NORTHERN TERRITORY GOVERNMENT — DEPARTMENT OF HEALTH

ACUTE CARE PAEDIATRIC SEPSIS PATHWAY

Principal name:
Other name(s):
D.O.B:
HRN:
Sex:

Patient Label

Address must be documented if patient details handwritten

Sepsis is a time-critical MEDICAL EMERGENCY

Clinical pathways never replace clinical judgement. Use this pathway for patients aged 0-17 years with suspected sepsis. Use in conjunction with NT Paediatric Sepsis Guideline and NT Observation Chart.

Date: _____ **Time:** _____ **Initial:** _____ **Print name:** _____ **Role:** _____

RECOGNISE

Could it be sepsis?

Consider sepsis in all patients with an acute illness and abnormal vital signs.
Presentation can vary between patients and at times may not be obvious. *Tick below all that apply.*

Are there signs/symptoms that are consistent with an infection?

- ❑ Fever or hypothermia, rigors, tachycardia, reduced alertness
- ❑ Cool peripheries, mottled skin, pallor
- ❑ **Respiratory:** cough, increased respiratory rate or work of breathing, apnoea
- ❑ **Skin:** cellulitis, increased pain and tenderness out of proportion, infected wounds, non-blanching rash
- ❑ **IV/CVC line access:** redness, pain, swelling, discharge
- ❑ **Musculoskeletal:** swollen, painful, tender, warm joints or long bones
- ❑ **Neurological:** neck stiffness, headache, photophobia, altered level of cognition or consciousness
- ❑ **Abdomen:** severe pain, tenderness, urinary tract infection, severe vomiting

Younger children may present with the following:

- ❑ Weak cry, grunting, irritable
- ❑ Decreased feeding
- ❑ Acute weight loss (associated with dehydration)

Increase your suspicion of sepsis in these patients:

- ❑ Aboriginal and Torres Strait Islander people
- ❑ High level of parental/caregiver concern
- ❑ Re-presentation
- ❑ Previous sepsis presentation
- ❑ Worsening of infection despite antibiotic treatment
- ❑ Recent surgery, invasive procedure or burns
- ❑ Immunocompromised or neutropenia
- ❑ Chronic disease or congenital disorder
- ❑ **Risk of bacteraemia:** prosthetic valves, VP shunt, indwelling medical devices
- ❑ Recent trauma including minor trauma
- ❑ Under 2 months of age

Plus any of the following criteria:

❑ Vital signs that trigger a MET / Code blue call ❑ Vital signs that trigger a Rapid Response in ED	❑ Vital signs in the pink or yellow zone on age specific observation chart ❑ Central capillary return greater than 2 seconds ❑ Lactate greater than 2 mmol/L ❑ New altered mental status ❑ Petechiae ❑ Unexplained severe/strong pain ❑ Abnormal white cell counts ❑ Clinician/parental/caregiver concern	❑ Nil escalation criteria present

RESPOND & ESCALATE

Patient may have **septic shock**	Patient may have **sepsis** or have **other causes** for deterioration	Sepsis screening negative
Ward: Call medical emergency team on *** **ED:** Notify senior emergency doctor or up-triage to ATS 1 or 2	Notify senior medical officer (SMO) for a clinical review or up-triage to ATS 2 Escalated to: _____ Time: _____	Re-screen as clinically indicated. Initial: _____

If sepsis suspected by a senior medical officer, commence the **SEPSIS BUNDLE.**
Consider alternate diagnoses and simultaneous investigation and treatment for differential diagnoses.

- Sepsis/septic shock diagnosis Y / N

Time: _____ Initial: _____ Print name: _____ Role: _____

- If sepsis is not suspected **now,** document the provisional diagnosis in the medical records. Re-evaluate as clinically indicated. If patient deteriorates, re-screen by starting a new pathway.
- If to be discharged home, give patient and/or caregiver sepsis recognition education.

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SEPSIS BUNDLE: 6 KEY ACTIONS IN 60 MINUTES*
*If patient at risk of febrile neutropenia with septic shock, administer antibiotics within 30 minutes.

Ensure management plan aligns with patient's goals of care.
If there are any clinically indicated variations in care to the pathway, document this in the patient record.

RESUSCITATE

1. Consider oxygen therapy Maintain SpO_2 94% or higher.	▪ SpO_2 maintained	Y / N
2. Establish intravenous (IV) access If unsuccessful, obtain access with intraosseous (IO) or central venous catheter.	▪ Access established	Y / N
3. Collect blood cultures prior to antibiotics (where possible) and a venous blood gas (with lactate) FBC, UEC, LFTs, CRP, blood glucose and coagulation studies. Other investigations as indicated: CXR, urinalysis, urine culture, sputum culture, joint aspirates, wound and melioidosis swabs.	▪ Blood cultures collected ▪ Lactate collected Lactate level: _____ mmol/L	Y / N Y / N
4. Administer IV antibiotics (check allergies) Use correct regimen for age and sepsis severity. If source unknown, use sepsis/septic shock without clear focus regimen (page 3 & 4). If source known, use empirical regimen (page 4 to 6). Ensure nursing staff administer antibiotics immediately. **If surgical source suspected, consult the relevant surgical team.**	▪ 1st antimicrobial commenced ▪ 2nd antimicrobial commenced	Y / N Y / N
5. Assess fluid state and consider fluid resuscitation Use 10mL/kg (0.9% sodium chloride, Hartmann's or Plasma-lyte) bolus. Re-assess and give additional 10mL/kg bolus (maximum of 40mL/kg) as indicated. Consider inotropes early in consultation with paediatrician +/- intensive care physician.	▪ Fluids administered ▪ Inotropes required	Y / N Y / N
6. Monitor signs of deterioration and urine output For the first 2 hours, monitor vital signs every 30 minutes and urine output every 60 minutes. If warranted, insert IDC.	▪ Fluid balance commenced ▪ IDC required	Y / N Y / N

Bundle completed. Time: _____ Initial: _____ Print name: _____ Role: _____

RE-ASSESS & MONITOR

Re-assess and monitor observations every 30 minutes. Aim for the following:

- Targeted vital signs as per medical consultation
- Lactate less than 2 mmol/L
- Central capillary return under 2 seconds
- Blood glucose greater than 3 mmol/L
- Urine output greater than 0.5mL/kg/hour

Escalate for further medical review if patient meets any of the following: *Tick below which escalation criteria apply.*

- ❑ Central capillary return more than 2 seconds
- ❑ Targeted vital signs are not improving
- ❑ Lactate not trending down
- ❑ Urine output less than 0.5mL/kg/hour
- ❑ New altered mental state
- ❑ Clinician/parental/caregiver concern

If patient deteriorates or fails to improve, re-assess, and refer to higher level of care

- Reconsider diagnosis
- Reconsider treatment
- Consider treatment as a cause of deterioration
- Follow local transfer procedure
- Use ISOBAR to handover to receiving team

REVIEW

The 24-hour management plan to be documented in the patient record and include: *Tick once completed/request initiated.*

- ❑ Likely source of infection
- ❑ Frequency of observations and monitoring
- ❑ Fluid balance
- ❑ Medication review
  - Review of antibiotics against microbiology sensitivities
- ❑ Consultation with relevant specialists e.g., infectious diseases, paediatric, intensive care or surgical teams
- ❑ Sepsis diagnosis and management plan discussed with patient/family/carer and education provided

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NT Empirical Antibiotic Guide for Severe Infections – Top End, East Arnhem & Big Rivers Regions

Disclaimer: Antibiotic protocols may change. Prescribers should check for updates to the sepsis pathway on PGC.

- Review antibiotics daily and de-escalate where appropriate (within 48 to 72 hours).
- Call infectious disease (IFD) physician for advice and approval for restricted antibiotics as required.
- Refer to Vancomycin – Children Aged <12 NT Hospitals Guideline OR Vancomycin >12 years NT Hospital Guideline for additional information on vancomycin dosing.
- *Gentamicin maximum dose for children aged less than 10 years is 320mg. Gentamicin maximum dose for children aged 10 years and over is 560mg.
- Administer antibiotics from shortest to longest infusion times (antibiotics are listed in the order of administration).
- When administering Meropenem in patients with severe penicillin hypersensitivity (immediate or delayed), administer cautiously in a critical care area and monitor for reaction.
- Consider Vancomycin 25mg/kg IV loading dose if patient requires intensive care unit (ICU) admission.
- Consider urgent surgical consult if condition may require surgical intervention.

	Preferred therapy	Immediate non-severe or delayed non-severe penicillin hypersensitivity	Immediate severe (anaphylaxis) or delayed severe penicillin hypersensitivity (SJS, TEN, DRESS, interstitial nephritis)
SEPSIS WITHOUT CLEAR FOCUS – UNDER 2 MONTHS			
MENINGITIS NOT EXCLUDED	Ampicillin 50mg/kg IV 6 hourly **AND** Cefotaxime 50mg/kg IV 6 hourly (8 hourly in first week of life) **AND** Gentamicin IV 24 hourly (less than 1 month = 5mg/kg, 1 to 2 months = 7.5g/kg*) *If severely unwell / S. aureus suspected,* **REPLACE** Ampicillin with Vancomycin 15mg/kg IV (less than 1 month = 8 hourly, 1 to 2 months = 6 hourly)	Ciprofloxacin 10mg/kg IV (maximum 400mg) 8 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) (less than 1 month = 8 hourly, 1 to 2 months = 6 hourly)	
	CONSIDER Aciclovir 20mg/kg IV 8 hourly if Herpes Simplex Virus (HSV) suspected.		
MENINGITIS EXCLUDED FOLLOWING LP	Ampicillin 50mg/kg IV 6 hourly **AND** Gentamicin IV 24 hourly (less than 1 month = 5mg/kg, 1 to 2 months = 7.5mg/kg*) *If severely unwell / S. aureus suspected,* **REPLACE** Ampicillin with Vancomycin 15mg/kg IV (less than 1 month = 8 hourly, 1 to 2 months = 6 hourly)	Ciprofloxacin 10mg/kg IV (maximum 400mg) 8 hourly *If S. aureus suspected,* **ADD** Vancomycin 15mg/kg IV (maximum 750mg) (less than 1 month = 8 hourly, 1 to 2 months = 6 hourly)	
SEPSIS WITHOUT CLEAR FOCUS – 2 MONTHS AND OVER			
SEPTIC SHOCK WITHOUT CLEAR FOCUS **Requiring ICU**	**Dry Season**		
	Piperacillin/Tazobactam 100mg/kg IV (maximum 4g) 6 hourly **AND** Vancomycin 25mg/kg IV loading dose **THEN REGULAR** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly	Meropenem 25mg/kg IV (maximum 1g) 8 hourly **AND** Vancomycin 25mg/kg IV loading dose **THEN REGULAR** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly	
	CONSIDER Clindamycin 15mg/kg IV (maximum 600mg) 8 hourly if toxin mediated streptococcal or staphylococcal infection is suspected.		
	Wet Season		
	Meropenem 25mg/kg IV (maximum 1g) 8 hourly **AND** Vancomycin 25mg/kg IV loading dose **THEN REGULAR** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly		
	CONSIDER Clindamycin 15mg/kg IV (maximum 600mg) 8 hourly if toxin mediated streptococcal or staphylococcal infection is suspected.		
SEPTIC SHOCK WITHOUT CLEAR FOCUS **Not requiring ICU**	**Wet & Dry Season**		
	Ceftriaxone 100mg/kg IV (maximum 4g) 24 hourly **AND** Gentamicin 7.5mg/kg IV (maximum 560mg*) 24 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly		Meropenem 25mg/kg IV (maximum 1g) 8 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly

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SEPSIS WITHOUT CLEAR FOCUS – 2 MONTHS AND OVER			
SEPSIS WITHOUT CLEAR FOCUS Not requiring ICU	**Wet & Dry Season**		
	Ceftriaxone 100mg/kg IV (maximum 4g) 24 hourly *If S. aureus suspected,* **ADD** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly		Ciprofloxacin 10mg/kg IV (maximum 400mg) 8 hourly. *If S. aureus suspected,* **ADD** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly
FEBRILE NEUTROPENIA	Piperacillin/Tazobactam 100mg/kg IV (maximum 4g) 6 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly	Meropenem 25mg/kg IV (maximum 1g) 8 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly	
CENTRAL NERVOUS SYSTEM			
MENINGITIS Over 2 months	Ceftriaxone 100mg/kg IV (maximum 4g) 24 hourly		Ciprofloxacin 10mg/kg IV (maximum 400mg) 8 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly
	CONSIDER Dexamethasone 0.15mg/kg IV (maximum 10mg). Start before or with first dose of antibiotics, then 6 hourly for 2 to 4 days. **CONSIDER** Aciclovir 20mg/kg IV 8 hourly if Herpes Simplex Virus (HSV) suspected.		
MENINGITIS Under 2 months	Ampicillin 50mg/kg IV 6 hourly **AND** Cefotaxime 50mg/kg IV 6 hourly (8 hourly in first week of life)		
	CONSIDER Aciclovir 20mg/kg IV 8 hourly if Herpes Simplex Virus (HSV) suspected.		
CSF SHUNT INFECTION	Ceftazidime 50mg/kg IV (maximum 2g) 8 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly		Ciprofloxacin 10mg/kg IV (maximum 400mg) 8 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly
RESPIRATORY			
SEVERE COMMUNITY ACQUIRED PNEUMONIA Requiring ICU	**Dry Season**		
	Piperacillin/Tazobactam 100mg/kg IV (maximum 4g) 6 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly **AND** Azithromycin 10mg/kg IV (maximum 500mg) 24 hourly	Meropenem 25mg/kg IV (maximum 1g) 8 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly **AND** Azithromycin 10mg/kg IV (maximum 500mg) 24 hourly	
	Wet Season		
	Meropenem 25mg/kg IV (maximum 1g) 8 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly **AND** Azithromycin 10mg/kg IV (maximum 500mg) 24 hourly		
SEVERE COMMUNITY ACQUIRED PNEUMONIA Not Requiring ICU	**Wet & Dry Season**		
	Ceftriaxone 50mg/kg IV (maximum 4g) 24 hourly *If S. aureus suspected,* **ADD** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly		Ciprofloxacin 10mg/kg IV (maximum 400mg) 12 hourly. *If S. aureus suspected,* **ADD** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly
	CONSIDER Azithromycin 10mg/kg IV (maximum 500mg) 24 hourly		

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MODERATE COMMUNITY ACQUIRED PNEUMONIA	Benzylpenicillin 50mg/kg IV (maximum 2.4g) 6 hourly	Ceftriaxone 50mg/kg IV (maximum 4g) 24 hourly	Azithromycin 10mg/kg IV (maximum 500mg) 24 hourly
EMPYEMA	Ceftriaxone 50mg/kg IV (maximum 4g) 24 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly **CONSIDER ADDING** Clindamycin 15mg/kg (maximum 600mg) IV 8 hourly		Ciprofloxacin 10mg/kg IV (maximum 400mg) 12 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly
CARDIAC			
ENDOCARDITIS	Ceftriaxone 100mg/kg IV (maximum 4g) 24 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly		Ciprofloxacin 10mg/kg IV (maximum 400mg) 8 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly
URINARY TRACT			
PYELONEPHRITIS/ COMPLICATED UTI	Ampicillin 50mg/kg IV (maximum 2g) 6 hourly **AND** Gentamicin 7.5mg/kg IV (maximum 560mg*) 24 hourly	Gentamicin 7.5mg/kg IV (maximum 560mg*) 24 hourly	
HEAD AND NECK			
BACTERIAL TRACHEITIS / EPIGLOTTITIS	Piperacillin/Tazobactam 100mg/kg IV (maximum 4g) 6 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly	Ceftazidime 50mg/kg IV (maximum 2g) 8 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly	Ciprofloxacin 10mg/kg IV (maximum 400mg) 8 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly
MASTOIDITIS			
RETROPHARYNGEAL ABSCESS	Amoxicillin-Clavulanate 25mg/kg (maximum 2g) IV 6 hourly	Cefazolin 50mg/kg IV (maximum 2g) 8 hourly **AND** Metronidazole 12.5mg/kg IV (maximum 500mg) 12 hourly	Clindamycin 15mg/kg IV (maximum 600mg) 8 hourly
GASTROINTESTINAL			
COMPLICATED APPENDICITIS OR PERITONITIS	Ampicillin 50mg/kg IV (maximum 2g) 6 hourly **AND** Gentamicin 7.5mg/kg IV (maximum 560mg*) 24 hourly **AND** Metronidazole 12.5mg/kg IV (maximum 500mg) 12 hourly	Ceftriaxone 50mg/kg IV (maximum 4g) 24 hourly **AND** Metronidazole 12.5mg/kg IV (maximum 500mg) 12 hourly	Gentamicin 7.5mg/kg IV (maximum 560mg*) 24 hourly **AND** Clindamycin 15mg/kg IV (maximum 600mg) 8 hourly
CHOLANGITIS			Gentamicin 7.5mg/kg IV (maximum 560mg*) 24 hourly **AND** Metronidazole 12.5mg/kg IV (maximum 500mg) 12 hourly
BONE, JOINT, SOFT TISSUE, SKIN			
SEVERE CELLULITIS	Cefazolin 50mg/kg IV (maximum 2g) 8 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly		Ciprofloxacin 10mg/kg IV (maximum 400mg) 12 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly
SEVERE WATER EXPOSURE CELLULITIS	Ciprofloxacin 10mg/kg IV (maximum 400mg) 12 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly		
	ADD Clindamycin 15mg/kg IV (maximum 600mg) 8 hourly, if crocodile or shark bite.		

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ORBITAL CELLULITIS / SEVERE PERIORBITAL CELLULITIS	Ceftriaxone 50mg/kg IV (maximum 4g) 24 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly		Ciprofloxacin 10mg/kg IV (maximum 400mg) 12 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly
OSTEOMYELITIS/ SEPTIC ARTHRITIS	Cefazolin 50mg/kg IV (maximum 2g) 8 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly		Ciprofloxacin 10mg/kg IV (maximum 400mg) 12 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly
SUSPECTED NECROTISING FASCIITIS **Call surgeon and IFD**	Piperacillin/Tazobactam 100mg/kg IV (maximum 4g) 6 hourly **AND** Clindamycin 15mg/kg IV (maximum 600mg) 8 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly	Meropenem 25mg/kg IV (maximum 1g) 8 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly	
WOUND/TRAUMA			
SEVERE BITES (HUMAN, CAT, DOG)	Amoxicillin-Clavulanate 25mg/kg IV (maximum 2g) 8 hourly **AND** Vancomycin 15mg/kg IV (maximum 750mg) 6 hourly	Clindamycin 15mg/kg IV (maximum 600mg) 8 hourly **AND** Ciprofloxacin 10mg/kg IV (maximum 400mg) 12 hourly	

Sepsis Resources for Health Professionals