and out (flare) with each breath
- ☐ Crackly noises from the chest

Activity and movement

- ☐ Can't concentrate
- ☐ Can't stay awake
- ☐ No interest in playing
- ☐ No interest in what is happening around them
- ☐ Irritable and won't settle
- ☐ Restlessness
- ☐ Unable to walk or refusing to walk
- ☐ Not using an arm, leg, hand or foot for no obvious reason
- ☐ Feeling more unwell than before

Pain

- ☐ Headache, neck, muscle, chest, bone or joint pain for no obvious reason
- ☐ Pain relief is not working

Skin

- ☐ Cold hands and feet
- ☐ Skin painful to touch
- ☐ Bright red skin all over
- ☐ Rash

Toileting

- ☐ No urine (wee) or wet nappies for12 hours or more
- ☐ Fewer nappies and not as heavy as usual
- ☐ Blood in the faeces (poo)
- ☐ More than 5 watery diarrhoea (runny poo) episodes in 24 hours

Eating and drinking

- ☐ Unable to keep any fluids down because of vomiting
- ☐ Vomit that is green or black or has blood in it
- ☐ No interest in drinking or feeding
- ☐ Very thirsty
- ☐ Dry mouth, lips or tongue

Illnesses can change – trust your gut feeling. Even if your child has recently seen a doctor, if you think they may have sepsis, come back to hospital and ask "Could it be sepsis?".

Visit www.childrens.health.qld.gov.au/sepsis