NT Health

Guideline

Due for review: 09/08/2028

Paediatric Primary Health Care Sepsis Recognition and Management

Contents

Applicability

This guideline must be considered by:

- Northern Territory Urban and Remote Primary Health Care Facilities; Prison Health; Police Watch Houses; Mental Health Services

This guideline must be used for the following:

- Patients from 0 to 12 years old

SEE SEPARATE DOCUMENT: PRIMARY HEALTH CARE PAEDIATRIC SEPSIS PATHWAY for easy reference to sepsis recognition and management.

NORTHERN TERRITORY GOVERNMENT

Guideline statement

This guideline provides additional information to:

- Provide guidance for best practice for sepsis recognition and management,
- Where sepsis is suspected, empower staff to escalate care to clinicians experienced in recognising and managing sepsis,
- Engage senior medical staff in sepsis recognition and management of patients,
- Support the provision of education and information to patient and carers.

Recommendations in this guideline are not intended to replace a clinician's good clinical judgement when presented with a patient with unique characteristics, and is not intended to set a standard for clinical care.

For remote primary health care (PHC) facilities, this guideline should be used in conjunction with the Remote Early Warning Score (REWS) and NT Health Paediatric Sepsis Pathway for Primary Health Care.

For urban facilities (Urban PHC, Prison Health, Police Watch Houses and Mental Health Services), this guideline shoud be used in conjunction with local escalation procedures and NT Health Paediatric Sepsis Pathway for Primary Health Care.

Policy suite

This guideline forms part of the following national ACSQHC Sepsis Clinical Care Standard suite for this topic. Related documents are also listed below:

- Sepsis Clinical Care Standard
- Antimicrobial Stewardship Clinical Care Standard
- CARPA Standard Treatment Manual for remote and rural practice: 8th edition
- Physiological Deterioration Patient Recognition and Management NT Health Policy
- Use of Observation Charts in Recognising and Responding to Clinical Deterioration NT Health Procedure
- Adult Acute Care Sepsis Recognition and Management NT Health Guideline
- Paediatric Acute Care Sepsis Recognition and Management NT Health Guideline
- Adult Primary Health Care Sepsis Recognition and Management NT Health Guideline
- Sepsis and Septic Shock RDH ICU Medical Guideline
- NT Health Acute Care Adult TER/EAR/BRR Sepsis Pathway
- NT Health Acute Care Adult CAR/BR Sepsis Pathway
- NT Health Acute Care Paediatric TER/EAR/BRR Sepsis Pathway
- NT Health Acute Care Paediatric CAR/BR Sepsis Pathway
- NT Health Primary Health Care Adult Sepsis Pathway
- NT Health Primary Health Care Paediatric Sepsis Pathway

Guideline details

Introduction

The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3):

Sepsis is life-threatening organ dysfunction due to a dysregulated host response to infection.

- It is important to diagnose sepsis quickly, but also not to over-diagnose. Most children with fever (with or without a focus) do not have sepsis (see sepsis recognition section).
- Septic shock in children is sepsis with evidence of cardiovascular organ dysfunction; hypotension is a late sign.
- Rapid vascular access, early initiation of empiric antimicrobials and carefully titrated fluid resuscitation is vital.
- Inotropes and vasopressors may be safely administered via peripheral or intraosseus access in children during initial resuscitation.

Sepsis is a time-critical medical emergency that arises when the body has a dysregulated response to an infection. This results in damage to the body's own tissues and organs, which can lead to septic shock and organ failure. Sepsis can be triggered by infections caused by bacteria, viruses, fungi, and parasites. Bacterial infections are the most common triggers.

Almost half of all global sepsis cases occur in children. The mortality rate for untreated septic shock is more than 80% and with treatment mortality rate is estimated at 15 to 20% in children. In Australia, Aboriginal and Torres Strait Islander children (median age was 1.7 years) are three times more likely to have sepsis that requires intensive care unit (ICU) admission. This reflects the social determinants of health and remoteness of the communities, coupled with transport issues to access medical care, which can result in poor health outcomes.

Early recognition of sepsis is important in all health care settings. The majority of sepsis cases arise in the community, therefore the first point of contact with health care workers in primary care, ambulance services or emergency departments (ED) is critical for the early detection of sepsis. Early recognition in non-acute and pre-hospital settings has been associated to faster treatment and improving outcomes. Literature suggests a sepsis improvement program, which includes screening and management tools can significantly decrease the time to recognise and manage sepsis, resulting in better survival rates.

The common themes of sepsis related deaths in the Northern Territory (NT) includes: patients of a young age, fit build, and delayed or missed sepsis recognition, diagnosis and administration of appropriate antibiotics.

Partnering with consumers

The patient and/or caregiver should be involved in all the clinical decision-making and the care planning process. Prior to evacuation and on return to community, care planning should involve discussions regarding the future healthcare that may be required post acute care including information on how to access services post-discharge.

The patient and/or caregiver should be provided with the sepsis consumer resources and relevant clinical information regarding the treatment they have had or may receive (refer to the staff intranet or internet sites to access local electronic resources). Goals of care and prognosis should be discussed and their wishes should be incorporated into the treatment and end-of-life care planning as appropriate.

Sepsis recognition

Lack of recognition prevents timely therapy. Sepsis screening is associated with earlier treatment

Early recognition and prompt treatment of sepsis through a formalised screening effort is necessary to reduce mortality risk. Sepsis is not a specific illness but rather a syndrome that can be recognised by a constellation of clinical signs and symptoms in a patient with suspected infection. There is no gold standard diagnostic test that exists to identify sepsis.

Sepsis may not be obvious in every child, it may be non-specific and subtle. Children may exhibit different physiological abnormalities, therefore a diagnosis should be based on clinical judgment and may be supported by relevant investigations. It is important to pay attention to patient risk factors and increase your suspicion of sepsis in these patients. Concerns expressed by the patient and/or caregivers, particularly changes to mental status are also an important consideration in clinical assessment.

In the Top End, sepsis can occur due to melioidosis, especially in the wet season. Consider melioidosis in all patients presenting with sepsis or septic shock. Please refer to the TEHS Melioidosis Guideline for diagnosis and management of melioidosis.

Could it be sepsis?

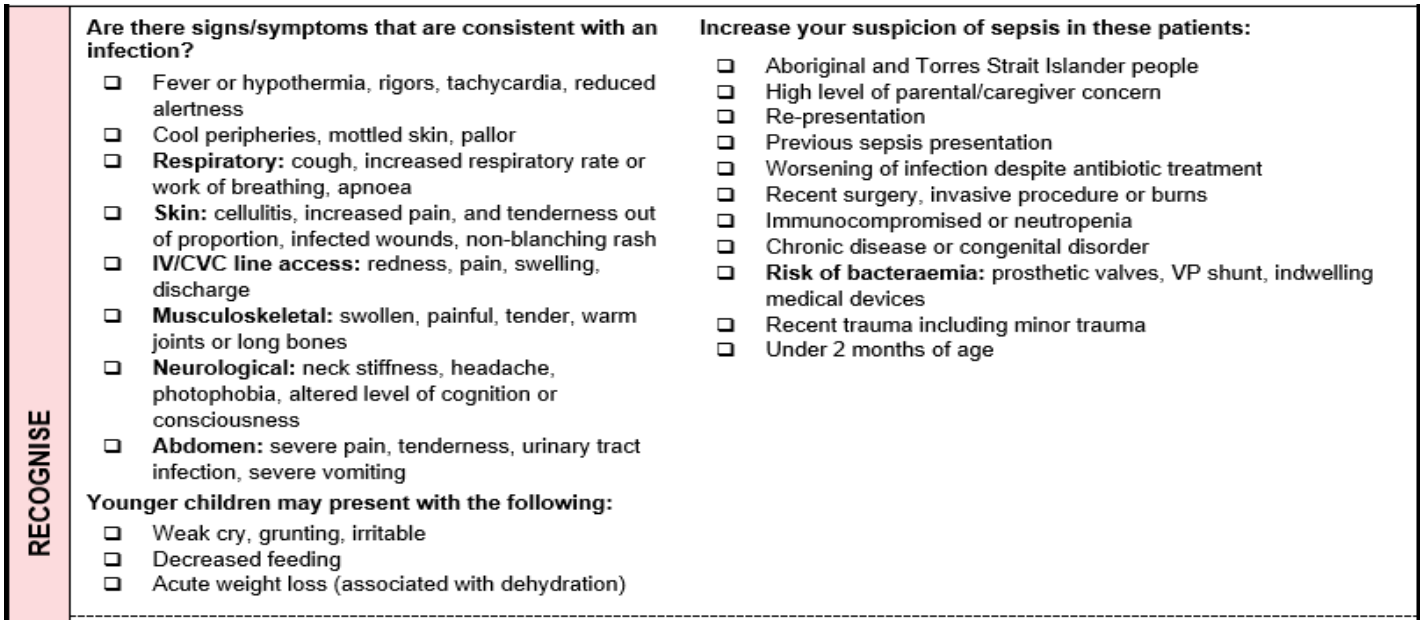
Screening for Sepsis should occur in all patients who have signs or symptoms of infection.

The sepsis pathway empowers clinicians to escalate to senior medical officer(s) and/or tertiary centre to determine the cause of clinical deterioration on the background of a suspected infection.

Sepsis or septic shock should be considered in a patient with a suspected or proven infection (as indicated by signs and symptoms in Figure 1) who presents with any of the following:

- Altered mental state
- Unwell appearance +/- non-blanching rash
- Abnormal vital signs and physiological indicators (Figure 2)
- Unexplained strong pain
- Toxin mediated signs which can include vomiting, diarrhoea, myalgia, conjunctival injection, confusion, collapse and a widespread erythematous rash. Toxin mediated sepsis is caused by superantigens from toxin-producing strains of *S. aureus* or Group A Streptococcus (GAS).

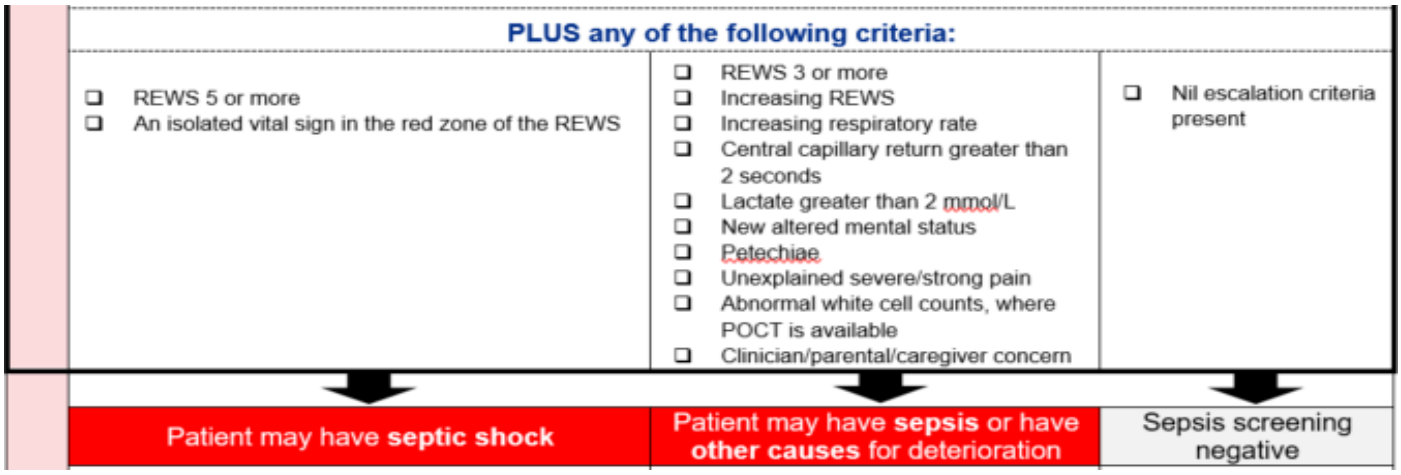
Figure 1: Signs and symptoms of infection



Signs that may suggest septic shock and rapid deterioration

Warm, flushed skin may be present in the early phases of sepsis. As sepsis progresses to shock, the skin may become cool due to redirection of blood flow to core organs. Additional signs of hypoperfusion include tachycardia, altered consciousness, restlessness, and oliguria or anuria.

Figure 2: Physiological indicators of septic shock and sepsis

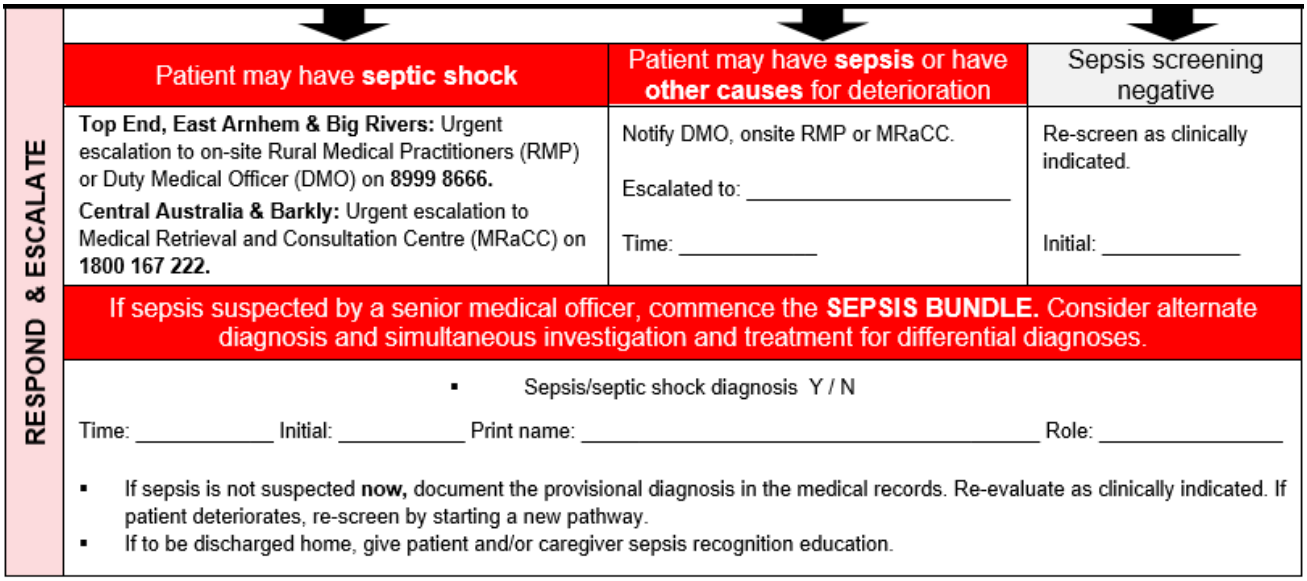


Sepsis response and escalation

Early response to suspected sepsis or septic shock through appropriate escalation to a senior medical officer or retrieval service as outlined in CARPA is crucial to ensure early initiation of appropriate treatment. The following response and escalation process should occur if patients meet the warning signs of deterioration. Urban facilities should follow local procedures for the escalation and transport for the deteriorating patient.

If sepsis screening is negative i.e. no escalation criteria is present, re-screen as clinically indicated by starting a new pathway.

Figure 3: Sepsis response and escalation



Initial sepsis management

"The culture is one of assuming least injury/illness rather than actively excluding the greatest illness/injury, this is particularly dangerous in a high morbidity cross cultural environment." Dr Didier Palmer, Executive Director RDPH.

Due to the remote setting of patients and/or potential for rapid deterioration, sepsis requires early transfer to a hospital facility. Early involvement of the DMO, MRaCC or tertiary centre to allow this process to occur is essential. Evacuation/transfer is a key component of the management plan for acutely unwell remote patients.

Clinical judgement is required to balance the risk of over treatment/investigation. It may be more appropriate to collect targeted cultures and investigations within 2 to 3 hours for those patients with vague presentations and who not meet the screening criteria for septic shock or sepsis.

Initial sepsis management consists of undertaking 6 key actions within 60 minutes in the sepsis bundle, including assessment of airway, breathing, circulation and disability as per advanced life support (ALS) principles. This pathway supports appropriate treatment is initiated **as soon as possible** after recognition or strong suspicion and within 60 minutes for both sepsis and septic shock. If there are known delays in patient retrieval i.e. longer than one hour, it is recommended treatment be commenced on site, with antibiotic prescription by retrieval consultant, or paediatric IFD Specialist (office hours) or Paediatrician on-call (after hours and weekends). Relevant antibiotics should be kept on imprest in remote clinics as per CARPA – Sepsis Management and/or NT Health Acute Care Paediatric Sepsis Pathway (TER/EAR/BRR or CAR/BR). Evidence suggests that a delay in the first dose of antibiotics beyond 60 minutes of presentation has been associated with increased in-hospital mortality.

Urban primary health care facilities, prison health, police watch houses and mental health services may be limited in their capacity to implement the 6 key actions in the sepsis bundle. Early escalation is vital in this setting to ensure rapid transport to a tertiary setting.

Table 1: Sepsis management – Sepsis bundle

Actions	Details
1. Consider oxygen therapy	• Administer oxygen if required. Maintain saturations 94% and above.
2. Establish intravenous (IV) access	• If IV access is unsuccessful after two attempts, consider intraosseous (IO). Do not delay antibiotics.

3. Collect blood cultures and lactate.
Other cultures and investigations as clinically indicated.
Aim to collect cultures prior to antibiotics
	• Point of care testing should be performed including CHEM8+ and CG4+.
	• Paediatric collections to comprise of one paediatric aerobic bottle inoculated with 1–4 mL of blood (4 mL is optimal). If child has a central venous catheter (CVC) collect blood culture from the CVC.
	• The risk-benefit ratio favours rapid administration of antimicrobials if it is not logistically possible to obtain cultures promptly.
	• Lactate can be obtained from CG4+ point of care testing. Lactate is a useful marker of the severity of sepsis and sepsis is more likely to be present if lactate is greater than 2 mmol/L.
	• Other investigations can include:
	  ○ the Blood tests: blood glucose level, FBC, CRP, LFT, coagulation studies (PT, APTT), UEC.
	  ○ Other cultures as clinically indicated: sputum, urine (and urinalysis) and wound cultures, joint aspirates, melioid rectal and throat swabs.
	  ○ Other cultures/investigations may include lumbar puncture. CXR and other radiology as clinically indicated. Consider myocarditis or cardiomyopathy if cold shock with tachycardia, or deterioration with fluid bolus. CXR may be used to diagnose cardiomegaly.
	• Send culture pathology with the patient to the hospital.

4. Administer intravenous (IV) antibiotics (consider possible source)	• Administer IV/IM antibiotics (check allergies). If sepsis, give ceftriaxone 50mg/kg IV/IM. If septic shock, give ceftriaxone 100mg/kg IV/IM and gentamicin 7.5mg/kg IV/IM (maximum 560mg). Discuss with on-call paediatrician for advice. • If an abscess, septic arthritis or necrotising fasciitis is suspected, DMO or MRaCC to consult senior surgical doctor for advice. Note necrotising fasciitis is a surgical emergency. • Nursing staff should be informed of urgent need to administer antibiotics and they should be administered in order of shortest to longest administration time as outlined in the Australian Injectable Drugs Handbook. • Seek IFD/senior pharmacist advice where there is a requirement for oral/IM administration if IV/IO access cannot be obtained.
5. Assess fluid and consider fluid resuscitation	• Consider 10 mL/kg of 0.9% Sodium Chloride. Refer to *Fluid Management (Paediatrics) RDH Guideline [archived on 16/05/2024]* and Intravenous (IV) Fluids (Paediatric) CAHS Guideline. • If no response, consider inotropes in consultation with DMO, on-site RMP, MRaCC, medical retrieval service. **If vasopressors required,** consider adrenaline 0.05 mcg/kg/min to 0.3 mcg/kg/min.

Actions	Details
6. Monitor signs of deterioration and urine output	• Patients with sepsis or septic shock should be closely monitored, due to high risk of clinical deterioration. • While waiting for retrieval service monitor vital signs every 15 minutes and urine output every 60 minutes. • If warranted, consider IDC insertion.

Figure 4: Sepsis bundle

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 intraosseous (IO) access.	▪ Access established	Y / N
3. **Perform tests, prioritising blood taken in the following order: blood cultures prior to antibiotics, CG4+ and CHEM8+.** Do not delay antibiotics if unable to collect or inadequate sample or analyser issues. Other investigations as indicated: urinalysis, sputum, wound swabs, melioidosis, pathology or stool samples. Send culture pathology with the patient to the hospital.	▪ Blood cultures collected ▪ Lactate collected Lactate level: _____ mmol/L	Y / N Y / N
4. **Administer IV/IM antibiotics (check allergies)** If sepsis give ceftriaxone 50mg/kg IV/IM If septic shock, give ceftriaxone 100mg/kg IV/IM and gentamicin 7.5mg/kg IV/IM (maximum 560mg) Discuss with on-call paediatrician for advice. Ensure nursing staff administer antibiotics immediately. If surgical source suspected, MRaCC/DMO to consult surgical team.	▪ 1st antimicrobial commenced ▪ 2nd antimicrobial commenced	Y / N Y / N
5. **Assess fluid state and consider fluid resuscitation** Use 10 mL/kg (0.9% sodium chloride or Hartmann's) bolus. Consider inotropes / vasopressors early in consultation with MRaCC or CareFlight or Emergency Specialist: Adrenaline 1 to 10mcg/kg/hour IV as per 'Adrenaline Infusion PHC Remote Guideline'. *The guideline requires the administration rate is calculated by the retrieval consultant.*	▪ Fluids administered ▪ Inotropes required	Y / N Y / N
6. **Monitor signs of deterioration and urine output** While waiting for the retrieval service, monitor vital signs and calculate REWS every 15 to 30 minutes (as per CARPA) 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 and monitor

Close monitoring of observations is recommended for patients with suspected or confirmed sepsis due to high risk of clinical deterioration. Repeat observations and REWS calculation should adhere to the appropriate endorsed CARPA Guidelines. Urban facilities to follow local procedures for ongoing monitoring until transfer.

Medical officers may request targeted vital signs based on the individual context and this should be clearly documented in the medical records in accordance with the observation chart in recognising and responding to clinical deterioration procedure. Figure 5 is a snapshot of the process outlined on the pathway (Appendix A).

Figure 5: Re-assess and monitor

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

Upon medical review, Medical Officer(s) should consider the following:

- Source of infection should be re-reviewed and determined as soon as possible. Appropriate investigations and/or referral to determine the source of infection should be undertaken as a matter of urgency,
- Ensure appropriate antibiotic regimen for source control,
- Discuss with medical retrieval service officer and/or other specialists such as paediatric infectious disease specialist (office hours Monday-Friday) or on-call Paediatrician (after-hours and weekends), ICU physicians or surgeons as appropriate, and
- Consider expediting retrieval if possible.

Referral to a higher level of care

Patients managed in remote clinics or the community after being diagnosed with suspected sepsis are at risk of deterioration. Urgent referral to a tertiary hospital should be prioritised. Prior to retrieval, consideration of an escort for those patients whose disposition is likely intensive care units needs to occur. Ensure appropriate nursing staff and retrieval team composition is allocated to care for the patient so they can be closely monitored.

ISOBAR or ISBAR and the sepsis pathway should be used to communicate critical information upon handover to ensure the right information is provided to the receiving team to continue to provide care for the patient. Ensure all culture pathology are provided to the retrieval team (if able to collect i.e. urban facilities may not have equipment available).

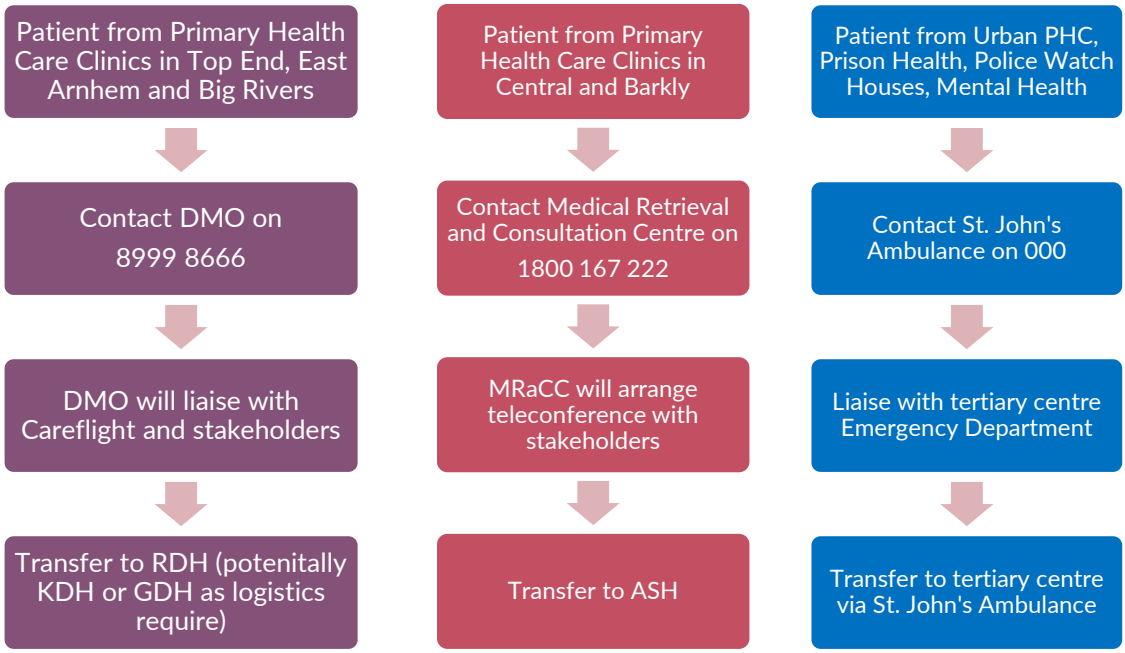
Figure 6: Referral to a higher level of care

HANDOVER

Prepare for Transfer: *Tick once completed.*

- ❑ Follow local transfer procedure
- ❑ Sepsis diagnosis and management plan discussed with patient/family/caregiver and education provided, arrange an escort if required
- ❑ Use ISOBAR/ISBAR to handover to receiving team
- ❑ Handover culture pathology to the retrieval team
- ❑ Handover copy of sepsis pathway to the retrieval team

Figure 7: Referral to a higher level of care for remote primary health care clinics



Ongoing management plan in primary health care setting while awaiting retrieval

The components of ongoing care of patients with sepsis will vary depending on the source of infection as well as the severity of a patient's illness, underlying illnesses and/or immunosuppression.

Critical information and management plan should be clearly documented in the patient's medical record to ensure a communication of the management plan to clinicians involved in the ongoing care of the patient. Refer to The Clinical Record Documentation NT Hospitals Policy that outlines the requirements for clinical documentation. The management plan should be communicated at handover and to the senior doctor, medical retrieval team and the patient and/or caregiver.

Any variation in care to the sepsis pathway should be documented in the medical record.

In addition to regular documentation, documentation in relation to sepsis should include (where able):

- Likely source of infection
- Any further investigation plans
- Frequency of observations and monitoring, e.g. every 15 to 30 minutes as per CARPA (remote PHC) or local procedures for recognition of the deteriorating patient (urban facilities)
- Fluid balance
- Medications that are withheld
- Antibiotic regimen as per CARPA and in consultation with retrieval specialists/IFD
- Consultation with relevant specialists e.g. infectious diseases, paediatric or intensive care teams, and multidisciplinary team e.g. interpreters and/or Aboriginal Liaison Officer as required.

Care planning on return to home or to community from hospital

Sepsis can have long-lasting effects including altered immunological, physiological, psychological and cognitive functioning. Discuss the cognitive and psychological effects that may occur after diagnosis and treatment for sepsis, including fatigue and anxiety. Ensure follow-up requirements have been discussed with the patient and carers, and ensure this is reflected in the electronic health record/recall management system.

Discharge documention from acute care services must include;

- A formal diagnosis of sepsis,
- A referral to the usual primary care provider with a plan for any follow-up requirements,
- Details of the senior clinician or care coordinator where appropriate.
- Contact details for follow up requirements such as Allied Health, Outpatients or Community Clinic, emotional and social wellbeing support.

Education requirements

Each service has its own dedicated sepsis teaching programs that includes sepsis education in all:

- medical and nursing orientation or induction packages, and
- regular dedicated competency-based sessions throughout the year which includes sepsis simulation.

Completion of the sepsis e-module via MyLearning or RAHC is recommended prior to attending face-to-face courses, e.g. Remote Emergency Course, Central Australia Remote Emergency (CARE) course.

Monitoring

NT Health quarterly sepsis dashboard (outcome measure) reports and six monthly (process measure) auditing is used to monitor the effectiveness of sepsis pathways in detecting sepsis. Each region is responsible for their own monitoring via Business Intelligence system and/or auditing, reporting and related quality improvements. Monitoring will have oversight by the NT Health Sepsis Standard Committee and NT Health Clinical Goverance Committee.

Accessibility

Sepsis pathways are available via Darwin Stores with a specific HR code:

- Primary health care paediatric sepsis pathway – HR543c-02/23

Refer to the sepsis staff intranet or internet sites for further information about ordering sepsis pathways and viewing samples of same.

Roles and responsibility

Sepsis patients must have an overarching lead consultant responsible for their care. When multiple teams are involved, communications between teams must be at Consultant level.

Antimicrobial Stewardship (AMS) teams are responsible for keeping sepsis pathway antibiotic recommendations up to date. A formal review shall be undertaken every six months.

Definitions

The following definition(s) are relevant to this guideline.

Term	Definition
ACSQHC	Australian Commission on Safety and Quality in Health Care.
AMS	Antimicrobial Stewardship – the ongoing effort by a health service organisation to optimise antimicrobial use among patients 'to improve patient outcomes, ensure cost-effective therapy and reduce adverse sequalae of antimicrobial use, including antimicrobial resistance.
CARPA	Central Australian Rural Practitioners Association – Standard Treatment Manual for remote and rural practice.
DMO	District Medical Officer – A senior physician of a health agency, usually at the district level, who is responsible and accountable fo providing quality medical care within that setting.
MRaCC	Medical Retrieval and Consultation Centre – Provides a 24-hour, single point-of-contact emergency consultation service for clinicians, and operates a medical retrieval service for acute care cases, inter-hospital transfers and repatriation of patients back to country.
REWS	Remote Early Warning Score – a guide used by medical services to quickly determine the degree of illness of a patient based on vital signs.
RMP	Rural Medical Practitioner – General Practitioners who provide primary care services, emergency medicine and have training in additional skills like obstetrics, anaesthetics or mental health services.

Document history

Document metadata		
Document Owner	Sepsis Nurse Management Consultant, NT Health	
Document Approver	Karen Stringer - Chief Medical Officer, NT Health Chair, NT Health Clinical Policy Committee	
Author	Julie Tran, Sandra Brownlea	
HEALTHINTRA-ID	HEALTHINTRA-1627664142-58308	
Content Manager ID	EDOC2021/432289	
Version Number: | Version: 12.0 |	**Approved Date:** 09/08/2023	**Review Date:** 09/08/2028

National Safety and Quality Health Service standards

National Safety and Quality Health Service standards							
Clinical Governance	Partnering with Consumers	Preventing and Controlling Healthcare Associated Infection	Medication Safety	Comprehensive Care	Communicating for Safety	Blood Management	Recognising & Responding to Acute Deterioration
☒	☒	☐	☐	☒	☒	☐	☒