St John

Clinical Practice Manual

St John Ambulance Australia (NT) Inc.

Version 1.3 2022

Contents

Foreword and Acknowledgment

This Clinical Practice Manual has been developed and approved for the use of St John Ambulance

Australia (NT) Inc (St John NT) staff by the Medical Advisory Panel. This practice manual is provided to support the clinical decision-making of:

- Advanced Responders (AR)
- Patient Transport Officers (PTO)
- Ambulance Paramedics (AP)
- Intensive Care Paramedics (ICP).

It is important that clinicians of all levels who rely on the information within this document ensure independent verification of the accuracy, currency and completeness, including version history.

The Clinical Practice Manual 2022 represents some of the most contemporary clinical practice and care developments for first responders, patient transport and paramedics alike. Its development involved reviewing the clinical practice and management guidelines of

many of the services represented by the Council of Ambulance Authorities, thus leveraging off the research and development of larger services. St John NT would like to particularly thank Ambulance Victoria and Queensland Ambulance Service for sharing their guidelines, procedures and assessment tools, which supported the development of this manual.

I would like to acknowledge the work of the late Paul Bellman, Regional Manager Southern, Intensive Care Paramedic and Adj. Clinical Associate professor, Charles Darwin University. Paul was instrumental in the development and release of this document. He brought an extensive range of experience and knowledge to our service and played an active role in community events. Thanks also to the members of the various committees, administrative support and individual paramedics for their assistance in feedback, input, review and quality assurance as this manual has gone through the various clinical approvals and reviews.

It is the hope that this update of the Clinical Practice Manual and subsequent Clinical Development and Education will allow the advanced responders, patient transport officers and paramedics of the Northern Territory to deliver the highest clinical standards of out-of-hospital care to the community and those who require our assistance across the Territory.

Andrew Thomas

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Disclaimer:

Treatments and medication ranges in the CPM are in line with current best practice for the majority of situations. St. John NT supports clinicians to use their clinical judgment to provide reduced doses of medication in situations that they believe will benefit patient safety. These situations should be reviewed to both confirm the appropriateness of the modified intervention, and ensure contemporary CPM dose's validity.

The Clinical Practice Manual is expressly intended for use by St John Ambulance Australia (NT) Inc. (St John NT) advanced responders, patient transport officers and paramedics when performing their duties and/or delivering ambulance services for, and on behalf of, St John NT.

St John NT disclaims, to the maximum extent permitted by law, all responsibility and liability (including without limitation, liability in negligence) for all expenses, losses, damages and costs incurred for any reason associated with the use of this manual, including the materials within or referred to throughout this document being in any way inaccurate, out of context, incomplete or unavailable.

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Any feedback or suggestions should be forwarded to **cpm@stjohnnt.asn.au**

Letter from the Chief Executive Officer

August 2021

Dear All,

To support us in delivering our vision for high-quality care for our community, whether that be through emergency medical responses, the provision of primary healthcare or providing medical assistance at community and major events, we have developed contemporary, evidenced-based clinical guidelines that promote the provision of quality healthcare and safe delivery of clinical interventions.

The development of the guidelines has been from an evidence-based approach combining the best research available with expert consensus on best practice, reviewed by a multi-disciplinary team of clinicians.

These guidelines, accompanied by structured education, supported by our clinical governance framework and delivered within our Just Culture will ensure we are well placed to deliver care in all circumstances, across all clinical levels anywhere in the Northern Territory.

Through the implementation and constant review and updating of these guidelines, we will ensure that our community will receive from us the best possible care and that we will deliver improved health outcomes for all Territorians.

Judith Barker

Chief Executive Officer
St John Ambulance Australia (NT) Inc.

Letter from the Chief Medical Officer

August 2021

Dear Colleague,

Absolute consensus is impossible in work such as the authors; but their and other contributing experts' efforts to support your labours with a parsimonious, practical, and evidence-based resource are to be commended. Read these exceptional efforts through your lens as a clinician, applying your own professional knowledge, adaptability and logic to any necessary modifications; for instance, due to COVID-19.

This CPM demonstrates St John NT entrusting you with some advanced therapies not available to many of your ambulance colleagues in other services; in recognition of:

- your dedication;
- your care;
- your knowledge;
- your skills; and,
- the unique Territory clinical, environmental and cultural contexts in which you undertake your profession.

Own this trust. Reciprocate this trust by submitting concerns, corrections, suggestions or feedback to cpm@stjohnnt.asn.au so that we may all bring our best selves to our patients, and each other.

… pro utilitate hominum

Dr Tom Quigley

Chief Medical Officer
St John Ambulance Australia (NT) Inc.

Clinical Procedures

P001 - Clinical Approach

The clinical approach is the underpinning procedure for the application of all clinical guidelines and pharmacology management of patients. This sets the principles for assessment and provides a systematic, structured, reproducible and comprehensive assessment of the health status of our patients, and supports the management decisions taken by the treating clinician.

Initial Actions and Considerations

- Bias and human factors have the potential to impact all aspects of our assessment of patients and then any decisions made for provision of care. It is important for all clinicians to ensure we recognise, consider and discuss them throughout care.
- Factors such as found in the 'HALTS' self-assessment should be considered and actions taken to limit their impact on your ability to provide an objective assessment. Ask yourself, are you **Hungry, Angry, Late, Tired or Stressed?**
- Patients from marginalised populations are at greater risk of harm from both conscious and unconscious bias. These risks include patients from a low socioeconomic background, culturally and linguistically diverse backgrounds, Aboriginal or Torres Strait Islanders, and those who are substance affected, have a mental health-related presentation or behavioural disturbances.
- Care should also be taken to not compartmentalise your approach based on dispatch information alone, as this also presents a risk to patient safety.

Rapid Initial Assessment

- The process of undertaking a complete patient assessment is ongoing, dynamic, adaptive and cyclical and requires regular reassessment and prioritisation of tasks/treatments, especially in patients who are moderately or critically unwell. You should also undertake regular reassessment of patients to assess the effectiveness of care provided.
- Undertake regular risk assessments and identify any dangers (dynamic risk assessments); mitigate or remove dangers where possible; and do not place yourself, our response partners or bystanders at risk to manage high-risk patients. If necessary, rapidly and safely remove patient from dangers/risks.
- Rapidly assess the patient's need for a more detailed initial (primary) assessment if deemed unwell or if they are non-serious and appear well; continue to history and structured (secondary) assessment.
- Establish a rapport with patient and bystanders; position patient appropriately and provide reassurance as required.
- Establish early consent to assess and treat.
- Position patient appropriately
- If indicated undertake a primary assessment of:
  - **R**esponse (AVPU);
  - **A**irway (open and patent);
  - **B**reathing (work of breathing);
  - **C**irculation (pulses and haemorrhage control);
  - **D**isability;
  - **E**xposure/environmental concerns.
- Provide an early SITREP and request any assistance or ICP backup early as indicated.
- Establish if any Advanced Personal Plan, Not for Resuscitation Orders or limitation of treatment directives exist and their documentation if available.
- Concurrently manage life-threatening findings with appropriate interventions, including commencement of resuscitation strategies.

History, Vital Signs & Secondary Assessments

- Gain a history of this event from the patient:
  - timeline of event/incident/complaint;
  - nature of the case;
  - any pertinent lead-up information (prodromal symptoms);
  - previous similar history;
  - aggravating or relieving factors.
- Assess vital signs and apply appropriate assessment adjuncts as indicated:
  - Perfusion Status Assessment (PSA);
  - Respiratory Status Assessment (RSA);
  - Glasgow Coma Score (GCS);
  - Neurological/Mental Health Assessment (MHA);
  - temperature;
  - Blood Glucose Level (BGL);
  - Oxygen saturation and expired carbon dioxide measurement (SpO_2 and $EtCO_2$);
  - Electrocardiogram (ECG), either four- or 12-lead as indicated;
  - Ultrasound (eFAST/POCUS) as indicated;
  - point of care blood testing as indicated (iSTAT or similar).
- Past history:
  - medical conditions, either known or suspected;
  - medications taken or ceased recently;
  - allergies, medicine or other relevant;
  - risk factors such as age, family history, smoking, frailty, alcohol or drug use etc.
- Secondary survey:
  - general physical examination;
  - auscultation, exposure/visualisation and palpation as indicated;
  - trauma head to toes assessment;
  - focused assessments as indicated in relevant CPGs.
- Social or environmental factors:
  - consider any social or environmental impacts on the patient's health.

Provisional Diagnosis

- Consideration of differentials:
  - identify any possible causes of the patient's presentation;
  - refine the list into possible conditions or causes;
  - prioritise them based on likelihood and urgency;
  - identify a working or provisional diagnosis or grouping of clinical problems.
- Apply clinical judgement:
  - clinical judgement can be a subjective process. Discuss or seek assistance where required to assist, minimise risks where possible and consider consultation if backup not available;
  - create a hierarchy of clinical problems requiring management and consider them whilst forming your diagnosis.

Care Pathway and Management

- ***Plan:***
  - discuss possible care plans or pathways, treatment options, risks and benefits;
  - reaffirm that you have the patient's consent where capacity is deemed (**refer P003 Clinical Safety**);
  - decide and establish a collective understanding amongst clinicians, patient and, where necessary, family/guardians/carers;
  - prepare for care, suitable and appropriate resources, logistics and access for extrication, task allocation, contingencies and fall-back positions. Assess ability to ambulate or self-extricate (**as per P003 Clinical Safety**).
- ***Implementation:***
  - escalation of care requirements considered, has been ICP backup requested;
  - treatment per relevant CPG/s;
  - transport or referral (treat and release).
- ***Reassess:***
  - monitor trends and effectiveness of treatment;
  - monitor vital signs, ideally minimum of two sets and where multiple sets required 15-minutely;
  - identify deterioration and escalate care as required – summon assistance;
  - review the diagnosis and evaluate overall care – adjust as necessary.

Transfer of Care

- Refer to another appropriate healthcare provider and document advice given.
- Be mindful of bias, ensure documentation and handover are as objective and factual as possible.
- Hand over to healthcare facility, clinic or hospital staff (IMIST-AMBO/ISOBAR).

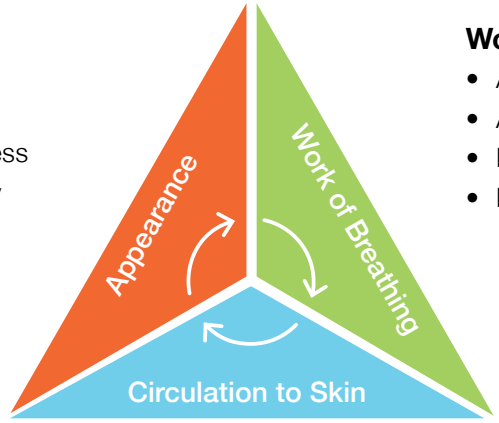
Paediatric Considerations

- The Paediatric Assessment Triangle provides an accurate method for a simple "first impression" assessment to guide urgency of care, particularly for non-verbal children. It can be conducted rapidly and without equipment. If the patient exhibits abnormal findings then proceed immediately to the primary survey.

Paediatric definition	Age
Newborn	Birth to 24hrs
Small infant	Under 3 months
Large infant	3 – 12 months
Small child	1 – 4 years
Medium child	5 – 11 years

Paediatric Assessment Triangle

Appearance
- Tone
- Interactiveness
- Consolability
- Look/Gaze
- Speech/Cry



Work of Breathing
- Abnormal Breath Sounds
- Abnormal Positioning
- Retractions
- Nasal Flaring

Circulation to the Skin
- Pallor
- Mottling
- Cyanosis

Criteria	Well Child	Unwell Child
Tone	Active, reaching, moving, strong grip	Still, floppy, quiet
Interactivity	Interested in the environment, looking smiling	Not interested in surroundings
Consolability	Easily comforted/consoled	Inconsolable
Look & gaze	Looks at caregivers or items of interest	Staring, not engaging in eye contact
Speech & cry	Cries	Moaning, grunting or quiet

Normal Paediatric Values	Heart Rate	Blood Pressure	Respiration Rates
Newborn	110 – 170 bpm	>60mmHg systolic	25 – 60 rpm
Small Infant	110 – 170 bpm	>60mmHg systolic	25 – 60 rpm
Large Infant	105 – 165 bpm	>65mmHg systolic	25 – 55 rpm
Small Child	85 – 150 bpm	>70mmHg systolic	20 – 40 rpm
Medium Child	70 – 135 bpm	>80mmHg systolic	16 – 34 rpm

The adequate perfusion vital signs are based on hospital data for well children. They reflect the vital signs used by paediatric services trigger a medical review for a paediatric inpatient. They can be modified based on clinical context. The clinical trend for the patient is as important as the threshold limits and a patient who is moving through the adequate range towards inadequate perfusion should trigger attention prior to crossing the threshold.

The pattern of change in variables is often more important than the value itself. For example, a heart rate that is steadily rising through the acceptable range should trigger attention

- Repeated observations are essential
- Look at previous measurements in the same child, earlier in the care, or during prior attendance
- Consider measurements in the clinical context of the child

These values are generally the 5th and 95th percentile values for each paediatric variable, rounded to more workable values

Paediatric Weigh Calculation

Paediatrics are children 11yrs and under, 12 and above are managed per adults. For children various treatments are based on body weight, such as drug doses, defibrillation joules and fluid volume. It is acceptable to ask a parent the patient's weight. If weight is unknown, it can be estimated using the following guide:

Age	Weight
< 24 hours	3.5kg
3 months	6kg
6 months	8kg
1 – 11 yrs	2 x (age + 4)

ETT Size Calculator: Age / 4 + 3.5 = Cuffed Tube Size & Age / 2 + 12 = Length at Lips

This is a guide only, always have half sizes available and confirm placement with bilateral chest auscultation and recheck ETT placement frequently, especially after patient movement.

Paediatric Quick Reference Chart

Age	0	3m	6m	1	2	3	4	5	6	7	8	9	10	11	Yrs
Weight	**3.5**	**6**	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**	**30**	**kg**
Resps Normal lower limit	25	25	25	20	20	20	20	16	16	16	16	16	16	16	/min
Resps Normal upper limit	60	60	55	40	40	40	40	34	34	34	34	34	34	34	/min
Pulse Normal lower limit	110	110	105	85	85	85	85	70	70	70	70	70	70	70	/min
Pulse Normal upper limit	170	170	165	150	150	150	135	135	135	135	135	135	135	135	/min
SBP Normal lower limit	60	60	65	70	70	70	70	80	80	80	80	80	80	80	mmhg
ETT Internal diameter	3.5	3.5	3.5	4.0	4.5	5.0	5.0	5.5	5.5	6.0	6.0	6.5	6.5	7.0	mm
ETT Length at lips	9.5	9.5	11	12	13	13.5	14	14.5	15	15.5	16	16.5	17	17.5	cm
Naso/Orogastric Tube	6-8	12	12	12	12	12	12	14	14	14	14	14	14	14	FG
Suction Catheter for ETT	6	6	6	6	8	8	8	10	10	10	10	10	10	12	FG
DCCS (Biphasic) 4 joules/kg	15	20	30	50	50	70	70	100	100	100	100	120	150	150	Joules

(Source: Ambulance Victoria Clinical Practice Guidelines)

Paediatric Cannulation and Intraosseous Insertion

Due to the infrequent nature of these procedures, skill maintenance and limited experience for most Ambulance Paramedics it is preferable that IV and IO access be initiated by an Intensive Care Paramedic (ICP) for all paediatric patients (age 11 or below). If an ICP is unavailable or delayed then Ambulance Paramedics can consult prior to establishing access for the purpose of fluid administration.

The exception to this is ***during cardiac arrest where both procedures may be performed without the need for consultation.*** Ambulance Paramedics may initiate IV/IO access (limit of two attempts) where there is a clear emergent need for fluid administration and contact cannot be made for consultation.

P002 - Principles of High Performance CPR

High-performance cardiopulmonary resuscitation (CPR) prioritises early defibrillation and high-quality chest compressions with a focus on rate, depth and full recoil. It relies heavily on a teams-based approach, appropriate role delineation and effective communication.

Key Principles

- Move the patient to a location quickly (where possible) where the team are able to establish 360-degree access to them.
- Ensure that team roles are assigned, appropriate direction and briefing is provided to all responders, and that adequate resources have been requested to support ongoing resuscitation efforts.
- If there is any doubt to the presence of a pulse, then immediately commence CPR aiming for the following:
  - rate 100–120 a minute;
  - depth of >5cm for Adults and 1/3 chest depth for paediatrics;
  - allow full recoil of the chest;
  - allow one second for adequate ventilation with BVM (prior to SGA insertion);
  - minimise interruption to chest compressions;
  - focus on team performance and communications;
  - first DCCS should be delivered within two minutes of arrival;
  - charge defibrillator during compressions;
  - perform rhythm analysis on screen and *shock if doubt exists to the rhythm present* (considering fine VF or wide pulseless rhythm);
  - hover hands over the chest and immediately resume compressions after defibrillation or decision taken to disarm;
  - switch out responders undertaking chest compressions every two minutes to ensure fatigue and quality is managed.
- Undertake gastric decompression as soon as resources allow, post placement of SGA or ETT.
- Assess temperature and BGL and manage accordingly.
- Prepare for ROSC and extrication.
- Consider need for use of mCPR device.

P003 – Clinical Risk, Consent, Care Refusal and Non-Transport

Clinical safety encompasses all of the considerations that are made during both the assessment and management of care we deliver to patients. These are not considered additional or stand-alone, but should form part of your consideration and be accounted for in all circumstances.

Risks to Patient Safety

Patients who are at risk of deterioration or adverse outcomes if not transported must be taken to hospital by ambulance barring valid refusal. Transport may be facilitated by other appropriate means in some circumstances.

Consider any risk of diagnostic error:

- diagnostic uncertainty;
- bias or human factors;
- elder and frail, or the very young;
- communication difficulties;
- current or significant history of drug and alcohol use and intoxication;
- history of mental health problems;
- Aboriginal or Torres Strait Islander;
- multiple comorbidities, complex medical history;
- patients on five or greater medications concurrently;
- rare medical conditions;
- highly emotive scenes.

Consider risk of deterioration:

- expected clinical course or trajectory;
- borderline vital signs;
- history of falls, stroke, TIA, AFib and on anticoagulation therapies;
- failure to respond to community-based treatment as expected.

Consider social and environmental risks, or access to care:

- risks to the safety of the patient;
- poor health literacy;
- adequate shelter and warmth;
- the supply of required/regular medications;
- ability to access necessary health services or further help if required.

Clinical Indicators of Risk

Red Indicators mandate that paramedics maintain a high index of suspicion of serious injury or illness, and nearly always the patient should be transported. However, where transport is believed to not be required (eg in circumstances of palliatiave care with care needs able to be met outside hospital) or refused it is advised to consult with your Duty Manager or Clinical Consult Line (ICP DAT). The presence of red indicators does not mandate the need for ICP attendance and the list is not exhaustive.

Red Indicators

- abnormal vitals signs – HR >120 bpm, RR >30 per min, SBP <90mmHg, SpO_2 <90% or GCS<15;
- stridor;
- first presentation seizure;
- anaphylaxis, including resolved post adrenaline;
- acute coronary syndromes;
- ectopic pregnancy (known or suspected);
- primary obstetric issues;
- stroke or TIA;
- sudden onset severe headache;
- inability to walk, when usually able;
- post tonsillectomy bleeding within 14 days of procedure.

Yellow Indicators do not mandate transport; however, patients with one or more yellow indicators must be advised to attend hospital or seek further medical attention, this includes GP or clinic assessment within a reasonable, prescribed timeframe via other means.

Yellow Indicators

- ongoing patient or carer concerns;
- infection not responding to community-based care;
- any immunocompromised patients with suspected infection (this includes chemotherapy, organ transplant, HIV/AIDS and Rheumatoid arthritis therapies);
- frailty;
- surgical procedure within past 14 days;
- significant unexplained pain (score >5);
- syncope, including asymptomatic with normal ECG and vital signs;
- abdominal pain.

Ideally yellow patients will have the capacity to attend their own GP, health clinic or hospital.

Frailty Scale

When screening and assessing for frailty, we should consider a person's physical performance, nutritional status, cognition and mental health and be proactive in providing tailored care when the person is accessing the service. Considerations should be given to overall care, medication management (they may already have significant polypharmacy), falls, increased risks and procedural complications and patient ambulation or restriction of movement during assessment and transport.

Very Fit – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are amoung the fittest for their age.

Well – People who have no active disease symptoms but are less fit than category 1. Often, they exercise or are very active occasionally, e.g. seasonally.

Managing Well – People whose medical problems are well controlled, but are not regularly active beyond routine walking.

Vulnerable – While not dependent on others for daily help, often symptoms limit activities. A common complaint is being "slowed up", and/or being tired during the day.

Mildly Frail – These people often have more evident slowing, and need help in high order IADLs (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.

Moderately Frail – People need help with all outside activities and with keeping house. Inside, they often have problems with stairs and need help with bathing and might need minimal assistance (cuing, standby) with dressing.

Severely Frail – Completely dependent for personal care, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within – 6 months)

Very Severely Frail – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.

Terminally Ill – Approaching the end of life. This category applies to people with a life expectancy <6 months, who are not otherwise evidently frail.

Scoring frailty in people with dementia

The degree of frailty corresponds to the degree of dementia. Common **symptoms in mild dementia** include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

In **moderate dementia**, recent memory is very impaired, even though they seemingly can remember their past life events well. The can do personal care with prompting.

In **severe dementia**, they cannot do personal care without help.

Ambulation Assessment

Ambulation assessment should be performed to ascertain a patient's ability to mobilise and weight-bear, and the limit of self-mobility they have prior to extrication or patient movement. This takes into account the frailty status of a patient, their current presentation and any pre-incident or event capacity restrictions, including use of the sit/stand/walk assessment.

The aim is to ensure that we prioritise both paramedic and patient safety; select and utilise appropriate extrication techniques and equipment; and, where necessary, identify the need for additional resources and support to move a patient safely.

Ensure that you plan and request additional resources. The following groups are either of increased or high risk of reduced mobility or self-ambulation and will require facilitated extrication:

- patients with decreased, inadequate or poor perfusion;
- frail or patients with impaired mobility normally, including use of mobility aids;
- effects of medication, illicit drugs or alcohol;
- cognitive impairment or concurrent neurological issues;
- history of instability or frequent falls;
- injury (new or old);
- morbid obesity;
- specific conditions requiring specific posture or limited exertion, such as anaphylaxis, respiratory distress, diving emergencies, extremes of temperature or ACS/STEMI.

Be aware of any additional risks of deterioration by asking a patient to walk. If there is any doubt, use extrication aids (chair, boards, elk, slide boards, lifting sheet).

Consent and Capacity

A statement of general principle is that every adult has a right to determine his or her own healthcare, including to commence, continue or withdraw healthcare. Existing NT legislation that governs consent to healthcare includes the *Advance Personal Planning Act 2013*, the *Guardianship of Adults Act 2016*, and the *Mental Health and Related Services Act 1998*.

Under the *Advance Personal Planning Act 2013* and the *Guardianship of Adults Act 2016* an adult has decision-making capacity for a matter if he or she has the capacity to:

- understand and retain information about the matter;
- weigh the information in order to make a decision about the matter; and
- communicate that decision in some way.

An adult is presumed to have decision-making capacity until the contrary is shown. An adult's decision-making capacity may be decision- and time-specific.

Understanding impaired decision-making capacity means that the person is unable to:

- understand the information given to them and the choices available to them (which must be presented to them in a way they should be able to understand, including using an interpreter);
- understand the consequences of having the healthcare or not having the healthcare;
- make a decision based on this information (or their own social, religious or moral grounds);
- retain the information, even if for a short time;
- communicate the decision in some way (verbally or with assistance).

Capacity for Consent

It is important to identify if a patient is suffering from any condition which could impact the patient's decision-making capacity; however, such a finding should not, of itself, result in a conclusion that the patient lacks the capacity to decide.

"Capacity to make decisions is not a fixed state, that is, either present or not. It is a fluid concept that can shift in response to a number of variables." Paramedics would appreciate the practical nature of this statement as it is not uncommon that they will observe fluctuations in a patient's conscious state, degree of orientation and level of comprehension in the relatively short period of time that the patient is in their care.

These fluctuations are often attributable to the patient's clinical condition or the effects of substances such as alcohol, illicit substances or prescribed medications. Whilst it is imperative to identify any such conditions which could impact the patient's decision-making capacity; such a finding should not, of itself, result in a conclusion that the patient lacks the capacity to decide.

Similarly to the identification of a medical condition, a patient being simply under the age of 18 years of age is not an absolute barrier to their being assessed as competent; rather the test for capacity requires that the young person is of sufficient intelligence and maturity to understand the nature of the decision.

Use of Restrictive Practices

The use of restrictive practices must be a last resort and the least restrictive option must be selected, most often as a requirement of the Mental Health or Adult Guardianship Acts. Restrictive practices are only used after alternative strategies have failed. In these situations, workers with expertise will apply and monitor the restraint and support the recovery of the patient afterwards in order to reduce harm. This includes the use of sedation.

Advanced Personal Plan and Advocacy

Adult and palliataive paediatric patients' care plans are completed by patients, guardians and their medical practitioner to document their treatment wishes. Paramedics should follow the treatment directives detailed within the patient's authorised plan which may include decisions related to resuscitation, medications and/or patient dispositions.

Three steps to be followed if you believe a patient has an APP:

1. Locate – read and apply the patient's wishes as outlined in their APP/Living Will and document;
2. Unable to locate – make contact with hospital or GP if details are known, and apply the patient's wishes as discussed in their APP/Living will and document;
3. Unable to locate, unable to contact hospital or GP, or no documents found – understand patient's current conditions, quality of life or futility of care, discuss with family, guardian or carer, and make a determination based on information provided in good faith that makes the patient comfortable and meets their communicated wishes.

Trauma-Informed Care Principles

"Trauma-informed services do no harm i.e. they do not re-traumatise or blame victims for their efforts to manage their traumatic reactions, and they embrace a message of hope and optimism that recovery is possible. In trauma-informed services, trauma survivors are seen as unique individuals who have experienced extremely abnormal situations and have managed as best they could."

(Dr Cathy Kezelman, Blue Knot Foundation President)

Trauma-informed care is based on the understanding that:

- a significant number of people living with mental health conditions have experienced trauma in their lives;
- trauma may be a factor for people in distress;
- the impact of trauma may be lifelong;
- trauma can impact the person, their emotions and relationships with others.

Core trauma-informed principles:

- Safety – emotional as well as physical, e.g. is the environment welcoming?
- Trust – is the service sensitive to people's needs?
- Choice – do you provide opportunity for choice?
- Collaboration – do you communicate a sense of 'doing with' rather than 'doing to'?
- Empowerment – is empowering people a key focus?
- Respect for Diversity – do you respect diversity in all its forms?

Non-patient transport guideline

There are times when St John NT paramedics may be considering the non-transport of patients. This section is provided to guide paramedics in situations where a patient is deceased, refuses treatment or transport, or the paramedic feels that ambulance transport is not required.

Patient is deceased

As a general rule it is not the responsibility of St John NT paramedics to routinely transport deceased patients. However, in some limited circumstances where it is deemed appropriate or necessary to assist in the transport of the deceased, discussions should have previously been had with the Duty Manager (DM) and ECC to facilitate such requests, most often via NT Police.

If a decision has been made to transport and approved by the DM, the deceased should be transported to the nearest ED for Medical Officer Certification of death and/or directly to the mortuary.

Refusal of treatment by patient

Every patient with capacity has the right to make decisions regarding their healthcare, including refusing ambulance treatment or transport. This includes against medical or paramedical advice.

When attending a patient assessed as competent who expressly refuses ambulance assessment, treatment or transport, the paramedic should conduct VIRCA assessment to determine that the decision to refuse against recommendation is valid.

Voluntary: The decision must be a voluntary choice, free of coercion or influence of others;

Informed: The patient must be fully informed of the risks or consequences of their decision;

Relevant: Refusal must be relevant the situation or treatment that has been recommended;

Capacity: The patient must understand the nature and consequences of their decisions;

Advice: They are provided valid and suitable advice on options for their comfort and safety.

If the patient has provided a valid refusal as assessed by VIRCA, then the paramedic must respect the patient's wishes.

All assessment findings and recommendations should be communicated with the patient and/or guardian(s)/ care giver(s) and documented within the ePCR. Comprehensive documentation is always important, but this is particularly the case when the patient is not being transported; this includes asking the patient to sign their refusal in the ePCR.

Parent or guardian care refusal on behalf of children is particularly fraught with clinical risk and a low threshold for seeking ICPDAT assistance should be kept.

Paramedic decision that transport is not required

Following a thorough and detailed clinical assessment, the paramedic may form the view that the patient's condition does not require ambulance transport to a hospital emergency department or other facility. This may occur when:

- Red and Yellow Clinical Indicators have been reviewed;
- the patient is not suffering from any obvious illness or injury and the assessment findings do not raise any reasonable suspicion that an illness or injury exists; or
- where the patient is suffering a very minor condition which is transient and unlikely to escalate or deteriorate, and where urgent attendance at a hospital or other facility is not warranted.

As a result, the paramedic may consider one of the following options:

- no ambulance treatment is required and no subsequent medical assessment or treatment is indicated;
- no ambulance treatment is required, and subsequent support services and/or non-urgent medical treatment is indicated;
- ambulance/first aid treatment was required and provided, and post further assessment further treatment or assessment is not indicated; or
- transfer care to other services for non-urgent treatment or further non-urgent assessment by other means.

Australian Charter of Healthcare Rights

The Australian Charter of Healthcare Rights describes the right that consumers, or someone they care for, can expect when receiving healthcare provided in Australia. These rights apply to all people in all places where that care is provided and states that they have the right to:

Access – healthcare services that meets their needs;

Safety – receive safe and high-quality care that meets national standards, and be cared for in an environment that makes them feel safe;

Respect – be treated as an individual, with dignity and respect, including their culture, identity, beliefs and choices being recognised and respected;

Partnership – be able to ask questions, be involved in open and honest communications, make decisions about their healthcare provider to the extent they are able, be included in planning and decision-making;

Information – be provided with clear communication about their condition, risks and benefits or tests and treatment so patients can give their informed consent. Be given assistance to understand and use health information or be advised when something has gone wrong with their healthcare, and its impacts on patients;

Privacy – have their privacy respected and have any patient information kept secure and confidential;

Give Feedback – provide feedback or make a complaint or compliment without fear of repercussion, have their concerns addressed in a transparent manner, and an ability to share their experiences to better inform or improve the quality of care and healthcare services.

P004 - Cultural Safety and Diversity

Cultural and Linguistic Diversity

The Northern Territory is characterised by a rich cultural diversity, with approximately 46% of the population identifying as culturally or linguistically diverse. Within the Northern Territory, 29.5% of the population speaks a language other than English at home, and 19.8% of the population were born overseas.

St John NT acknowledges that cultural groups are dynamic and evolving in perpetuity. We recognise that cultural groups are not fixed or homogenous and that diversity exists within and across cultural groups.

As such, the following guideline aims to provide general information only and is not intended to be used as a substitute for appropriate assessment of each patient.

Culture informs the way that people perceive health and ill-health. Culture also influences how a person accesses and interacts with the healthcare system. As such, cultural safety is a fundamental pillar of patient-centred healthcare.

Evidence suggests that appropriately addressing cultural and linguistic differences between healthcare providers and their patients can result in 'better clinical outcomes and improved patient wellbeing' via:

- improving communication and fostering better patient understanding;
- increasing the patient's feelings of satisfaction;
- mitigating the patient's feelings of anxiety, mistrust and fear;
- optimising the efficiency and ease of patient assessment.

Paramedics are obligated to be aware of their responsibility to provide culturally safe and appropriate care. This includes but is not limited to:

- acknowledging how their own cultural heritage, identity and personal experiences constitute a lens which informs and influences their attitudes, beliefs, values and behaviour;
- avoiding making assumptions about a patient's cultural identity and their level of knowledge;
- addressing implicit biases which are likely to influence assessment, clinical judgement and treatment of culturally and linguistically diverse patients;
- remembering that, ultimately, the patient determines whether the care that they have received is culturally safe or otherwise.

Aboriginal and Torres Strait Islander Patients

St John NT acknowledges Aboriginal and Torres Strait Islanders peoples as the Traditional Owners and Custodians of this land in which we live and work. We pay our respects to Aboriginal and Torres Strait Islander cultures, and their Elders past, present and emerging.

Aboriginal and Torres Strait Islander people should be warned that some of the following guidelines refer to sensitive topics, including death and dying.

Aboriginal and Torres Strait Islander people comprise 25.5% of the population. Within this population, 91% identify as of Aboriginal origin, 5% identify as of Torres Strait Islander origin, and 4.1% identify as of both Aboriginal and Torres Strait Islander origin.

Historical Context

Colonisation and ongoing dispossession have historically caused and continues to engender institutionalised racism, structural discrimination and socioeconomic disadvantage.

Complex intergenerational trauma continues to negatively impact the ways in which some Aboriginal and Torres Strait Islander people access, interact with and perceive mainstream health services. As a result, some Aboriginal and Torres Strait Islander people:

- avoid accessing mainstream services due to fear of being judged, feelings of mistrust and perceived racism;
- delay accessing care until they are very unwell.

When providing assessment, care and treatment for Aboriginal and Torres Strait Islander patients, it is imperative that paramedics:

- recognise that some Aboriginal and Torres Strait Islander patients feel culturally unsafe in mainstream services;
- work to devolve perceived power dynamics by reinforcing the patient's status as a partner in decisions about their health;
- acknowledge that within many Aboriginal and Torres Strait Islander communities, the physical, social, emotional and cultural wellbeing of the whole community plays an integral role in the maintenance of an individual's experience of health and wellbeing;
- affirm the integral role Traditional Medicine and Traditional Healing has for some Aboriginal and Torres Strait Islander people as part of a holistic approach;
- avoid shaming and judgemental communication;
- understand that pain is often poorly assessed and under-treated in Aboriginal and Torres Strait Islander patients;
- facilitate continuity of care through handover of pertinent information to the receiving facility.

Men's and Women's Business

Men's and women's business is distinctively separate. Where possible, patients should be treated by clinicians of the same sex. If this is not possible, permission should be sought from the patient and community/family members before the patient is treated in a culturally sensitive manner.

Death, bereavement and mourning (Sorry Business)

For many Aboriginal and Torres Strait Islander people death is not feared, but rather a time where a person's spirit is released to the Dreaming and returned to its sacred place in traditional country. The time before and after death involves a variety of customs, rituals and beliefs and is all part of the grieving process, known as Sorry Business. In some instances, the entire community will shut down and a time for mourning will take precedence over all other matters.

Members of the community will generally engage in traditional practices to identify those who have passed. In many communities it is taboo to mention the name of a deceased person. A substitute mourning name may be given, as speaking the deceased name is 'calling back their spirit to the world'.

Loud mourning cries, sorry cuts and seeing and talking to spirits or totems are normal and culturally significant practices and should not be viewed as a form of self-harm or mental illness. Community members often do not like being touched by strangers, particularly during Sorry Business. If you wish to express your condolences, saying 'Sorry' without undue eye contact is normally considered appropriate.

If death does not result from natural causes or there is some inference that the death is untimely or as the result of another person, this may lead to retaliation or 'Pay Back'.

Sexual Orientation and Gender Diversity

There is a paucity of data around the demography of both gender diverse and sexually diverse population. As both identity and language are dynamic and evolving, there is no standardised nomenclature to describe these communities. Gender identity and sexual identity are distinct and differentiable; however, an individual may experience gender diversity and sexual diversity simultaneously.

St John NT acknowledges that sexually diverse and gender diverse communities are not static or homogenous. Significant diversity exists within and across these groups. As such, the following guideline aims to provide general information only and is not intended to be used as a substitute for appropriate assessment of each patient.

Gender Diversity

Gender diverse is a term used to describe people those whose "gender identity does not align with the social expectations associated with their sex assigned at birth". This can include but is not limited to "trans individuals, nonbinary people, a-gender individuals, gender fluid/genderqueer people, 'Sistergirls', 'Brotherboys', two-spirit members of Indigenous communities, and other evolving identities". It is important to note that gender identity is not limited to the parameters of a binary conceptualisation of gender (i.e. male and female). Approximately 2.7% of the high school-aged population in Australia are trans or gender diverse. The estimated number of transgender, gender diverse and non-binary adults ranges from 0.5% to 0.9% (Strauss et al., 2020).

Sexual Diversity

Sexuality can be defined as "a person's enduring physical, romantic, emotional, and/or spiritual attraction to another person". An estimated 2.6% of the population within the Northern Territory identify as non-heterosexual, a term which encompasses individuals who identify as gay, homosexual, lesbian, bisexual, or otherwise construct their sexuality in other (such as queer). A person's sexual orientation should not be assumed based on their partner(s), appearance, behaviour or expression (Fenway Health, 2010).

Gender and Sexual Diversity in the Healthcare System

There is evidence of pre-colonial sexual diversity and gender diversity in some Aboriginal and Torres Strait Islander communities, often known as Sistergirls and Brotherboys. It is important to acknowledge "that Western definitions of transgender do not reflect the culture and lived reality of Aboriginal and Torres Strait Islander transgendered people".

The experiences of sexually diverse and gender diverse people within the health system may be influenced as a result of other factors. For example, sexually diverse and gender diverse people of colour report experiencing increased rates of discrimination within healthcare. Similarly, trans and non-binary people with disabilities also experience higher rates of discrimination. An individual's gender identity, sexuality and expression may also evolve over time, meaning that older adults may have different or increased healthcare needs throughout their life.

Historically, mainstream healthcare services have systematically enforced heteronormativity, cis-genderedness and the gender binary whilst pathologising sexual diversity and gender diversity.

Sexually diverse and gender diverse people are confronted with numerous challenges and barriers to accessing safe, appropriate and responsive healthcare. This often leaves individuals with unmet health needs and facing subsequent health disparities.

These barriers include but are not limited to:

- reluctance to disclose sexual identity or gender identity to healthcare workers due to fear of experiencing discrimination, including transphobia and homophobia;
- a scarcity of clinicians within mainstream health services who are knowledgeable about the health needs unique to some sexually diverse and gender diverse people;
- irrelevant or inappropriate focus on a patient's gender identity or sexual identity as the cause of a presenting medical problem;
- avoidance and mistrust towards healthcare services stemming from previous negative experiences and discrimination.

Paramedics have a responsibility to provide safe and appropriate care to sexually diverse and gender diverse patients. This includes but is not limited to:

- acknowledging that their own identity and lived experience informs and influences their attitudes, beliefs, values and behaviour;
- recognising and addressing implicit biases which are likely to influence assessment, clinical judgement and treatment;
- recognising the correct and consistent use of a patient's mode of address, name, pronouns etc. as an integral component of ethical practice;
- practicing sensitive, safe, sexuality-affirming and gender-affirming history-taking;
- understanding that some sexually diverse and gender diverse people feel reluctant to disclose their identity to healthcare workers due to fear of eliciting a negative reaction.

Tips for Paramedics:

- Clarify what mode of address and pronoun(s) the patient uses.
- Consider including reference to your own mode of address and pronoun(s) when introducing yourself to patients.
- Avoid assumptions of gender identity, sexual identity and sexual orientation based on physical appearance, presentation or behaviour.
- Avoid assumptions of heterosexuality and cis-genderedness.
- Facilitate continuity of care through patient advocacy and handover of pertinent information to receiving facilities or in written/verbal referrals (such as pronouns and partner(s)) with the patient's permission.

P005 - Conscious State and Neurological Assessment

At St John NT, like many other services we will use two methods of assessment and communication of consciousness. AVPU is a relatively quick and easily applied tool to provide an indication of conscious state during initial assessment. This is then often followed up with a Glasgow Coma Scale (GCS) which is a more objective measure of consciousness.

During the parts of the assessment that require the application of a painful stimuli, this should be done in a consistent, reproducible and professional manner. Single point pressure such as top of sternum and nail bed pressure should be performed manually without use of aids such as a pen or sharp object; vigorous stimuli should be avoided, such as sternum rubbing.

AVPU Assessment

Assessment Result	Recorded As	
Alert and responding	A – Alert	(Correlates to GCS 14 – 15)
Responding to voice	V – Verbal	(Correlates to GCS 12 – 13)
Responding to painful stimuli	P – Pain	(Correlates to GCS 7 – 9)
Not responding or unresponsive	U – Unresponsive	(Correlates to GCS <7)

GCS Assessment

Adult	Paediatric >4 yrs	Paediatric <4 yrs	Score
Eye Opening	**Eye Opening**	**Eye Opening**	
Spontaneous	Spontaneous	Spontaneous	4
To voice	To voice	Reacts to speech	3
To pain	To pain	Reacts to pain	2
None	None	None	1
Verbal Response	**Verbal Response**	**Verbal Response**	
Orientated	Orientated for age	Coos, babbles, smile/words	5
Confused	Confusion	Cries consolably	4
Inappropriate words	Inappropriate words	Inconsolable crying/irritable	3
Incomp. sounds	Cries or incomp. sounds	Moans to pain	2
None	None	None	1
Motor Response	**Motor Response**	**Motor Response**	
Obeys commands	Obeys commands	Spontaneous movements	6
Localises to pain	Localises to pain	Localises to pain	5
Withdraws from pain	Withdraws from pain	Withdraws from pain	4
Flexion to pain	Flexion to pain	Flexion response	3
Extension to pain	Extension to pain	Extension response	2
None	None	None	1

P006 - Neurological and Mental Status Assessments

A neurological assessment is a systematic method that can be used to ascertain a patient's mental function. A neurological assessment includes assessing the patients:

- Pupils – to assess size, reaction to light and unusual eye moment
- Motor function – to assess muscle coordination, strength, tone and any obvious facial weakness. It should also include any abnormal movements such as seizures, tremors, decorticate/decerebrate posturing.
- Sensory function – to assess hearing, the ability to understand verbal communication and superficial sensation to light touch and pain.

Mental health and medical presentations requiring a systematic assessment for a potential disorder make up a reasonable number of our patient presentations. The Mental Status Assessment (MSA) is designed to provide paramedics with a guide to the patient's behaviour, not to necessarily label or diagnose a patient with a specific mental health condition. This is designed to support the paramedic's decision-making, combined with their own clinical judgement, with regard to clinical triggers that may necessitate intervention or the transport of a patient to hospital.

Look for, listen to and ask about all categories below.
The patient may be suffering from some of the following examples

**Remember verbal de-escalation strategies, active listening and calm/open body language.*

OBSERVE	**Safety**	Paramedic, patient and bystander safety is the first priority. Assess the scene for dangers i.e location, weapon. Obtain police support early if required. Maintain vigilant reassessment of scene safety.
	Appearance	Look for signs indicative of mental health issues or poor self-caring; uncleanliness, dishevelled, malnourished, signs of addiction (injection marks/nicotine stains), posture, pupil size, odour.
	Behaviour	Patient may display; odd mannerisms, impaired gait, avoidance or over use of eye contact, threatening or violent behaviour, unusual motor activity or activity level (i.e wired or buzzing), bizarre/inappropriate responses to stimuli, pacing.
	Affect	Observed to be; flat, depressed, agitated, excited, hostile, argumentative, violent, irritable, morose, reactive, unbalanced, bizarre, withdrawn etc.
LISTEN	**Speech**	Take note of: rate, volume, quantity, tone, content, overly talkative, difficult to engage, tangential, flat, inflections etc.
	Thought Process	May be altered, can be perceived by patient jumping irrationally between thoughts, sounding vague, unsteady thought flow when communicating verbally.
	Cognition	May be exhibited signs of impairment such as; poor ability to organise thoughts, short attention span, poor memory, disorientation, impaired judgement, lack of insight.
DISCUSS	**Thought Content**	My be dominated by: delusions, obsessions, preoccupations, phobias, suicidal/despressed or homicidal thoughts, compulsions, superstitions.
	Self-Harm	Ask patient directly if they have attempted self-harm, suicide or are thinking/planning for these. Ask about previous attempts.
	Perceptions	Patient may be suffering from; hallucinations (ask specifically about auditory, visual and command hallucinations), disassociation i.e 'I feel detached from my body', 'my surroundings aren't real', 'I am not in control of my actions'.
	Environment	Risk factors include; lack of familial and social support, addiction or substance abuse, low socio-economic status, life experiences, recent stressors, sleeping problems or comorbidities (either physical or mental health conditions).

(Source: Ambulance Victoria Clinical Practice Guidelines)

Patients demonstrating high-risk symptoms should not be considered non-transport options. Consideration for appropriate support from police should be considered early, with use of the least restrictive options considered first, with escalation based on patient presentation and need. This includes use of chemical sedation and physical restraint.

In some cases, consideration for assessment by co-responder teams is sometimes appropriate and generally would coincide with non-transport management pathways in all but high-risk situations.

P007 - Mental Health Conditions

This procedure is applied for patients where there is a high index of suspicion of a presentation with a mental health issue and where the patient is aged 18 years or older.

Ensure that the scene is safe, regularly perform a dynamic risk assessment, and complete a neurological assessment (**as per P006 Neurological and Mental Status Assessments**). Also consider possible clinical or organic causes (AEIOUTIPS), grief and pain, cultural considerations and manage accordingly.

If the scene is deemed unsafe on arrival, immediately withdraw from the scene, notify the ECC and request police assistance. Patients with extreme agitated behaviour or violent are considered high risk and may require management (**as per C022 Acute Behavioural Disturbances**).

A patient is considered high risk if they demonstrate any of the following:

- unwillingness to accept assistance;
- current suicidal ideation or previous attempts of suicide or self-harm;
- patient who lacks any social or emotional support options;
- evidence of not coping. This can be either by verbal statements or environmental cue.
- current attempted suicide or self-harm requiring assessment or management at an ED;
- intentional overdose or poisoning requiring assessment or management at an ED;
- substance intoxication to the point that the patient is unable to complete a neurological assessment;
- they are subjected to an Involuntary Admissions Order by police;
- requires application of **C022 Acute Behavioural Disturbances**;
- patient is in a dangerous social situation (family or domestic violence);
- acute psychosis, mania or confusional/delirium state.

Management of agitation or delivery of sedation should first be managed de-escalation strategies, then using the minimal amount of restriction (**as per C022 Acute Behavioural Disturbances**).

Patients who are considered low risk will likely still benefit from specialist mental assessment and attendance by the co-responder team t/- transport are to be actively considered.

P008 - SAT Score

Assessment should be ongoing as a patient's condition is likely to be dynamic and will move within the spectrum of agitation in either direction.

Mild agitation may present as anxious, restless, pacing, excessive talking, not aggressive and generally cooperative. They should be able to safely self-administer oral medications.

Moderate agitation may present with loud outbursts, frequent non-purposeful movements, not generally aggressive or violent. Their risky behaviour may be controlled with sedation either oral, if accepting, or IM sedation.

Severe agitation may present as uncooperative, combative, violent, immediate danger to themselves or others, fighting against an overwhelming force (being held down), lacks capacity or rationale. They require sedation and restraint with the priority being their safety and that of others around them.

Sedation Assessment Tool (SAT)

Score	Responsiveness	Speech
+ 3	Combative, violent, out of control	Continual loud outbursts
+ 2	Very anxious and agitated	Loud outbursts
+ 1	Anxious and restless	Normal/talkative
0	Responds easily to name	Speaks normally
- 1	Asleep but rouses if name called	Slurring or prominent slowing
- 2	Physical stimulation to rouse	Few recognisable words
- 3	No response to stimulation	Nil

P009 - Respiratory Status Assessment

Respiratory status assessment

	Normal	Mild distress	Moderate distress	Severe distress (life threat)
General appearance	Calm, quiet	Calm or mildly anxious	Distressed or anxious	Distressed, anxious, fighting to breathe, exhausted, catatonic
Speech	Clear and steady sentences	Full sentences	Short phrases only	Words only or unable to speak
Breath sounds and chest auscultation	Usually quiet no wheeze	Able to cough	Able to cough	Unable to cough
		Asthma: mild expiratory wheeze	**Asthma:** expiratory wheeze, +/- inspiratory wheeze	**Asthma:** expiratory wheeze +/- inspiratory wheeze, maybe no breath sounds (late)
	No crackles or scattered fine basal crackles, e.g. postural	**LVF:** may be some fine crackles at bases	**LVF:** crackles at bases – to mid-zone	**LVF:** fine crackles – full field, with possible wheeze **Upper Airway Obstruction** Inspiratory stridor
Respiratory rate	12 – 16	16 – 20	> 20	> 20 Bradypnoea (< 8)
Respiratory rhythm	Regular even cycles	**Asthma:** may have slightly prolonged expiratory phase	**Asthma:** prolonged expiratory phase	**Asthma:** prolonged expiratory phase
Work of breathing	Normal chest movement	Slight increase in normal chest movement	Marked chest movement +/- use of accessory muscles	Marked chest movement with accessory muscle use, intercostal retraction +/- tracheal tugging
HR	60 – 100bpm	60 – 100 bpm	100 – 120 bpm	> 120 bpm Bradycardia late sign
Skin	Normal	Normal	Pale and sweaty	Pale and sweaty, +/- cyanosis
Conscious state	Alert	Alert	May be altered	Altered or unconscious

(Source: Ambulance Victoria Clinical Practice Guidelines)

P010 - Perfusion Status Assessment

Perfusion status assessment

	Skin	Pulse	BP	Conscious State
Adequate perfusion	Warm, pink, dry	60 – 100 bpm	> 100 mmHg systolic	Alert and orientated to time and place
Borderline perfusion	Cool, pale, clammy	50 – 100 bpm	80 – 100 mmHg systolic	Alert and orientated to time and place
Inadequate perfusion	Cool, pale, clammy	< 50 bpm or > 100 bpm	60 – 80 mmHg systolic	Either alert and orientated to time and place **or** altered
Extremely poor perfusion	Cool, pale, clammy	< 50 bpm or > 110 bpm	< 60 mmHg systolic or unrecordable	Altered or unconscious
No perfusion	Cool, pale, clammy	No palpable pulse	Unrecordable	Unconscious

(Source: Ambulance Victoria Clinical Practice Guidelines)

P011 - APGAR Score

The APGAR score should be conducted at one and five minutes post-birth and then repeated five-minutely until the APGAR is greater than seven.

0 – 3 – Requires ongoing management/resuscitation;

4 – 6 – Respiratory depression, may require ventilation;

7 – 10 – Satisfactory.

	0	1	2
Appearance	Cyanosed/pale	Body pink/blue limbs	Fully pink
Pulse	Absent	<100	>100
Grimace	None	Grimaces	Cries
Activity	Limp	Extremity flexion	Active motion
Respiratory Effort	Absent	Weak/gasping/ ineffective	Strong cry

P012 - MASS and Rosier Scores

The MASS is simple to use, with accurate prehospital identification of stroke. It distinguishes stroke mimics, with good recognition of suitable patients for thrombolytic therapy.

MASS Stroke Assessment

In the setting of a normal BGL, an abnormal finding in one or more of the following is positive for suspicion of stroke.

	Instruction	Normal finding	Abnormal finding
Facial droop	Pt to show teeth or smile	Both sides of the face move	One side of the face does not move as well as the other
Speech	Pt to repeat "You can't teach an old dog new tricks"	Pt says the correct words with no slurring	Pt slurs words, says incorrect words or is unable to speak or understand
Hand grip	Pt to squeeze your fingers	Equal grip strength	Unilateral weakness

(Source: Ambulance Victoria Clinical Practice Guidelines)

Rosier Score

The ROSIER score is used to distinguish between suspected stroke and stroke mimics.

Has there been loss of consciousness or syncope?	Y(-1) ☐	N (0) ☐
Has there been seizure activity?	Y(-1) ☐	N (0) ☐
Is there a **NEW ACUTE** onset (or an awakening from sleep)?		
Asymmetric facial weakness	Y (+1) ☐	N (0) ☐
Asymmetric arm weakness	Y (+1) ☐	N (0) ☐
Asymmetric leg weakness	Y (+1) ☐	N (0) ☐
Speech disturbance	Y (+1) ☐	N (0) ☐
Visual field defect	Y (+1) ☐	N (0) ☐

TOTAL SCORE _____ (-2 to +5)

Stroke is unlikely, but not completely excluded, if the score is 0 or less than 0.

P013 - Withholding/Cessation of Resuscitation and ROLE/ VOD

Withholding and Cessation of Resuscitation

Compelling reasons to withhold resuscitation would include any patient with a valid advanced care directive to not commence resuscitation, or obvious death including the following:

- injuries incompatible with life;
- rigor mortis;
- post mortem lividity;
- petrifaction or decomposition;
- death already declared by Medical Officer at the scene.

A St John NT paramedic may also withhold resuscitation if there is no prospect of resuscitation in a patient who has suffered a prolonged cardiac arrest. This is a patient who has a presenting rhythm of asystole and has had no resuscitative efforts for 15 minutes post collapse.

Cessation of resuscitation may be considered after 30–45 minutes of ALS/ICP resuscitation, if transport or continuation is considered futile and there is no compelling reason to continue. A compelling reason to continue would include signs of life such as profound hypothermia, pupil reactions, gasping or agonal respirations, periods of ROSC, youth and/or absence of co-morbidities, refractory VF with mCPR device available for transport.

ROLE/VOD

Recording of Life Extinct (ROLE) or Verification of Death (VOD) refers to establishing that a death has occurred after a thorough examination of the body. The following criteria must be present to allow for ROLE/VOD to be determined by a paramedic in a patient:

- no palpable carotid pulse;
- no heart sounds for 30 seconds to one minute on auscultation;
- no breath sounds for 30 seconds to one minute on auscultation;
- fixed and unresponsive pupils, may be dilated;
- no motor response or facial grimace to painful stimuli and;
- ECG of asystole.

Post cessation of cardiac arrest management, the assessment should be performed 10 minutes after care and management has been removed to ensure late ROSC does not occur or is not recognised.

Police should be notified in most cases, in particular if reportable or review death occurs, with the crew remaining on scene until their arrival. Reportable cases would include SIDS, unexpected or unnatural death, violent death, a death post medical procedure, death of a person in custody or under the auspice of Mental Health Act or in the care of a person unknown, the death of a child (<18 years).

Certification of death must still be ultimately performed by a Medical Officer as to the cause of death. This falls outside of the scope of this process.

P014 - Palliative Care

Palliative care aims to improve the quality of life of patients and their families who are facing a life-limiting condition. Palliative care helps people live as fully and comfortably as possible, regardless of age, and can be provided in many different settings. It is a multi-disciplinary approach to care involving many facets- psychological support and pastoral care; treatment and care specific to the disease; symptom management; and support services offered intra-facility and to those who wish to remain at home or in their communities. Palliative care intends to neither hasten nor postpone the process of dying, but accepts that death is a normal process.

It is important all healthcare professionals ensure they know and understand the patient's wishes, both during routine care and end-of-life decisions. We should understand any orders or documentation in place, and work with family and appointed guardians to deliver the right care, and where necessary withhold futile or declined treatment to meet these wishes.

Ambulance services have several different ways in which they may interact in palliative care situations, from non-emergency transport, through to emergency ambulance attendance for incidents/falls/accidents, carer exhaustion or incapacity; or unexpected changes in condition.

Paramedic approach to the palliative care patient

The paramedic needs to determine the reason for the ambulance request and how that fits in with the patient's current palliative care plan.

The initial questions the paramedic then should consider are:

- *Is this reason not related to the palliative illness?* If this is the case, then the paramedic needs to complete a thorough clinical assessment of the patient and implement care, according to current St John NT Clinical Guidelines but modified by patient wishes.
- *Is this reason related to the illness for which the patient is receiving palliative care?* If this is the case, then the paramedic needs to consult with the patient, their carer and if able, consult with the patient's palliative care health practitioner or the NT Palliative Care Consultant via the Royal Darwin Hospital Switch on 08 8922 8888 (Top End) or 08 8951 7777 (Central).
  - Palliative Care Patients have a 'Red Folder,' which stays with the patient at all times and contains the details of the illness, medication plan, Advanced Personal Plan (APP) and Resuscitation Status Form (RSF).
  - The Red Folder can assist you in your clinical decision making if you are unable to make contact with the NT Palliative Care Team or Consultant.

Advanced Personal Plan (APP)

The APP is a legal, binding document that details the level of care that the person desires in the event of an adverse event, usually a cardiac or respiratory arrest.

Resuscitation Status Form (RSF)

The RSF is an NT Department of Health form that specifies either not attempting resuscitation in the event of arrest, or with certain limits, e.g. not for intubation, not for CPR. This form is signed by the medical team caring for the patient and the patient themselves, prior to losing their capacity to make a clinical decision about their care.

Palliative Care Medication Pack

The palliative care medication pack generally contains the medications used within the patient's infusion pump, that is delivering these medications subcutaneously over a 12 to 24 hour period. These can include:

- Morphine;
- Midazolam;
- Haloperidol; and,
- Hyoscine butylbromide.

These medications are usually left to ensure there is enough for the pump and any potential breakthrough dosages.

Other medications can include over the counter medications such as:

- Paracetamol;
- NSAIDs; and,
- Various laxative medications

Although some of these medications are not part of the St John NT DTPs, paramedics should be familiar with the types of medications.

Making Patient Care Decisions- Capacity, APPs and RSFs

When determining the patient's wishes in respect to their treatment and transport, the paramedic needs to determine if their patient has the capacity to make decisions about their treatment.

- If your patient is able to still make clinical decisions about their medical / palliative care treatment, then obtain their consent to do so. Such decisions may contradict their most recent APP or RSF and such new decisions are still to be respected.
- If the patient lacks or no longer has the capacity to make clinical decisions related to their care, then the paramedic needs to inquire about what advanced care planning is in place. This would include locating the patient's Red Folder APP and RSF.

Futility and *First, do no harm*

In caring for palliative care patients St John NT staff may be seeing and administering medication doses beyond those normally encountered, and whilst such doses may occur shortly before death, if given with the intent of relieving suffering they are not seen as harming the patient or causing death.

It is important to note that St John NT staff are not compelled to commence or continue treatment that in their professional opinion is futile or harmful to any patient, including advanced life support; regardless of stated wishes of patients and others.

Common presenting problems with palliative care patients

Pain

With appropriate analgesia, pain can normally be managed well in palliative patients. There are times in which your patient may require additional breakthrough pain relief.

To provide breakthrough pain relief administration for a palliative patient, first review the patient's Red Folder to see what is listed on their *valid* medication plan:

- If fentanyl or morphine are listed in doses below or equal to **C030 Pain Management** then give these as indicated in the Red Folder;
- If fentanyl or morphine are already being given as part of a subcut infusion consider giving ***one twelfth of that dose* as a stat SC dose and repeat once after 30 minutes if required**;
- If the above 'one twelfth dose' of fentanyl or morphine or the medication plan exceeds the normal **C030 Pain Management** then such doses can be given once by paramedics and ICPs but must be followed up with at least one of:
  - consultation with ICP DAP for a disposition;
  - consultation with the NT Palliative Care Consultant 08 8922 8888 (Top End) or 08 8951 7777 (Central) for a disposition; or
  - transfer to hospital.

If a Red Folder is unable to be located, medication plan is invalid (e.g. believed to be erroneous, old, patient already exceeded limits), or if the patient is opioid naïve; then commence pain relief per **C030 Pain Management** and consult the NT Palliative Care Consultant for a further plan and disposition.

Ensure to methodically check opioid doses with a colleague, ICP DAT or NT Palliative Care Consultant if a solo-responder.

Nausea and Vomiting

Nausea and vomiting can be related to multiple issues. Examples include:

- Medications (particularly analgesics)
- Severe pain
- The patient's terminal illness; or
- Another medical condition.

Nausea and vomiting can be extremely distressful to patients and it is important that control is attempted.

Non-pharmacological methods include:

- Increasing access to fresh air;
- Changing body position;
- Removing offensive odours;
- Acupressure (see C028 Nausea and Vomiting); and,
- Offering sips of carbonated beverages such as lemonade or soda water.

If non-pharmacological methods do not work, first review the patient's Red Folder and locate the medication plan to see what current antiemetic's the patient is on. If the patient has not had any antiemetic prior to St John NT arrival then treat as per **C028 Nausea and Vomiting**.

If after ten minutes there has been no effect in reducing the patient's nausea or vomiting, or upon review of their medication plan and they have already reached their maximum antiemetic, then:

- Administer **(Adult) Droperidol 0.5mg (0.25mg in frail or under 50kg) IV.**

Managing Breathlessness

If there is anything within the Red Folder medication plan already indicated for breathlessness, then verify with the patient or patient carers, to see if this had already been applied. If it has not been enacted, do so as per the patient's medication plan, preferably with the patient or carer self-administering such medications.

Again consider assisting the patient with non-pharmacological interventions for breathlessness such as position, fresh air, pedestal fan directed at the patient, *et al*.

If the patient's medication plan pharmacology has already been used, is not present or additional breakthrough medication is required, then paramedics should:

- Consider new pathology- e.g. pulmonary embolus, or aspiration with any attendant management options; and,
- Consider **(Adult) Fentanyl 25- 50microg, repeated once at 10 minutes** or **(Adult) Morphine 0.5- 1mg SC, repeated once at 20 minutes** (*Do not* combine fentanyl and morphine, use one or the other).

If any agent has been used for breathlessness other than as prescribed in the medication plan then one of the following is also required:

- consultation with ICP DAP for a disposition;
- consultation with the NT Palliative Care Consultant 08 8922 8888 (Top End) or 08 8951 7777 (Central) for a disposition; or
- transfer to hospital.

Managing Anxiety and Agitation

Agitation in the palliative care patient may also be due to a number of causes including pain, hypoxia, hypotension, sepsis, urinary retention and electrolyte imbalance. When managing anxiety and agitation, review the patient's Red Folder, identify if there is anything within the medication plan already indicated for this and then verify with the patient or patient carers, to see if this has already been applied. If it hasn't, then as per the patient's medication plan, the patient's carer should administer medication if possible.

If the approved patient medication plan pharmacology has been used, or does not exist and non-pharmacological methods have not worked then paramedics can consider administering:

- **(Adult) Droperidol 2.5- 5mg IMI** (particular caution is required in dehydrated patients).

If Droperidol is ineffective or contra-indicated, then consider:

- **(Adult) Midazolam 2.5- 5mg IMI.**

If any agent has been used for agitation other than as prescribed in the medication plan then one of the following is also required:

- consultation with ICP DAP for a disposition;
- consultation with the NT Palliative Care Consultant 08 8922 8888 (Top End) or 08 8951 7777 (Central) for a disposition; or
- transfer to hospital.

Managing Constipation

Constipation is common in patients receiving analgesic medications, are immobile due to illness, and have a reduced oral intake. Paramedics should ascertain when the patient last passed faeces and flatus. Not passing flatus for greater than 12 hours should concern the paramedic for a possible bowel obstruction. Paramedics also need to review the patient's Red Folder, identify if there is anything within the medication plan already indicated for this and then verify with the patient or patient carers, to see if this had already been applied. If it has not, then as per the patient's medication plan, the patient or carer should administer as per the medication instructions.

If the approved patient medication plan pharmacology has been used, is invalid or absent, and a breakthrough medication is required due to no relief from systems, then paramedics should again consider any corroborating features of bowel obstruction and if found preference transfer to hospital unless truly terminal or patient/ carer validly refusing; or otherwise contact the NT Palliative Care Consultant 08 8922 8888 for further clinical advice.

Managing dehydration

Dehydration occurs particularly in the terminal phase of a palliative illness. Paramedics should consult the patient's Red Folder and review the patient management plan to see what is indicated for the management of dehydration and then manage as per any plan, preferably via the patient's carer.

Paramedics should also contact the NT Palliative Care Consultant on 08 8922 8888 (Top End) or 08 8951 7777 (Central) to discuss alternate management pathways to help reduce dehydration symptoms. This may involve SC or IV fluids but generally, once in the terminal phase of an illness managing dehydration with artificial fluids is not considered best care.

Managing Respiratory Secretions

Particularly in the terminal phase of a palliated illness patients can suffer from varying levels of issues with their respiratory secretions. Paramedics need to review the patient's Red Folder, identify if there is anything within the medication plan already indicated for this and then verify with the patient or patient carers, to see if this had already been applied. If it has not, then as per the patient's medication plan, the patient's carer should administer as per the medication instructions.

Anticholinergics are used to manage respiratory secretions. Some anticholinergics, including the only one St John NT currently carries, Atropine, cross the blood: brain barrier so are generally only used in the late terminal phase of an illness if at all, and its possible behavioural side effects should be discussed with the NT Palliative Care Consultant on 08 8922 8888 (Top End) or 08 8951 7777 (Central) prior to administration. If so authorised:

- **(Adult) Atropine 400- 600 microg SC once only**

Care after death

The death of a patient, even if expected, is still a very challenging environment to work in. Grief is a natural part of death for everyone who is left behind once a family member or friend dies. The way in which people respond to death can be very unpredictable, so paramedics need to be aware of their surrounding and if required retreat from the immediate area and request assistance for NT POL.

Generally, once a patient has died, **Recording of Life Extinct** has been performed **and on consult with general practitioner or NT Palliative Care Consultant there are *no* reasons to consider the patient's case requires referral to the Coroner:**

- Remove monitoring;
- Leave invasive lines in place;
- Place the body supine;
- Place head on pillow;
- Try to close the eyelids and/or mouth;
- Place arms down by the side;
- Cover the body up to the neck with a sheet or similar;
- 'De-medicalise' the area of packs and equipment as much and as quickly as possible;
- If air-conditioning available: turn to cold;
- (Modifying above to any patient or carer expressed cultural considerations).

Family members/ carers may also require assistance with contacting the funeral director, the patient's palliative care healthcare provider / general practitioner or even contact other family members who may be interstate or overseas. Providing assistance where practical and within operational demand, can go a long way in assisting the family in early grief and is often remembered forever by the family/ carers.

Cultural Considerations

St John NT acknowledges that cultural groups are dynamic and evolving in perpetuity. We recognise that cultural groups are not fixed or homogenous and that diversity exists within and across cultural groups. Clinical Procedure **P004 – Cultural Safety and Diversity**, discusses many key aspects of this, and paramedics should make themselves very familiar with this content.

It should also be noted that many cultural beliefs or actions associated with death, to an outsider to that culture can seem very strange. As paramedics we should not view these behaviours, customs or rituals as 'abnormal' or 'wrong' behaviour. What may seem very strange to you, may in fact be a traditional behaviour or cultural belief, bestowed on someone who has recently died, that has been in place for thousands of years.

If at any time you feel uncomfortable, remove yourself to a safe location or speak with either a person you were initially in contact with on scene (if safe to do so) or contact the Duty Manager for further advice.

Special Notes

- It is important that the patient's regular treatment team are aware of the care delivered by St John NT Paramedics. Endeavour to update the patient's normal treating GP or the NT Palliative Care Consultant on 08 8922 8888 (Top End) or 08 8951 7777 (Central) if not transporting to hospital or as part of the case if the patient has died.
- Medications administered from either the St John NT Drug or Palliative Care Medication Pack ***must be documented on the St John NT ePCR***. It is important to ensure all (including out of scope) medications administered whilst St John NT involved in care of the patient are listed on the ePCR and that reference must be made that states:
  - Patient Name;
  - NT Palliative Care Details for the patient;
  - Palliative care consultant or general practitioner details – if used;
  - Medication name, dosage, route, administration time; and,
  - Where the medication administered came from
    - St John NT Drug Kit; or,
    - Patient's Palliative Care Medication Pack.

P015 - Clinical Consultation (ICP and CMO)

There are situations that may present to clinicians (either Advanced Responder, Patient Transport Service, paramedics or ICPs) that are challenging, especially with the increasing sophistication of our care delivery.

It is considered good clinical practice to seek assistance or backup where indicated, and when this physical assistance has been requested and is not available, for our clinicians to consult. This is particularly important in situations where it is felt that further advice or consultation may contribute to better patient care.

St John NT offers 24/7 access to a senior Intensive Care Paramedic (ICP); 24/7 for ARs, PTOs and paramedics/ICPs; and the Chief Medical Officer provides access for ICPs for advice on critical care interventions. We also envisage support from our PACER team for specific mental health interventions or advice in line with the changes within the CPM.

For clinical care and patient management situations and where the request for advice relates to the provision of critical care intervention, then a request should always be made for ICP support and this recorded in your Siren ePCR. If the request is unable to be met, crews will be offered the option of a clinical consultation call via mobile phone through the ECC. It is important that these calls are managed via the ECC, so any information provided or given is recorded.

The consultation services are not provided for ad hoc authorisation of extension to clinical scope outside of the clinician's normal authority to practice (ATP), but may be required before administering drugs or performing procedures requiring consultation and approval, as mandated with below and where backup is not available.

In instances where ICP backup is not available or delayed (>30min) on consult:

- paramedic chest decompression in GCS 10 or above where indicated;
- exceeding fluid maximum during prolonged case management;
- paediatric cannulation;
- severe hyperkalaemia (no P waves, symptomatic bradycardia, widened QRS, peaked T wave);
- exceeding narcotic analgesia maximum during prolonged case management;
- TXA with positive coast score in trauma ≥ 3 hours and <3hrs post event pr PPH;
- adrenaline infusion 1mg in 1000ml bag, with 1ml=1microg in non-cardiac inadequate perfusion.

P016 - Clinical Handover

Transfer of patient care between healthcare providers, clinicians or locations is a high-risk situation, with an increased risk of errors at these times. Effective clinical handover which is structured and standardised can improve patient safety.

St John NT recognises the need for concise and complete handover and supports the use of two tools to assist in this process for situations that require a quick critical patient handover (ISOBAR) versus complete and detailed handover (IMIST AMBO).

ISOBAR

I – Identification (yourself and your patient, age/DOB)

S – Situation (history and immediate history)

O – Observations (observation and examination findings)

B – Background and history (past history, allergies, medications and prodromal findings)

A – Actions and assessment (treatments, medications, effectiveness)

R – Risks, Requirements and Read-backs (what are the ongoing concerns, further care required and are there any questions).

IMIST-AMBO

I – Identification (self and your patients)

M – Mechanism/Medical Complaint

I – Injuries or information relating to complaint (recent history and assessment)

S – Signs (vital signs and GCS)

T – Treatments and trends

A – Allergies

M – Medications

B – Background (past history and prodrome)

O – Other issues.

P017 - Emergency Dialysis Disconnection

Haemodialysis Disconnection

Haemodialysis is where blood is pumped from the body, via the arterio-venous fistula into a dialysis machine which removes waste products and excess fluid from the blood. The machine, acting as an artificial kidney, assists with balance of fluids, minerals and other chemicals in the blood, cleansing it prior to returning it to the body.

- Where possible, get the patient or carer who has equipment familiarity to assist in the disconnections;
- Where this is not possible, don gloves and observe aseptic technique;
- Turn equipment off at the machine on/off switch;
- Clamp catheter tubing using available clamps in situ; artery forceps; or, if required, umbilical clamps from the obstetric kit;
- Disconnect patient from the device; do not remove cannulas;
- Connect a cap to the cannula(s) or extension tubing to maintain sterility;
- The cannula can be utilised for fluid or medication if required; and,
- Manage any bleeding **as per C047 – Dialysis Emergencies**.

Peritoneal dialysis

Peritoneal dialysis uses the peritoneal membrane (the fine layer of tissue lining the abdominal cavity) to act at the filter, it has a rich vascular supply and is ideal for filtering wastes and removal of excessive fluid from the blood. Dialysis solution is instilled into the abdominal cavity via a surgically placed port and then drained sometime later.

- ***Where possible, get the patient or carer who has equipment familiarity to assist in the disconnections;***
- Where this is not possible, don gloves and observe aseptic technique;
- Turn equipment off (if machine-based and not gravity) at the machine itself;
- Turn tubing flow off from the machine or hanging bag via the clamps or roller lock and repeat this for the drainage bag;
- If necessary, clamp catheter tubing at either side of the connector ports using available clamps; artery forceps; or, if required, umbilical clamps from the obstetric kit; then,
- Disconnect the patient and place the caps on the catheter port ends.

P018 - Medication Safety and Infusions

Medication Safety

Care needs to be taken by all clinicians to ensure that they check and cross-check medication and particularly infusions.

Clinicians are responsible for ensuring they have the right medication; in date; in the right dose/ concentration and route; that there are no contra-indication, reactions or better alternatives to consider and the impact of how much or how frequently the medication is to be administered.

Always observe asepsis in drawing up any IV medications, particularly taking care to disinfect the rubber stopper of any vials.

Always label drugs as they are made up. Do not accept drugs from others that have not been labelled and presented with ampoule for cross check.

Paediatric medication administration has been identified as having a higher rate or error, and caution should always be taken to avoid over/under dosing.

Regardless of the case, *if unsure pause and recheck.*

Infusions

Care with infusions not only to deliver medications in a controlled fashion, but also that what is administered in a safe and consistent manner that minimises the risk of medication error or harm. The following is a guide for preparation of longer-term infusions:

Adrenaline and Noradrenaline

Syringe Size	Drug dose	Dilute	Diluent	Concent.	Rate of admin	Dosage admin	Total
50ml	3mg	**up to 50mls**	Glu. 5%	1ml=60microg	**2.5ml - 100ml/hr**	2.5–100microg/ min	PRN

- **NB Paramedics** unable to get ICP back up with an *in extremis* **non-cardiac inadequate perfusion** patient, paramedics should consult for an emergency **adrenaline infusion:**
  - inject **ONE x 1mL ampoule 1:1000 Adrenaline into a 1000ml bag normal saline**;
  - label bag *immediately* with large wording **'ADRENALINE 1:1000'**;
  - cross check dilution and dose with partner, **both initial bag**;
  - ***ensure to mix adrenaline in bag adequately;***
  - now mixture equals **1ml of infusion= 1microg Adrenaline;**
  - **start at a rate of 1 drop per sec≈3 microg/ minute** (1mL≈ 20 drops) **into most proximal and largest gauge IV or IO;**
  - **double rate every two minutes** until adequate haemodynamic response, **do not exceed 20ml (=20 microg) / minute;**
  - as escalating adrenaline in parallel continue to try establish ICP support;
  - **two minutely HR and blood pressures as a minimum/ do not leave the patient or lose contact with the adrenaline line;**
  - **de-escalate adrenaline therapy** in reverse manner as patient improves;
  - **convert to an ICP infusion as soon as able and sabotage bag** to prevent inadvertent re-use.

Amiodarone

Syringe Size	Drug dose	Dilute	Diluent	Concent.	Rate of admin	Dosage admin	Total
20ml	300mg	**up to 20mls**	Glu. 5%	1ml=15mg	**60ml/hr**	NA	300mg

Magnesium

Syringe Size	Drug dose	Dilute	Diluent	Concent.	Rate of admin	Dosage admin	Total
20ml	10mmoL	**up to 20mls**	Glu. 5%	1ml=0.5mmol	**120ml/hr**	NA	10/20mmoL

Morphine/Midazolam

Syringe Size	Drug dose	Dilute	Diluent	Concent.	Rate of admin	Dosage admin	Total
50ml	30mg each	**up to 30mls**	Glu. 5%	1ml=1mg each	**2.5–20ml/hr**	2.5–20mg/hr	PRN

Fentanyl/Midazolam

Syringe Size	Drug dose	Dilute	Diluent	Concent.	Rate of admin	Dosage admin	Total
50ml	300microg/30mg	**up to 30mls**	Glu. 5%	1ml=10microg/1mg each	**2.5–20ml/hr**	25–100microg /2.5–20mg/hr	PRN

Ketamine

Syringe Size	Drug dose	Dilute	Diluent	Concent.	Rate of admin	Dosage admin	Total
50ml	200mg	**up to 50mls**	Glu. 5%	1ml=4mg	**5 - 20ml/hr**	20–80mg/hr	200mg

Levetiracetam

Syringe Size	Drug dose	Dilute	Diluent	Concent.	Rate of admin	Dosage admin	Total
50ml	30mg/kg	**up to 50mls**	Glu. 5%	30mg/kg (in 50mls)	**200ml/hr**	NA	3g-A and 2g-P

Ceftriaxone

Syringe Size	Drug dose	Dilute	Diluent	Concent.	Rate of admin	Dosage admin	Total
20ml	2g or 50mg/kg <10yrs	**up to 20ml**	Water F/I	1ml=100mg or 50mg/kg (in 20mls)	**40ml/hr**	NA	2g or 50mg/kg <10yrs

P019 - Assault, Abuse and Scene Management Principles

Clinical features of harm as a result of abuse or assault can be subtle or obvious. These include the effects or emotional injury. Any individual may suffer from a combination of physical, emotional/psychological or sexual-related injuries; or outcomes that result from neglect.

If the clinician has any suspicions regard the safety or welfare of a patient or other person, then those concerns need to be acted upon. These concerns can be based on actions or information that is either directly witnessed, appears suspicious, is stated by the victim or gained via a third party.

Of particular concern is:

- physical abuse or assault, including domestic and family violence;
- sexual assault or abuse;
- child abuse, elder abuse or abuse of the disabled; and,
- neglect.

Patients may experience a range of feelings, including denial, disbelief, fear, guilt, shame, depression and loss of trust in themselves and others. The social stigma attached to many forms of abuse can heighten these feelings and the distress experienced and displayed. Paramedics should provide ongoing supportive care and treatment and manage such patients with dignity and empathy. It is important that paramedics assure the victim/patient that their disclosures and information provided are the right thing to do.

Mandatory Reporting

Differences exist in the types of abuse and neglect that must be reported. In the NT it is mandatory to report suspicions of all five recognised types of abuse and neglect (physical abuse, sexual abuse, emotional abuse, neglect, and exposure to family violence) in both children and adults.

In all jurisdictions, the legislation protects the mandatory reporter's identity from disclosure. In addition, the legislation provides that as long as the report is made in good faith, the reporter cannot be liable in any civil, criminal or administrative proceedings.

Case features that are suggestive of abuse:

- delays in soliciting medical aid for injuries sustained;
- injuries not consistent with history given;
- vague or no explanation given for injuries;
- patient presenting with minor complaint that doesn't correspond to physical findings;
- disproportionally distressed, anxious or fearful;
- lack of empathy or concern or inappropriate and defensive behaviours from other parties or alleged perpetrators;
- different witnesses provide markedly different accounts of how injuries occurred.

Physical findings that are suggestive of physical abuse:

- patterns of injury;
  - old or healing bruises or injuries that are difficult to explain;
  - marks or bruising to wrists, ankles, throat or chest from tight grip or ligature;
  - parallel stripe patterns consistent with being struck by a belt, cord or stick;
  - injuries to forearms, head or back suggestive of defensive injury;
  - bite marks, burns or scalds, including cigarette burns;
  - injuries to obscure locations or genital regions;
- severe nappy rash suggestive of neglect;
- poor physical appearance or malnutrition; and/ or,
- variation of answers to questions on history or events.

Features that are suggestive of child abuse:

- child abuse can incorporate the physical, emotional and sexual abuse signs, as well as neglect;
- emotional abuse (or psychological abuse) relates to actions that cause serious behavioural, emotional, or mental disorders in a child in the absence of physical harm;
- reluctance by another party or alleged perpetrator for the child to be examined;
- siblings are blamed for causing the injuries;
- it is inferred that the injury was self-inflicted; and/ or,
- injuries inconsistent with the level of development.

Features that are suggestive of sexual assault:

Adults

- disclosure of a sexual assault;
- loss of consciousness, episode of amnesia or drug-related blackouts;
- genito/anal injury;
- patient may present with a minor complaint that does not correspond to their physical presentation;
- disproportional distress, anxiety or fear; and/ or,
- evidence of self-harm, history of suicide attempts or ideation, or eating disorders.

Children

- developmental regressive behaviours;
- history of sleep disturbances;
- old bruising or history of injuries that are difficult to explain;
- uncharacteristic abdominal pains;
- uncharacteristic urinary or faecal incontinence;
- phobias; and/ or,
- sexualised behaviours.

Features of neglect:

- neglect is the continued failure to maintain a person's physical or psychological needs and may involve providing inadequate food, clothing or shelter; not protecting them from physical harm or danger; not providing appropriate medical care or treatment;
- neglect can be perpetrated against any member of the community; however, older persons, children, and physically/intellectually impaired individuals are at increased risk;
- these actions are likely to lead to the impairment of health and development of the individual, especially children.

In all these situations personal safety, the safety of other clinicians, the patients and uninvolved bystanders is paramount. Do not make assurances that information provided to you will not be disclosed or kept secret. Do not advise any alleged perpetrators or possibly involved parties of the allegations.

Scene management considerations

Alleged acts of sexual, physical or child abuse are crimes and, as such, crime scene preservation is always important. Clinicians should be mindful of making every attempt to minimise disruption of a scene whilst treating a patient or victim appropriately. Preserve the potential crime scene/s and everything within as best as possible, noting locations of people or items seen during your management.

Impress upon the patient or victim the importance of not showering or washing so as to preserve evidence.

Do not destroy or discard clothing worn by the patient or victim during any alleged assault.

Notify NT Police early and ensure allegations/suspicions are communicated to the receiving medical and nursing staff so that evidence can be preserved.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Clinical Practice Guidelines

C001 - Airway Management

The following guideline is provided to support the decision-making and process of undertaking pre-hospital airway management where there is a need to support patient oxygenation, ventilation or to provide a more secure airway. This includes basic airway adjunct use and suitability assessment such as OP or NP Airways; use of Bag-Valve-Mask (BVM); Supraglottic airway (SGA) selection and insertion; through to intubation or Rapid Sequence Intubation (RSI).

Indications

Basic Airway Management

- Unconscious and Absent Airway Reflexes:
  - Manual airway techniques should be employed; these includes positioning to achieve neutral alignment, opening the mouth and removing foreign bodies, lateral positioning, airway manoeuvres such as jaw thrust and triple airway manoeuvre;
  - use of airway adjuncts where indicated, such as placement of Nasopharyngeal Airways (NPA) or Oropharyngeal Airways (OPA) to assist in establishment and maintenance of a patent airway.
- Ineffective or inadequate ventilation:
  - use of Bag-Valve-Mask (BVM) to provide assistance or support absent ventilation, ensure correct fitting mask (C and E or Vice grip) and gentle assistance, being aware of high airway pressure, gastric inflation and tidal volumes, avoid over inflation or hyperventilation;
  - if difficulties continue, add airway adjuncts and consider application of two operator ventilation strategies.
- Where there is a need to have prolonged IPPV – Supraglottic airway (SGA):
  - if gag reflex is absent and ongoing airway support and ventilation is required, placement of an SGA should be considered;
  - neutral alignment and appropriate airway size selection is important to ensure adequate seal and effectiveness;
- Consider placement of gastric tube into SGA port to relieve gastric inflation and distension.

Unassisted Intubation Indications

- Absent airway reflexes:
  - inability to support own airway, no gag reflex present and basic airway techniques and adjuncts are not supporting adequate oxygenation and ventilation;
  - where performance of intubation is unlikely to worsen patient's condition, e.g. avoid where you suspect raised ICP, TBI or stroke.
- Respiratory arrest:
  - where the patient is refractory to non-invasive ventilation or medications, requiring ongoing manual ventilation;
  - where required for targeted treatment.
- Cardiac arrest:
  - preference should be given to placement and management with an SGA in the early phases of a cardiac arrest;
  - placement of an ETT in cardiac arrest should not interfere or interrupt application of effective external cardiac compressions or defibrillation;
  - consider early ETT if airway difficult to manage or airway soiling a risk.

Medication Facilitated Intubation Indications

- The following circumstances form the basis for the decision to undertake a medication-facilitated intubation:
  - airway is not patent;
  - respiratory support required and/or respiratory failure present;
  - targeted support and treatment required.
- The goal of securing the airway is to provide adequate oxygenation, adequate ventilation and finally provide a definitive airway.

Precautions

- Establish resuscitation orders and Advanced Care Directives (ACD).
- Anticipate any difficulties with basic life-support and Bag-Valve-Mask resuscitation.
- Consider the need for airway adjuncts in neurological emergencies prior to assisted intubation – all attempts should be made to avoid gag reflexes in TBI/NTBI.
- Unable to put patient in the neutral position (SGA not sealing).
- Anticipate possible difficulties – be prepared for them.
- Imminent risk of cardiac arrest.

Contraindications

- Clinical situations where a difficult airway procedure is not feasible.
- No functional capnography – prior to intubation.

Preparation and Pre-Intubation

- Maintain manual airway support in a neutral position, consider ramping and optimisation;
- Measure and insert an OPA or NPA airway as indicated;
- Place nasal specs to allow for apnoeic oxygenation;
- Pre-oxygenate or assist ventilation with BVM;
- Ensure ECG is placed on patient and SpO_2 is regularly monitored;
- Consider the need for an SGA.
- Monitor $EtCO_2$;
- IV access: Ideally x 2 and check patency and secure.
- Ensure patient placed into a neutral position and optimised, by ramping position as indicated;
- Apply PEEP at 5cm for pre-oxygenation;
- Ensure adequate ‘Preparation’, ‘Position’, ‘Perfusion’, ‘Pre-oxygenation’, and ‘People’.
- **Prepare equipment:**
  - lay out equipment in a systematic fashion;
  - prepare and check suction equipment;
  - ETT x 2 (primary size and one size smaller);
  - have both bougie and introducer ready;
  - 2 x functional direct laryngoscope (DL) blades and handle;
  - video laryngoscope (VL) and two blades;
  - prepare adjuncts if not already available (OPA, NPA, SGA, Cric marked and kit ready);
  - manual inline stabilisation for suspected cervical spine injury as required;

  - brief assistants on support and need for possible cricoid or bimanual pressure if required;
  - colourmetric $EtCO_2$ detector (fall back for $EtCO_2$ failure or use in small paediatrics).
- **10m/kg NaCl 0.9% pre-hydration** for assisted airway procedures, consider inotropes if required;
- Manage hypotension or tachycardia as per relevant guideline.
- **Draw up medications (RSI), label appropriately:**
  - Primary Sedation – **Ketamine 0.5- 2mg/kg (200mg Max) (IV);**
  - Alternative Sedation if primary is C/I – **Fentanyl 2microg/kg + Adult 0.1mg/kg Midazolam (IV) or Paediatric Midazolam 0.2mg/kg (IV);**
  - Paralysis – **Rocuronium 1.5mg/kg;**
  - Resus Drugs – **Atropine and Adrenaline pre-drawn as required.**
- Continue pre-oxygenation and recheck the optimised patient;
- Perform challenge response checklist (see separate document).

Intubation

- Administer sedation per above based on frailty, blood pressure and indication;
- Administer paralysis per above based on indication;
- Turn nasal spec oxygen source to 15 L/ min
- Place ETT via DL or VL as per insertion guidelines; visualise tube passing the cords;
- Confirm placement with $EtCO_2$;
- Note length at lips or teeth;
- Auscultate chest and stomach; watch for chest rise and fall, tube misting and SpO_2.

Post Intubation

- Provide any ongoing circulatory support post-procedure;
- Place an OG or NG Tube and drainage bag;
- Ventilate the patient at Tidal Volume **(Vt) 6ml/kg, PEEP 5-10cmH_2O**, aiming for $EtCO_2$ 30-35mmHg or as appropriate to condition TCA 20-25mmHg and DKA at pre-ETT level of minimum 25mmHg;
- Re-check ETT with all patient movements.
- **Ongoing sedation Adult:**
  - **Fentanyl 300microg and Midazolam 30mg in 30mL** at 1 – 10ml per hour with boluses up to 5ml as required; or,
  - **Ketamine 200mg in 50mL** at 5- 20mL per hour.
- **Ongoing sedation Paediatric:**
  - **Fentanyl 300microg and Midazolam 15mg in** 15ml at 0.1-0.2ml/kg per hour and 1 – 2ml boluses as required.
- Aim for **perfusion targets**:
  - TBI = SBP 120mmHg;
  - NTBI SBP 120–140mmHg; and,
  - ROSC SBP >100mmHg.
- Consider need for ongoing paralysis **Rocuronium 1mg/kg or paediatric 0.5mg/kg as required (~30 minutely).**

Difficult Airway Algorithm (Including 'CICO'- Can't Intubate, Can't Oxygenate)

- Communicate to the team clearly that you are entering the Difficult Airway Algorithm;
- Ensure that you communicate your progression through this algorithm until you manage to achieve ventilation and oxygenation;
- Verbalise all escalation points;
- Algorithm:
  - Attempt to improve the patient's position by ramping, two person BVM, use of other airway adjuncts;
  - Any reattempt at intubation should be optimised and utilising a bougie and video laryngoscope;
  - If no success with ETT, attempt to place an OPA or NPA and attempt IPPV with a BVM;
  - If no success with OPA/NPA and IPPV, insert a LMA and attempt IPPV with a bag;
  - If no success with LMA, proceed to Cricothyroidotomy/Front of Neck Access (scalpel/finger/bougie) and IPPV with a bag;
- Consider use of sedation to maintain SGA or Cricothyroidotomy.

C002 - Cardiac Arrest - Medical

The following guideline is provided to support the decision-making and process of undertaking the management of the patient suffering a medical cardiac arrest. The aim is to appropriately recognise and manage out-of-hospital cardiac arrest, and guide the response for those who have a medical cause, or as an extension to the traumatic arrest guideline. The focus is immediate and uninterrupted high-performance CPR and rapid defibrillation minimising hands off chest time over two-minute cycles.

Initial Assessment and Care

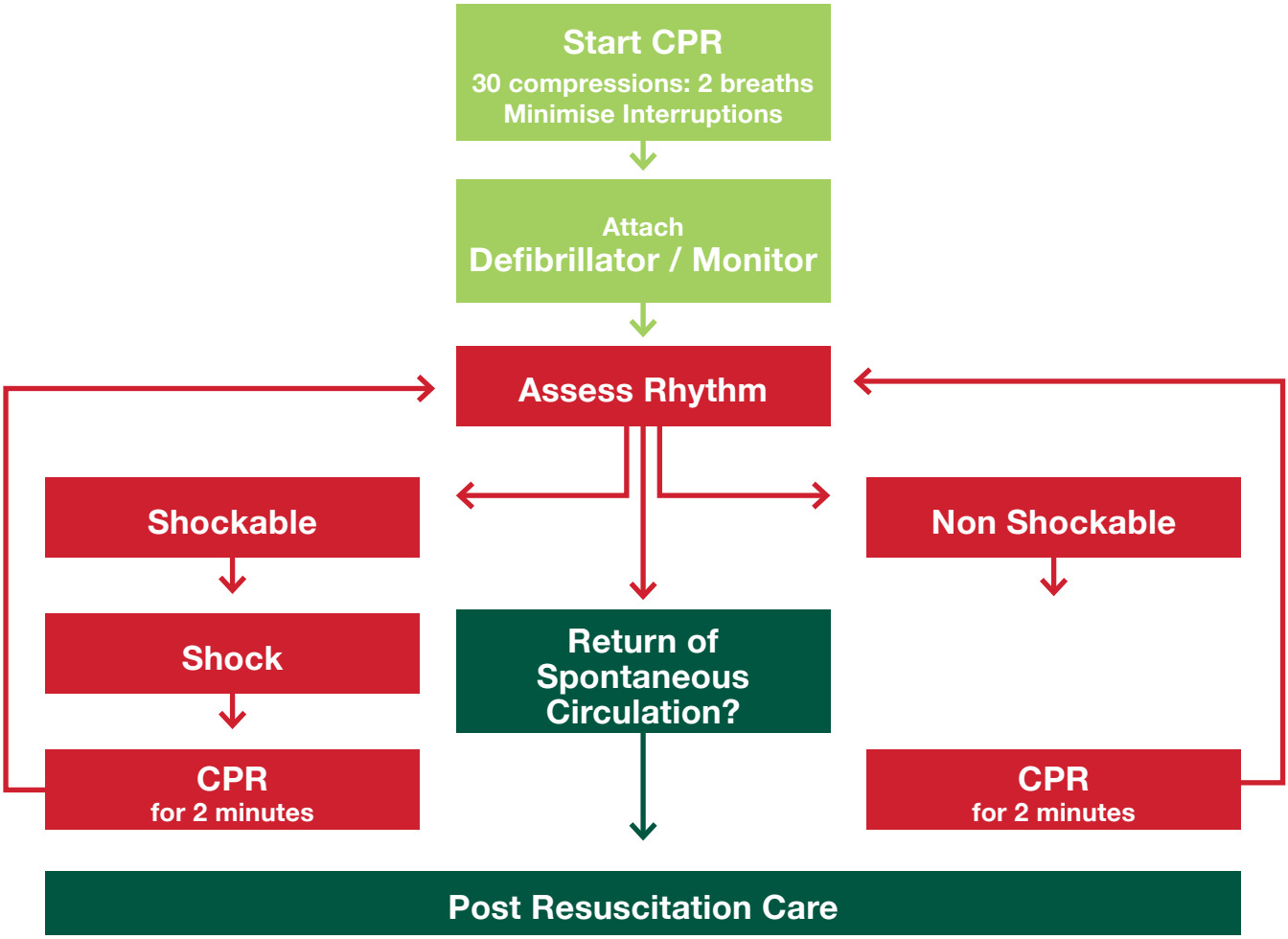
- Apply clinical approach;
- Confirm unconscious, pulseless +/- agonal or abnormal respirations;
- Inadequate perfusion and the following: HR<40 in child; HR<60 in infant; or a HR<100 in newborn which should be managed **as per C049 Newborn Resuscitation;**
- Confirm the history and mechanism does not indicate traumatic cause;
- Immediately commence CPR per High Performance CPR Guidance;
  - **Adult – 100–120bpm; >5cm depth; allow full recoil; ratio 30:2;**
  - **Paed – 100–120bpm; 1/3 chest depth; allow full recoil; 15:2;**
  - **regular changeover of ECC operator at two minute intervals.**
- Place defibrillator pads on the patient.
  - **AED – allow to analyse and shock as indicated; no shock indicated continue CPR; Repeat two-minutely as indicated; immediately recommence CPR post shock.**
- **(charge during compressions in manual mode)**; manual rhythm interpretation, and rapid shock for VF or pulseless VT ***(if in doubt shock)***;
  - **DCCS – 200J (Adult) or 4J/kg *rounded up* (Paediatric); if patient in Asystole or PEA continue CPR. Repeat two-minutely as indicated; immediately recommence ECC post DCCS.**
- Only perform carotid pulse checks where there is an apparent perfusing rhythm.
- Ensure patient's airway is optimised for oxygenation;
- Insert iGel LMA;
- Connect to $EtCO_2$ attached to monitor (note and record value regularly);
- Connect to SIRB;
- **CPR ratio 30:2 (adult)** post LMA or ETT placement;
- Gain IV access; if IV access taking longer than 60 seconds- IO placement by most senior clinician.
  - **Adrenaline 1mg (Adult) or 10microg/kg (Paed) IV/IO every second cycle (four-minutely);**
  - **Amiodarone 300mg (Adult) or 5mg/kg (Paed) IV/IO after 3rd DCCS, then 150mg (Adult) or**
  - **5mg/kg (Paed) after 5th DCCS (max 450mg combined dose for both Adult and Paed);**
  - **Minimal normal saline (TVKO) in pulseless VT or VF; if patient in PEA from suspected hypovolaemia, asthma, or anaphylaxis then 20ml/kg IV/IO.**

- Consider 4Hs and 4Ts as causes for cardiac arrest;
- Consider adjunct arrest therapies:
  - For suspected **Hyperkalaemia cause - Calcium Gluconate 10ml (2.2mmoL) (Adult) or 0.5ml/kg up to 20ml (Paed ICP only) IV/IO;**
  - For suspected **Tricyclic antidepressant OD or Hyperkalaemia cause - Sodium Bicarbonate 8.4% 100ml (Adult) or 1ml/kg (Paed ICP only) IV/IO; repeat once for (TCA OD);**
  - For suspected **Torsades de Pointes - Magnesium Sulphate 10mmoL (Adult) or 0.1mmoL/kg up to 5mmoL (Paed ICP only) IV/IO; repeat dose once at 10 minutes.**
- If tension pneumothorax suspected, decompression is required **per C033 Chest Injuries**;
- Obtain a BGL and manage hypoglycaemia **as per C026 Diabetic Emergencies**;
- Manage return of spontaneous circulation **as per C004 ROSC**;
- Ideally intubation will be performed without interrupting CPR **as per C001 Airway Management;**
- Manage CPR interfering patient with **Ketamine 10–20mg IV/IO (Adult)** boluses at five-minute intervals;
- Consider the placement and use of **mCPR device (Adult)**.

Considerations

- Children aged 12 and over should be managed as per adult.
- Target time to first shock/ disarm is <2 minutes post-arrival.
- It is important to focus on team communication, minimal hands off chest and high-quality CPR.
- A sudden rise $EtCO_2$ may be a surrogate marker for ROSC or cardiac output.
- Fluid administration in patients with shockable rhythms without evidence of hypovolaemia may be detrimental; limit use to flushing medication and TKVO only in these patients.
- Hypothermic patients with a temperature <30ºC should have adrenaline and amiodarone withheld, then **double drug dosage intervals of adrenaline and amiodarone for Temps between 30^{0}C- 34.9^{0}C**; consider use of mCPR and transport in these patients;
- Consider other less medical causes of arrest – this includes tension pneumothorax, upper airway obstruction, exsanguination, hyperkalaemia, asthma, anaphylaxis and hypoxia.
- Pregnant patients >20 weeks gestation (uterine fundus at or above umbilicus) should have manual left uterine displacement or left lateral tilt applied to relieve pressure on aorta and vena cava; consider mCPR transport for emergency resuscitative hysterotomy.
- Consider paediatric transport early wherever possible (either intra-arrest or post-arrest).
- Cessation of resuscitation should be considered after 30–45 minutes of ALS/ICP resuscitation, if transport or continuation is considered futile.
- Before cessation consider the place of prolonged resuscitation (+/-mCPR) in cases including, but not limited to paediatric, asthmatic, refractory VF/VT, STEMI for PCI or thrombolysis therapy, hypothermic, immersion, and certain poisoning cardiac arrests.
- Perform ROLE ten minutes after resuscitation has been ceased.
- Consider use of video laryngoscope to facilitate ETT during CPR.
- PEEP is not indicated in cardiac arrest.

Advanced Life Support for Adults



During CPR

Airways adjuncts (LMA/ETT)

Oxygen

Waveform capnography

IV / IO access

Plan actions before interrupting compressions (e.g charge manual defibrillator)

Drugs

Shockable

- Adrenaline 1mg after 2nd shock (then every 2nd loop)
- Amiodarone 300mg after 3 shocks

Non Shockable

- Adrenaline 1mg immediately (then every 2nd loop)

Consider and Correct

Hypoxia

Hypovolaemia

Hyper / hypokalaemia / metabolic disorders

Hypothermia / hyperthemia

Tension pneumothorax

Tamponade

Toxins

Thrombosis (pulmonary / coronary)

Post Resuscitation Care

Re-evaluate ABCDE

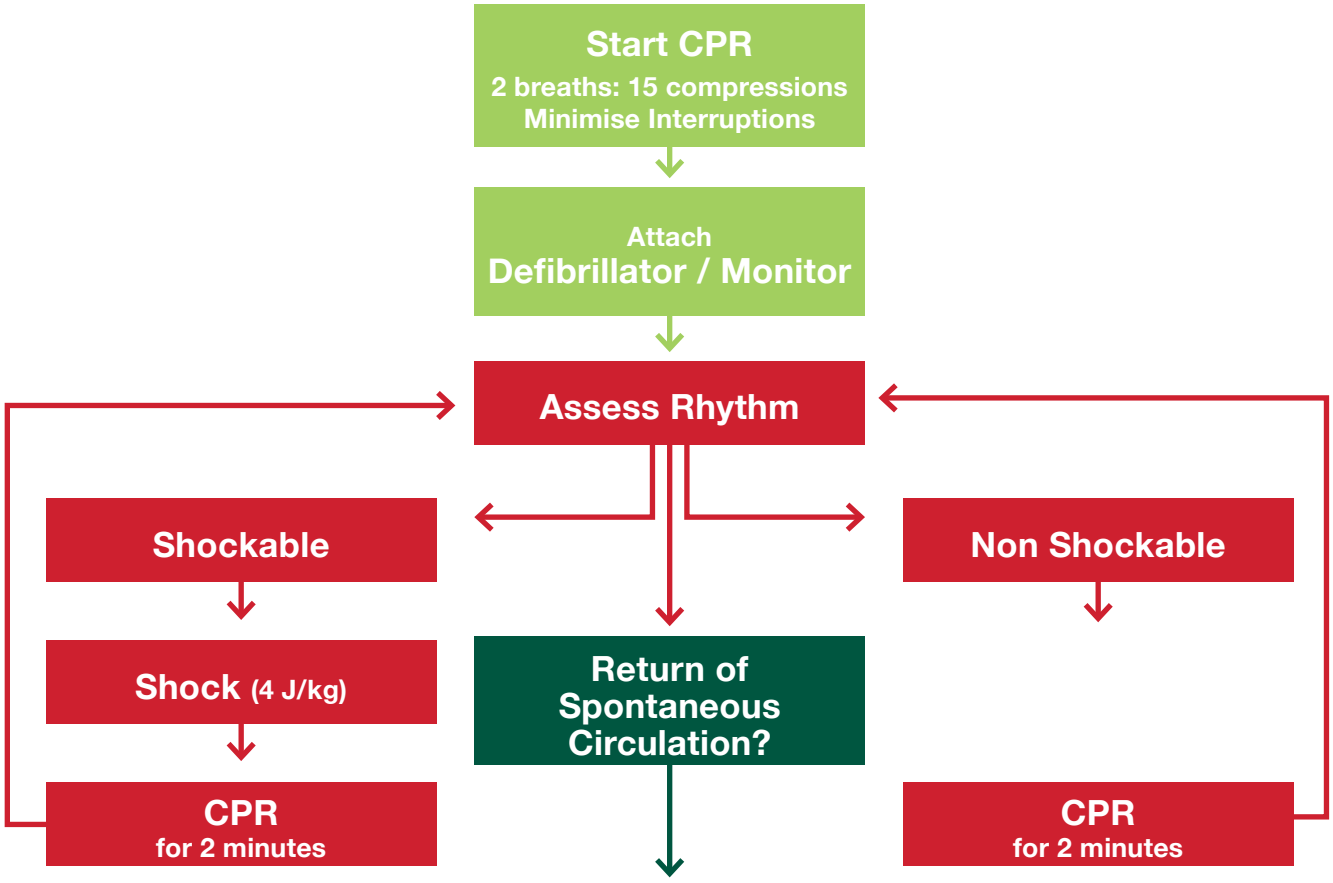
12 lead ECG

Treat precipitating causes

Aim for: SpO_2 94-98%, normocapnia and normoglycaemia

Targeted temperature management

Advanced Life Support for Infants and Children



During CPR

Airways adjuncts (LMA/ETT)

Oxygen

Waveform capnography

IV / IO access

Plan actions before interrupting compressions (e.g charge manual defibrillator to 4 J/kg)

Drugs

Shockable

- Adrenaline 10 mcg/kg after 2nd shock (then every 2nd loop)
- Amiodarone 5mg/kg after 3 shocks

Non Shockable

- Adrenaline 10 mcg/kg immediately (then every 2nd loop)

Consider and Correct

Hypoxia

Hypovolaemia

Hyper / hypokalaemia / metabolic disorders

Hypothermia / hyperthemia

Tension pneumothorax

Tamponade

Toxins

Thrombosis (pulmonary / coronary)

Post Resuscitation Care

Re-evaluate ABCDE

12 lead ECG

Treat precipitating causes

Re-evaluate oxygenation and ventilation

Targeted Temperature Management

C003 - Cardiac Arrest – Traumatic

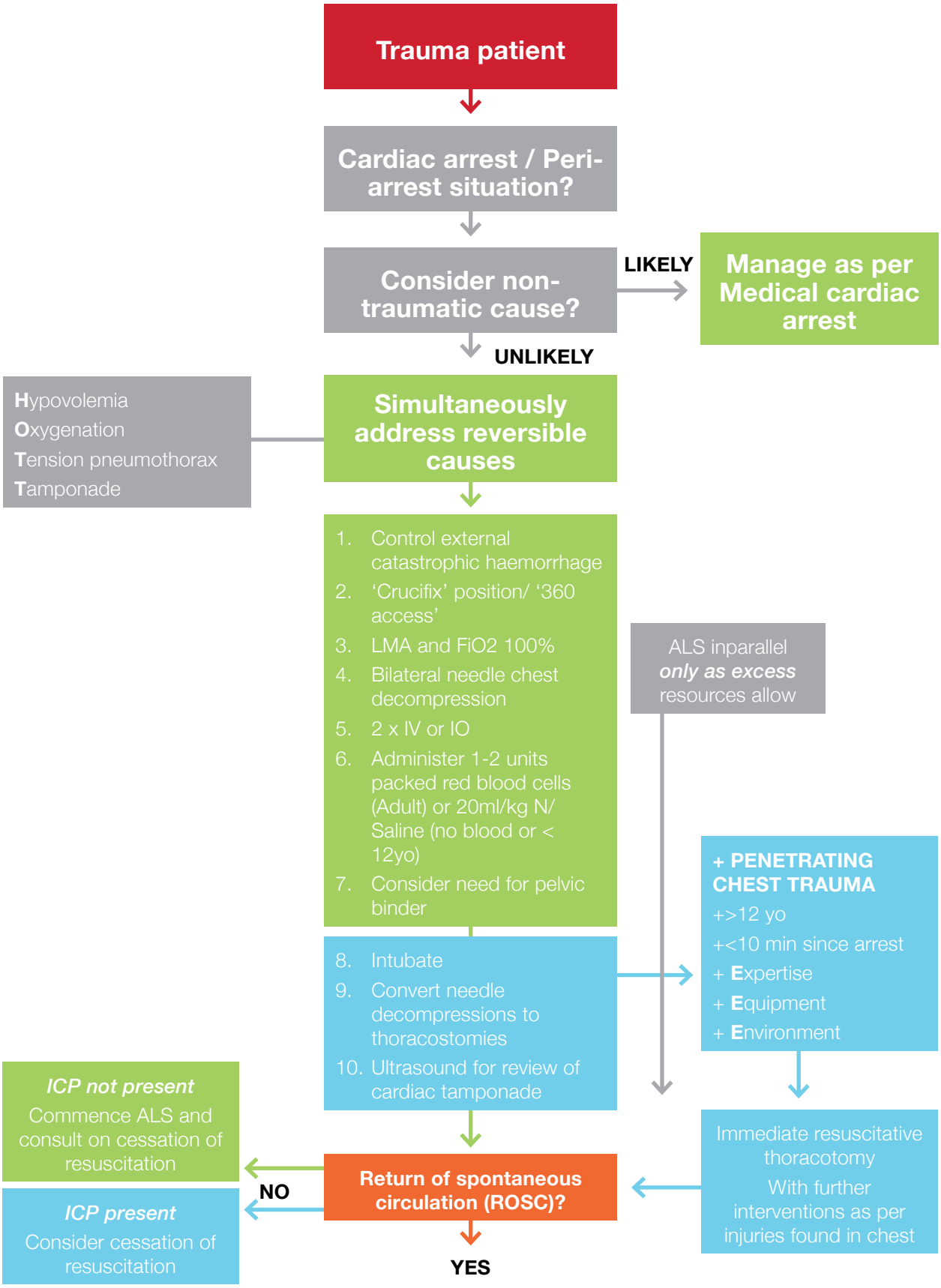
The following guideline is provided to support the decision-making and process of undertaking the management of the patient suffering a traumatic cardiac arrest. The aim is to appropriately recognise and manage an out-of-hospital cardiac arrest and guide the response for those who have a traumatic cause. The focus is the management of major haemorrhage or significant traumatic injury over other interventions.

Initial Assessment and Care

- Apply clinical approach;
- Confirm unconscious, pulseless +/- agonal or abnormal respirations;
- Confirm the history and mechanism does not indicate medical cause;
- Chest compressions are not indicated at this stage;
- Control all major haemorrhages, direct pressure, apply dressings and use tourniquets where appropriate;
- Ensure that the airway is patent and commence BVM ventilation + oxygen;
- Insert SGA and continue ventilation;
- Commence high performance CPR.
  - Needle decompression of the chest bilaterally (**as per C033 Chest Injuries**), where chest trauma is a suspected cause of arrest.
- Gain IV access; if IV access is taking longer than 60 seconds, consider IO placement;
  - **Normal saline 20ml/kg IV or IO.**
- If a pelvic fracture is suspected, **apply a pelvic binder.**
- Intubation preferable in traumatic arrest, proceed to ETT on arrival or if indicated go directly to Cricothyroidotomy/front of neck access **as per C001 Airway Management;**
- Undertake bilateral chest finger thoracostomy **as per C033 Chest Injuries;**
- In the setting of the traumatic cardiac arrest, if the initial presenting rhythm is asystole, the ICP can consider early cessation once all reversible causes have been managed as above and patient remains in asystole.
- Consider the need for long bone fracture immobilisation;
- If there has been some response to the above management, and additional resources allow the continuation of resuscitation efforts where they are not considered futile, continue management **as per C002 Cardiac Arrest Medical.**

Considerations

- Children aged 12 and over should be managed per adult.
- Prioritise the control of major haemorrhages over other interventions.
- Correctable causes to be managed in order of the apparent clinical need include
  - **H**ypovolaemia with haemorrhage control +/- blood;
  - **O**xygenation with FiO2 100% via LMA; and,
  - **T**ension pneumothorax with bilateral needle decompression or finger thoracostomies.
  - (**T**amponade is currently a traumatic cardiac arrest cause that cannot be relieved by St John NT staff.)
- If any doubt to the cause of the arrest, manage **as per C002 Cardiac Arrest Medical**.
- Pregnant patients >20 weeks gestation (uterine fundus at or above the umbilicus) should have manual left uterine displacement or left lateral tilt to relieve pressure on aorta and vena cava as local resources dictate; consider mCPR transport for emergency resuscitative hysterotomy.
- If resources allow, after 30–45 minutes of ALS/ICP resuscitation (both traumatic and medical) cessation is supported.
- Paediatric patients should be transported wherever possible.
- Perform ROLE ten minutes after resuscitation has been ceased.
- Cessation of resuscitation should be considered early if unresponsive to specific traumatic interventions above, or continuation seems futile.
- PEEP is not indicated in cardiac arrest.


Trauma patient
Cardiac arrest / Peri-arrest situation?
Consider non-traumatic cause?
LIKELY
Manage as per Medical cardiac arrest
UNLIKELY
Hypovolemia
Oxygenation
Tension pneumothorax
Tamponade
Simultaneously address reversible causes
1. Control external catastrophic haemorrhage
2. 'Crucifix' position/ '360 access'
3. LMA and FiO2 100%
4. Bilateral needle chest decompression
5. 2 x IV or IO
6. Administer 1-2 units packed red blood cells (Adult) or 20ml/kg N/ Saline (no blood or < 12yo)
7. Consider need for pelvic binder
ALS inparallel only as excess resources allow
8. Intubate
9. Convert needle decompressions to thoracostomies
10. Ultrasound for review of cardiac tamponade
+ PENETRATING CHEST TRAUMA
+>12 yo
+<10 min since arrest
+ Expertise
+ Equipment
+ Environment
ICP not present
Commence ALS and consult on cessation of resuscitation
ICP present
Consider cessation of resuscitation
NO
Return of spontaneous circulation (ROSC)?
Immediate resuscitative thoracotomy
With further interventions as per injuries found in chest
YES
Pre-hospital:
• 'Load and go' Immediate transport to appropriate hospital, only pausing for life saving interventions
• General post ROSC care en route as able
• Pre-notify reciving hospital 'Post Traumatic Cardiac Arrest' and request any immediate needs on arrival

C004 - Return of Spontaneous Circulation (ROSC)

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who has achieved return of spontaneous circulation post-cardiac arrest. The aim is to appropriately recognise and manage the ROSC patient, as there is increasing evidence to support a systematic process of management of the post-cardiac arrest leading to increased survival to hospital discharge.

Initial Assessment and Care

- Apply clinical approach;
- Optimise patient position for airway protection and on-going management;
- Ensure that the airway remains patent and continue to assist the patient with BVM ventilation + oxygen;
- Package and prepare the patient for transport, monitor temperature, BGL and take regular observations;
- Monitor and adjust ventilation to achieve an SpO_2 of >94% and an $EtCO_2$ of 30–40 mmHg, avoid hyperventilation;
- Aim for a post ROSC **SBP of >100 in adults and SBP >80 in paediatrics;**
- Limit fluid to no more than 20ml/kg, then inotropic support should be applied;
- Perform a 12-lead ECG;
- Consider the need for management of other traumatic injuries and minor fracture immobilisation;
- Manage arrhythmia **as per C007 Bradycardia or C008 Tachycardia.**
- If not already done so, and the patient has had an intra-arrest time of >10 minutes or remains unconscious despite oxygenation and perfusion management, consider Intubation **as per C001 Airway Management;**
- If fluid therapy alone does not support the patients post ROSC perfusion, consider adrenaline boluses or infusion **as per C009 Inadequate Perfusion – Cardiac.**

Considerations

- Children 12 yrs of age and over should be managed per adult.
- Excessive fluid administration in the arrest and post-ROSC phases may have a detrimental effect on the patient, particularly those with rhythms such as VT or VF, fluid administration should be limited in these cohorts; 20ml/kg should be the most fluid administered either during or post-cardiac arrest unless correcting hypovolaemia.
- The primary aims after initial resuscitation are airway and breathing support; support circulation and cerebral perfusion and manage any further cardiac arrhythmia.
- Consider further management of causes of arrest (4Hs and 4Ts), including pneumothorax, upper airway obstruction, exsanguination, hyperkalaemia, asthma, anaphylaxis, hypothermia/hyperthermia, acidosis, overdose and hypoxia.

C005 - Acute Coronary Syndromes

The following guideline is provided to support the decision-making and process of undertaking the management of the patient experiencing an acute coronary syndrome. The aim is to appropriately recognise and manage the ACS patient which comprises conditions such as angina, unstable angina, myocardial ischaemia, non-ST elevation ACS (NSTEACS) and acute ST elevation myocardial infarctions (STEMI).

Initial Assessment and Care

- Apply clinical approach;
- Place the patient in a position of comfort; minimise exertion;
- Assess the patient's vital signs and ascertain any treatment or medications taken;
- If the patient looks unwell and you suspect they are suffering a primary cardiac event (pale, short of breath, sweating, nausea, +/- chest pain) request a backup ambulance crew;
- If you suspect an ACS event, ensure the AED is close at hand.
  - **Aspirin 300mg PO**, if not already self-administered;
  - if SBP>110mmHg, **GTN Spray 400microg SL (one spray)**, repeat at five minutes **(max three sprays)**.
- Perform a 12-lead ECG (this should be done within 10 minutes of arrival);
- If the ECG suggests a STEMI or presents with significant arrhythmia, request ICP support.
  - if SBP>110mmHg, **GTN Spray 400microg (one spray) SL**, if pain persists no maximum dose;
  - if SBP>90mmHg, **GTN Patch 50mg (0.4mg/hr) upper chest or upper arm**; if BP drops below this, remove patch, note date and time of application on patch.
- If pain continues, manage **as per C030 Pain Management**;
- If STEMI confirmed and onset <12 hours, manage **per C006 STEMI**;
- If nausea and/or vomiting, manage **per C028 Nausea and Vomiting**;
- If LVF present, manage **per C011 Acute Pulmonary Oedema**;
- Manage arrhythmia **as per C007 Bradycardia or C008 Tachycardia**.
- If inadequately or poorly perfused, manage **as per C009 Inadequate Perfusion – Cardiac.**

Considerations

- It is important to note that not all patients experiencing an ACS event will have pain for a variety of reasons.
- All patients with a suspected ACS event require follow up and investigation at a hospital, even if their pain completely resolves spontaneously.
- The absence of any evidence of ischaemia or infarction on the ECG does not exclude the possibility that the patient is having an AMI; they may require serial ECGs and enzyme testing to confirm or rule out an ACS event.
- Excessive oxygenation of STEMI patients who have normal oxygen saturations has been found to be detrimental, oxygen is only indicated when the saturations drop and its administration should be titrated to achieve an adequate SpO_2.
- Ideally STEMI and high-risk NSTEAC patients, wherever possible, should be assessed and transported to their nearest hospital (or PCI facility if available). Provide early notification for all confirmed STEMI patients.
- The aim of analgesia in the ACS patient is to make the patient as comfortable as possible; in some cases, abolition of pain is not possible. Avoid excessive opioid use.

C006 - ST Elevation Myocardial Infarction (STEMI) (Not Currently In Use)

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who is experiencing a STEMI. The aim is to appropriately recognise and manage the STEMI patient, as time from onset to coronary reperfusion can have a significant impact on the morbidity and mortality. The aim is the timely transport to an established PCI service or provision of Pre-Hospital Thrombolysis (PHT).

Initial Assessment and Care

- Apply clinical approach;
- If patient **symptoms are >12 hours old**, continue to manage **per C005 Acute Coronary Syndromes** focusing on transport with notification;
- If **symptoms < 12 hours old** manage as **per C005 Acute Coronary Syndromes**;
- Perform and interpret 12 lead ECG;
- If **STEMI paramedic-confirmed or seen on Zoll (***STEMI*** or ***ACUTE MI***) and onset <12 hours**,
  - Transmit the 12-lead ECG (Consult Numbers Here);
  - **Place defibrillation pads** onto patient's chest;
  - Gain two patent IV access; however, avoid both uncompressible venepuncture sites or excessive attempts;
  - Whilst awaiting callback from cardiologist perform PHT checklist for inclusion/exclusion and relative contraindications;
  - On callback with cardiologist- confirm STEMI Dx, evaluate PCI and thrombolysis inclusion/ exclusion criteria and contraindications, evaluate time to PCI,;
  - If PHT authorised by cardiologist:
  - - Perform informed consent with information statement to patient;
  - - **Heparin IV** 4000IU **as a bolus**, repeat 1000IU at one-hour intervals;
  - - **Tenecteplase IV** (refer to table for patient weight-based dose below).
- Repeat 12-lead ECG 10 minutes post administration, then every 30 minutes thereafter.
- **If the patient is not for PHT or is for PCI they should be urgently transported to hospital with a pre-notify 'Code STEMI'**;
- If inadequately or poorly perfused, manage **as per C009 Inadequate Perfusion – Cardiac**, target a SBP of >100mmHg;
- Manage arrhythmias **as per C007 Bradycardia or C008 Tachycardia**, being mindful that arrhythmias are common during reperfusion and many do not need specific management.

Considerations

- Paramedics and ICPs should call the Cardiology Consultation Service if there is any uncertainty regarding the management or diagnosis of STEMI.
- Paramedics and ICPs must call the Cardiology Consultation Service prior to any administration of Heparin or Tenecteplase.
- Success of PHT may not initially be evident for 1–1.5 hours; thrombolysis is unsuccessful in approximately 30% of cases.
- The true success of PHT will not be known until PCI is performed; however, you should see a reduction in pain or discomfort and decreasing ST segments.

✔ Inclusion Criteria

Symptoms' onset is less than 12 hours, and:

- 12-lead ECG identifies STEMI or ECG showing ST elevation in two or more contiguous leads;
- ST elevation greater or equal to 2.5mm in leads V2–V3 in male aged <40 years; or
- ST elevation greater or equal to 2mm in leads V2–V3 in male aged >40 years; or
- ST elevation greater or equal to 1.5mm in leads V2–V3 in women; or
- ST elevation greater or equal to 1mm in other leads; or
- new onset LBBB.

✘ Exclusion Criteria

The patient must not be thrombolysed if they meet any of the following:

- have had major intracranial, spinal, chest, abdominal or joint replacement surgery in past three months;
- suffered a significant head injury in the past three months;
- suffered a major traumatic injury in the past three months;
- suffered an Intracranial Haemorrhage, stroke or TIA in the past three months;
- had any Gastrointestinal or Genitourinary bleeding in the past one month;
- have any current bleeding disorders, active bleeding (excluding menses) or bleeding tendencies;
- currently on anticoagulants (Warfarin, Heparin, Enoxaparin, Dabigatran, Rivaroxaban, Apixaban) or glycoprotein IIb/IIa inhibitors (Abciximab, Eptifibatide, Tirofiban);
- has a known allergy to Tenecteplase or Gentamicin.

Relative Contraindications

If any of the following apply, ensure to clearly highlight to Cardiology Consultation Service before proceeding with PHT:

- Aged >75;
- pt with non-compressible vascular puncture sites (biopsy sites or IV central lines);
- history of liver disease;
- SBP >160mmHg or DBP >100mmHg;
- HR >120bpm;
- low body weight;
- active peptic ulcer;
- anaemia;
- possibility of acute pericarditis or subacute bacterial endocarditis;
- pt who has received traumatic or prolonged (>10 minutes) CPR;
- pregnant or within one week post-partum.

Tenecteplase dosing

Patient Weight (kg)	Tenecteplase dose to be administered (mg)	Corresponding volume of reconstituted solution (ml)
<60	30	6
>60 – <70	35	7
>70 – <80	40	8
>80 – <90	45	9
>90	50	10

C007 - Bradycardia

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who has symptomatic bradycardia. The aim is to appropriately recognise and manage the bradycardic patient with the view of restoring adequate cardiac output and cerebral perfusion whilst targeting an age- and fitness-appropriate heart rate.

Initial Assessment and Care

- Apply clinical approach;
- Assess the heart rate and perfusion status of the patient;
- Indications of symptomatic bradycardia include heart rate <60 bpm; inadequate perfusion (SBP <80mmHg) including STEMI or ischaemia, pallor and dizziness; APO with a heart rate <40 bpm; VT associated with ventricular escape rhythm; heart rate <20 regardless of BP.
- Secure IV access.
  - If symptomatic **Atropine 0.6mg IV/IO (Adult) or 20microg/kg IV/IO up to 0.6 mg (Paed ICP only)** repeat once at two minutes if required.
- Perform a 12-lead ECG.
- If inadequate response, escalate to IV adrenaline.
  - **Adrenaline infusion 2.5microg/min IV,** increasing to max 10microg/min over five minutes **or 0.05microg/kg/min-0.5microg/kg/min IV (Paed)**; consider use of boluses if syringe driver not set up or available and patient has immediate needs;
  - **Adrenaline boluses 20–50microg IV/IO (Adult) or 1microg/kg (max 50microg) (Paed)**; repeat as required at one-minute intervals.
- If inadequate response to adrenaline or rapid deterioration, escalate to Transthoracic Pacing;
  - **Select pacing**, commence at 30mA and a HR of 70/min, increase by 10mA until capture achieved, then set 10mA above capture voltage.
  - **Midazolam 1 – 2.5mg IV (Adult)** as required **or 0.05- 0.1 mg/kg up to 2.5mg (Paed);** repeat once;
  - **Fentanyl 50microg IV (Adult)** as required **or 1microg/kg up to 50microg (Paed)** as required.
  - **Consider Ketamine** as an alternative **10 – 40mg (Adult)** as a bolus as required or **1.5 mg/kg up to 40 mg (Paed- first dose)** then **0.5 mg/kg (Paed subsequent dose as required.)**

Considerations

- Hypoxia is a common cause of bradycardia and initial management should focus on improving oxygenation and ventilation.
- Atropine is ineffective and potentially harmful in patients who have had a heart transplant.
- Care should be taken with Atropine administration with AMI has increased heart rate may lead to worsening ischaemia.
- Manage or remove the non-cardiac causes of bradycardia specifically and concurrently.

C008 - Tachycardia (Narrow and Wide)

The following guideline is provided to support the decision-making and process of undertaking the management of the patient with symptomatic tachycardia. The aim is to appropriately recognise and manage the tachycardic patient with the view of restoring adequate cardiac output and cerebral perfusion whilst targeting an age- and fitness-appropriate heart rate.

Initial Assessment and Care

- Apply clinical approach;
- Assess the heart rate and perfusion status of the patient;
- Indications of symptomatic tachycardia include high heart rates, palpitations, inadequate perfusion (SBP <80mmHg), pallor and dizziness, altered consciousness and shortness of breath.
- Secure IV access;
- Perform and interpret at 12 lead ECG;
- Throughout episode of care be ready at any time to capture and print any sudden rhythm or ST/T changes.
- **Narrow complex tachycardia** (QRS <0.12 sec, absent or abnormal P wave, suspecting SVT) excluding AFib or AFlut;
  - SVT SBP >100mmHg: **Perform Modified or Abdominal Valsalva**, max three attempts.
- **Wide complex tachycardia** (QRS >0.12 sec, rate > 100, lasting longer than 30 sec, regular, A-V dissociation or absent P waves);
  - **Place defibrillation pads** onto patient's chest.

- SVT SBP <100mmHg:
  - **Adenosine 6mg IV** fast push with 20ml flush;
  - if no reversion after two minutes-> **Adenosine 12mg IV** fast push with 20ml flush;
  - if no reversion after two minutes-> **Adenosine 12mg IV** fast push with 20ml flush;
  - if no reversion, manage symptomatically;

- VT stable and adequate perfusion:
  - **Amiodarone Infusion 5mg/kg max 300mg**, given over 20 minutes, once only;

- Pt with SVT or VT who is unstable or rapidly deteriorating:
  - **Fentanyl 50microg IV (Adult)** as required **or 1microg/kg up to 50microg (Paed)** as required;
  - **Midazolam 1 – 2.5mg IV (Adult)** as required **or 0.1mg/kg up to 2.5mg (Paed)**;
  - **Sync Cardioversion – Select Sync and DCCS 150J or 2J/kg Paed**; repeat once if required.
  - If unsuccessful, move pads to anterior-posterior placement and **DCCS 200J or 4J/kg Paed**;
- If inadequately or poorly perfused, manage **per C009 Inadequate Perfusion – Cardiac**.

- If VT is suspected Torsades de Pointes:
  - **Magnesium Suplate 10mmol (Adult) or 0.1mmol/Kg up to 5mmol IV/IO,** given 20 minutes via infusion (SpringFusor), repeat dose once at 20 minutes.
- Pt suffering from Medical Cardiac Arrest where suspected polymorphic VT is present
  - **Magnesium Suplate 10mmol (Adult) or 0.1mmol/Kg up to 5mmol IV/IO**, given 20 minutes via infusion (SpringFusor), repeat dose once at 20 minutes.

Considerations

- Age >35 years and history of myocardial disease has a high sensitivity and predictive value for VT; therefore, history and clinical assessment should guide the management of wide complex tachycardia.
- Where the rhythm interpretation is uncertain and a regular wide complex tachycardia is present, then this should be managed as VT until proven otherwise.
- An important clinical feature when managing tachycardia, in particular wide tachycardia, is perfusion status and haemodynamic instability. All patients with rapidly decreasing or poor perfusion, regardless of the cause, require immediate synchronised cardioversion as delay may precipitate rapid deterioration into cardiac arrest.
- AFs or SVT deteriorating to the point of peri-arrest should be managed by synchronised cardioversion.
- CAUTION always consider hyperkalaemia (especially in ultra-wide > 200ms QRS) and TCA overdose before giving amiodarone (hyperkalaemia and TCA overdose are contraindication to amiodarone)

C009 - Inadequate Perfusion – Cardiac

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who is inadequately or poorly perfused from a cardiogenic cause. The aim is to appropriately recognise and manage the inadequately perfused patient with the view of identifying cardiogenic causes then support cerebral and respiratory function and, where necessary, support any impacts on perfusion without worsening the underlying condition.

Initial Assessment and Care

- Apply clinical approach;
- Position patient appropriately to support perfusion;
- Ensure a complete history to accurately identify the cause of the perfusion compromise;
- Care needs to be taken with unstable patients of a cardiac origin who have chest pain (manage **as per C005 Acute Coronary Syndromes**), including cautious use of nitrates;
- Administer oxygen titrating to a SpO_2 of >95%.
- Cardiac aetiology suspected, perform an ECG (12-lead);
- Manage other causes appropriately, including arrhythmia or hypovolaemia;
- Gain IV access;
  - **if crackles and cardiogenic pulmonary oedema present,** avoid large administration of IV fluids if possible and preference inotropes.
  - **No crackles or pulmonary oedema present** cautiously administer normal saline 0.9% in 250ml boluses up to 500ml.
- If pain continues, manage **as per C030 Pain Management**; be cautious of worsening hypotension;
- If no improvement or full field APO:
  - **CPAP at 5cm H20, cautiously as increased intrathoracic pressure may cause significant negative impact to perfusion;**
  - **Adrenaline infusion 5mcg/min doubling rate every minute until adequate perfusion achieved (adjust to maintain perfusion), max dose 100mcg/min (Adult), 0.2mcg/kg/min with a max dose of 0.5mcg/kg/min (Paed);**
  - **Adrenaline boluses** if infusion not ready or syringe driver not present **10–20mcg IV up to 50–100mcg in extremis (Adult)** repeat at one minute **or 1–2mcg/kg IV (Paed not exceeding 50mcg)** repeat at two minutes.
- If chest remains clear, then **continue NaCl 0.9% up to 20ml/kg** as required.

Considerations

- Patients with APO, cardiogenic shock and concurrent respiratory failure should have immediate ICP support where available.
- Cautious use of fluids needs to be considered in poor perfusion (250–500ml max) to support haemodynamics and maintain cerebral perfusion to clinical effect. Inotropic support is usually required to support cardiac output.
- Extreme caution should be exercised with the application of CPAP in a shocked patient; it is not advised to place it on patients until perfusion is corrected.
- Adrenaline infusions >100microg/min are likely to be harmful to patients. In these circumstances where the maximum dose is reached, consideration should be given to the administration of further fluid therapy or acceptance of a lower blood pressure.

C010 - Inadequate Perfusion – Non-Cardiac

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who is inadequately or poorly perfused from a non-cardiogenic cause. The aim is to appropriately recognise and manage the inadequately perfused patient with the view of identifying causes then managing accordingly, including prioritising support of respiratory and cerebral function.

Initial Assessment and Care

- Apply clinical approach;
- Position patient appropriately to support perfusion;
- Assess the history and attempt to understand the cause of the perfusion compromise;
- Administer oxygen titrating to an SpO_2 of >95%;
- If crackles and shortness of breath present, rule out cardiac failure;
- Perform an ECG (including 12-lead);
- Gain IV access;
- If you suspect an infective cause of respiratory crackles or clear chest present, cautious administration of fluid:
  - **Normal saline 0.9% 20ml/kg given in 250ml boluses,** titrating to achieve adequate perfusion.
- If chest remains clear, no worsening of infective crackles or cardiac concerns and perfusion does not improve:
  - **Repeat Normal saline 0.9% 20ml/kg, max 40ml/kg.**
- If perfusion remains poor despite fluid therapy:
  - **Adrenaline boluses** (if infusion not ready or syringe driver not present) **10–20microg IV; up to 50–100microg in extremis (Adult)** repeat at one minute or **1–2microg/kg IV (Paed not exceeding 50microg)** repeat at two minutes,
  - **Adrenaline infusion 5microg/min doubling rate every minute until adequate perfusion achieved (adjust to maintain perfusion), max dose 100microg/min (Adult), 0.2microg/kg/min with a max dose of 0.5microg/kg/min (Paed).**
- If chest remains clear, **cautiously continue NaCl 0.9% up to 60ml/kg** as required. This would often be required for extended transport times.

Considerations

- Be mindful of any analgesia or sedation infusions that may also be impacting perfusion. A balance should be sought between the need for inotropic support and effective management of sedation and analgesia.
- Adrenaline infusions >100microg/min are likely to be harmful to patients. In circumstances where the maximum dose is reached, consideration should be given to the administration of further fluid therapy or acceptance of a lower blood pressure.
- If ICP is not available, then paramedics should consider consulting for "***emergency adrenaline***" **as per P018 – Medication Safety**.

C011 - Acute Pulmonary Oedema (APO)

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who has symptomatic acute pulmonary oedema. The aim is to appropriately recognise acute pulmonary oedema with the view to identifying cardiogenic and non-cardiogenic causes then managing accordingly. This includes supporting respiratory function and work of breathing as well as, where necessary, supporting impacts on perfusion.

Initial Assessment and Care

- Apply clinical approach;
- Position patient appropriately to support respirations;
- Assess the history and attempt to understand the cause of the oedema;
- If the patient has chest pain and/or you suspect a cardiac origin, manage **as per C005 Acute Coronary Syndromes**.
- If crackles and shortness of breath present and cardiac aetiology suspected:
  - Perform and interpret an ECG (including 12-lead);
  - Throughout episode of care be ready at any time to capture and print any sudden rhythm or ST/T changes.
  - Gain IV access.
- If SBP>110mmHg and cardiac cause then **GTN Spray 400microg (one spray) SL**, no maximum dose;
- If SBP>90mmHg **GTN Patch 50mg (0.4mg/hr) upper chest or upper arm**; if BP drops below 90mmHg, remove patch;
- If pain continues, manage **as per C030 Pain Management**;
- If no improvement or full field APO:
  - **CPAP at 5cm H20,** increasing to 10cm H2O if more respiratory support required. Contra-indicated in GCS <13, hypoventilation, hypotension, vomiting, pneumothorax, serious arrhythmia, or otherwise requiring intubation;
- Continue GTN as above.
  - Consider **Frusemide 40mg IV**, repeat once at 30 minutes if required.
- If work of breathing is significantly increased, or respiratory failure imminent, consider intubation **as per C001 Airway Management**;
- If inadequately or poorly perfused, manage **as per C009 Inadequate Perfusion – Cardiac.**

Considerations

- Patients with APO, cardiogenic shock and concurrent respiratory failure should have immediate ICP support where available. Cautious use of fluids needs to be considered in poor perfusion (100–500ml max) to support haemodynamics and clinical effect. Inotropic support may be required to support cardiac output.
- Nitrates are the management of choice for cardiogenic APO as they target the both preload and afterload.
- Frusemide is not a first-line treatment and is only considered when the patient is normotensive or hypertensive (chronic presentation) and has been given nitrates, and CPAP is not indicated. Caution should be exercised in the hypotensive patient;.
- Non-cardiac APO can be caused by smoke/toxic inhalation, near drowning (aspiration), sepsis, burns and anaphylaxis. These patients should be trialled on oxygen therapy (high concentration); escalating to IPPV (PEEP) or CPAP with caution; they do not require nitrates.

C012 - Pulmonary Embolus (PE)

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who is experiencing a pulmonary embolus. The aim is to appropriately recognise and manage the patient with a pulmonary embolus with the view of identifying cardiogenic and non-cardiogenic causes then managing then accordingly. It is also important to ensure that the cardiac instability caused by right ventricular failure from a massive PE is managed appropriately without negatively worsening the injury.

Initial Assessment and Care

- Apply clinical approach;
- Position patient appropriately to support respirations;
- Assess the history and attempt to understand the cause of the shortness of breath, pain, light-headedness and cardiovascular instability;
- Administer oxygen titrating to an SpO_2 of 100%;
- Gain IV access;
- Perform an ECG (including 12-lead).
  - **Consider 250–500ml IV NaCl 0.9% (Adult) or 10ml/kg for a (Paed)**, **titrating to effect**; avoid aggressive fluid administration during resuscitation of patient as this may worsen an already failing right ventricle.
- If pain continues manage **as per C030 Pain Management**;
- If inadequately or poorly perfused manage **as per C009 Inadequate Perfusion – Cardiac**.

Considerations

- **Clinical features of a PE** include DVT signs, haemoptysis, focused pleuritic chest pain, shortness of breath, increased work of breathing with rapid respirations; JVD distension, tachycardia, hypotension, cyanosis, low grade fever >37.5C, syncope, cardiac arrest. ECG changes suggestive of PE include sinus tachycardia, signs of right ventricular dysfunction either S1 Q3 T3 and RBBB, T wave inversion in inferior leads and V1–V4.
- **DVT signs** may include limb swelling, reddening and localised heat/warmth, or limb tenderness on palpation.
- **Risk assessment** for PE should include history of previous PE or known DVTs; prolonged immobilisation; recent surgery, significant trauma or hospital admission; use of oral contraceptive or hormone replacement therapy; pregnancy and postpartum period or cancer treatment.
- **Differentials** that mimic a PE should also be considered including respiratory tract infection/ pneumonia; pericarditis; AMI and CCF; pleurisy; pericardial tamponade; or pneumothorax.

C013 - Airway Obstruction

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who is experiencing an upper airway obstruction. The aim is to appropriately recognise and manage the patient with an upper airway obstruction, either partial or complete, from a foreign or other cause, with view to improving the reduction of distress and improving air entry, ventilation, and oxygenation.

Initial Assessment and Care

- Apply clinical approach;
- Undertake a rapid assessment of the airway to determine the type of obstruction, and identify the causal factors (foreign body, inflammation);
- Position patient appropriately to support respirations; do not attempt to inspect the airway if you suspect the cause may be epiglottitis;
- If not critical, perform respiratory status assessment;
- If the patient is conscious and has a suspected foreign body obstruction:
  - **Encourage to cough** – instruct the patient to take a deep breath before coughing;
  - **If patient unable, or becomes unable to, mount an effective cough:**
  - **Provide back blows x5**, whilst the patient is in a head down position if possible;
  - **Provide chest thrusts x5**, whilst the patient is in a head down position if possible;
  - **Repeat above two steps where consciousness remains.**
- If the patient has lost consciousness from a suspected foreign body obstruction:
  - **Attempt direct laryngoscopy, and removal with Magill's forceps;**
  - **Commence chest compressions.**
- If patient loses cardiac output, manage **as per C002 Cardiac Arrest Medical;**
- If unable to resolve suspected foreign body obstruction as above:
  - **Attempt endotracheal intubation as per C001 Airway Management, if obstruction is below vocal cords;**
  - **Perform cricothyroidotomy as per C001 Airway Management if obstruction is above vocal cords.**
- **If stridor from any other cause:**
- **Adrenaline 5mg (5 x 1:1000 Amps) via nebuliser** – repeat once if no improvement after 15 minutes; run oxygen at 8lpm;
- **Hydrocortisone 200mg IV (Adult),** single dose only;
- **Hydrocortisone 4mg/kg max single dose 100mg (Paed ICP Only),** single dose only.

Considerations

- Stridor in adult patients usually indicates an airway obstruction of at least 50% of the internal diameter of the upper airway and should be considered a medical emergency
- Mild to moderate airway obstruction often presents with a partial obstruction and adequate gas exchanged characterised by patient placing themselves in an optimal position (sitting forward); effective cough; crying or verbal responses present; ability to breathe around obstruction and take a full breath; responsive and alert.
- Continually reassess respiratory status assessment.
- Bronchodilators will not assist with stridor.
- Severe airway obstructions may be partial or complete and characterised by absent or ineffective cough; unable to vocalise; worsening stridor; quiet chest and unable to ventilate; cyanosis and decreasing level of consciousness, leading to apnoea and LOC.
- Intubating a patient with stridor or upper airway obstruction is likely to be difficult and consideration should be given to the ability to undertake the difficult or failed airway algorithm **per C001 Airway Management**, bearing in mind that supraglottic techniques are unlikely to be effective. Emergency front of neck access may be required.

C014 - Croup

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who is experiencing croup. The aim is to appropriately recognise and manage the patient with croup according to the severity of the presentation, with a view to improving air entry, work of breathing, overall distress and reduction of symptoms, including upper airway stridor.

Initial Assessment and Care

- Apply clinical approach;
- Avoid unnecessary movements of the patient; prepare to assist or use extrication adjuncts to manage these patients, keep the patient calm and avoid over-stimulation/distress to the patient;
- Position patient appropriately to support respirations; do not attempt to inspect the airway;
- Undertake a respiratory status assessment and determine the severity;
- Provide reassurance; engage parent or family to assist in settling as necessary;
- If symptoms are mild, no further action is required and the patient should be referred and transported to medical care for further assessment and management;
- If symptoms are moderate to severe:
  - **Dexamethasone 600microg/kg (max 12mg) PO**, single dose only.
- If patient is experiencing increasing respiratory distress, lethargy, marked or decreasing stridor:
  - **Adrenaline 5mg (5 x 1:1000 Amps) via nebuliser** repeat once if no improvement after 15 minutes, run oxygen at 8lpm;
- Reassess and commence transport, note that exposure to cold air during loading of patient may temporarily worsen symptoms
- Dexamethasone may be given IV if access available; it is suggested that IV placement only be performed in extremis as the anxiety and distress of the procedure may worsen patient condition.

Considerations

- Respiratory symptoms such as dyspnoea and stridor may also mimic other conditions. Consideration should be given to the possibility or a foreign body inhalation, retropharyngeal or peri-tonsillar abscess (quinsy), bacterial tracheitis or epiglottitis.
- Oxygen saturations in isolation are an unreliable indicator of severity and alone should be used to monitor response to treatment.
- Decreasing cough and stridor and increasing lethargy may be a sign of the patient's condition worsening and they must be regularly assessed.
- Increased work of breathing + drooling + absence of cough are more suggestive of epiglottitis.
- Epiglottitis may also present with tripod stance or sniffing position, lower pitched stridor (often like snoring). In these circumstances do not attempt to inspect airway.

C015 - Acute Asthma

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who is experiencing an acute unrelieved asthmatic episode. The aim is to appropriately recognise and manage the asthma according to the severity of the presentation with a view of improving air entry, work of breathing and oxygenation.

Initial Assessment and Care

- Apply clinical approach;
- Avoid unnecessary movements in the moderate to severe patient; prepare to assist or use extrication adjuncts to manage these patients;
- Position patient appropriately to support respirations;
- Assess the history and attempt to understand the cause or triggers of the bronchospasm and time of onset;
- Undertake a respiratory status assessment and determine the severity;
- Determine if the patient has a self-management action plan and/or if the patient has followed their asthma management plan;
  - **Salbutamol 1.2mg (12 puffs) pMDI via Spacer (Adult) or 600microg (six puffs pMDI via spacer (Paed)**, repeat at 10–15 minutes as required.
- If patient is unresponsive, deteriorating or symptoms rated as severe:
  - **Salbutamol 10mg/5ml via nebuliser (Adult) or 5mg/2.5ml via nebuliser (Paed)**, repeat 5–10 minutes as required, ensure continuous oxygen at 8lpm;
  - **Ipratropium Bromide 500microg via nebuliser (Adult) or 250microg via nebuliser (Paed),** , single dose only, run oxygen at 8lpm.
- Gain IV access.
  - **Hydrocortisone 100mg IV/IMI (Adult)**, slow push, single dose only.
- If patient remains unresponsive and deteriorating:
  - **Adrenaline 500microg IMI (0.5ml of 1:1000) (Adult), >6yrs–12yrs 300microg IMI (0.3ml of 1:1000) or <6yrs 150microg (0.15ml of 1:1000) (Paed),** , repeat every five minutes as required;
  - **Hydrocortisone 4mg/Kg (max 100mg) IV/IMI (Paed)**, slow push, single dose only.
- If patient remains unresponsive to IM adrenaline:
  - **Adrenaline via infusion at 2–15microg/min IV (Adult) or 0.05microg/kg/min IV (Paed)**; consider use of boluses if syringe driver not set up or available;
  - **Adrenaline 10–20microg IV bolus (Adult) or 1–2microg/kg (max 50microg) (Paed)**, if required as above and infusion not ready or available;
  - **Magnesium Sulphate 10mmoL over 20 minutes via infusion (Adult), or 0.1mmoL/kg (max 5mmoL) over 15 minutes via infusion (Paed)**, single dose only.
- If work of breathing is significantly compromised, or respiratory failure imminent, consider intubation **as per C001 Airway Management**;
- If patient has a loss of consciousness and apnoea, gently **Ventilate at a rate of 5–8 breaths per minute at Vt of 6ml/kg (Adult) or 10–15 breaths per minute Vt to achieve chest rise and fall (Paed);**
- If patient loses cardiac output manage **as per C002 Cardiac Arrest Medical**, ensuring to exclude tension pneumothorax (unlikely). Manage poor perfusion post ROSC initially with fluid.

Considerations

- Respiratory symptoms such as dyspnoea and wheezing are non-specific indicaters of COPD. Consider differential diagnoses such as cardiac failure and APO, COPD, foreign body or upper airway obstruction in patients without a known history of asthma.
- Asthma is a dynamic condition and patients can appear to be improving then decline quickly, without warning of their impending sudden decline.
- Pulse oximetry is not a reliable indicator of asthma severity or patient improvement alone, as hypoxaemia is a late sign. It should be placed on early but not relied upon in isolation.
- Care should be taken to not over-ventilate patients with IPPV and allow for a prolonged expiratory phase.
- Due to high intrathoracic pressure as a result of gas trapping, venous return may be compromised resulting in loss of cardiac output; apnoea allows for gas trapping to be reduced.
- Tension pneumothorax is unlikely in the spontaneously ventilating patient, or those having their ventilations supported with IPPV via BVM, unless assistance is forceful, especially when combined with ETT.
- High $EtCO_2$ levels should be anticipated in the intubated asthmatic. When managing ventilation you should be conscious of gas trapping when attempting to reduce $EtCO_2$ levels.

C016 - Chronic Obstructive Pulmonary Disease (COPD)

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who is experiencing an exacerbation of their COPD. The aim is to appropriately recognise and manage the patient with COPD according to the severity of the presentation, with a view of improving air entry, work of breathing and stabilising their optimal oxygenation.

Initial Assessment and Care

- Apply clinical approach;
- Avoid unnecessary movements of the patient, prepare to assist or use extrication adjuncts to manage these patients;
- Position patient appropriately to support respirations;
- Undertake a respiratory status assessment and determine the severity of the exacerbation and its possible source or trigger;
- **Caution:** where an infective source has been identified, don appropriate PPE, avoid or at least mitigate (eg perform prior to loading) aerosolising procedures as much as is practicable;
- Wherever possible preference pMDI, use a nebuliser only in severe COPD cases;
- If the use of a nebuliser is not indicated or available:
  - **Salbutamol 1.2mg (12 puffs) pMDI via spacer (Adult)**, single dose only.
- Otherwise:
  - **Salbutamol 10mg/5ml via nebuliser (Adult)** single dose only, run oxygen at 8lpm;
  - **Ipratropium Bromide 500microg via nebuliser (Adult)**, single dose only, run oxygen at 8lpm.
- Gain IV access.
  - **Hydrocortisone 100mg IV/IMI (Adult)**, slow push, single dose only.
- Once bronchodilator medications have been administered, replace mask with nasal cannula and aim for a SpO_2 of 88–92%.
- If patient is not responding after 10 minutes and work of breathing (increased rate and distress) continues:
  - **Provide CPAP at 5cm/H2O, increasing to 10cm/H2O after a further 10 minutes** if not adequate response. Constantly reassess patient for deteriorating respiratory status or ventilation failure.
- If patient has a loss of consciousness and apnoea, gently **Ventilate at a rate of 5–8 breaths per minute at Vt of 6ml/kg (Adult)**;
- If work of breathing significant, or respiratory failure imminent, consider intubation **as per C001 Airway Management.**

Considerations

- Respiratory symptoms such as dyspnoea and wheezing are non-specific indicators of COPD. Consider differential diagnoses such as cardiac failure and APO, asthma, pneumonia, pulmonary emboli, anaphylaxis, foreign body or upper airway obstruction; particularly in patients without a known history of COPD.
- Whilst COPD is generally characterised by irreversible or permanent airflow limitation, bronchodilators may be of some assistance to improve the clinical presentation of these patients during exacerbation.
- Loss of hypoxic respiratory drive secondary to excessive oxygen administration is an important concern especially in patients with known poor oxygen tolerance or significant carbon dioxide retention. The resultant hypercapnia and subsequent acidosis may have a depressant effect on CNS, CVS and respirations.
- COPD patients only have a low physiological reserve and therefore may deteriorate with minimal exertion. Paramedics should exercise extreme caution with the movement of the patients and have a low threshold for the use of extrication adjuncts.
- High $EtCO_2$ levels should be anticipated in the intubated COPD patient. When managing ventilation you should be aware of potential gas trapping when attempting to reduce $EtCO_2$ levels.

C017 - Respiratory Tract Infections (RTI)

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who is experiencing a respiratory tract infection (RTI) of any origin either seasonal or other. The aim is to appropriately recognise and manage the patient with an RTI according to the severity of the presentation, with a view of improving air entry, work of breathing and stabilising their optimal oxygenation, whilst limiting the spread of infection.

Initial Assessment and Care

- Apply clinical approach;
- If the patient is presenting with respiratory symptoms, hand them a surgical face mask to place on their face and continue to gain a complete history;
- Don appropriate PPE;
- The crew should be mindful of cross-contamination and take all infection control measures and hand hygiene appropriate to the patient's presentations;
- Position patient appropriately to support respirations;
- Undertake a respiratory status assessment and determine the severity of the infection and its possible source;
- Optimisation of oxygenation and ventilation as required, **aim to stage the increase of oxygen if required, starting with nasal cannula and migrating to masks**;
- Caution, aerosolising procedures such as nebulising should be avoided wherever possible;
- Routine use of nebulised bronchodilators should be avoided due to infection risk; the patient should be assessed for an underlying history of chronic bronchitis, asthma or COPD before considering administration of bronchodilators. If bronchodilators appear necessary:
  - **Salbutamol 1.2mg (12 puffs) pMDI via spacer (Adult),** single dose only.
- Gain IV access only if there is a need for IV medications or fluid;
- After administration of medications (oral or inhaled), replace oxygen prongs/mask with the **aim of maintaining a SpO_2 of 92–96%**.
- If patient is not responding after 10 minutes and work of breathing (increased rate and distress) continues and it appears patient's condition is deteriorating, request ICP support;
- Assess for and manage signs of severe sepsis **as per C029 Meningococcal and Sepsis Management**;
- CPAP is generally not advised.

Considerations

- Bronchodilators should not be routinely used in respiratory tract infections. Whilst some infections rarely trigger asthma or exacerbate pre-existing COPD, the wheezing often heard in RTI patients is caused by inflammation and mucous plugging that does not often respond to bronchodilator therapy.
- Initial management of RTI patients should be focused on infection control, minimising the spread of the infection and symptomatic management of their condition.
- If the patient has generalised discomfort or headache, consider administering an age- and weight-appropriate dose of paracetamol PO.
- ***Refer to any specific service guidance for the specific management of respiratory or infective pathogens.***

C018 - Hyperventilation

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who is experiencing hyperventilation. The aim is to appropriately recognise and manage the patient with hyperventilation with a view of settling their breathing and restoring a normal respiratory rate and pattern.

Initial Assessment and Care

- Apply clinical approach;
- Approach patient in a calm and controlled fashion;
- Position patient appropriately to support respirations;
- Undertake a respiratory status assessment and determine if the condition is isolated hyperventilation or as a result of another underlying pathology;
- Note respiratory rate will be dependent on age and other comorbidities;
- Calmly coach the patient's breathing; do not use rebreathing or any other adjuncts such as paper bags;
- Distraction and asking the patient to read or state a passage of text can assist in modulating breathing in order to speak, if you think this is suitable or appropriate in the presenting circumstances.

Considerations

- Hypocapnia from hyperventilation may lead to the patient experiencing paraesthesia (pin and needles sensation) to face, hands and feet that may become painful; restlessness and agitation; sensation of dyspnoea; generalised pain or chest discomfort, dizziness and vertigo, carpopedal spasms and if unarrested may lead to unconsciousness.
- Rapid breathing due to hypoxaemia will usually be reflected in concurrent poor or low SpO_2 readings, with the exception of patients who have experienced carbon monoxide poisoning.
- Hyperventilation due to emotional distress is rare in children, so they should always be assessed for an underlying cause for their respiratory rate elevation.
- The practice of rebreathing or use of a paper bag to treat hyperventilation has been discouraged for some time. This is as a result of the technique failing to adequately address the hypocapnia and usually resulting in mild to moderate hypoxia, which has led to potentially fatal consequences where other underlying causes have not been correctly diagnosed.

C019 - Headache

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who is experiencing an unrelieved headache. The aim is to appropriately recognise and manage the patient with moderate to severe headache according to its suspected origin and severity of the presentation, with a view of managing the causal factors and providing analgesia and symptom management.

Initial Assessment and Care

- Apply clinical approach;
- Avoid loud noises or bright light as this may add to patient distress;
- Undertake a neurological status assessment and assessment of pain as part of your history gathering; does the patient have a pre-existing condition?
- If uncertain of the cause and you suspect an intracranial haemorrhage, manage **as per C019 Stroke and Transient Ischaemic Attack (TIA);**
- If uncertain of the cause and you suspect Meningococcal Septicaemia, manage **as per C028 Meningococcal and Sepsis Management**;
- For all other primary headaches of any severity:
  - **Paracetamol 1000mg PO (Adult), 500mg PO (frail or < 50kg) or 15mg/kg Elixir PO (Paed)**, single dose only;
  - **Prochlorperazine 12.5mg IM (>18yrs adult only)**, single dose only.
- Gain IV access;
- If dehydration suspected, manage with IV fluid as per C037 Hypovolaemia;
- If unable to give Prochlorperazine and nausea and vomiting present, manage **as per C028 Nausea and Vomiting;**
- If after 15 minutes without resolution of above symptoms or headache and pain is rated as severe:
  - Fentanyl IV or IN **as per C030 Pain Management.**
- Be alert for suspected intracranial injury or bleed;
- If patient loses consciousness and/or respiratory failure imminent, consider intubation **as per C001 Airway Management.**

Considerations

- Primary headaches are characterised by no discernible cause and the problems appears to be an abnormality at a molecular level. Primary headaches account for approximately 90% of all presentations with the most common diagnosis being migraines, tension or cluster headache.
- Secondary headaches are usually associated with clearly identifiable underlying causes, many with life-threatening or significant consequences if not managed appropriately. Common diagnoses include intracranial haemorrhage, stroke, tumours and severe infections.
- Pre-hospital diagnosis of headaches is difficult but should include a detailed history and thorough examination. Headache management is dependent on the suspected aetiology and tailored accordingly. Pre-hospital management is focused on providing interim relief until a confirmed diagnosis is made and targeted management provided.
- Sudden onset of a severe headache, often referred to a 'thunder-clap headache' or the 'worst headache ever', should prompt the treating officer to suspect a more serious intracranial pathology, even if subsequently resolved.
- Other signs suggestive of more sinister events include abnormal neurological findings on examination; unusual aura or sensations; new onset headaches in patients over 50 years of age; history of cancer; altered or deteriorating consciousness; sudden collapse and/or unconsciousness; seizure activity; fever; and neck stiffness.
- Patients with a previous history and diagnosis of cluster headaches may benefit from oxygen therapy over narcotic analgesia.

C020 - Stroke and Transient Ischaemic Attack (TIA)

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who is experiencing a stroke or transient ischaemic attack. The aim is to appropriately recognise and manage the patient with signs of neurological insult from either TIA or stroke and determine severity of the presentation with a view to managing the patient symptomatically and providing analgesia and transport to a suitable destination for ongoing care.

Initial Assessment and Care

- Apply clinical approach;
- Avoid loud noises or bright light as this may add to patient distress;
- Undertake a neurological status assessment, does the patient have a pre-existing condition or stroke/ TIA history?
- Exclude any conditions which might mimic stroke, including hypoglycaemia;
- Consider the need for oxygen **as per D035 Oxygen, aiming to maintain a SpO_2 of > 92%**, as required and titrating to effect;
- If nausea and vomiting present, manage **as per C028 Nausea and Vomiting**;
- Gain IV access;
- If pain present, manage **as per C030 Pain Management;**
- Transport without delay and pre-notify the hospital;
- Endeavour to support diagnosis of stroke utilising the ROSIER Score and document the level of impairment; also note time of onset clearly as this will determine suitability for other management/ treatment in hospital;
- Be alert for potential deteriorating and suspected intracranial injury or bleed;
- If patient loses consciousness and/or respiratory failure imminent, consider intubation **as per C001 Airway Management**.

Considerations

- A stroke occurs when the blood flow to a portion of the brain is interrupted, causing tissue ischaemia and if blood flow is not restored, infarction and permanent brain injury.
- A TIA occurs when a transient ischemia resolves
- These cerebrovascular insults are classified as either haemorrhagic stroke, ischaemic stroke or transient ischaemic attacks.
- Stroke and TIA management are focused on early recognition, slowing or reducing some of the symptoms, and transport to definitive care for reperfusion therapy such as thrombolysis or endovascular clot retrieval.
- Stroke mimics include hypo/hyperglycaemia; seizures; sepsis; intoxication; tumours; inner ear disorder; traumatic haemorrhages; syncope; migraine; electrolyte imbalance; and hypoxia.
- Pre-hospital notification details should be provided prior to transport in an attempt to reduce the time to CT and other subsequent management.
- Opioid analgesia should be used with caution due to the risk of deterioration in conscious state.
- Intubation should only be considered where there is difficulty in maintaining adequate oxygenation and ventilation **as per C001 Airway Management.**

C021 - Seizures

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who is experiencing a seizure. The aim is to appropriately recognise and manage the patient with signs of a seizure, including assessment and determination of the type of seizure presentation, with a view of managing the patient symptomatically.

Initial Assessment and Care

- Apply clinical approach;
- Do not attempt to inhibit movement or restrain any patient actively seizing, protect from further injury by providing padding or moving patient away from objects;
- Undertake a rapid neurological status assessment and determine if seizure activity still presenting, remembering not all seizures present with generalised movements;
- If seizure has ceased and patient is postictal, airway, ventilation, perfusion and GCS should be assessed and managed;
- Manage treatable causes; however, management of active seizure activity should take precedence;
- Consider the need for administration of oxygen **as per D035 Oxygen**;
- If nausea and vomiting present, manage **as per C028 Nausea and Vomiting**;
- If still actively seizing and consciousness impaired:
  - **Midazolam 10mg IMI or 5mg IV (Adult) (half doses in the frail, *<60kg or where you suspect interaction of Midazolam with other substances/medications)*.** Repeat dose at 10-minute intervals, maximum total doses IMI and IV 30mg combined for adults.
  - Alternatively for paediatric patients

    Midazolam 2.5–5mg IMI (large child 4–11 years);

    Midazolam 2.5mg IMI (small child 1–4 years);

    Midazolam 0.5 – 1mg IMI (newborn to large infant); and,

    Repeat original dose ***once*** at 10 minutes if required, maximum is 2x IMI doses for Paed.
- Gain IV access if not already established;
- Status Epilepticus is defined at any seizure lasting >5 minutes or two or more seizures without recovery;
- Continue to monitor and assess airway and ventilation post any Midazolam dose.
  - **Midazolam 5mg IV (Adult) (Frail 2.5mg),**
    Midazolam 1 - 2mg IV (large child 4 – 11yrs),
    Midazolam 1mg IV (small child 1 – 4yrs),
    Midazolam 0.2 – 0.5mg IV (newborn to large infant);
  - **Maximum total doses IMI and IV 30mg combined for adults, or 2x IM/IV doses for Paed.**
- If no measurable effect post-two doses of Midazolam consider:
  - **Levetiracetam 30mg/kg over 15 minutes via infusion (Adult),**
    Levetiracetam 30mg/kg over 15 minutes via infusion max 2g (>16kg),
    Levetiracetam 30mg/Kg over 15 minutes via infusion max 500mg (<16kg).
- If patient is considered to have imminent respiratory failure or airway compromise, consider intubation **as per C001 Airway Management.**

Considerations

- **Focal seizures** are where abnormal neuronal activity originates in and is limited to one hemisphere of the cerebral cortex. It may present with **Focal** activity in a conscious patient; or **Focal Dyscognitive**, where there is some impairment of consciousness.
- **Generalised seizures** are where abnormal neuronal activity rapidly spreads and engages both hemispheres of the cerebral cortex, and may manifest several ways. **Absence**: a brief loss of awareness and responsiveness; **Atonic**: a sudden loss in muscle tone, often resulting in a collapse/ fall; **Tonic**: a sudden generalised stiffness of muscle tone; **Myoclonic:** sudden jerking of muscle that can then spread to a tonic clonic episode; and finally **Tonic Clonic**, which results in a concurrent involuntary muscular contractions and symmetrical jerking movements, often lasting minutes and generally has a postictal period post-seizure.
- **Status Epilepticus** is a medical emergency and is defined as any seizure activity great than five minutes in duration or where the patient does not recover to a GCS of 15 prior to a second seizure.
- **Psychogenic non-epileptic seizures**, previously known as pseudoseizures, are episodic behavioural events that mimic seizure activity but are not in fact 'epileptic seizures'. There are different causative factors for their occurrence in different individuals. ***If doubt exists to whether a seizure psychogenic or epileptic then the administration of midazolam is considered appropriate.***
- Midazolam can have pronounced effects on blood pressure, consciousness, airway tone and ventilation. Paramedics must regularly reassess and be vigilant with any patient administered midazolam.
- Intubation (advanced airway) should only be considered where there is difficulty in maintaining adequate oxygenation and ventilation.
- When seizures occur in pregnancy (normally >20 weeks gestation) or up to six weeks post-partum (rare), eclampsia should be considered as the possible cause, the patient should be managed **as per C054 Preeclampsia – Eclampsia.**

C022 - Autonomic Dysreflexia

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who has symptomatic autonomic dysreflexia. The aim is to appropriately recognise and manage the patient suffering an episode of autonomic dysreflexia, identifying and removing the stimulus as able, as well as relieving the symptoms; thereby preventing a possible cerebrovascular catastrophe.

Initial Assessment and Care

- Apply clinical approach;
- Position patient appropriately, sitting with legs dependent if possible;
- Loosen any clothing;
- Confirm previous spinal cord injury at T6 or above, SBP >160mmHg, severe headache; +/- bradycardia, blurred vision, skin flushing and /or sweating above level of injury;
- Assess the history and attempt to identify the noxious stimulus, (e.g. kinked catheter, bladder distension, bowel irritation, bed sores or ulceration, pregnancy or trauma etc.); remove stimuli if possible;
  - **GTN Spray 400microg (one spray) SL**, repeat at 5–10 minute intervals until symptoms resolve and SBP<160mmHg;
- If pain continues or painful stimuli is suspected, manage **as per C030 Pain Relief**;
- Seizures should be managed **as per C021 Seizures**;
- Transport to hospital.

Considerations

- Blood pressure for quadriplegics and high-level paraplegics is typically low when lying and even lower when sitting; ***blood pressures >100/60mmHg may be significant***.
- Removal of the noxious stimuli is the preferred management, but this can often be difficult to achieve in the pre-hospital environment; therefore, symptomatic management to prevent any cerebrovascular catastrophe and other complications is often the primary goal.
- Complications which may result from autonomic dysreflexia from sustained severe peripheral hypertension include intracranial haemorrhages, myocardial infarction and seizures.

C023 - Acute Behaviour Disturbances

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who is experiencing acute behavioural disturbances such as agitation and psychosis. The aim is to appropriately recognise and assist these patients, attempting to safely assess, de-escalate, protect and suitably manage these patients. The causes of these episodes can be multifactorial and include mental illness, intoxication with drugs and/or alcohol, as a result of trauma, or the impact of organic illnesses.

Initial Assessment and Care

- Apply clinical approach;
- Ensure the safety of the crew, bystanders/family and the patient, performing dynamic risk assessment. If you feel it is unsafe, request NT Police assistance;
- Be mindful of your surroundings, location, entry and exits if needed;
- Check for actual weapons or items which could be purposed into weapons;
- Undertake a rapid neurological status assessment and determine any correctable causes (e.g. BSL);
- Attempt to establish communication with the patient, using a calm and controlled voice;
- Be mindful of your language, tone, volume and body language; this requires well-practised self-control. Ensure that you communicate with non-aggression (tone and stance);
- Empathise and listen carefully, actively listen and repeat back to the patient to show you are hearing what they are saying;
- Attempt to focus on the issue at hand; attempt to focus the patient on how to solve their problems;
- Carefully monitor the patient for signs of escalation and aggression;
- Communication takes time. Be patient; rushing may escalate a situation;
- **Perform a SAT score;**
- Determine the need for active management, voluntary or involuntary and call for ICP back up as required;
- Attempt to identify a clinical cause for their presentation; gain a history (e.g. AEIOUTIPS) and manage accordingly;
- Monitor and assess the patient for any signs of suicidal intent or ideation including subtle or obvious plans or suicidal statements, loss of interest, worries and fear, drug and alcohol abuse, stress, loss of employment, social isolation or finalising of affairs;
- Monitor and assess for personality or behavioural changes,
- If you suspect a traumatic head injury, agitation should be managed with adequate analgesia **as per C031 Traumatic Head Injury;**
- If patient is cooperative, mildly agitated with a SAT score 1–2 and capable of taking oral medication:
  - **Olanzapine 10mg SL (aged 16 or greater)**, repeat original dose once at 30 minutes if required.
- If patient is cooperative, and/or moderately agitated with a SAT score of 2 or greater:
  - **Droperidol 10mg IM (aged 16–65), or 5mg (>65 yo, intoxicated or frail)**, repeat original dose once at 20 minutes if required. **Paed between 8–15 years Droperidol 0.1mg/kg max single dose 5mg only on consultation.** ***ABD Sedation Checklist must be used for all patients***
- Gain IV access if required;

- Continue to monitor and assess airway and ventilation post sedation administration;
- **Apply minimum physical restraints required for safe transport if indicated;**
- Note above **Droperidol IM doses** may be given IV by an ICP;
- If the patient is uncooperative, has a SAT score of 2+ and considered not suitable for Droperidol from a time to therapeutic effect perspective:
  - **Ketamine 200mg IMI (Adult), or Ketamine 4mg/ kg IMI (Paed) max 200mg,** repeat once at 15 minutes if required.
- If an adult patient is extremely agitated secondary to drug induced psychosis, with a SAT score of 3+:
  - **Ketamine 200mg (<60kg); 300 mg (60–90kg); 400mg (>90kg), (Adult) no repeat dose.**
  - **Midazolam 2.5–5mg IV (Adult), 2.5mg (Paed), as required to maintain sedation for transport. Consider Ketamine infusion if unsuccessful or prolonged transport;**
  - **Ketamine infusion via syringe driver commenced at 1 mg/ IBW kg/ h (titrating to effect within range 0.5- 2mg/ IBW kg/ h)**
  - **NB for this infusion only draw up Ketamine 200 mg up to a volume of 50 mL to give a final concentration of 4 mg/ mL**
- **Atropine 600microg IV (Adult)** if hypersalivation post-Ketamine.
- Continue to monitor and assess airway and ventilation post sedation administration, in particular post-midazolam;
- **Apply physical or mechanical restraints for safe transport.**
- If patient loses consciousness and/or respiratory failure imminent, consider intubation **as per C001 Airway Management.**

Considerations

- The care objectives are the safety of all responders, bystanders/family and the patient; reduction in the agitation or psychosis; manage any correctable clinical causes; all whilst maintaining the respect and dignity of the patient through empathetic and appropriate communications.
- This guideline applies to the management of any patient which present with agitation; aggression, altered mentation, depression or self-harm, or violent behaviours. This is to be utilised in conjunction with any guidance or directive as outline in the *Northern Territory Mental Health and Related Services Act 1998* as it relates to both voluntary and involuntary mental health management.
- Questioning of at-risk or suicidal patients should cover: is there a means or method; have plans been made; is there an intent; what are their thoughts like; do they have support mechanisms; what is their history; are they impulsive; and have drugs and/or alcohol been involved?
- When sedation is required, the **ABD Sedation Checklist must be used at all times**
- **Complete Form 6 on arrival at hospital for all involuntary patients**; this should include all measures deemed reasonable that were taken to manage and protect the patient, the crew or others. Ensure that the ePCR is complete, outlining the rationale for use of section 31 and actions taken and a copy submitted with the form to an approved psychiatric practitioner.
- Under section 31 of the *Mental Health and Related Services Act 1998*, a paramedic may detain a person being conveyed in an ambulance for up to six hours where they believe that the person may fulfil the criteria for involuntary admission on the grounds of mental illness or mental disturbance.
- Consider use of $EtCO_2$ monitoring where the patients conscious state decreases post-sedation.
- Midazolam can have pronounced effects on blood pressure, consciousness, ventilation and airway tone. Paramedics must regularly reassess and continually monitor any patient administered midazolam.
- Patients administered Midazolam and/ or Ketamine should be administered oxygen concurrently.

Acute Behavioural Disturbance Sedation Check List

INDICATIONS:

- Acute behavioural disturbance with a SAT Score ≥ +2 when:
  - Patient was not suitable for Olanzapine administration; **and**
  - Verbal de-escalation has failed; **and**
  - The patient presents an imminent risk to themselves or others around them

Pre Sedation checks:

1. Appropriate St John NT and NT Police resources available?
2. ABD sedation team roles allocated?
   a. Sedation supervisor
   b. Sedation assistant
3. Sedative agent Drug Therapy reviewed and ICP DAT line considered (if required)
4. Ambulance clinician positioned at the patient's head for continuous monitoring
5. Defibrillator pads or ECG electrodes ready to be applied the patient to continually monitor the patient's ECG, when safe.
6. Resuscitation equipment immediately available to clinicians
7. All team members, including NT Police have been fully briefed

Avoid prone positioning or pressure to the head, neck, chest and back of the patient

Post Sedation Checks

1. Remove patient restraint as early as possible, once safe to do so.
2. Posture the patient appropriately and continually assess vital signs
3. Apply $EtCO_2$ nasal inline device to patient
4. Notify receiving hospital prior to arrival

ABD Sedation Handover

Patient name:_____Age: _____

Estimated body weight: _____

Presenting history:_____

_____

_____

Pre-sedation SAT score:_____

Suspected ABD cause: _____

Cause discussed with ICP-DAT ☐ Yes ☐ No

Name of ICP-DAT Officer:

SAT score		Sedative used		Sedation effective	
Dose		Time		☐ Yes	☐ No
SAT Score		Sedative used		Sedation effective	
Dose		Time		☐ Yes	☐ No
SAT Score		Sedative used		Sedation effective	
Dose		Time		☐ Yes	☐ No

Post Sedative Vital Sign Survey:

Time:			
SAT Score			
GCS:			
HR:			
RR:			
SpO_2			
$EtCo_2$			
ECG Rhythm			

C024 - Allergic Reactions and Anaphylaxis

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who is experiencing either a mild allergic reaction or anaphylactic episode. The aim is to appropriately recognise and manage the patient suffering an allergic reaction or anaphylaxis, to determine the severity of the presentation, with a view of improving air entry, work of breathing, oxygenation and perfusion.

Initial Assessment and Care

- Apply clinical approach;
- Position patient appropriately to support respirations and/or perfusion ***prevent the patient from sitting up, standing up or walking until anaphylaxis is excluded;***
- Rapidly assess the history and attempt to understand the cause or triggers of the reaction and remove if possible;
- Undertake a perfusion status and respiratory status assessment and determine the severity of the reaction;
- Determine if a self-management action plan exists or if the patient has followed their allergy and anaphylaxis management plan;
- If the reaction is mild (urticaria or reddening of eyes):
  - **Loratadine 10mg PO (Paed aged >8–adult)**, single dose only.
- If the patient presents in anaphylaxis:
  - **Adrenaline 500microg IMI (0.5ml of 1:1000) (Adult), >6yrs–12yrs or frail 300microg IMI (0.3ml of 1:1000) or <6yrs 150microg (0.15ml of 1:1000) (Paed)**, repeat every five minutes as required;

    Adrenaline is the lifesaving drug in anaphylaxis and delay to administration can be fatal.
- If bronchospasm (wheeze) present:
  - **Salbutamol 1.2mg (12 puffs) pMDI via spacer (Adult) or 600microg (6 puffs pMDI via spacer (Paed)**, repeat at 10–15 minutes as required;
- If patient is unresponsive, deteriorating or symptoms rated as severe:
  - **Salbutamol 10mg/5ml via nebuliser (Adult) or 5mg/2.5ml via nebuliser (Paed or frail adult)**, repeat at 5–10 minutes as required, run oxygen at 8lpm;
  - **Ipratropium Bromide 500microg via nebuliser (Adult) or 250microg via nebuliser (Paed or frail adult),** single dose only, run oxygen at 8lpm.
- Gain IV access;
- If patient remains hypotensive:
  - **Normal saline 0.9% 20ml/kg**, once if required.
- If upper airway stridor present and unresolved by IM adrenaline:
  - **Adrenaline 5mg (5 x 1:1000 Amps) via nebuliser** repeat once if no improvement after 15 minutes, run oxygen at 8lpm.
- Steroid administration for severe allergic reaction and anaphylaxis only:
  - Consider for wheeze despite repeated and ongoing appropriate doses of adrenaline.
  - **Hydrocortisone 200mg IV/IMI (Adult)**, slow push, single dose only;

- **Hydrocortisone 4mg/Kg (max 100mg) IV/IMI (Paed)**, slow push, single dose only;

- If patient remains unresponsive to IM adrenaline:
  - **Adrenaline via Infusion at 2.5 – 10microg/min IV (Adult) or 0.05microg/kg/min-0.5microg/kg/min IV (Paed);**
  - If syringe driver not set up or available: **Adrenaline 10– 20microg IV bolus (Adult) or 1 microg/kg (max 50microg) (Paed)**, if required as above and infusion not ready or available.
- If work of breathing significant, or respiratory failure imminent, consider intubation **as per C001 Airway Management**.

Considerations

- An allergic reaction normally only involves a single system and whilst considered minor in nature, still requires follow-up with a Medical Officer post-administration of an oral antihistamine.
- Anaphylaxis is a systemic reaction involving any of the follow two systems at once: **Respiratory** (dyspnoea, wheeze, stridor, sensation of throat closing, runny nose); **Cardiovascular** (tachycardia, hypotension, dizziness, collapse, bradycardia); **Abdominal** (nausea, vomiting, diarrhoea, cramping/pain); and **Cutaneous** (urticaria, angioedema, itchiness, flushed). Or an acute onset of an isolated hypotension (SBP <90mmHg) following known exposure to an antigen.
- The presentation and severity of anaphylaxis is variable and unpredictable. There is evidence to suggest that clinician hesitation and delayed adrenaline administration are linked to increase fatalities.
- Sitting up, standing or walking any patient who has suffered an anaphylaxis should be avoided, even if they appear to have recovered and appear asymptomatic. Patients are best managed supine or semi-recumbent.
- Consider administration of Glucagon if signs of refractory anaphylaxis are present. Refractory anaphylaxis can be identified if there is *no improvement after* ***>3 doses of IMI Adrenaline*** or ***patient known to be taking Beta-Blockers)***, then consider IV dosage for Refractory Anaphylaxis as per **D012 Glucagon**.
- Be aware that multiple doses of IM adrenaline may be required.
- All patients managed for anaphylaxis must be transported for further assessment and observation.
- Intravenous adrenaline should ideally be administered through an intravenous infusion, using an approved infusion device. Care must be taken with bolus adrenaline due to the risk of cardiac arrhythmia or ischaemia.

C025 - Adrenal Insufficiency

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who has symptomatic adrenal insufficiency. The aim is to recognise and manage the patient suffering an episode of Addisonian crisis, Acute Adrenal Crisis or adrenal insufficiency whilst also identifying any compounding illness (eg infection).

Initial Assessment and Care

- Apply clinical approach;
- Assess history, signs and symptoms;
- Reassurance and place patient in a position of comfort;
- Gain IV access;
  - **Normal saline 0.9% 20ml/kg** as required to maintain adequate perfusion;
  - **Hydrocortisone 100mg IV/IMI (Adult)**, single dose only
- **Hydrocortisone 4mg/kg IV/IMI (Paediatric ICP Only)**, single dose only, not exceeding 100mg.
- If pain continues, manage **as per C030 Pain Management**
- If hyperkalaemia is suspected, perform and interpret a 12 lead ECG and manage **as per C026 Hyperkalaemia;**
- If hypoglycaemic, manage **as per C026 Diabetic Emergencies**;
- If nausea and vomiting, manage **as per C028 Nausea and Vomiting**;
- Transport to hospital.

Considerations

- Adrenal insufficiency presents with a known history of Addison's disease, long term corticosteroid therapy or known autoimmune disease and the following symptoms: altered consciousness; non-specific abdominal pain; anorexia; vomiting (hyperemesis); diarrhoea; hypothermia; hypoglycaemia; and hyperkalaemia.
- Hydrocortisone provides the necessary endocrine hormonal requirements in symptomatic adrenal insufficiency and adrenal crisis.
- The administration of hydrocortisone is appropriate if the paramedic has a strong suspicion of symptomatic adrenal insufficiency or adrenal crisis.
- Adrenal crisis is insufficiency associated with hypotension and disturbance of consciousness and/or mental state often with hyperkalaemia; is a life threat and requires urgent empiric treatment with hydrocortisone.

C026 - Diabetic Emergencies

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who is experiencing a diabetic emergency. The aim is to recognise and manage the patient with signs of either hypoglycaemia or hyperglycaemia and determine the severity of the presentation, with a view to managing the patient symptomatically. It is recommended that we provide transport to a suitable destination for ongoing care with any atypical presentation.

Initial Assessment and Care

- Apply clinical approach;
- Maintain vigilance on approach, as some diabetics may present aggressively;
- Undertake a neurological status assessment, obtain a history and BGL;
- Exclude any conditions which might mimic diabetic emergencies such as postictal or stroke (hypoglycaemia) or dehydration, sepsis or metabolic disorder (hyperglycaemia);
- If altered consciousness, consider the need for oxygen **as per D035 Oxygen**, as required and titrating to effect.

- **If BGL is < 4mmoL and patient is conscious:**
  - **Glucose Gel 15g PO**, consider second dose after 15 minutes if required.
- BGL not responding or altered consciousness:
  - **Glucagon 1IU (1ml) IM (>25kg) or 0.5IU (0.5ml) IM (<25kg)**, single dose only.
- Gain IV access.
  - **Glucose 10% 15g (150ml) IV (Adult), or 0.2g/kg (2ml/kg) IV (Paediatric ICP only)**; if BGL does not improve after 10 minutes, Glucose 10% 10g (100ml) IV, or **0.2g/kg (2ml/kg) IV (Paediatric ICP only)**;
  - **Normal saline 0.9% IV flushes (at least 10ml) before and after each Glucose IV.**
- If patient has a history of diabetes, other underlying cause (e.g. infection) is excluded, is recovering well and refusing transport, attempt to ensure they consume some supplementary carbohydrates (sandwich etc.) prior to departure and encourage follow up with GP;
- If inadequate response, no clear diabetic history or concern still exists regarding the patient's condition, transport to hospital for further assessment.

- **If BGL is High (>10mmoL or signs of Diabetic Ketoacidosis DKA or Hyperosmolar Hyperglycaemic Syndrome HHS):**
- Gain IV access;
- **Normal saline 0.9% 20ml/kg**, titrating to manage perfusion status;
- Manage nausea and vomiting **as per C028 Nausea and Vomiting**;
- If conscious state deteriorating, request ICP Support;
- Manage suspected hyperkalaemia **as per C026 Hyperkalaemia**;
- If patient loses consciousness and becomes obtunded (insulin overdose or severe DKA), consider intubation **as per C001 Airway Management**.

Considerations

- Glucose is an essential metabolic fuel for the brain and a constant supply is critical for normal neurological function. Management of hypoglycaemia is aimed at returning the patients BGL to between 4–8mmoL. If no improvement in consciousness is achieved at this BGL level, other causes for altered consciousness should be considered.
- Intravenous glucose is the recommended first line management strategy for any patient unable to be administered oral glucose gel. It is important to ensure IV patency prior to administration of any hypertonic glucose.
- DKA is a life-threatening complication usually seen in patients with T1DM that is characterised by hyperglycaemia (BGL>10mmoL), ketosis and metabolic acidosis.
- HHS is a life-threatening complication of T2DM that is characterised by hyperglycaemia (BGL>40mmoL), hyperosmolarity and severe dehydration.
- Intubation should only be considered where there is difficulty in maintaining adequate oxygenation and ventilation. Removing the patient's ability to achieve compensatory respiratory alkalosis (hyperventilation or Kussmaul's respirations) can lead to poorer outcomes in DKA; as such, intubation should be avoided except in cases where the patient is severely obtunded.
- Post-intubation in DKA aim to maintain $EtCO_2$ 20- 25mmHg.

C027 - Hyperkalaemia

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who is experiencing hyperkalaemia. The aim is to appropriately recognise and manage the patient with signs of hyperkalaemia, determine the severity of the presentation via signs and symptoms and ECG, with a view of managing the patient accordingly to stabilise the cardiovascular system.

Initial Assessment and Care

- Apply clinical approach;
- Undertake a perfusion, respiratory and neurological status assessment, and obtain a history and BGL;
- Assess for generalised weakness, lethargy and confusion. Patients may also have nausea, vomiting and diarrhoea, history of CKD or metabolic acidosis;
- If altered consciousness, consider the need for oxygen **as per D035 Oxygen**, as required and titrating to effect;
- If patient presents in cardiac arrest from suspected hyperkalaemia, manage **as per C002 Cardiac Arrest Medical**;
- Undertake and interpret a 12-lead ECG. If signs of hyperkalaemia present (bradycardia, absent P waves, widening QRS, peaked T waves, sinusoidal waveform):
  - **Salbutamol 10mg Neb (Adult), or 5mg Neb (Paed)**, repeat as required up to 30mg (Adult) and 15mg (Paed). If nebuliser contraindicated consider **Salbutamol 1.2mg (12 puffs) pMDI via spacer (Adult), 600microg (6 puffs) pMDI via spacer (Paed< 6 or frail adult)**, repeat as required up to three times.
- Gain IV access;
  - **Normal saline 0.9% IV,** as required to maintain adequate perfusion. Use cautiously with CRF;
  - **Calcium Gluconate 2.2mmoL (10ml) IV (Adult) or 0.5ml/kg (up to 20ml) IV (Paed), slow push over five minutes,** (infusion if available) repeat original dose once at 10 minutes if required.
- If severe hyperkalaemia persists with hypotension, widened/sinewave QRS:
  - **Sodium Bicarbonate 8.4% 100ml IV (Adult) or 1ml/kg IV (up to 50ml) (Paed)**, repeat original dose once if required at 10 minutes.
- If patient loses consciousness and unable to maintain airway and ventilation, consider intubation **as per C001 Airway Management**. **DO NOT USE suxamethonium.**

Considerations

- Nebulised Salbutamol is stated to reduce serum potassium levels by 0.5–1mmoL within 30 minutes of administration.
- Calcium gluconate provides immediate stabilisation of the myocardium; it does not directly reduce or impact serum potassium levels.
- Sodium bicarbonate 8.4% may reduce serum potassium levels by 0.5–1mmoL and provide temporary stabilisation of myocardium whilst identifying and managing the underlying cause.
- Post-intubation in hyperkalaemia aim to maintain $EtCO_2$ 20- 25mmHg.

C028 - Nausea and Vomiting

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who is experiencing nausea and vomiting. The aim is to appropriately recognise and manage the patient appropriately and, where indicated, relieve the symptoms or their cause.

Initial Assessment and Care

- Apply clinical approach;
- Assess the patient for the potential source of nausea or need to administer an antiemetic. Patients with motion sickness, vertigo, suspected spinal injury, headache or eye trauma are also managed under this guideline;
- If the patient has undifferentiated nausea and vomiting, or prophylaxis for spinal or eye injury:
  - Ondansetron ODT 4mg PO, repeat once at five minutes if required (Adult), or **4mg PO (>5yr Paed) or 2mg (3–5 years Paed)**, single dose only;
- If known allergy to ondansetron, or first line treatment for motion sickness and vertigo:
  - **Prochlorperazine 12.5mg IMI (>18 years adult only**), single dose only.
- Gain IV access.
- **If intolerant of ODT Ondansetron**
  - **Ondansetron 8mg IV/IM over two minutes IV (Adult)**, single dose only.
  - **Ondansetron 4mg IV/IM over two minutes IV (>5 years Paed) or 0.1mg/kg (3–5 years Paed), ICP only, single dose only.**
- Whilst there is a paucity of research trialling **PC6 acupoint** pre-hospital (three patient finger breadths from bottom of palm; firm pressure between the two palpable tendons for two- three minutes then repeated on contralateral side); in patients complaining of ongoing nausea, refusing medication (eg pregnant) or suffering nausea secondary to opioids or cancer therapy, it is not unreasonable to ask the patient to trial this acupressure on themselves.
- Manage any pain **as per C030 Pain Management**;
- If dehydration suspected, manage with IV fluid **as per C037 Hypovolaemia**;
- Caution with antiemetic therapy with paediatric patients, as it may precipitate dystonic reactions or QT prolongation.
- The risk versus benefit of antiemetic therapy should be considered for each patient.

Considerations

- The clinical presentation of nausea and vomiting is variable and will depend upon the underlying cause.
- Vomiting in patients managed supine for spinal or those with altered consciousness has the potential for airway compromise; therefore, prophylactic administration is advised.
- Stimulation of the gag reflex and subsequent vomiting causes a spike in intracranial pressure.
- Effectiveness of oral medications or dissolving tablets is improved if they are provided sub-lingual.

C029 - Meningococcal and Sepsis Management

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who is experiencing sepsis or meningococcal septicaemia. The aim is to appropriately recognise and manage the patient with signs of sepsis, septic shock or meningococcal infection and determine the severity of the presentation, with a view to managing the patient symptomatically and supporting respiration and perfusion.

Initial Assessment and Care

- Apply clinical approach;
- Undertake a neurological, respiratory and perfusion status assessment; perform a temperature and BGL (refer observation ranges below); attempt to define the source of infection;
- Regardless of consciousness, if sepsis or septicaemia is suspected, administer oxygen **as per D035 Oxygen**. Aim for a SpO_2 as close to 100% as possible;
- **If severe infection, sepsis or septic shock is suspected** (with high temperature and irritability/ agitation):
  - **Paracetamol 1g PO (Adult), 500mg PO (frail or <60kg) or 15mg/kg Elixir PO (Paed)** single dose only.
- Gain IV access;
- If inadequate or poorly perfused:
  - **Normal saline 0.9% 20ml/kg IV**, titrated to patient response; repeat up to a max 40ml/kg.
- If patient remains poorly perfused:
  - Ensure a large patent peripheral IV line, as central as possible, **Noradrenaline starting at 5microg/min via infusion (Adult)**, titrate rate to achieve adequate perfusion, max 50microg/min. Paediatric administration possible on consultation with CMO or receiving ED consultant.

Meningococcal Infection:

- Ensure appropriate PPE is worn;
- Assess patient, looking for signs of infection, meningeal signs and +/- non-blanching rash;
- Request ICP support.
- Gain IV access.
  - **Normal saline 0.9% 20ml/kg**, titrating to manage perfusion status.
- Manage nausea and vomiting **as per C028 Nausea and Vomiting**;
- Request ICP support.
  - **Ceftriaxone 2g IMI (Adult and Paed >10 years), or 50mg/kg IMI (Paed <10 years)**, single dose only.
  - **Ceftriaxone 2g IV (Adult and Paed >10years), or 50mg/kg IV (Paed <10 years)**, over 30 minutes via infusion, single dose only.
- Manage inadequate or poor perfusion as per sepsis/septic shock above;
- If patient loses consciousness and has a compromised airway and ventilation, consider intubation **as per C001 Airway Management**.

Considerations

- Sepsis is now defined as life-threatening organ dysfunction caused by a dysregulated host response to an infection. It has a mortality rate of 10–12%.
- Septic shock is a subset of sepsis, with profound circulatory, cellular and metabolic abnormalities. It has a mortality rate of 20–23%.
- Meningococcal infections can lead to death within hours, often progressing very quickly from non-specific complaints including skin changes, cool peripheries and ***leg pain*** amongst others.
- Meningococcal meningitis occurs when *Meningococcus* bacteria infect the membranes covering the brain and spinal cord; symptoms include headache, neck stiffness, photophobia, vomiting, confusion and non-blanching petechial rash.
- Meningococcal septicaemia occurs when *Meningococcus* bacteria enter the blood stream and rapidly multiply; symptoms again can include a non-blanching rash as well as fever, lethargy/ confusion, severe pains, haemodynamic shock, and others.
- Patients can suffer from meningococcal meningitis, septicaemia or both.
- ***CAUTION All staff or bystanders present for CPR or advanced airway manoeuvres on patients confirmed to have Meningococcal infection must have post exposure antibiotic prophylaxis.***

Observation Ranges

To be considered for the criteria of sepsis or septic shock the patient should present with two or more of the following signs.

Vital Sign v Age	<1 yr	1–4 yrs	5–11 yrs	12–15 yrs	16 yrs and over
Temperature	<35.0ºC or >38.0ºC	<35.0ºC or >38.0ºC	<35.0ºC or >38.0ºC	<35.0ºC or >38.0ºC	<35.0ºC or >38.0ºC
Respiratory Rate	<20 or >50	<15 or >40	>40	>30	>20
Heart Rate	<90 or >170	<80 or >160	<70 or >150	<50 or >130	<40 or >100
Systolic Blood Pressure	< 65	<70	<75	<80	<90
Conscious State	Responding to Painful Stimuli Only	Responding to Painful Stimuli Only	Confused	Confused	Confused

C030 - Pain Management

The following guideline is provided to support the decision-making and process of undertaking the management of the patient who is experiencing pain from any cause. The aim is to appropriately recognise and manage the patient's pain by managing the cause, use supportive and non-pharmacological strategies and, finally, by administration of appropriate analgesia. The causes of these episodes can be multifactorial it is important to understand the nature (chronic and acute), tolerance, co-morbidities and analgesia already administered.

Initial Assessment and Care

- Apply clinical approach;
- Undertake a systematic clinical assessment, physical assessment with particular attention to **O**nset, **P**rovocation, **Q**uality, **R**adiation, **S**everity and **T**ime **(OPQRST)**;
- Ascertain any history of pain and current management plans;
- Plan to manage specific causes concurrently, this includes nitrates for cardiac pain, application of heat or cold packs, splinting or patient positioning. Note that some of these may require analgesia to facilitate position or splinting (procedural);
- Provide adequate reassurance, explain what your plan is to the patient.

For Mild Pain (1–3 on scale):

- Analgesia may not be required, look at non-pharmacological support;
- Administer simple analgesia:
  - **Ibuprofen 200–400mg PO (Adult Only)**, max dose 400mg; and/or
  - **Paracetamol 500mg–1g PO (Adult)**, max dose 1g, or **15mg/kg PO** (Paed) single dose only.

For Moderate Pain (4–6 on scale);

- Consider concurrent simple analgesia as above, including as an adjunct to IV or IN analgesia, preference of narcotic v Methoxyflurane should be based on ease of administration or ability to inhale medications effectively.
  - **Methoxyflurane 3ml INH**; max dose 6ml (Adult) and 3ml (Paed); or
  - **Fentanyl 50– 100microg IN (Adult)**, repeat 50microg at 10 minutes as required, max dose 300microg, then consult; or
  - **Fentanyl 50microg IN (Frail or >65years)**, repeat 25microg at 10 minutes as required, max dose 200microg, then consult; or
  - **Fentanyl 1.5microg/kg IN (>1year Paed)**, repeat once only as required, max single dose 50microg, then consult; or
  - **Fentanyl 25–100microg IMI (Adult)** repeat at 10 minutes as required, max dose 200microg IMI; or
  - **Fentanyl 2microg/kg IMI (Paed)**, single dose not to exceed 50microg, repeat at 10 minutes as required, max dose 100microg IMI; or
  - **Morphine 2.5–10mg IMI/SC (Adult)**, repeat at 15 minutes as required, max dose 20mg IMI/SC; or
  - **Morphine 0.1mg/kg IMI (>1 year Paed)**, single dose not to exceed 5mg, repeat at 15 minutes as required, max dose 0.2mg/kg.
- Gain IV access;
- Consider IV use if access available for moderate pain as outlined below, if appropriate.

For Severe Pain (7–10 on scale):

- Consider concurrent simple analgesia as above, including as an adjunct to IV or IN analgesia.
  - **Fentanyl 25–50microg IV (Adult)**, repeat at 5–10 minutes as required, max dose 300mcg then consult; or
  - **Morphine 2.5–5mg IV (Adult)**, repeat at 5–10 minutes as required, max dose 30mg then consult;
  - **Fentanyl 1microg/kg IV/IO (Paed)**, single dose not to exceed 25microg, repeat at 5–10 minutes as required, no max dose; or
  - **Morphine 0.1mg/kg IV/IO (> 1 year Paed)**, single dose not to exceed 2.5mg, repeat 0.05mg/kg at 5–10 minutes as required, no max dose;
  - **Ketamine 10–40mg IV/IMI (Adult)**, repeat at 5–10 minutes as required, max dose 200mg then consult with CMO; or
  - **Ketamine 0.1–0.2mg/kg IV/IMI (Paed)**, repeat at 5–10 minutes as required, max dose 1mg/kg then consult with CMO;
  - **Consider Ketamine infusion 20–80mg/hr IV (Adult)**, 200mg/50ml at 5 – 20ml/hr.
- Ketamine should generally be administered in conjunction with narcotic analgesia, not as a stand-alone medication.
  - **Atropine 600microg IV (Adult) or 20microg/kg IV (Paed)**, single dose, if hypersalivation post Ketamine.
- No IV or IN max dose of narcotics for ICP, administer analgesia as required titrating to effect and onset of side effects, no requirement for ICP to consult;
- Continue to monitor and assess airway and ventilation post sedation administration;
- If patient loses consciousness and/or respiratory failure imminent (from injuries), or due to high levels of analgesia requirement in severe intractable pain, consider intubation **as per C001 Airway Management**.

Considerations

- Pain perception involves an element of psychophysiological reaction, and therefore the utilisation of non-pharmacological approaches to pain management should be considered.
- The adequacy of effect of analgesia administration should be gleaned from the patient whilst also balanced against the side effects of each medication. The administration of analgesia should be balanced against signs of distress, physiological signs, patient ratings of pain or relief provided by procedures such as splinting etc.
- A patient's inability to specifically rate or give pain a number should not preclude analgesia administration, for example in non-English speaking, dementia, cultural reasons or other disabilities. Where a pain-producing stimuli is present and an indication of distress, then consideration should be given to an appropriate level of analgesia.
- Divide all intranasal doses of fentanyl across both nostrils (half of dose in each nostril)
- Note maximum doses of analgesia, if further analgesia is being considered or required over these stated maximums, Ambulance Paramedics should consult with ICP-DAT if ICP backup is not available.
- Consider early application of simple analgesia to compliment use of IV analgesia, in particular in musculoskeletal injury or fractures.
- Upper limit max doses (IV) should include any IN, IMI or SC doses previously administered.
- Emergence reactions, hallucinations or other disturbances may be associated with the administration of Ketamine. These can often be managed with small additional bolus of Ketamine, or if necessary **0.5–1mg Midazolam IV**.

C031 - Traumatic Head Injury

The following guideline is provided to support the decision-making and process of undertaking the management of the patient suffering a traumatic head injury. The aim is to appropriately recognise the injury and optimise oxygenation, ventilation and cerebral perfusion in order to prevent secondary brain trauma or injury.

Initial Assessment and Care

- Apply clinical approach;
- Assess the conscious state per **P006 Neurological and Mental Status Assessments** in combination with mechanism of injury;
- Avoid eliciting a gag reflex wherever possible avoid OPA, NPA or SGA unless absolutely necessary;
- Administer oxygen **per the D035 Oxygen** administration guideline;
- Maintain normothermia;
- Assess airway and ventilation, be aware of possible $EtCO_2$ or SpO_2 derangement;
- Secure IV access;
- Manage and control combativeness with judicious opioid pain relief **as per C030 Pain Management;**
- Dress and manage head wounds as appropriate;
- Consider a spinal injury in all head-injured patients;
- Manage the patient's perfusion with the **aim of maintaining a MAP of 85- 90 mmHg, using Normal Saline 0.9% or Hartmann's Solution;**
- Manage sustained seizures **as per C021 Seizures;**
- Manage hypoglycaemia **as per C026 Diabetic Emergencies;**
- Manage ongoing analgesia **as per C030 Pain Management;**
- If the patient's agitation and combativeness is preventing clinical assessment and early interventions then consider **Ketamine 10–40mg IMI or IV boluses;**
- Consider Medication Assisted Intubation **as per C001 Airway Management**. Recommendation is for **Fentanyl 2 microg/ kg pre-medication** 2-3 minutes prior to induction with **Ketamine 0.5- 2 mg/ kg;** supporting ventilation pre-induction as required.

Considerations

- Have a high index of suspicion of an intracranial bleed with elderly patients, or patients on anti-coagulant therapy.
- Chronic alcohol misuse and intoxicated patients are also at high risk of traumatic brain injuries.
- Midazolam should be avoided unless managing seizures.
- Significant head injury should be suspected in the patient with a GCS of less than 15 with a LOC especially if >5 minutes; memory loss; seizures; vomiting; suspected skull fractures; or any other neurological deficits.
- Ideally patients with head injuries should be transported in a 30º head elevated position.
- Caution should be used with any IV vasopressors for management of perfusion in TBI patients.

C032 - Spinal Injuries

The following guideline is provided to support the decision-making and process of undertaking the management of the patient suffering possible, suspected or actual spinal injuries. The aim is to appropriately recognise the potential or actual injuries, provide appropriate interventions, and prevent further damage or neurological impacts.

Initial Assessment and Care

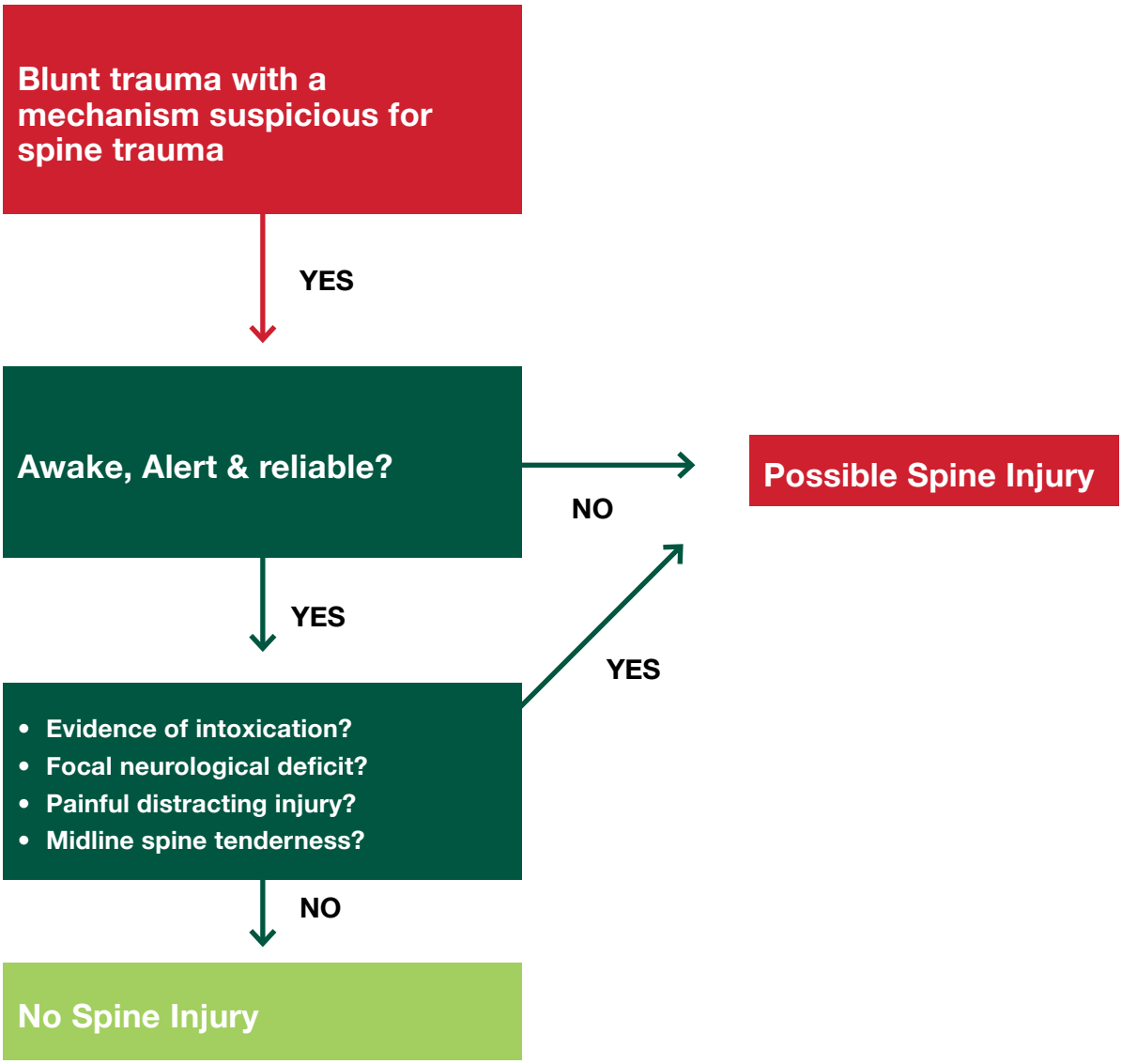
- Apply clinical approach;
- Assess the injuries and determine any immediate;
- Apply a soft collar if suspected injury;
- Manage pain and agitation with pharmacological agents for pain relief **as per C030 Pain Management**;
- Maintain patient in a supported supine position, aiming to achieve neutral alignment;
- Any movement of this patient should be facilitated with spinal precautions and using a spine board, combi-carrier or scoop stretcher;
- Maintain normothermia;
- Undertake spinal injury assessment including **NEXUS** as further below:
- **If possible spine injury, and not already done, place on soft collar 'spine not cleared'; undertake standard spinal precautions and immobilisation, including use of vacuum mattress;**
- **If no spine injury indicated, immobilisation not required; if soft collar in situ, it may be removed.**
- Secure IV access;
- Manage nausea and vomiting prophylaxis **as per C028 Nausea and Vomiting;**
- Manage ongoing analgesia **as per C030 Pain Management;**
- Manage the patient's perfusion with the aim of maintaining a MAP of 85- 90 mmHg, **as per C031 Traumatic Head Injury;**
- Consider expedited scene times once all pre-hospital stabilisation attempts have been made;
- If patient loses consciousness and/or respiratory failure imminent, consider intubation **as per C001 Airway Management, with manual inline stabilisation required.**

Considerations

- Spinal cord injury of the spine is suspected with associated motor, sensory and/or autonomic deficit post injury. These can be caused by hyperflexion, hyperextension, rotation, compression or penetrating mechanisms.
- The purpose of undertaking spinal immobilisation is to support and return a patient to neutral alignment of the spinal column, thereby reducing or distributing the forces placed onto it. Note the patient's head should not be independently restrained at any time, ideally immobilisation is provided via a vacuum mattress, and patients should not be transported on an extrication device or hard board for longer than 15 minutes.
- Whilst the optimal position for spinal immobilisation is supine, ensure that the patient is supported (lumber spine and cervical). Some slight head/upper body elevation (ideally achieved on a stretcher) may be required to improve comfort and respiration.
- ***Neurogenic shock*** can occur when there is interruption to normal sympathetic nervous system function by T6 or higher spinal cord or direct CNS insult or injury. This manifests as a loss of vasomotor tone, resultant **hypotension and relative bradycardia**.

- ***Spinal Shock*** is a transient (days to months) condition that is usually accompanied by acute injury and non-sustained cord compression and can present with paralysis, areflexia and anaesthesia. Findings in spinal shock may include:
  - Impaired motor function may present with diaphragmatic ventilation, paralysis, flaccidity (caution with the patient not controlling arms) or abnormal posturing; and/ or,
  - Impaired sensory function may present with local or generalised paraesthesia or loss of proprioception; and/ or.
  - Impaired autonomic function may present with hypotension, bradycardia, thermo-deregulation and priapism.
- ***ie signs of both spinal and neurogenic shock may co-exist.***

NEXUS



Modified from source: https://www.wildmedcenter.com/blog/the-focused-spine-assessment-fsa

C033 - Chest Injuries

The following guideline is provided to support the decision-making and process of undertaking the management of the patient suffering chest injuries, and specifically tension pneumothorax. The aim is to appropriately recognise the injury, optimise oxygenation, ventilation and improve perfusion in order to prevent cardiovascular collapse, loss of consciousness and cardiac arrest.

Initial Assessment and Care

- Apply clinical approach;
- Assess the mechanism of injury; Traumatic, Spontaneous pathology or Iatrogenic cause;
- If required administer supplemental oxygen **as per D035 Oxygen**, titrating to effect;
- Ideally, the patient should be managed in a semi-recumbent or sitting position to aid respiration and work of breathing, the exceptions are poor conscious state, potential spinal injuries or poor perfusion;
- Perform respiratory, perfusion and conscious status assessment;
- Dress and manage open wounds as appropriate;
- Manage pain and agitation, **as per C030 Pain Management**;
- Manage nausea and vomiting, **as per C028 Nausea and Vomiting**;
- Maintain normothermia;
- **Assess for signs of underlying lung injury:** refer considerations.
- **If tension pneumothorax suspected and patient has a GCS <10 and SBP <70mmHg:**
  - **Perform immediate needle thoracostomy** to the injured side; use **SMART** mnemonic

    Second intercostal space,
    Mid clavicular line,
    Above the rib below,
    Right angle to the chest,
    Toward body of vertebrae.
- Gain IV access (2x large bore cannula);
- Manage perfusion **as per C037 Hypovolaemia**; aim to maintain a SBP of >100mmHg;
- If available perform Ultrasound (for lung slide and haemothorax) if no hard signs and shock is present complete eFAST.
- Convert needle thoracostomy to **finger thoracostomy with a chest seal or intercostal catheter** as per clinical need (ROSC, IPPV or massive haemothorax).
- **If tension pneumothorax suspected and patient has a GCS >10 regardless of BP:**
  - **Perform needle or finger thoracostomy and intercostal catheter;** as per clinical need.
  - Infiltrate chest wall with **Lignocaine 2% 5–10ml** at site of insertion prior to procedure.
- If extensive chest injuries, consider facilitated intubation (RSI) **as per C001 Airway Management**.

Considerations

- **Signs of tension pneumothorax** - unequal air entry, paradoxical or asymmetrical chest wall movement, respiratory distress/increased work of breathing, decreasing Sp02, decreased breath sounds, bubbling or sucking chest wound, tracheal shift or tugging, increased JVP and distension, decreasing consciousness, hypotension, decreasing $EtCO_2$, increased peak inspiratory pressure and firming of BVM during ventilation, sudden increase in heart rate and drop in blood pressure are late signs.

Simple Pneumothorax – any of the following

- Unequal breath sounds in the spontaneously ventilating pt
- SpO_2 >92% on room air
- Subcutaneous emphysema

Tension Pneumothorax – any of the following +/- signs of a Simple Pneumothorax

- Increased Respiratory Distress in the awake pt
- SpO_2 <92% on O2 therapy
- Decreasing conscious state
- Poor perfusion – increasing HR + decreasing BP
- Increased peak inspiratory pressure and stiff bag (BVM)
- Decreasing $EtCO_2$
- Raised JVP
- Tracheal shift

- Ensure the needle that you are using is of a suitable length for the patient you are managing, larger patients will require longer needles.
- Caution needs to be taken when ventilating patients with chest injuries, over enthusiastic IPPV may increase likelihood of a tension pneumothorax.
- Rib fractures and significant chest wall injuries can cause a reasonable amount of pain, which left unmanaged can lead to hypoventilation; prioritise careful titration of analgesia as required.
- If placement of a needle thoracostomy reveals little to no air and copious amounts of blood, either cap the cannula or remove and cover the insertion site with an occlusive dressing.
- Penetrating trauma to the thorax may appear minor, but life-threatening injury may have still occurred. Treat all penetrating wounds as a potentially life-threatening injury regardless of the size or perceived depth.
- Consider a spinal injury in all moderate to high velocity trauma;

C034 - Abdominal Injuries

The following guideline is provided to support the decision-making and process of undertaking the management of the patient suffering abdominal trauma and injuries, and specifically trauma in pregnancy. The aim is to appropriately recognise the actual or potential injuries, optimise oxygenation and ventilation, and improve perfusion in order to prevent cardiovascular collapse, loss of consciousness and arrest.

Initial Assessment and Care

- Apply clinical approach;
- Assess the conscious state and GCS in combination with the applicable mechanism of injury;
- Administer supplemental oxygen **as per D035 Oxygen**, as required and titrating to effect;
- Ideally the patient should be managed in a position of comfort. Pregnant patients should have consideration for left lateral position, left lateral tilt or manual L uterine displacement to avoid aorto-caval compression. Be mindful of co-existent issues such as poor conscious state, potential spinal injuries or poor perfusion;
- Perform respiratory and perfusion status assessment with your secondary survey;
- Note that significant abdominal injuries may initially present with little to no external evidence of trauma;
- Manage pain and agitation with opioid pain relief **as per C030 Pain Management**;
- Maintain normothermia;
- **Assess for signs of underlying abdominal injury:** sudden or altered loss of consciousness; dyspnoea; abdominal pain/discomfort/guarding/tenderness either on palpation or rebound; signs of hypovolaemic shock; abdominal discolouration and/or bruising and or distension; presence of shoulder tip pain; malformation or pain to pelvis; PR bleeding; haematuria; vomiting; haematemesis; PV bleeding; refer considerations below for type of trauma;
- **Assess for signs of maternal traumatic injury:** premature labour; placental abruption; spotting of blood through to severe antenatal bleeding; uterine rupture and sudden profound shock; loss of foetal movement or heart sounds. Maternity patients are at high risk of diaphragmatic injuries; ***Pregnancy may mask signs of shock;***
- Secure IV access;
- Manage the patient's perfusion with the aim of maintaining a SBP of 90mmHg, **as per C037 Hypovolaemia**, unless head injury (TBI) is considered concurrently, then manage fluid **as per C031 Traumatic Head Injury**;
- Dress and manage open wounds as appropriate; do not attempt to replace any exposed abdominal contents; use moistened sterile pads or cling wrap;
- If pelvic fracture suspected, apply **Pelvic Binder** or consider reversed KED for small paediatrics;
- Consider a spinal injury in all moderate- to high-velocity trauma;
- Manage ongoing analgesia **as per C030 Pain Management**;
- Manage nausea and vomiting **as per C028 Nausea and Vomiting;**
- Consider expedited scene times once all pre-hospital stabilisation attempts have been made.
- Consider eFAST Ultrasound if patient in shock;
- If extensive injuries and difficulty managing pain, consider facilitated intubation (RSI) **as per C001 Airway Management**. Note RSI in trauma is high risk, which must be considered before attempting this or delaying transport to facilitate.

Considerations

- Blunt trauma can result in compression, high-velocity impact and shearing force injuries. This can result in the abdominal organs being subjected to compressing forces crushing organs and vessels between solid objects. Organs both hollow and solid are also susceptible to pressure changes and blast injuries. Shearing or tearing forces can rupture hollow organs, tear vessels and lacerate solid organs across multiple sites, with evident injuries being vague at best.
- Penetrating trauma and therefore the extent of vessel and organ damage leading to haemorrhage is dependent on the mechanism such as stabbing, slashing or high-velocity penetrations (shot or blast). Many of these patients will require urgent surgical management. Small entry wounds are at high risk of masking the significant injuries that underlie them. Regardless of cause, catastrophic deterioration can develop quickly and unexpectedly; therefore, they should be treated as serious and potentially life-threatening.
- In both adults and children, physique can change susceptibility of trauma, and a high index of suspicion must be maintained for other areas, such as chest and diaphragmatic injury.
- Maternal blood volume increases approximately 45% by term, this relative hypervolaemia can mask signs of haemorrhage and shock and should be taken into consideration.
- Maternal delayed gastric emptying and the displacement of intra-abdominal organs by the growing uterus increases the risk of vomiting and aspiration.
- Maternal heart rates can be expected to increase by 15–20 bpm in the later stages of pregnancy, with maternal BP's lowering by 10–15mmHg during the 2nd trimester and then normalising by term.

C035 - Limb Injuries

The following guideline is provided to support the decision-making and process of undertaking the management of the patient suffering limb injuries, soft tissue, fractures and dislocations. The aim is to appropriately recognise the actual or potential injuries, provide appropriate pharmacological and non-pharmacological intervention, prevent further limb injury and, where required, splinting.

Initial Assessment and Care

- Apply clinical approach;
- Assess the injuries and determine any immediate needs such as haemorrhage control with/ without tourniquets;
- Assess the limb for signs of extent of injury, including visual (deformity/swelling), palpation (crepitus or abnormal movement), neurovascular (sensation and motor) and circulation (temperature, capillary refill and pulses);
- Manage pain **as per C030 Pain Management**;
- Splint and provide supportive dressings as indicated;
- If wounds or open fractures are contaminated, they should be irrigated with sterile solution or normal saline. Iodine or antiseptic solutions should be avoided initially in deep wounds or compound fractures;
- Consider the use of specialised splints such as traction, pelvic or KED. Aim to immobilise the injury;
- Apply non-pharmacological assistance such as position, ice packs or supports (sling);
- Maintain normothermia;
- Assess the need to reduce or apply traction to any fractures, e.g. to restore circulation which is compromised >15 minutes from hospital;
- Secure IV access;
- Manage ongoing analgesia **as per C030 Pain Management**;
- Consider the need for ICP support for additional analgesia or procedural sedation;
- Manage the patient's perfusion with the aim of maintaining a SBP of 90mmHg, **as per C037 Hypovolaemia**; unless concurrent head injury (TBI)- then manage **fluid as per C031 Traumatic Head Injury;**
- Consider a spinal injury in all moderate to high-velocity trauma;
- Manage nausea and vomiting **as per C028 Nausea and Vomiting**;
- Consider expedited scene times once all pre-hospital stabilisation attempts have been made;
- Consider use of nerve blocks as indicated;
- Procedural sedation and use of Ketamine may be required to reduce fractures or dislocations where limbs are compromised.

Considerations

- The aim and guiding principles of good management of limb injuries is to immediately control haemorrhages in an escalating fashion; apply good splinting and dressing of injuries, including reductions. Attempt to resolve or improve neurological and vascular compromise where possible and appropriate; and, finally, apply suitable and appropriate analgesia to meet the needs of the particular injury.
- Limb injuries include sprains, strains and other soft tissue injuries through to fractures and dislocations. Patients may present with pain, reluctance to move or guarding of limb (in particular in those with difficulty communicating), loss of function and sensation, deformity, swelling, bruising, unusual positioning, bony crepitus, loss or diminished circulation.
- Altered or loss of sensation, poor capillary refill (>3 seconds), loss of pulses, cool, cyanosed or dusky skin in distal limb post-laceration, fracture or dislocation are indications of neurological and vascular compromise, which constitutes a limb-threatening injury and is therefore time critical.
- Fractures with neurovascular compromise should be realigned as soon as possible, ideally with the limb being immobilised in a near anatomical position. Compound fractures should be irrigated with normal saline before alignment and dressing. Apply traction and gentle counter-traction in line with limbs anatomical position. Apply a splint and immobilise.
- In general, dislocations with neurovascular compromise should, wherever possible, be transported urgently if within 15 minutes travel time of a hospital. Where this time cannot be met, consideration should be given to consultation and infield injury reduction undertaken.
- Injury reduction will more than likely require short procedural sedation. Apply sustained traction in a longitudinal direction away from the joint, whist having an assistant apply gentle counter-traction above the site of injury; **if in doubt consult** with senior ICP or destination hospital medical staff.

C036 - Burns

The following guideline is provided to support the decision-making and process of undertaking the management of the patient suffering burns. The aim is to appropriately recognise the extent and type of burns injury, optimise oxygenation and ventilation, and manage the burns appropriately with cooling, whilst managing any potential complications and pain.

Initial Assessment and Care

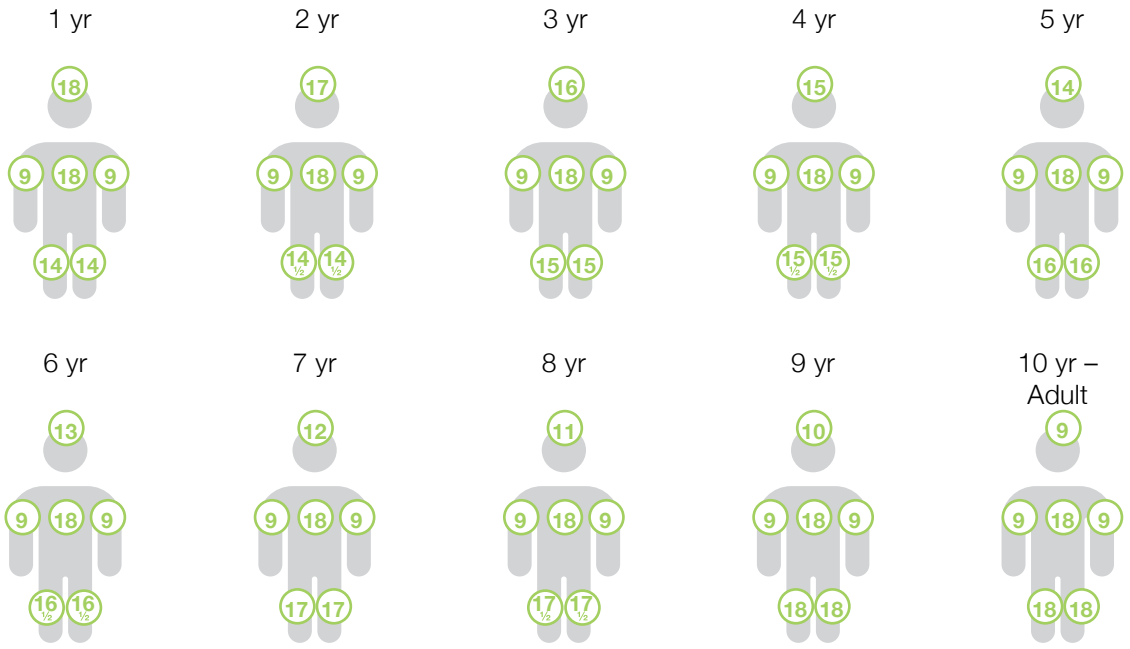
- Apply clinical approach;
- Assess for dangers and perform dynamic risk assessments as required;
- Maintain normothermia;
- Consider nebulised sterile water for airway burns;
- Gold standard is to ***cool burn area with clean cool water for 20 minutes***; cease cooling if patient starts to shiver or temperature <35ºC develops;
- If clean cool water is not available, then Burnaid or Hydrogel can be applied, ***ceased at 20 minutes***; be mindful of possible hypothermia;
- Apply cling wrap longitudinally to cover wounds;
- Assess size and depth of the burns and record per chart below;
- Administer oxygen **as per the D035 Oxygen** administration guideline;
- Manage pain with judicious opioid pain relief as per C030 Pain Management;
- Manage wheeze from smoke induced bronchospasm with Salbutamol **as per C015 Acute Asthma**;
- Reassess airway and ventilation; particularly assess for signs of airway burns;
- Secure IV access (avoid placing in burnt tissue where possible);
- Consider spinal or head injuries in burns from blast;
- Calculate TBSA (patient palm + fingers= 1% TBSA) of burns excluding superficial/ first degree (red, non-blistered skin)
  - If **Adult/ > 15 years old patient with non-superficial/ non-first degree TBSA > 20%** then calculate an **Adapted Parkland Formula fluid volume of (2 x non-superficial/ non-first degree TBSA percentage x mass in kg) mL.**
  - If **Paed patient >18 month old/ < 15 years old with non-first degree TBSA >20%** then calculate an **Adapted Parkland formula fluid volume of (1.5 x non-superficial/ non-first degree TBSA percentage x mass in kg) mL.**
  - Preferred fluid for Parkland fluid administration is **Hartmann's**.
  - Give this **Adapted Parkland formula volume at a rate such that it finishes 8 hours** ***post burn time of occurrence*****.**
  - **Consult for all patients < 18 months old.**
  - **Consult for all burns (paed or adult) greater than 8 hours old where Parkland formula indicated by TBSA calculation**
  - Give **Adapted Parkland** ***Parklands fluid volume through a separate line*** if at all possible
  - NB The **Adapted Parkland fluid rates does not provide for any maintenance or other resuscitation fluid requirements the patient may have**
- Manage ongoing analgesia **as per C030 Pain Management**;
  - If the patient's agitation and combativeness continues and is preventing adequate oxygenation, consider **Ketamine 10–40mg IMI or IV boluses**;
- Consider IO access if IV cannot be established quickly;
- Assisted intubation (RSI) **as per C001 Airway Management** if airway burns are suspected.

Considerations

- Pre-hospital and definitive hospital estimations of burns severity and extent will differ
- Care should be exercised with the administration of intravenous/intraosseous fluid as large rapid volumes increase the risk of interstitial oedema and tissue swelling, and present an increased risk of airway occlusion and difficulty in intubation.
- Respiratory compromise can manifest very quickly in airway and inhalation burns; early endotracheal intubation is often required. Consider airway burns where there are burns to the face, neck and upper torso; facial and upper airway swelling, singed nasal or facial hair; sooty/carbonaceous sputum; respiratory distress/wheeze/stridor/hoarseness; hypoxia; and decreasing GCS.
- Paramedics should be vigilant for signs of carbon monoxide poisoning or cyanide toxicity on any patient who has suffered burns in a confined space.
- Chemical and electrical burns should be transported and assessed by hospital staff.
- Burnaid/Hydrogel should be used with caution on burns >5% in paediatrics and >10% in adults as it can lead to unwanted rapid cooling of the patient.
- Circumferential burns are time critical as they can result in decreasing limb circulation and are at risk of compartment syndrome.
- Airways can be quickly lost if airway burns are not recognised and managed early.

Paediatric-Adult Burns Assessment Rulers

Expressed as a % of Total Body Surface Area



Chest + Abdomen = 18% Front or 18% Back
Limbs are measured circumferentially

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C037 - Hypovolaemia

The following guideline is provided to support the decision-making and process of undertaking the management of the patient suffering an absolute fluid deficit or hypovolaemia. The aim is to appropriately recognise the injury, optimise oxygenation and ventilation, and improve perfusion in order to support the cardiovascular system without compromising the patient by iatrogenic fluid overload. This guideline is intended for use with bleeding, vomiting, diarrhoea and dehydration where fluid loss is absolute.

Initial Assessment and Care

- Apply clinical approach;
- Ensure any source of loss of fluid or bleeding are controlled; this includes use of direct pressure, haemostatic dressings, fracture stabilisation and splinting;
- Avoid unnecessary movement of the patient as this may disrupt clotting;
- Avoid allowing the patients temperature to decrease, hypothermia should be avoided and attempts made to ensure normothermia;
- If required administer supplemental oxygen **as per D035 Oxygen**;
- Ideally patient should be managed in a supine or semi-recumbent position to assist with cerebral perfusion in poor perfusion circumstances;
- Perform respiratory and perfusion status assessment;
- Cautiously manage pain with opioid pain relief **as per C030 Pain Management**;
- If you suspect that the cause of the tachycardia and hypotension is the presence of a chest injury, manage **as per C033 Chest Injuries**;
- Secure IV access;
- If signs of inadequate perfusion are present, administer IV/IO fluid to achieve a systolic blood pressure of 90mmHg–100mmHg (an adequate radial pulse), in polytrauma with spinal injuries or TBI, then the blood pressure should be SBP 120mmHg:
  - Administer **Hartmann's Solution up to 20mlkg IV reassessing every 250ml** to ensure effectiveness and chest sounds remain clear; repeat up to a **maximum of 40ml/kg**; normal saline can also be used if incompatibility or contraindications for Hartmann's is present.
- Apply limb tourniquets as a last resort when dressings and direct pressure have failed to control haemorrhages;
- Try to optimise administered fluid temperature;
- Manage nausea and vomiting **as per C028 Nausea and Vomiting;**
- If patient has suspected or actual bleeding and has a **COAST Score of 3** or greater:
  - Administer **Tranexamic Acid 1g IV (Adult) or 15mg/kg (Paed) slowly over two to three minutes**, single dose max 1g.
  - **Administer Packed Red Cell Concentrate one to four units IV (Adult)** as available and required.
- In shock or hypotension without clear cause consider eFAST ultrasound;
- If injuries are present, consider facilitated intubation (RSI) **as per C001 Airway Management**, noting all attempts to restore perfusion must be undertaken prior and RSI in the hypovolaemic patient is high risk and a procedure of last resort.

Considerations

- Do not delay transport while trying to correct hypotension from bleeding. These patients are time critical and will require definitive intervention.
- Hypovolaemia can also be caused by non-haemorrhagic causes such as dehydration, gastrointestinal loss, exposure and neglect.
- Not all haemorrhage will be external and obvious. Long bone fractures, pelvic fractures, ectopic pregnancy rupture, GI bleeding and concealed blunt trauma should also be considered, particularly in paediatrics.
- Clinical signs of shock include skin colour changes and cool peripheries +/- moist or clammy skin; tachycardia or bradycardia (late sign); loss of peripheral pulses; extended capillary refill time >3 sec; SBP < 100mmHg; altered consciousness (drowsiness, confusion or agitation); cyanosis, both peripherally and centrally. A blood pressure in isolation should not be relied upon for a decision to start fluids.
- Paediatric patients may compensate for shock longer than adults, then suddenly decompensate.
- Hypotension in trauma may not necessarily be as a result of bleeding. Consider other causes such as obstructive shock (tamponade or pneumothorax), spinal cord injury, toxins or poisoning.
- Restoring perfusion in hypovolaemic patients must also consider the need to avoid:
  - excessive or rough patient movement;
  - maintenance of normothermia;
  - avoiding acidosis; and,
  - over administration of crystalloid fluids.
- Extreme caution needs to be taken with sedation and airway procedures in trauma, such patients are particularly intolerant of hypoxia and predisposed to sudden cardiovascular collapse. Caution with ‘normal’ doses of ketamine in these patients particularly is advised.

C038 - Carbon Monoxide

The following guideline is provided to support the decision-making and process of undertaking the management of the patient with accidental or intentional carbon monoxide poisoning. The aim is to appropriately recognise the extent of the intoxication, and optimise oxygenation and ventilation.

Initial Assessment and Care

- Apply clinical approach;
- Assess for dangers and perform dynamic risk assessments as required;
- ***CAUTION SpO_2 values may be falsely normal in carbon monoxide poisoning***
- Administer oxygen at highest concentration possible (caution in patients with COAD) **as per the D035 Oxygen** administration guideline;
- Reassess airway and ventilation, assess for signs of intoxication;
- Patient will have a high flow oxygen requirement that may be best provided by concurrent nasal and face mask oxygen administration to increase FiO2 or APPV with a BVM;
- Manage agitation or aggression **as per C023 – Acute Behavioural Disturbance;**
- Secure IV access;
- If the patient's agitation and combativeness continues and is preventing adequate oxygenation, consider **Ketamine 10–40mg IMI or IV boluses;**
- Consider IO access if IV cannot be established quickly;
- Assisted Intubation (RSI) **as per C001 Airway Management** in airway failure.

Considerations

- Carbon monoxide (CO) is a colourless and odourless gas produced as a by-product of combustion, such as petrol-powered machinery, fires, exhaust from vehicles and heating appliances (gas and combustion) that are inadequately ventilated.
- CO has an affinity for haemoglobin approximately 240 times that of oxygen.
- Due to CO's high affinity to haemoglobin, CO displaces oxygen and forms carboxyhaemoglobin, thus reducing the amount of oxygen transported to tissues throughout the body.
- The aim of management is to provide highest possible oxygen concentration to displace the CO from carboxyhaemoglobin to increase red blood cell oxygen carrying capacity to improve cellular oxygenation.
- Mild symptoms include headache, nausea, dizziness, tachycardia and agitation, leading to confusion, ataxia/loss of coordination, altered or loss of consciousness, seizures and coma.
- The cherry red skin alluded to in many texts is rarely seen.
- Not recognised and managed early airways can be quickly lost in severe toxicity, concurrent airway burns, or concurrent cyanide inhalation from fire.

C039 - Illicit Drug and Medication Overdose

The following guideline is provided to support the decision-making and process of undertaking the management of the patient suffering accidental or intentional illicit drug, medication, poisoning/ingestion or overdose. The aim is to appropriately recognise the extent and the source of any poisoning, optimise oxygenation and ventilation and, where indicated, provide the antidote.

Initial Assessment and Care

- Apply clinical approach;
- Assess for dangers and perform dynamic risk assessments as required; be aware of the possibility of uncapped sharps, or premises with hazards relating to substance production or intended to cause intentional harm (man-made traps etc.);
- Ensure appropriate PPE, do not enter if premises are considered contaminated; notify NTFRS and NTPOL for assistance;
- Optimise and manage airway and ventilation;
- Administer oxygen **as per the D035 Oxygen** administration guideline;
- Attempt to identify the cause or source of the overdose, retain packaging if possible;
- Remove contaminated clothing and decontaminate patients as indicated;
- If unsure of management or intoxication, consult **Poisons Information 13 11 26.**
- **If narcotic overdose is suspected and respiratory depression present:**
  - **Naloxone 1.6 mg (1600microg) (Adult) IMI or 20microg /kg (Paed) IMI** single dose only, **max dose 800 microg.**
  - **CAUTION**- Particularly in chronic opioid patients naloxone may precipitate very sudden, violent behaviour; manage ongoing agitation or aggression **as per C022 – Acute Behavioural Disturbance**;
  - **CAUTION-** Do NOT give naloxone to newborns or infants of opioid-dependent mothers, continue with airway and ventilation management
- Secure IV access;
  - **Naloxone 0.1mg (Adult) IV** repeat every two minutes until adequate self-ventilation or 2mg max reached or **20 microg/ kg (Paed) IV (ICP only)** single dose only, **max dose 800 microg**.

- If sedative, benzodiazepine or psychostimulant overdose is suspected:
- Manage agitation or aggression **as per C023 – Acute Behavioural Disturbance**;
- Control patient temperature **as per C045 – Environmental Emergencies**;
- Manage seizures **as per C021 – Seizures**;
- Manage perfusion **as per C010 Inadequate Perfusion – Non-Cardiac**.

- If calcium channel blocker or beta blocker overdose is suspected:
- Manage agitation or aggression **as per C023 – Acute Behavioural Disturbance**;
- Manage seizures **as per C021 – Seizures**;
- Manage perfusion **as per C010 Inadequate Perfusion – Non-Cardiac**;
- Manage bradycardia **as per C007 Bradycardia**;
- Manage tachycardia or torsades VT **as per C008 Tachycardia**;
- Manage ECG changes or signs of hyperkalaemia **as per C027 Hyperkalaemia**;

- In severe calcium channel blocker poisoning:
  - **Calcium Gluconate 2.2mmol (10ml) IV (Adult)** repeat dose once at 10 minutes if required or **0.5ml/kg up to 20ml (Paed)** slow push over five minutes, **no repeat dose for Paed**.
- Regularly reassess airway and ventilation, be aware of possible $EtCO_2$ or SpO_2 derangement, assess for signs of intoxication;
- 12-lead ECG should be performed in overdose involving cardio-toxic or cardio-active substances;
- Consider IO access if IV cannot be established quickly;
- Assisted Intubation (RSI) **as per C001 Airway Management** in airway failure.

Considerations

- Refer to table below for possible presentation against suspected agent types.
- A thorough risk assessment is critical and can be used to predict the clinical course of the patient's poisoning. Gathering pill or medication bottles and packets, and history from friends and family can be particularly useful. Information of importance includes the agent involved, total dose, time of exposure or ingestion, relevant signs and symptoms, and pre-existing conditions.
- Patients administered Naloxone should be managed to achieve adequate return of spontaneous and effective ventilation, and still require a period (> 4h) of observation to exclude late recurrence of opioid toxicity; IE they require transport to hospital even on full symptom resolution.
- Synthetic opioids such as Fentanyl may require higher doses of Naloxone than usual to reverse their effects.
- Psychostimulant intoxication is a cause of significant morbidity; agitation and paranoia are common. Although not common, they can lead to life-threatening complications such as hyperthermic crisis, myocardial ischaemia and intracranial haemorrhages.
- Many calcium channel blockers are slow-release medications; therefore, there can be a delay in toxicity of many hours from time of ingestion. Toxicity is potentially life-threatening in particular Verapamil or Diltiazem which are more cardio-active.
- Sotalol, in addition to its beta blocking effects also blocks potassium channels which causes QT prolongation and can lead to Torsades de Pointes.
- Glucagon was previously regarded as a specific antidote to beta blocker toxicity; however, it requires such large doses and only has a transient effect; therefore, it cannot be recommended in the pre-hospital setting.
- Airways can be quickly lost if deterioration is not recognised and managed early.

Agent Type	Example or Agent names	Clinical Signs
Cholinergic agents	Organophosphates Carbamates Nicotine Muscarinic Mushrooms	Sweating Salivation Pupil constriction Bronchorrhoea/oedema Lacrimation Bradycardia Agitation Fasciculations Seizures Coma
Anticholinergic agents	Antihistamines Quetiapine Olanzapine Benztropine Atropine	Dry and warm skin Flushing of skin Pupil dilatation Agitation Hyperthermia Dry mouth Tachycardia
Opioid agents	Heroin Oxycodone Methadone Morphine Codeine Fentanyl	Altered consciousness Sedation Respiratory depression Cool skin Diaphoresis Pupil constriction, pin point Coma
Calcium Channel Blocking agents	Verapamil Diltiazem Nifedipine Amlodipine Felodipine Lercanidipine	Bradycardia Heart blocks Hypotension Cardiogenic Shock Seizures Altered consciousness Hyperglycaemia Metabolic Acidosis Coma
Beta Blocking agents	Propranolol Atenolol Bisoprolol Carvedilol ***Sotalol (extra caution)***	Bradycardia Heart blocks Hypotension Cardiogenic shock Pulmonary oedema Seizures Altered consciousness QT prolongation Hypo/hyperglycaemia QRS prolongation >0.14 sec

Agent Type	Example or Agent names	Clinical Signs
Gamma-hydroxybutyrate (GHB) agents	GHB GBH Liquid E Fantasy	Euphoria Altered consciousness Myoclonus Agitation Behavioural disturbances Bradycardia Hypothermia Respiratory depression Coma Acidosis
Serotonin agents	SSRI SNRI MAOI Methamphetamines MDMA	Tremor Hyperreflexia Pupil dilatation Clonus Hyperthermia Agitation
Sympathomimetic agents	Methamphetamines MDMA Cocaine Methylphenidate	Tachycardia Diaphoresis Pupil dilatation Hyperthermia Agitation Euphoria Restlessness Paranoia Psychosis Seizures Rhabdomyolysis Renal failure Hypertension

C040 - Tricyclic Antidepressant (TCA) Overdose

The following guideline is provided to support decision-making and the management process of the patient who has either had an accidental or intentional tricyclic antidepressant overdose. The aim is to appropriately recognise the extent of the intoxication, optimise oxygenation and ventilation and, where indicated, provide treatment to stabilise cardiotoxicity.

Initial Assessment and Care

- Apply clinical approach;
- Assess for dangers and perform dynamic risk assessments as required;
- Administer oxygen **per the D035 Oxygen** administration guideline;
- Attempt to identify the cause or source of the overdose, retain packaging if possible;
- If unsure of management or intoxication, consult **Poisons Information 13 11 26**;
- Secure IV access;
- Perform and interpret 12-lead ECG, keep patient on continuous ECG monitoring;
- Manage seizures **as per C021 – Seizures;**
- Manage perfusion **as per C010 Inadequate Perfusion – Non-Cardiac;**
- Manage tachycardia or torsades VT **as per C008 Tachycardia;**
- Regularly reassess airway and ventilation;
- If QRS widening, >0.12s, poor perfusion and ventricular arrhythmia:
  - **Sodium Bicarbonate 8.4% 100ml IV (Adult) or 1ml/kg IV (up to 50ml) (Paed)**, repeat original dose once if required at 10 minutes.
- Consider IO access if IV cannot be established quickly;
- Assisted intubation (RSI) **as per C001 Airway Management** in airway failure or severe toxicity with GCS <10. Hyperventilate with respiratory rate 20–24 per minute, $EtCO_2$ target of 20–25mmHg if intubated.

Considerations

- Note that TCAs are not only prescribed for depression, they are also utilised for other medical conditions such as chronic pain management or migraines.
- In large overdoses patients can rapidly deteriorate to seizures, significant cardiac arrhythmia and loss of consciousness.
- Common presentations are outlined below with expected signs and symptoms.
- Ingestions of more than 10mg/kg in adults and as little at 5mg/kg in children are potentially toxic. Expect severe toxicity with doses greater than 20mg/kg.
- Airways can be quickly lost if deterioration is not recognised and managed early.

Agent generic name	Agent brand names	Clinical Signs
Amitriptyline	Endep	Drowsiness
Clomipramine	Entrip	Confusion
Dosulepin	Anafranil	Tachycardia
Doxepin	Placil	Slurred speech
Imipramine	Dothep	Hyperreflexia
Nortriptyline	Deptran	Ataxia
	Sinequan	Mild hypertension (initially)
	Tofranil	Dry mucosa
	Allegron	Respirator depression
	Nortritabs	Altered consciousness
		Hypoventilation
		Conduction delays on ECG
		PVCs, SVT or VT
		Hypotension
		Seizures
		Marked ECG derangement with QRS widening >0.12 sec

C041 - Organophosphate and Cholinergic Poisoning

The following guideline is provided to support the decision-making and process of undertaking management of the patient who has suffered an accidental or intentional organophosphate poisoning. The aim is to suspect organophosphate poisoning and its ongoing presence early, recognise the extent of poisoning, optimise oxygenation and ventilation and, where indicated, provide the appropriate management to arrest and treat poisoning progression until more definitive management can be provided; all in a manner safe to patients, staff and bystanders.

Initial Assessment and Care

- Apply clinical approach;
- Assess for dangers and perform dynamic risk assessments as required; be aware of possible hazards relating to production of or use of the organophosphate;
- Ensure appropriate PPE, do not enter if premises are considered contaminated; notify NTFRS and NTPOL for assistance;
- Administer oxygen **as per the D035 Oxygen** administration guideline;
- Attempt to identify the cause or source of the overdose and get a photo of packaging if possible;
- Remove contaminated clothing and decontaminate patients as indicated, preferably with soap and copious water;
- If unsure of management or intoxication, consult **Poisons Information 13 11 26;**
- ***Pre-alert receiving hospital*** to potential organophosphate poisoning. Follow receiving hospital protocols for approach and decontamination.
- Secure IV access;
- If evidence of severe poisoning such as excessive salivation, bronchospasm, diaphoresis, nausea, bradycardia with poor perfusion:
  - **Atropine 1.2mg (Adult) IV** or **20microg/kg (Paed) (ICP Only) IV** repeat every five minutes as required; no maximum dose;
- Manage perfusion **as per C010 Inadequate Perfusion – Non-Cardiac**;
- Manage bradycardia **as per C007 Bradycardia**;
- Regularly reassess airway and ventilation due to hypersecretion;
- Perform and interpret a 12-lead ECG;
- Consider IO access if IV cannot be established quickly;
- Assisted intubation (RSI) **as per C001 Airway Management** if airway failure or compromise suspected. (No Suxamethonium.)

Considerations

- Organophosphates are pesticides that inhibit acetylcholinesterase enzymes, increasing the action of acetylcholine (a neurotransmitter). Look for the key words anticholinesterase on labels.
- Possible sources of organophosphate and cholinergic poisoning include:
  - Cholinergic medications
  - Insecticides (including fumigation agents, sprays and baits)
  - Plunge dip chemicals for livestock
  - Nerve agents (eg Sarin)

- Signs and symptoms of cholinergic poisoning can be sought with the mnemonic **DUMBBELLS**
  - **D**iarrhoea
  - **U**rination
  - **M**iosis
  - **B**ronchial secretions
  - **B**radycardia
  - **E**mesis
  - **L**acrimation
  - **L**ethargy
  - **S**alivation
- Inhalational or dermal exposure (with the exception of nerve agents) is rarely life-threatening. The smell of an agent, even on the breath of an ingestion patient does not indicate exposure as it is usually the solvent which generally poses no toxicity to paramedics.
- In symptomatic cases extremely large doses of atropine may be required, consider calling for additional stock to be brought to crew if time to hospital is extended or prolonged.
- Refer to table below for possible presentation against suspected agent types.
- Airways can be quickly lost if deterioration not recognised and managed early.

Agent Type	Generic names	Clinical Signs
Organophosphates	Malathion Chlorpyrifos Coumaphos Diazinon Dichlorvos Diemethoate Fenthion Trichlorfon	Diarrhoea Urination Pupil constriction Bronchospasm and oedema Bradycardia Vomiting Lacrimation Salivation Hypotension Fasciculations Tremor Muscle weakness Respiratory muscle paralysis Agitation Seizures Coma
Carbamates	Carbendazim Oxamyl Carbofuran Methomyl Methiocarb	As Above
Nerve Agents	Sarin Soman Tabun VX Novichok	As Above
Pharmaceuticals	Rivastigmine Pyridostigmine Pilocarpine Bethanechol	As Above

C042 - Marine Envenomation

The following guideline is provided to support the decision-making and process of undertaking the management of the patient with a marine envenomation, in particular by box jellyfish or Irukandji. The aim is to appropriately recognise the type and extent of the envenomation, optimise oxygenation and ventilation and, where indicated, provide the appropriate management for pain, including neutralisation of the nematocyst and safe removal of same.

Initial Assessment and Care

- Apply clinical approach;
- Assess for dangers and perform dynamic risk assessments as required, be aware of possibility of secondary injury from tentacles;
- Ensure appropriate PPE, gloves, glasses and consider gown to avoid getting nematocyst on clothing;
- Apply copious vinegar to affected sites;
- After vinegar, attempt to remove tentacles/nematocyst;
- Manage pain with appropriate analgesia **as per C030 Pain Management;**
- Administer oxygen **as per the D035 Oxygen** as required;
- Provide IPPV via BVM as required;
- Secure IV access;
- Monitor cardiac rhythm with 3 lead ECG at least;
- If Irukandji Syndrome suspected and SBP >160mmHg then:
  - **Glyceryl Trinitrate 400microg SL (Adult) IV** repeat every five minutes as required to achieve a SBP <160mmHg, no maximum dose;
- Manage perfusion **as per C010 Inadequate Perfusion – Non-Cardiac;**
- Manage cardiac arrest **as per C002 Cardiac Arrest Medical;**
- Regularly reassess airway and ventilation patient may deteriorate quickly post-box jellyfish envenomation;
- Managing penetrating or blunt trauma symptomatically;
- In both box jellyfish and Irukandji envenomation with severe symptoms:
  - **Magnesium Sulphate 10mmoL** over 20 minutes **(Adult)** or **0.1mmoL/kg up to 5mmoL** over 15 minutes (Paed), administered by infusion, may be repeated once initial infusion complete if required.
- Consider IO access if IV cannot be established quickly;
- Assisted intubation (RSI) **as per C001 Airway Management** in airway or ventilation failure.

Considerations

- The only marine envenomation for which pressure immobilisation bandage is indicated is as a result of a ‘blue ringed octopus’ and paramedics are to be alert for possible respiratory or cardiac arrest post generalised paralysis in this envenomation.
- Airways can be quickly lost if deterioration is not recognised and managed early.

C043 - Snake Envenomation

The following guideline is provided to support the decision-making and process of undertaking the management of the patient with suspected venomous snake bite. The aim is to appropriately recognise the type and extent of the envenomation, optimise oxygenation and ventilation and, where indicated, provide the appropriate management of pain.

Initial Assessment and Care

- Apply clinical approach;
- Assess for dangers and perform dynamic risk assessments as required; be aware of snake; do not attempt to capture or kill snake. NB snake fangs are still venomous even if deceased;
- Do not attempt to clean or wash the bite site;
- Circle bite site with pen or marker then cover with dressing, noting approximately where bite is located under dressing;
- Apply pressure immobilisation bandage from proximal to distal limb then splint (regardless of known venomous or not);
- Manage pain with appropriate analgesia **as per C030 Pain Management;**
- Administer oxygen **as per the D035 Oxygen** administration guideline if required, including provision of IPPV via BVM as required;
- Secure IV access;
- Manage perfusion **as per C010 Inadequate Perfusion – Non-Cardiac;**
- Manage cardiac arrest **as per C002 Cardiac Arrest Medical;**
- Regularly reassess airway and ventilation as patient may deteriorate quickly post envenomation;
- Do not delay transport; early notification of hospital;
- Assisted intubation (RSI) **as per C001 Airway Management** in airway failure or compromise.

Considerations

- Australia and the Northern Territory have some of the most venomous snakes in the world; these include the western and eastern brown snakes, taipan, death adder, mulga (king brown), red-bellied black, fierce, whip snakes and sea snakes.
- All patients with a history of possible snake bite must be transported and assessed for possible envenomation.
- The wound may not look like definitive puncture marks; it may look like a superficial laceration or scratch.
- Envenomation signs include pain, swelling, bruising, nausea/vomiting, headache, abdominal pain, diarrhoea, diaphoresis, blurred vision, flaccid paralysis, excessive bleeding and coagulopathy, generalised muscle tenderness and renal impairment.
- Airways can be quickly lost if deterioration not recognised and managed early.

C044 - Spider Envenomation

The following guideline is provided to support the decision-making and process of undertaking the management of the patient with suspected spider bite or envenomation. The aim is to appropriately recognise the type and extent of the envenomation, optimise oxygenation and ventilation and, where indicated, provide the appropriate management of pain, supportive symptomatic care and transport to hospital for further evaluation and management.

Initial Assessment and Care

- Apply clinical approach;
- Assess for dangers and perform dynamic risk assessments as required, be aware of possible nearby spider, do not attempt to capture or kill spider;
- Do not attempt to clean or wash bite site;
- Circle bite site with pen or marker, then cover with dressing noting approximately where bite is located under dressing;
- Apply ***pressure immobilisation bandage only for mouse spider bites*** from proximal to distal limb then splint;
- Manage pain with appropriate analgesia **as per C030 Pain Management;**
- Administer oxygen **as per the D035 Oxygen** administration guideline if required, including provision of IPPV via BVM as required;
- Red-back bites may respond to ice-pack placement;
- Secure IV access;
- Manage perfusion **as per C010 Inadequate Perfusion – Non-Cardiac;**
- Manage bradycardia **as per C007 Bradycardia;**
- Manage any severe cholinergic effects **as per C041 – Organophosphate and Cholinergic Poisoning**;
- Regularly reassess airway and ventilation as patient may deteriorate quickly post envenomation;
- Do not delay transport, early notification of hospital.

Considerations

- Australia and the Northern Territory have some of the most venomous spiders in the world. Within the NT specifically, the majority of spider bites are red-back spider, to a much lesser extent mouse spider.
- Funnel web spiders are not endemic to the Northern Territory.
- The mouse spider is not a type of funnel web spider but does respond to similar treatment.
- All patients with a history of possible spider bite should be transported and assessed for possible envenomation. Fortunately, most spider bites or strikes do not result in envenomation requiring specific management.
- Signs of envenomation include pain, swelling, nausea/vomiting, headache, abdominal pain, tachy or bradycardia, lacrimation, diaphoresis, blurred vision, piloerection, fever, muscle spasms, fasciculations, pulmonary oedema, agitation, hypertension, through to coma.

C045 - Environmental Emergencies

The following guideline is provided to support the decision-making and process of undertaking the management of the patient suffering from environmental exposures resulting in hyperthermia or hypothermia. The aim is to appropriately recognise the extent of the exposure, optimise oxygenation, ventilation and support perfusion in order to reduce the possibility of arrhythmia or neurological impacts of temperature extremes. Heat is primarily gained or lost by conduction, convection, evaporation or radiation. Environmental emergencies can be exacerbated by environmental conditions, medications, exertion, trauma, infections or neurological disorders.

Initial Assessment and Care

Hypothermia Management:

- Apply clinical approach;
- Assess the level of hypothermia (refer considerations);
- Ensure that the patient is handled in a gentle fashion; avoid vigorous or unnecessary movement;
- Aim to minimise or arrest any further loss of heat from the patient; remove from source of exposure; remove wet or soiled clothing; dry off patient; place a layer between patient and any object/ground to avoid loss via conduction;
- Regularly monitor and record temperature;
- Monitor BGL closely as glucose consumption may have increased in an attempt to rewarm themselves;
- Place warm blankets, space blankets or self-warming blankets on patient; place the patient into a warm vehicle where possible;
- Administer supplemental oxygen **as per D035 Oxygen**, as required and titrating to effect;
- Aim for a patient temperature of 36–38ºC.
- Secure IV access;
- Manage the patient's perfusion with the aim of maintaining a SBP of >100mmHg, **as per C037 Hypovolaemia;** fluids should be warmed to avoid further reduction in core temperature;
- Intubation should be approached with caution in severe hypothermia due to risk of potential significant arrhythmia. If GCS <10, intubate **as per C001 Airway Management.**

Hyperthermia Management:

- Apply clinical approach;
- Ensure that the patient is handled in a gentle fashion; avoid vigorous or unnecessary movement;
- Aim to minimise or arrest any further heat transfer to the patient; remove from source of exposure; remove or loosen clothing;
- Regularly monitor and record temperature; place them into a cool vehicle where possible;
- If temp <40ºC, cooling should be done in a gentle fashion, misting/spray and cool skin (strip/spray/fan), cool oral fluids, fanning of patient;
  - If temp >40ºC, rapid cooling is indicated – use of cold packs to groin, axilla, neck and head, use of wet sheets or towels etc. (Note that this is not routinely done for infective causes of hyperthermia unless consciousness is compromised);
  - Administer supplemental oxygen **as per D035 Oxygen**, as required and titrating to effect;
  - If cause is infective, consider paracetamol:
  - **Paracetamol 1000mg PO (Adult), 500mg PO (frail or <60kg) or 15mg/kg Elixir PO (Paed),** single dose only;
- Aim for a patient temperature of 38–40ºC; avoid causing shivering.

- Secure IV access;
- Manage the patient's perfusion with the aim of maintaining a SBP of >100mmHg, **as per C037 Hypovolaemia**; fluids should be cooled to aid in reduction of core temperature.
- Intubation should be considered in severe hyperthermia. If GCS <10, intubate **as per C001 Airway Management**. Have a lower threshold for patients who have overdosed on psychostimulants.

Considerations

- Normal body temperatures are usually between >35–37.5ºC.
- Whilst thermometer technology has improved there is still difficulty in accurately measuring a patient's core temperature particularly at the extremes of temperature.
- Hypothermia is insidious and rarely occurs in isolation, with the elderly being most susceptible. It occurs when the body loses heat faster than it can be produced and retained.
  - **Mild hypothermia** is 32–35ºC and may present with vasoconstriction, lethargy, ataxia, decreasing consciousness, tiredness, tachypnoea, tachycardia, and usually normotension.
  - **Moderate hypothermia** is 28–32ºC, as above with confusion, delirium, worsening level of consciousness, bradycardia, hypotension, and muscle rigidity.
  - **Severe hypothermia** is less than 28ºC, conscious state deterioration to stupor and then coma, worse still vital signs, dilated pupils, absent reflexes, arrhythmias including bradycardia, atrial fibrillation, J wave in QRS, VF to asystole.
- **Hyperthermia** occurs as a result of the body's failure to thermoregulate, resulting in the body producing or retaining/absorbing more heat than it is able to dissipate it.
  - **Heat exhaustion** is a core temp of 37.5–40ºC and can present with diaphoresis, nausea and vomiting, tachypnoea, tachycardia, hypotension, headache, light-headedness, muscle pain and cramping, and fatigue.
  - **Heat stroke** is a core temp >40ºC and presents with CNS dysfunction, altered consciousness, seizures, severe headache, flushing of skin, hot and dry skin, hypotension and arrhythmia, tachypnoea and marked increase in work of breathing.
- Do not delay transport trying to correct temperature in patients who are severely hot or cold.
- Fluid temperature should be checked with the use of thermometer and recorded before administration.
- Shivering may be counterproductive in resuscitation efforts.
- Caution needs to be taken with sedation and airway management in these unstable patients.

C046 - Diving Emergencies

The following guideline is provided to support the decision-making and process of undertaking the management of the patient suffering from diving-related emergencies. The aim is to appropriately recognise the type of emergency whether it be decompression illness, barotrauma, arterial gas embolism or hypoxic blackout.

Initial Assessment and Care

- Apply clinical approach;
- Review history and signs and symptoms to best determine the injury being managed;
- Ensure that the patient is handled in a gentle fashion; position either supine or lateral; avoid head or leg elevation where possible;
- Administer highest concentration of oxygen possible **as per D035 Oxygen;**
- Maintain normothermia;
- Secure IV access;
- Manage the patient's perfusion **as per C037 Hypovolaemia**; fluids should only be given if chest clear;
- Seek and manage any pneumothorax **as per C033 Chest Injuries;**
- Manage any neurological deficits **as per C031Traumatic Head Injury** or **per C032 Spinal Injury**;
- BEWARE any air transport of such patients and ensure to request a 'sea level cabin' (or < 300m altitude by helicopter) to air crew as early as possible to enable logistical planning
- If GCS <10 then intubate **as per C001 Airway Management**.

Considerations

- Diving emergencies most often result from changes of environmental pressures occurring during descent and most commonly ascent. They include decompression illness, arterial gas embolism, barotrauma or shallow water blackouts.
- **Decompression Illness (DCI)** occurs when a diver has a quicker than normal ascent and subsequent decrease in atmospheric pressure. Nitrogen is unable to be exhaled normally and bubbles form within the tissue and blood stream, which can result in tissue ischaemia or pulmonary barotrauma.
- **Arterial Gas Embolism (AGE)** usually results from pulmonary barotrauma when expanding gases within the alveoli rupture, damaging the membrane and allowing bubbles of air to enter the circulation via the lungs.
- **Barotrauma** occurs when gas which is trapped, expands during ascent, causing trauma. Areas susceptible include eyes, ears, sinuses, mouth/dental and GI tract.
- **Shallow Water Blackout (hypoxia)** is usually a loss of consciousness secondary to holding their breath (free diving), on or near the surface.
- Important information for the hospital includes number of dives undertaken, intervals on the surface between dives, where dives occurred, maximum depths and bottoms times, gas mixtures and type of dive (SCUBA, saturation, snorkel etc.), symptoms and timings, decompression activities and type of ascent/descent.

- Signs and symptoms of a diving emergency include headache, sensory or motor deficits, seizures, paralysis, altered consciousness, visual disturbances, shortness of breath, coughing up blood, pulmonary oedema, chest pains, chest injuries, skin rash often with associated itch, pain to the joints and muscles, cardio/respiratory arrest.
- Patients will not always present after open or closed water diving, or what would be considered traditional diving activities. They can occur in cold deep water inland diving, holiday-makers who didn't give enough time before flying and are diverted to inland airports, commercial free-divers (pearling) or saturation divers who fly-in fly-out.

Emergency Contacts

*Royal Darwin Hospital has a 24/7 Hyperbaric Doctor available for advice, a call should be placed to the RDH switch and the paramedic should ask to be put in contact with the Doctor on **08 8922 8888** during business hour. The Hyperbaric Medicine Unit can be reached on **08 8922 8230**.*

*If RDH HBU is unavailable or uncontactable, you should attempt to contact the Divers Emergency Service on **1800 088 200**. This is an international service based at the RAH in Adelaide, but managed by SAAS.*

C047 - Dialysis Emergencies

The following guideline is provided to support the decision-making and process of undertaking the management of the patient suffering from renal dialysis emergencies. The aim is to appropriately recognise the type of emergencies whether it be hyperkalaemia, fluid overload, disequilibrium syndrome or fistula issues. Note that both haemodialysis and peritoneal dialysis are conducted in homes or remote facilities across the Territory, as well as in established health clinics and hospitals.

Initial Assessment and Care

- Apply clinical approach;
- Review history and signs and symptoms to best determine the presentation or chief complaint;
- Be cautious with patients who have missed their appointments or those who have multiple comorbidities;
- Administer oxygen **as per D035 Oxygen**, titrating to effect;
- Manage any pain **as per C030 Pain Management** – avoid Morphine;
- Control any haemorrhages, particularly to fistula with direct pressure and use of haemostatic dressings as a preference;
- Patients undergoing haemodialysis or peritoneal dialysis may require emergency disconnect from equipment, **refer P017 Emergency Dialysis Disconnection** and assist trained carer, staff or family members;
- Secure IV access;
- Manage bleeding and fluid **as per C037 Hypovolaemia**, considering fluids impact on patient's normal fluid management;
- **Note tourniquet placement on limb with fistula is likely to cause permanent damage to the future use of that limb, placement is a procedure of last resort.**
- Manage hyperkalaemia **as per C027 Hyperkalaemia;**
- Cerebral oedema from disequilibrium may result in seizures, manage **as per C021 Seizures;**
- Manage chest pain and APO **as per C005 Acute Coronary Syndrome** and **C011 Acute Pulmonary Oedema;**
- If GCS <10 then consider intubation **as per C001 Airway Management. Avoid suxamethonium.**

Considerations

- Ensure appropriate PPE is worn as fistulas are generally under considerable pressure.
- Bleeding fistula is a medical emergency and can result in a significant and rapid haemorrhage.
- If direct pressure and haemostatic dressings fail to control haemorrhage proceed to elevation and compression dressings.
- Avoid use of tourniquets wherever possible due to damage they cause to the fistula limb –if required to save a life, one should be applied.
- Care and caution should be taken with both placement of intravenous cannula and IV fluids in any patient with acute or chronic kidney disease. Avoid multiple attempts at access or sites where fistula formation has been identified.
- Disequilibrium occurs as a result cerebral oedema secondary to a mismatch between solute concentration (urea) in the CSF/cerebral capsule and blood.

C048 - Maternity and Childbirth

The following guideline is provided to support the decision-making and process of undertaking the management of the patient in labour and during normal childbirth. The aim is to appropriately recognise the patient's progression in labour, provide transport and, where necessary, assist with the normal vaginal delivery of the newborn. This guideline applies to patients who are considered full term, 37–42 weeks gestation.

Initial Assessment and Care

- Apply clinical approach;
- Obtain a maternal history:
  - History of current pregnancy including weeks' gestation; single or multiple newborns expected; have membranes ruptured and what the fluid looked like; presence of the urge to push; details on contractions (time, duration, started); have they notice foetal movements or absences of movement; are there any known complications; what antenatal care has occurred; note any bleeding, trauma, derangement of observations, diabetes, trauma etc.;
  - History of previous pregnancies, including total number, prior interventions required or caesarean sections, any known or suspected complications, progression and length of previous deliveries and labour;
- Allow the mother to assume a position of comfort and prepare maternity equipment, and towels and blankets for comfort and modesty;
- Assess for signs of imminent birth including loss of mucous plug (bloody show) dislodged from cervical canal, increasing frequency and severity of contractions with an urge to push or open bowels, spontaneous membrane rupture, bulging perineum, presenting part at the level of the vulva;
- If any complications **refer to relevant obstetric CPG C048–C057;**
- Arrange for transport to maternity service or clinic if labour is not progressing to imminent delivery;
- Administer oxygen **as per D035 Oxygen**, titrating to effect if SpO_2 drops below 94%;
- Manage any pain as per **C030 Pain Management;** avoid narcotics in second stage labour;
- Reassure mother and family throughout.
- Secure IV access early;
- Manage any trauma or traumatic bleeding **as per C037 Hypovolaemia;**
- If delivery imminent:
  - **Actively warm environment and warm blankets/ towels as able;**
  - Prepare to support controlled delivery of the head and shoulders, ensure a good hold of the child to avoid explosive delivery and subsequent trauma, use gentle perineal pressure to guard against tears;
  - If umbilical cord is around the neck, then attempt to loosely unwrap, and then encourage mum to push. However, if tight and newborn is failing to descend and the cord cannot be loosened, clamp and cut the cord;
  - After ensuring ***not a multiple pregnancy*** and maternal consent give **Oxytocin 10 IU IMI**, single dose only;
  - Note time of birth and undertake a newborn assessment and APGAR score at one and five minutes;
  - Manage unresponsive newborn **as per C049 Newborn Resuscitation;**
  - Post-birth assessment and care should include lightly drying baby, maintaining warmth. Once respiration and heart rate assessed as adequate, place child with skin-to-skin contact with mum; allow cord to cease pulsating then clamp and cut the cord (consider if mother, partner or family would like to do this);
  - Allow progression of third stage labour and placental delivery which can occur at 15 minutes to one

hour post-partum. Collect and retain placenta for midwife examination;

- Allow mother to commence breast feeding (this will also progress third stage labour);
- Note time of placental delivery;
- If ongoing blood loss >500ml and fundus not firm, manage bleeding **as per C053 Primary Postpartum Haemorrhage** and **C037 Hypovolaemia,**

- Consider need for TXA infusion as required **as per C052 Primary Postpartum Haemorrhage.**

Considerations

- **First Stage of Labour** – Onset of regular painful contractions to full cervical dilation, i.e. contractions two to 20 minutes and 20–60 seconds duration.
- **Second Stage of Labour** – Full cervical dilatation to birth of baby, typical durations are primipara – one to two hours, multipara 15–45 minutes.
- **Third Stage of Labour** – Birthing of placenta.
- Speak with the mother and family, discuss their birth plan or any wishes they may have for delivery.
- Ensure the care provided is culturally safe and appropriate within our given crewing and resources.
- ***Consider the need for additional resources to manage two separate patients.***
- Respect the mother's wishes regarding cutting of cord (lotus birth).
- If there is no immediate urgency to cut the cord, wait for it to cease pulsating, then clamp at 10cm, 15cm and 20cm from child and cut between 15cm and 20cm.
- Membranes should not be ruptured by a paramedic to progress labour or for any other reason prior to delivery. Manual rupture of the membrane should only occur if the head has been delivered and the membrane remains intact.

C049 - Newborn Resuscitation

The following guideline is provided to support the decision-making and process of undertaking the management of the unresponsive newborn requiring resuscitation. The aim is to appropriately recognise the neonatal patient's transition from the womb; recognising failure to adequately ventilate, oxygenate or perfuse themselves adequately post-delivery.

Resuscitation of extremely premature infants <23 weeks' gestation or <400g should be withheld as there is no possibility of successful resuscitation.

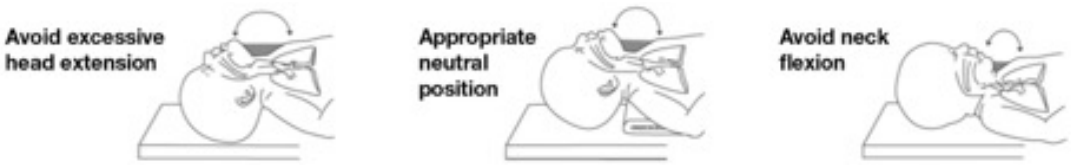
Initial Assessment and Care

- Assess the newborn's tone and breathing; if tone is poor or flaccid and they are apnoeic, attempt to stimulate the child with drying and warming for no more than 30 seconds;
- Place the newborn supine and head and neck in a neutral position; this may require support of a towel or padding to back and shoulders (refer diagram below);
- Assess and tap in time HR by palpating umbilicus pulsation adjacent abdomen or femoral arterial pulse;
- Assess respiratory and heart rate post initial actions above, **if gasping respirations or apnoea or HR <100bpm:**
  - **Provide neonatal BVM IPPV at 40–60 per minute, room air only; they may only require 5–20ml per breath (size dependent).**
- Place the **pulse oximeter probe on the patient right hand/wrist/thumb;**
- Attach ECG monitoring, HR should continue to be palpated;
- Reassess heart rate; **if HR <60bpm:**
  - **CPR 3:1 with oxygen running into BVM at 5 lpm (with reservoir valve and bag).**
- Reassess response to care every 30–60 seconds;
- If HR returns to 60–100bpm, cease compressions and continue IPPV as above with oxygen;
- If HR >100, and SpO_2 90% or greater discontinue oxygen and IPPV on room air, if SpO_2 <90% then continue IPPV and titrate between 1–5lpm to maintain 90%;
- If child is breathing normally, maintain warmth and transport, monitor SpO_2 and consider supplemental oxygen 1-2lpm via nasal cannula to maintain saturations of 90% or greater;
- Waveform $EtCO_2$ is inaccurate with such small tidal volumes (5–10ml), monitor neonate $EtCO_2$ with Colourmetric Detector if required.
- Secure IV or IO access;
- If HR <60 persists despite CPR then intubate;
- If HR <60 persists despite adequate ventilation:
  - **Adrenaline 10microg/kg IV/IO,** every four minutes.
- If still not responding:
- **Normal saline 0.9% 10–20ml/kg** (use 50ml syringe for accuracy) IV/IO;
- Assess BGL, if <2.5mmoL manage **as per C025 Diabetic Emergencies.**

Considerations

- ***'Breath baby, breathe'*** most babes will respond cardiovascularly and tone wise to good ventilation assistance;
- Airway suctioning is only required for visible foreign body (blood, meconium) and should only be to the mouth and never more than 5 cm in depth, where you can see the tip of your suction catheter, and brief (vigorous airway suctioning could both worsen ventilation and cardiovascular status).
- OPA airways are not recommended for routine use in newborns as they often result in paradoxical airway obstruction.
- HR is usually measured by auscultation or tapping out in neonates; however, ECG electrodes can be placed to assist with monitoring non-vigorous newborn, auscultation of HR is preferred in extremely premature (<28 weeks) neonates as electrodes may damage skin.
- If resuscitation is immediately required post-delivery, then consideration should be given to managing the neonate between the mother's legs, prior to attempting to clamp and cut the cord.
- Cutting the cord early is recommended to promote placental shunting to the newborn.
- Once the cord is cut, place the newborn on dry and warm linen in a position that allows safe and appropriate management.
- Use of bubble wrap and placing the newborn's body into a plastic bag, leaving the head exposed can also aid in warmth and temperature retainment. Ensure the external environment is as warm as possible.
- Shockable rhythms in newborns/neonates are rare; **should you see a shockable rhythm, apply paediatric pads and defibrillate at 4J/Kg** at two minute intervals.
- Expected SpO_2 values expected from birth to 10 minutes are: 1 minute = 65–75%; three minutes = 70–90%; six minutes = 85–95%; and 10 minutes = >95%.
- Consider use of 5cm of PEEP.

Airway Alignment for Newborn/Neonate (ARC Guidelines):



C050 - Miscarriage

The following guideline is provided to support the decision-making and process of undertaking the management of a patient experiencing a miscarriage or spontaneous loss of pregnancy. Miscarriage is a common but distressing complication of pregnancy and refers to the unexpected loss of a pregnancy prior to 20 weeks of gestation. Any infant delivered without signs of life at 20 weeks or greater is regarded as stillborn.

Initial Assessment and Care

- Apply clinical approach;
- Obtain a complete history, and any antenatal care or known issues;
- Miscarriage can be extremely distressing for patients, their families and friends. Paramedics should be mindful of the need for reassurance, compassion and respect avoiding any comments or suggestions of cause or reason;
- It is also important to recognise that approximately 25% of pregnancies have some bleeding or spotting in the first 12 weeks, patients should be assessed by a clinic or hospital; again avoid comments or diagnosis that may lead to either false hope or create anxiety;
- Any significant bleeding should be managed **as per C051 Antepartum Haemorrhage;**
- Retain any lost products of conception, tissue or foetus for examination at the receiving facility. Note this will be difficult for everyone, and should be conducted with the utmost respect. Do not dispose of any fetal remains;
- Manage any pain or discomfort **as per C030 Pain Management avoiding NSAIDs;**
- Manage nausea **as per C028 Nausea and Vomiting;**
- A complete foetus may be passed in later gestation, more often than not the placenta will not spontaneously separate. Clamp and cut the cord, wrap the infant, if >20 weeks of gestation then ROLE must be performed, if the mother wishes allow her to hold the fetus enroute to hospital;
- Reassess the patient for other conditions or infection; manage severe infection or sepsis **as per C029 Meningococcal and Sepsis Management.**

Considerations

- It is important to recognise that many women experience a strong sense of loss, sadness, anger, disappointment and disbelief, coupled with a sense of isolation and guilt. These experiences are normal. Responders should recognise and acknowledge the impact of a miscarriage with compassion and understanding, and patients and family should be offered support.
- Miscarriages clinical presentation ranges from signs consistent with a normal menstrual cycle through to lower abdominal discomfort, cramping and contractions; ongoing vaginal bleeding; hypotension and tachycardia, light-headedness and postural symptoms.
- The sudden development of presyncope with low heart rate should prompt a provisional diagnosis of Cervical Shock from products of conception at the cervical os and sensitive but rapid removal of the products should be attempted
- The presence of the above, as with severe pelvic pain and or rigidity, guarding, purulent discharge and fever are suggestive of intrauterine infection and should be managed **as per C029 Meningococcal and Sepsis Management**.
- Ensure that other differentials have been considered during assessment such as a normal implantation of pregnancy bleed, ectopic pregnancy, sexual assault or trauma.

C051 - Antepartum Haemorrhage

The following guideline is provided to support the decision-making and process of undertaking the management of a patient experiencing an antepartum haemorrhage (bleeding after 20 weeks gestation). The aim is to appropriately recognise the type of emergency whether it be trauma, placental abruption or placenta praevia.

Initial Assessment and Care

- Apply clinical approach;
- Position the patient in a position that avoids aorto-caval compression such as left lateral tilt;
- Haemorrhages should be managed externally with pads/combine dressing; nothing should be placed into the vagina nor should any digital internal examination occur as this may result in catastrophic bleeding;
- Assess perfusion; note external bleeding may not be reflective of larger internal losses;
- Administer oxygen **as per D035 Oxygen;**
- Manage any pain or discomfort **as per C030 Pain Management;**
- Manage nausea **as per C028 Nausea and Vomiting;**
- Gain IV access;
- Any significant bleeding should be managed **as per C037 Hypovolaemia;**
- Pre-notify hospital and determine if patient is being taken directly to maternity, theatre or managed in ED;
- TXA is ***not*** generally indicated in AP haemorrhage.

Considerations

- **Placenta Praevia** occurs when the placenta is situated either partially or completely over the lower uterine segment, completely covering the internal cervical os. It may present with smaller short bleeding, bright red blood, no pain other than associated contractions, soft and non-tender uterus through to firm uterus with significant bleeding and shock.
- **Placental Abruption** occurs when a normally situated placenta separates either partially or completely from the uterine wall, resulting in bleeding. This can be spontaneous or as a result of trauma. There are serious complications for both mother and child. It may present with constant pain in abdominal/pelvic region; bleeding may be significant or occur in small waves as the uterus contracts; tetanic uterine contractions and hypertonic uterine ('woody' or rigid on palpation); higher than expected fundal high due to expanding internal haemorrhage; signs of shock.
- Ensure that other differentials have been considered during assessment such as sexual assault or trauma.

C052 - Uterine Emergencies

The following guideline is provided to support the decision-making and process of undertaking the management of a patient who has suffered a uterine rupture or inversion during childbirth. The aim is to appropriately recognise the patient who has experienced a tear or rupture of the uterine wall verses the rarer but still potentially life-threatening uterine inversion.

Initial Assessment and Care

- Apply clinical approach;
- If delivery has not occurred, ensure the mother is placed into a left lateral tilt positon to avoid aorto-caval compression;
- If the baby has been delivered, note the time of birth and time of suspected injury and blood loss;
- Summon additional support and assistance;
- Pre-neonate delivery note the total blood loss, manage losses > 500ml **as per C051 Antepartum Haemorrhage** and **as per C037 Hypovolaemia;**
- Gain IV access;
- Protect any exposed uterus with moist sterile dressing;
- Manage pre-birth and the birth **as per C048 Maternity and Child Birth;**
- Manage post birth significant haemorrhage **as per C037 Hypovolaemia** and **as per C053 Primary Postpartum Haemorrhage;**
- Manage any pain or discomfort **as per C030 Pain Management;**
- Provide high flow oxygen **as per D035 Oxygen;**
- Prepare for possible newborn resuscitation **as per C049 Newborn Resuscitation.**

Considerations

- Whilst there are no definitive causes for uterine inversion, a common factor is an over-aggressive management of the third stage of labour, which includes excessive fundal massage and cord traction prior to placental separation.
- Risk factors for uterine rupture include a history of caesarean section or other uterine surgery, uterine malformation, dystocia, induced labour with medication, abnormal placentation, advanced maternal age, fetal macrosomia and trauma.
- Principles of care for uterine emergencies are providing supportive and symptomatic care and management, especially for shock states and then subsequent rapid transport to definitive care.

C053 - Primary Postpartum Haemorrhage

The following guideline is provided to support the decision-making and process of undertaking the management of a patient experiencing a primary postpartum haemorrhage. The aim is to appropriately recognise the patient who has an estimated blood loss > 500 ml in the first 24 hours after delivery. The causes in order of incidence **Tone** (uterine atony); **Trauma** (uterine rupture/inversion/vaginal tears); **Tissue** (retained placenta or membranes); and **Thrombin** (coagulopathies).

Initial Assessment and Care

- Apply clinical approach;
- Position the patient in a supine;
- Make note of amount of bleeding already occurred (including towels etc that may have been removed from immediately adjacent the patient) and any ongoing bleeding **CAUTION bleeding amount is normally underestimated by professionals**;
- Haemorrhages should be managed externally with pads/combine dressing; perineal tears should be managed with dressings and direct pressure;
- Assess perfusion;
- Administer oxygen **as per D035 Oxygen**, titrating to effect;
- Manage any pain or discomfort **as per C030 Pain Management;**
- Manage nausea **as per C028 Nausea and Vomiting;**
- Maintain normothermia;
- Assess the fundus. If palpable, firm, central and compacted do not massage further, otherwise:
  - Massage the fundus until firm and blood loss reduces; use a cupped hand and apply a firm circular motion, directed towards the pelvis.
  - Encourage the mother to empty her bladder if possible;
  - Encourage the mother to breastfeed if possible;
- **If consciousness impaired or pre-arrest perform external abdominal aortic compression** – locate the point of compression just above the umbilicus and slightly to left; apply firm downward pressure with closed fist through abdominal wall.

- **Oxytocin 10iu IMI**, repeat at five minutes if bleeding continues;
- Gain IV access;
- Any significant bleeding should be managed **as per C037 Hypovolaemia;**
- **After second Oxytocin Consider** consult for TXA if ICP unavailable;
- Pre-notify hospital and determine if patient is being taken directly to theatre or managed in ED, endeavour to bring placenta with mother;

- **Controlled Cord Traction (CCT) if signs of placental separation present** (further PV blood, cord lengthening, firming and rising uterus). ***NB always release cord traction before releasing hand guarding uterus in CCT.***
  - **Tranexamic Acid 1 g IV,** single dose only, slow push over 2–3 min.
- Consider and Oxytocin infusion on consult with receiving hospital consultant ensuring to handover to the consultant how much Oxytocin has already been given

Considerations

- PPH is ***a leading cause of pregnancy associated morbidity and mortality in Australia.*** The Northern Territory has the highest presentation of PPH per live birth.
- Extent of haemorrhage can often be masked by the normal pregnancy physiological changes; signs of shock may not appear until after greater than one litre of blood has already been lost.
- Normally the fundus will not become firm and contracted until the placenta is delivered; therefore, massage of the fundus prior to placental delivery should generally be avoided.
- Paramedics should have a high degree of vigilance, rechecking bleeding often, combined with close monitoring of the patient's perfusion status.

C054 - Pre-Eclampsia and Eclampsia

The following guideline is provided to support the decision-making and process of undertaking the management of a patient experiencing pre-eclampsia or eclampsia. The aim is to appropriately recognise the patient who is pregnant (< 20 weeks gestation) or post-partum (up to six weeks post delivery) and hypertensive, with or without secondary signs of pre-eclampsia, and be prepared for eclampsia (progression to seizures) and the unique management of eclamptic seizures. These are time critical emergencies requiring early recognition and intervention to reduce perinatal and maternal morbidity and mortality.

Initial Assessment and Care

- Apply clinical approach;
- Position the patient in a lateral position if still pregnant and assess their blood pressure regularly and look for signs and symptoms;
- Signs and symptoms of pre-eclampsia are significant hypertension (SBP >140mmHg or DBP >90mmHg) normally with some of the following: generalised oedema; headache; cerebral agitation/ irritation; visual disturbances (shimmering or flashing light); nausea and vomiting; clonus; hyperreflexia; heartburn or epigastric/abdominal pains; acute pulmonary oedema; jaundice;
- Ensure a quiet environment, avoid excessive motion or movement, allow them to get comfortable;
- Assess perfusion; note that external bleeding may not be reflective of larger internal losses;
- Administer oxygen **as per D035 Oxygen**, titrating to effect;
- Manage any pain or discomfort **as per C030 Pain Management;**
- Manage nausea **as per C028 Nausea and Vomiting;**
- Gain IV access;
- Any significant bleeding should be managed **as per C037 Hypovolaemia**, otherwise fluid should be restricted due to risk of precipitating APO;
- Manage seizures **as per C020 Seizures**; but NB that **preference is for Magnesium before Midazolam.**
- Pre-notify hospital and determine if patient is being taken directly to maternity or managed in ED;
- If eclampsia is suspected:
  - **Magnesium Sulphate 20mmoL over 20 minutes via infusion**, single dose only.

Considerations

- The only definitive treatment of eclampsia is the birth of the baby.
- The key principle to pre-hospital management of pre-eclampsia is supportive care and rapid conveyance to an obstetric hospital. Once seizing, the aim is to terminate the seizures in order to prevent maternal and foetal hypoxia.
- Eclampsia seizures do not usually last longer than 90 seconds and are often self-limiting.

C055 - Breech

The following guideline is provided to support the decision-making and process of undertaking the management of a patient with a breech presentation. The aim is to appropriately recognise the patient who is in established labour, where the foetus enters the birth canal with the buttocks or feet first and presents with either a frank, complete or footling presentation. Breech presentation presents 2–4% spontaneously/ undiagnosed at term, with an incidence as high as 10% at 30 weeks.

Initial Assessment and Care

- Apply clinical approach;
- Reassure mother – be mindful of cultural considerations;
- If birth not imminent, transport to maternity unit.
- If birth imminent:
  - Position the patient with buttocks to edge of the bed, with legs supported (lithotomy position); however, standing or squatting may be preferred by the mother;
  - Ensure effective communication with the mother, encourage to push hard with contractions during child birth;
- It is advisable to summon further assistance from a second crew and request ICP support;
- Manage any pain or discomfort **as per C030 Pain Management**;
- Manage post birth **as per C048 Maternity and Childbirth.**

- **Single footling or arm presentation only:**
- Don't attempt delivery if avoidable, urgent transport to maternity unit;
- Seek consultation with receiving hospital if required.

- **Buttocks or both feet presenting (General):**
- Manage **as per C048 Normal Child Birth;**
- Prepare for possible newborn resuscitation **as per C049 Newborn Resuscitation;**
- Allow birth to occur spontaneously;
- Try not to touch or stimulate the neonate unnecessarily, ***'hands off the breech'***;
- The birth of the buttocks and feet will occur slowly.

- **Buttocks first back uppermost:**
- This is the most common presentation – do not attempt to pull the baby out;
- Continue to encourage the mother to push with each contraction;
- Feet and legs should release;
- Allow further decent of the neonate;
- Be mindful of maintaining warmth of the limbs without over stimulating them;
- The neonate's body should continue to descend until the arms and clavicles are birthed;
- Allow the neonate to hang until the nape of the neck is visible; they should be face down;
- Assist the birth of the head using the **modified Mauriceau Smellie Velt** manoeuvre:
- Place your dominant hand under the neonate's body, with index and middle fingers onto their cheekbones;
- With your non-dominant hand, place the index and ring finger on the neonate's shoulders. Your middle finger on the occiput to assist head support during flexion;

- Slowly lift the neonate straight up in a circular fashion, then onto the mother's abdomen, allow the head to birth in a controlled fashion.
- manoeuvre can be assisted by a second person placing pressure behind the pelvic bone to assist with head delivery.

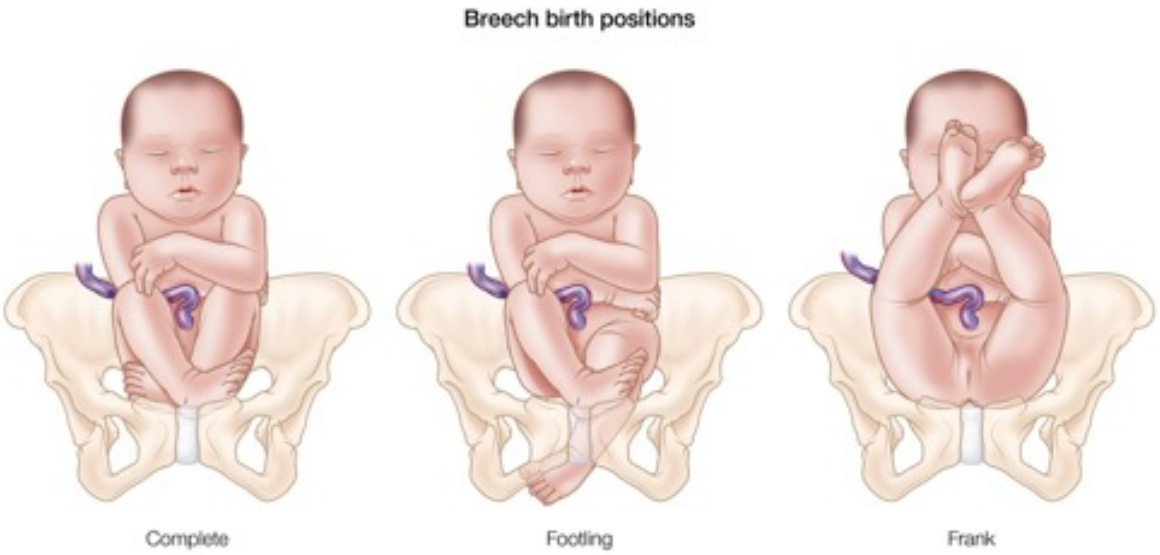
- **If back is not uppermost:**
- It is important to attempt to return the neonates back into the upright position. If the legs deliver and the back is not uppermost:
  - Gently hold the neonate, with thumbs on the sacrum with fingers around their thighs; do not squeeze or put pressure on the abdomen of the child;
- Between contractions, rotate the neonate into the correct position, taking care of their spine;
- Take care to ensure that the neonate is not pulled.

- **Frank presentation and legs don't birth:**
- Slip one hand along the leg of the neonate lying anteriorly;
- Locate the knee, place a finger behind the knee and deliver it by flexion and abduction.

- **Arms don't birth spontaneously – Lovsett's Manoeuvre:**
- Hold neonate by the sacrum, turn them 90 degrees so than one shoulder is the antero-posterior position;
- Insert a finger into the brachial plexus and sweep the arm down over the neonate's chest;
- Turn neonate 180 degrees so that the opposite shoulder is antero-posterior and repeat the arm sweep as above;
- Turn neonate back 90 degree so they are back uppermost and await further decent;
- Again, avoid pulling or putting any traction on the neonate.

Considerations

- A hands-off approach encourages the neonate to maintain a position of flexion which simplifies birth.
- Manoeuvres described above are only required in the event of a delay, or obstruction to delivery.
- The main force of birth is maternal effort. Do not attempt to pull neonate out; allow the birth to occur naturally with minimal handling.



C056 - Cord Prolapse

The following guideline is provided to support the decision-making and process of undertaking the management of a patient with a prolapsed umbilical cord. The aim is to appropriately recognise the patient who is in established labour; the membranes have ruptured and where the cord slips down and protrudes into the vagina and is visible externally.

Initial Assessment and Care

- Apply clinical approach;
- Note that the umbilical cord is visible at the vaginal opening and membranes have ruptured;
- Ensure effective communication with the mother; explain what is happening and why; provide reassurance;
- It is advisable to summon further assistance from second crew and request ICP support if delivery is considered imminent;
- Position the patient with into either the exaggerated Sims Position (semi-prone) with hips elevated over a towel (first preference for restraint in transport), or the knee to chest Sims Position.
- Manage pre- and post-birth **as per C048 Maternity and Child Birth**;
- Manage any pain or discomfort **as per C030 Pain Management**;
- Provide high flow oxygen **as per D035 Oxygen**;
- Minimise handling of the cord;
- Keep the cord warm and moist with use of warm saline soaked dressings;
- Use two fingers to gently place the cord into the vagina and note if the cord is pulsating;
- If not pulsating, using the two fingers determine if a presenting part (normally the head) is compressing the cord; push the presenting part away from the cord;
- Maintain this pressure until advised to release, or the child is birthed;
- Prepare for possible newborn resuscitation **as per C049 Newborn Resuscitation**.

Considerations

- Cord handling should be kept to a minimum as this can precipitate vasospasm of the umbilical vessels.
- The principle of pre-hospital management is to monitor the cord for pulsations, and use maternal positions and where necessary pressure to prevent cord compression.
- Caesarean section is the recommended mode of delivery in cases of cord prolapse, early notification is important; the crew member performing the above manoeuvres may be required to do so until patient is in theatre.

C057 - Shoulder Dystocia

The following guideline is provided to support the decision-making and process of undertaking the management of a patient where the normal birthing procedure has been stalled by suspected shoulder dystocia. The aim is to appropriately recognise the patient who in established labour, and birthing has a prolonged head-to-body delivery time greater than one minute (> 60 seconds). Another sign to look for is 'turtle sign', where the head 'bobs' moving forward with contractions, then retracting secondary to the anterior shoulder being caught against the symphysis pubis. This may result in difficulty accessing if the cord if around the neck.

Initial Assessment and Care

- Apply clinical approach; note the time of birth of the head;
- Summon additional support and assistance;
- Position the patient's buttocks onto the end of the bed;
- Ensure effective communication with the mother; explain what is happening and why, and provide reassurance;
- Sequentially apply the following maneuvers to overcome the shoulder dystocia:
- **1. McRoberts manoeuvre**, bringing the mothers knees to chest and thighs to abdomen.
  - If shoulder does not release after 30 seconds:
- **2. Rubin's I manoeuvre**, apply suprapubic pressure in downwards and lateral direction at a 45 degree angle to neonate's back – can be continuous or rocking motion.
  - If shoulder does not release after 30 seconds:
- **3. Gaskin manoeuvre**, ask mother to roll over onto 'all fours' and encourage them to push.
  - Hold the neonate's head and chest/back and apply gentle downward traction attempting to dis-impact posterior shoulder (now uppermost);
- Consult with local maternity service via ECC for further advice;
- If unsuccessful, commence **transport in McRoberts position with left lateral tilt**;
- If any above techniques are successful, manage birth **as per C048 Maternity and Child Birth**;
- Manage any pain or discomfort **as per C030 Pain Management**;
- Provide high flow oxygen **as per D035 Oxygen**;
- Prepare for possible newborn resuscitation **as per C049 Newborn Resuscitation**.

Considerations

- Shoulder dystocia is associated with serious complications for both the mother and baby. Perinatal morbidity includes asphyxia, birth trauma such as brachial plexus injury and fractured clavicles, and permanent neurological damage. Foetal death can also occur if shoulder dystocia is not recognised immediately and treated promptly.

C058 - Genitalia Injury and Mutilation

The following guideline is provided to support the decision-making and process of undertaking the management of a patient with genitalia injuries or mutilation. The aim is to appropriately recognise the patient who has experienced acute genitalia injury, or has complications secondary to injury or mutilation from accidental, non-accidental, assault, self-harm or cultural or religious processes. These can be time critical emergencies requiring suspicion for, sensitive early recognition and intervention to reduce morbidity and mortality.

Initial Assessment and Care

- Apply clinical approach;
- Position the patient in a position of comfort;
- Be supportive and understanding with the patient; understand the cultural consideration from those in attendance. If part of a rite of passage or initiation ceremony they may wish for a male or female carer specific to their circumstances;
- Any bleeding can be managed with dressings and direct pressure, the perineal region is highly vascular and use of haemostatic dressings may be required;
- Administer oxygen **as per D035 Oxygen;**
- Manage any pain or discomfort **as per C030 Pain Management;**
- Manage nausea **as per C028 Nausea and Vomiting;**
- Gain IV access;
- Any significant bleeding should be managed **as per C037 Hypovolaemia;**
- Note that female genital mutilation can lead to significant complications during child birth, including increased risk of tear or lacerations;

Considerations

- These situations can be confronting in some circumstances.
- There are many reasons for non-accidental and non-medical genitalia injury or mutilation due to cultural and religious reasons such as circumcision, removal or modification to external female and male genitalia.
- It is practiced in many countries around the world, in Africa, Middle East, Asia and Australia.
- Female genital injuries and mutilation ranges across four main types being removal of the clitoris, stitching and/or cauterising the labia, closing off most of the vaginal opening leading to complication from the injury itself, or complications for birth.
- Male injuries are either from circumcision or genitalia modification for personal, religious and cultural reasons.
- Both male and females may also have injury from piercing or traumatic removal (unintentional) of piercing.


Cat Tourniquet
Bandage Compression
TIME:
Aspirin
Penthrox
Inhaler
Medical Developments International
Charcoal Filter
GTN
Sodium Chloride 30 ml
Sodium Chloride 30 ml
Sodium Chloride 30 ml
ASMOL
CFC-FREE
Inhaler
Glucose

Drug Therapy Guidelines

D001 - Adenosine

Presentation	6mg/2ml Ampoule
Pharmacology	Adenosine is a Class 5 antiarrhythmic and naturally occurring purine nucleoside found in all body cells. It prolongs conduction through the AV node. This prolongation enables termination of re-entry circuit activity. Note that some patients may also experience mild vasodilatation post-administration.
Metabolism	By adenosine deaminase found in circulating red blood cells and vascular endothelium.
Route of Administration	• Intravenous (IV)
Notes	• If patient is haemodynamically unstable or deteriorating, perform synchronised cardioversion. • Atrial Flutter and Atrial Fibrillation should not be treated using adenosine. • If wide complex QRS or unsure of the diagnosis post 12 lead ECG, treat as per wide-complex tachycardia. • IV adenosine has a very short half-life and should be administered rapidly through a large proximal vein (such as a ACF), followed by a 10–20ml flush at a minimum. • Onset: 5–10 seconds IV • Duration: 10 seconds • Half Life: 30 seconds.
✔ **Indications**	• Supraventricular Tachycardia.
✘ **Contraindications**	• Known allergy • Second- or third-degree AV Block • Atrial fibrillation or flutter • Ventricular tachycardia.
⚠ **Precautions**	• Bronchospasm in asthma and/or COPD. • May be ineffective in patients with high caffeine intake or on high doses of theophylline medications (antagonised by methylaxathines). • Consider application of oxygen to reduce side effects during administration.
⚡ **Side Effects**	• Often transient side effects only • Feeling of impending doom • Dyspnoea • Nausea and/or vomiting • Headache and dizziness • Hypotension • Arrhythmia • Skin flushing.

Dose as per Indication

Symptomatic SVT (either AVNRT or AVRT)

Adult	Paediatric
First dose 6mg IV fast push *If ineffective after 2 min post-administration*	**0.1mg/kg IV fast push** *If ineffective after 2 min post-administration*
Second dose 12mg IV fast push *If ineffective after 2 min post-administration*	*Consult for further doses or consider cardioversion if necessary*
Third and Final dose 12mg IV fast push **Max dose 30mg IV**	

D002 - Adrenaline

Presentation	1mg/1ml Ampoule
Pharmacology	A naturally occurring catecholamine sympathomimetic which acts primarily on the Alpha and Beta adrenergic receptors. The stimulation of these receptors is responsible for increasing SA node firing rate, and increased AV node conduction velocity thus increasing HR (B1); increasing the force of myocardial contraction (B1); increased irritability of the ventricles (B1); bronchodilation (B2); and finally peripheral vasoconstriction (A1).
Metabolism	The majority of circulating adrenaline is metabolised by sympathetic nerve endings. It is subject to the process of mitochondrial enzymatic breakdown by monoamine oxidase at the synaptic level, finally excreted by the kidneys.
Route of Administration	• Intravenous (IV) • Intramuscular (IM) • Intraosseous (IO) • Nebulised
Notes	• Repeated IM injections to the same site may cause ischaemia and/or necrosis. • If a patient has croup like signs and symptoms, consider other possible pathologies, i.e. acute epiglottitis, tracheitis or other upper airway infection or obstruction. • Onset: 30 seconds IV or 5–10 minutes IM • Duration: 5–10 minutes • Half Life: 2 minutes.
✔ **Indications**	• Cardiac arrest • Croup or upper airway stridor • Anaphylaxis or severe allergic reaction • Severe asthma • Inadequate perfusion (cardiac, non-cardiac, excluding haemorrhage). • Bradycardia with poor perfusion refractory to Atropine
✘ **Contraindications**	• Known allergy • Hypovolaemic shock without adequate fluid replacement.
⚠ **Precautions**	• Elderly and frail • Hypertension • Patients on monoamine oxidase inhibitors (MAOI) • Higher doses may be required for patients on beta blockers.
⚡ **Side Effects**	• Tachycardia/palpitations • Hypertension • Headache • Nausea and/or vomiting • Pupil dilation • Anxiety • Arrhythmia.

Dose as per Indication

Cardiac Arrest

Adult	Paediatric
1mg IV/IO	***>1yr 10microg/kg IV/IO***
Repeat at 4 min (every second cycle) as required	***<1yr 100microg IV/IO***
No max dose	*Repeat at 4 min (every second cycle) as required*
	No max dose
Infusion if perfusion remains poor post ROSC	*Infusion if perfusion remains poor post ROSC*
3mg/50ml (1ml/hr = 1microg/min) commence at 2.5–5microg/min (2.5–5ml/hr)	**300microg/50ml (0.1microg/min = 1ml/hr) commenced at 0.05microg/kg/min**
Max rate 50–100microg/min (50–100ml/hr)	**Max rate 0.5microg/kg/min**
	Consider adult preparation if rate exceeds 60ml/hr, and adjust to concentration accordingly.

Croup or Upper Airway Stridor

Adult	Paediatric
5mg Nebulised	**5mg Nebulised**
For upper airway stridor, repeat once if required	*For upper airway stridor, repeat once if required*
Max dose 10mg	**Max dose 10mg**

Anaphylaxis or Severe Allergic Reaction

Adult	Paediatric
500microg IMI	**>6 years 300microg IMI**
Repeat at 5 min as required	**<6 years 150microg IMI**
No max dose	*Repeat at 5 min as required*
	No max dose
5mg Nebulised	**5mg Nebulised**
For upper airway stridor	*For upper airway stridor*
No repeat dose	**No repeat dose**
10–20microg IV/IO	**2microg/kg IV/IO**
Repeat at 1 min as required	*Single dose not to exceed 50microg*
No max dose	*Repeat at 2 min*
	No max dose
Consider infusion if perfusion remains poor	*Consider infusion if perfusion remains poor*
3mg/50ml (1ml/hr = 1microg/min) commence at 2.5microg/min	**300microg/50ml (0.1microg/min = 1ml/hr) commenced at 0.05microg/kg/min**
Max rate 10microg/min	**Max rate 0.5microg/kg/min**
	Consider adult preparation if rate exceeds 60ml/hr, and adjust to concentration accordingly.

Severe Asthma

Adult	Paediatric
500 microg IMI *Repeat at 5 min as required* **No max dose**	**>6 years 300microg IMI** **<6 years 150microg IMI** *Repeat at 5 min as required* **No max dose**
10–20microg IV/IO *Repeat at 1 min as required* **No max dose**	**1–2microg/kg IV/IO** *Single dose not to exceed 50mcg.* *Repeat at 2 min* **No max dose**
Consider infusion if multiple boluses required **3mg/50ml (1ml/hr = 1microg/min) commence at 2microg/min (2ml/hr)** **Max rate 15microg/min (15ml/hr)**	*Consider infusion if multiple boluses required* **300microg/50ml (0.1microg/min = 1ml/hr) commenced at 0.05microg/kg/min** **Max rate 0.5microg/kg/min** *Consider adult preparation if rate exceeds 60ml/hr, and adjust to concentration accordingly.*

Inadequate perfusion refractory to adequate fluid resuscitation (Cardiac and Non-Cardiac) excluding haemorrhagic causes

Adult	Paediatric
10–20microg IV/IO boluses initially, if extremely poorly perfused consider 50–100microg if required *Repeat at 1 min as required* **No max dose**	**1–2microg/kg IV/IO boluses if required** *Single dose not to exceed 50microg* *Repeat at 2 min* **No max dose**
Infusion **3mg/50ml (1ml/hr = 1microg/min) commence at 5microg/min (5ml/hr)** **Max rate 50–100microg/min (50–100ml/hr)**	*Infusion* **300microg/50ml (0.1microg/min = 1ml/hr) commenced at 0.05microg/kg/min** **Max rate 0.5microg/kg/min** *Consider adult preparation if rate exceeds 60ml/hr, and adjust to concentration accordingly.*

Bradycardia with Poor/Inadequate Perfusion refractory to Atropine

Adult	Paediatric
20–50microg IV/IO *Repeat at 1 min as required* **10microg/min**	**2microg/kg IV/IO** *Single dose not to exceed 50microg* *Repeat at 2 min* **No max dose**
Consider infusion if perfusion remains poor **3mg/50ml (1ml/hr = 1microg/min) commence at 2.5microg/min** **Max rate 10microg/min, then consider TCP**	*Consider infusion if perfusion remains poor* **300microg/50ml (0.1microg/min = 1ml/hr) commenced at 0.05microg/kg/min** **Max rate 0.5microg/kg/min** *Consider adult preparation if rate exceeds 60ml/hr, and adjust to concentration accordingly.*

D003 - Amiodarone

Presentation	150mg/3ml Ampoule
Pharmacology	Amiodarone is primarily a Class III antiarrhythmic that prolongs the duration of the action potential and therefore refractory period of atrial, nodal and ventricular tissues. It reduces conduction across myocardial and conducting cells. It demonstrates electrophysiological properties across all Vaughn-Williams classes, thereby demonstrating a broad spectrum of activity.
Metabolism	The majority of amiodarone is excreted via the liver and gastrointestinal tract by biliary excretion, there may also be some hepatic recirculation.
Route of Administration	• Intravenous (IV) • Intraosseous (IO)
Notes	• Amiodarone is considered the first line antiarrhythmic management in sustained conscious ventricular tachycardia without haemodynamic compromise. • If the patient is in Torsades de Pointes or the cause of the arrest is suspected to be from QT prolongation of any cause, then Magnesium Sulphate administration should be considered. • If the patient has a hypersensitivity or allergy to Amiodarone then consideration should be given to administration of Lignocaine. • Onset: 2 minutes • Duration: 30 minutes to 2 hours dependent on dosing • Half Life: 1–2 hours.
✔ Indications	• Cardiac arrest with VF or VT refractory to cardioversion • Sustained conscious VT without haemodynamic compromise.
✘ Contraindications	• Second or Third degree heart block without PPM • Hyperkalaemia › Known allergy › Haemodynamically unstable › Other therapies that prolong QT intervals › Pregnancy • Tricyclic and certain other cardiotoxic overdoses.
⚠ Precautions	• Thyroid disease • Ondansetron administration in past 24 hours • Hypotension.
Side Effects	• Hypotension • Bradycardia • Nausea and/or vomiting • Peripheral paraesthesia.

Dose as per Indication

Cardiac Arrest with VF or VT

Adult	Paediatric
300mg IV/IO	**5mg/kg IV/IO**
Repeat at 150mg per guideline	*Repeat once per guideline*
Max dose 450mg	**Max dose 10mg/kg or total of 450mg**

Sustained Conscious VT

Adult	Paediatric
300mg in 20mls at 60ml/hr (20 min)	**Not indicated for use in paediatrics**
Single dose only	
Max dose 300mg	

D004 - Aspirin

Presentation	300mg chewable or soluble tablet
Pharmacology	Aspirin is an analgesic, antipyretic, anti-inflammatory medication that inhibits platelet aggregation. Its main use in ambulance is in preventing platelets from aggregating to exposed collagen fibres, minimises thrombus formation and can delay or retard the progression of a coronary artery thrombosis. It also inhibits synthesis of prostaglandins thereby acting as an anti-inflammatory.
Metabolism	Aspirin is converted to salicylic acid in many tissues, but primarily in the gastrointestinal mucosa and liver, subsequently excreted by the kidneys.
Route of Administration	• Oral (PO)
Notes	• If confirmation has been received that the patient has consumed the appropriate dose of Aspirin (at least 300mg) in the preceding 12 hours, it can be withheld. • Aspirin is indicated for episodes of Acute Coronary Syndrome. This includes the pain-free presentation of Acute Cardiogenic Pulmonary Oedema of a suspected ACS origin. It is not indicated in other presentation of APO of a non-cardiac origin. • Onset: ~10 minutes • Duration: ~7 days • Half Life: 3 hours.
✔ Indications	• Acute Coronary Syndrome › Including Acute Cardiogenic Pulmonary Oedema.
✘ Contraindications	• Known allergy or hypersensitivity to NSAIDs • Chest pain associated with psychostimulant overdose with SBP>160mmHg • Bleeding or clotting disorders • Suspected aortic aneurysm • Active and current gastrointestinal bleeding or ulcers • Patient <18 years of age.
⚠ Precautions	• History of peptic ulcers • Asthma • Patients on other anticoagulant medications • Pregnancy.
⚡ Side Effects	• Epigastric discomfort or pain • Gastritis • Gastrointestinal bleeding • Nausea and/or vomiting • Bronchospasm (rare) • Increased bleeding times • Hypersensitivity reaction.

Dose as per Indication

Acute Coronary Syndrome

Adult	Paediatric
300 mg PO *No repeat, not required if evidence of aspirin 300mg+ in preceding 12 hours* **Max dose 300mg**	**Not indicated**

D005 - Atropine

Presentation	0.6mg/1ml Ampoule
Pharmacology	Atropine is an anticholinergic (antimuscarinic) agent which works by competitively inhibiting acetylcholine's actions on the parasympathetic nervous system's post ganglionic nerves at neuroeffector sites (eg vagus). For the heart this results in an increased heart rate by improved sinoatrial node firing, and increased conduction velocity through the atrioventricular node. It is also used as an antidote to the effects of cholinesterase inhibitors (e.g. organophosphate insecticides); its action in this regard relates to reducing excessive salivation, sweat, gastrointestinal tract and bronchial secretions. It can be used in the management of secretions post-Ketamine administration. It also has the ability to assist with relaxation of smooth muscle.
Metabolism	Atropine is metabolised by the liver and excreted mainly by the kidneys.
Route of Administration	• Intravenous (IV) • Intramuscular (IM) • Intraosseous (IO)
Notes	• A dose of up to 1.2mg is generally sufficient to resolve bradycardia in adult patients. Subsequent doses in patients who fail to respond are usually not beneficial. • Small doses given slowly can result in a paradoxical bradycardia. • Atropine requirements for organophosphate toxicity vary between patients, large doses are often required. • Patients with tachycardia secondary to organophosphate toxicity should still be administered atropine if respiratory distress and excessive oral secretions are present. • Target atropinisation for organophosphate toxicity: clear chest on auscultation; heart rate >80; SBP >80mmHg. • Onset: 1–2 minutes • Duration: 5 hours • Half Life: 3–4 hours
✔ Indications	• Bradycardia with poor perfusion • Organophosphate toxicity • Envenomation with parasympathetic activity • Hypersalivation secondary to Ketamine administration.
✘ Contraindications	• Known allergy • Heart transplant.
⚠ Precautions	• AMI • Atrial flutter or fibrillation • Glaucoma.
⚡ Side Effects	• Agitation, confusion, visual blurring • Hallucinations • Dilated pupils • Dry mouth, warm dry skin, reduced bronchial and gastric secretions • Tachycardia and palpitations • Urinary retention.

Dose as per Indication

Bradycardia with Poor Perfusion

Adult	Paediatric
0.6mg IV/IO	**20microg/kg IV/IO (not exceeding 600microg)**
Repeat once at 2 min as required	*Repeat once at 2 min as required*
Max dose 1.2mg	**Max dose 40microg/kg or 1.2mg**

Organophosphate Toxicity or Envenomation with Parasympathetic Activity

Adult	Paediatric
1.2 mg IV/IO	**20microg/kg IV/IO (not exceeding 600microg)**
Repeat at 5 min as required	*Repeat at 5 min as required*
No max dose	**No max dose**

Hypersalivation secondary to Ketamine

Adult	Paediatric
0.6mg IV/IO	**20microg/kg IV/IO (not exceeding 600microg)**
Not repeated	*Not repeated*
Max dose 0.6mg	**Max dose 20microg/kg or 0.6mg**

D006 - Calcium Gluconate

Presentation	953mg/10ml (2.2mmol) Ampoule
Pharmacology	Calcium is an electrolyte that plays an integral role in the muscular and neural systems. It is involved in skeletal muscle contraction, excitation coupling in cardiac and smooth muscle and acts as an intracellular second messenger. These effects combine to exert a positive inotropic effect in the post-cardiac arrest patient. It additionally has a role in cardiac membrane stabilisation in hyperkalaemia. It is used in the treatment of hypermagnesaemia.
Metabolism	Most of the calcium parentally administered is filtered by the renal glomeruli is reabsorbed, the remainder is either excreted in urine or faeces.
Route of Administration	• Intravenous (IV) • Intraosseous (IO)
Notes	• Consider hyperkalaemic cardiac arrest in the dialysis patient. • Onset: 1–3 minutes • Duration: 30–60 minutes • Half Life: N/A
✔ Indications	• Suspected hyperkalaemic cardiac arrest • Severe hyperkalaemia with significant cardiac rhythm disturbance • Hypotension or toxicity associated with magnesium infusion • Calcium channel blocker toxicity • Following pre-hospital blood administration.
✘ Contraindications	• Known allergy • Digoxin (Digitalis) overdose.
⚠ Precautions	• Respiratory Acidosis.
⚡ Side Effects	• Syncope • Hypotension • Bradycardia • Cardiac Dysrhythmia • Cardiac arrest.

Dose as per Indication

Suspected Hyperkalaemic Cardiac Arrest

Adult	Paediatric
10ml (2.2mmoL) IV/IO *Single dose only* **Max dose 10ml (2.2mmol)**	**0.5mL/ kg IV/IO over 2-5 min (individual dose not to exceed 20mL)**

Calcium channel blocker toxicity; Hypotension with Magnesium Sulphate; Severe Hyperkalaemia

Adult	Paediatric
10ml (2.2mmol) IV/IO *Slow push over 2–5 min* *Repeat once at 10 min* **Max dose 20ml (4.4mmol)**	**0.5mL/ kg IV/IO over 2-5 min (individual dose not to exceed 20mL)**

Follow Blood Administration Only

Adult	Paediatric
20ml (4.4mmol) IV/IO *Slow push over 2–5 min* *Repeat with every unit transfused.* **Max dose 20ml (4.4mmol)**	**Not indicated**

D007 - Ceftriaxone

Presentation	2g Vial (powder)
Pharmacology	Ceftriaxone is a third generation, broad spectrum, cephalosporin antibiotic with a bactericidal action.
Metabolism	Ceftriaxone is excreted as a variety of active and inactive metabolites from the body though urine, bile and faeces.
Route of Administration	• Intravenous (IV) • Intramuscular (IM) • Intraosseous (IO)
Notes	• Due to the adverse effects associated with IM administration, IV or IO Ceftriaxone administration is preferred. • If administration is via the IM route, the solution should be administered by deep injection (preferable upper outer thigh) with no more than 4mls to be injected into any single site. • Onset: 30 seconds IV or 60 seconds IM • Duration: 1 day • Half Life: 4 –8 hours.
✔ Indications	• Suspected meningococcal septicaemia, or meningitis
✘ Contraindications	• <1 month of age • Do not co-administer with Ca containing fluids including Hartmanns • Known allergy • Anaphylaxis to Penicillin-based drugs.
⚠ Precautions	• Mild allergy to Penicillin-based drugs.
⚡ Side Effects	• Skin rash • Nausea and/or vomiting • Pain at IM injection site.

Dose as per Indication

Supsected Meningococcal Septicaemia or Meningitis

Adult	Paediatric
2g IMI	**>10 years 2g IMI**
Single dose only	**<10 years >1 month 50mg/kg (refer below)**
Max dose 2g	*Single dose only*
	Max dose 2g or weight dependent dose
Syringe Preparation – Reconstitute 2g with 7mls of lignocaine to achieve a total of 2g in 8 ml. Give across two sites.	*Syringe Preparation – Reconstitute 2g with 7mls of lignocaine to achieve a total of 2g in 8 ml. If >4 ml, give over two sites.*
2g IV/IO	**>10 years 2g IV/IO**
Single dose only, infusion only	**<10 years >1 month 50mg/kg (refer below)**
Max dose 2g	*Single dose only, infusion only*
	Max Dose 2g or weight dependent dose.
Syringe preparation: Reconstitute 2g with 19ml of water for injection to achieve a total of 2g in 20ml. Give slowly over 30 minutes as an infusion.	*Syringe preparation: Reconstitute 2g with 19ml of water for injection to achieve a total of 2g in 20ml. Give slowly over 30 minutes as an infusion.*

IM ADMINISTRATION (2g in 8ml = 250mg/ml)			
Age (years)	**Weight (kg)**	**Dose (50mg/kg)**	**Volume (rounded up nearest mL)**
3 months	3.5	175	1
6 months	7	350	2
1	10	500	2
2	13	650	3
3	16	800	4
4	19	950	4
5	22	1100	5
6	25	1250	5
7	28	1400	6
8	31	1550	7
9	34	1700	7
10	37	2000	8

IV ADMINISTRATION (2g in 20ml – 100mg/ml)			
Age (years)	**Weight (kg)**	**Dose (50mg/kg)**	**Volume (rounded up nearest mL)**
3 months	3.5	175	2
6 months	7	350	4
1	10	500	5
2	13	650	7
3	16	800	8
4	19	950	10
5	22	1100	11
6	25	1250	13
7	28	1400	14
8	31	1550	16
9	34	1700	17
10	37	2000	20

D008 - Dexamethasone

Presentation	8mg/2ml Vial
Pharmacology	Dexamethasone, a corticosteroid, more specifically a glucocorticoid, mimics steroids normally secreted by the adrenal cortex. The precise mechanism by which it works rapidly in croup are not fully known; however, its properties allow for inhibition of inflammatory reactions, vasocontractile actions and suppressing the immune system. It is often also used for chemotherapy associated nausea and a number of palliative symptoms' control.
Metabolism	By the liver and other tissues and excreted by the kidneys.
Route of Administration	• Intravenous (IV) • Per Oral (PO)
Notes	• Dexamethasone vials do not contain an antimicrobial agent; therefore, the solution must be used or immediately and residual discarded. • If croup is suspected ensure that any other possible causes of their presentation are excluded such as epiglottitis, tracheitis or airway obstruction. • If the patient has received their own steroid preparation within 4 hours of ambulance presentation, Dexamethasone should be withheld. • Dexamethasone for croup has been associated with lower hospital readmission rates. • Patients who receive Dexamethasone must be transported to an appropriate healthcare facility for further assessment. • Onset: 30–60 minutes • Duration: 72 hours • Half Life: 4–5 hours.
✔ Indications	• Croup • Valid chemotherapy or palliative care plan authorising its use
✘ Contraindications	• Known allergy.
⚠ Precautions	• If solution is not clear or is contaminated it should be discarded.
⚡ Side Effects	• Nil of significance.

Dose as per Indication

Croup

Adult	Paediatric
Not indicated P.O. for Adults	**600microg/kg PO** *Single dose only* **Max dose 12mg**
8mg IV/IO *Single dose only* **Max dose 8mg**	**600microg/kg IV** *Single dose only* **Max dose 12mg**

Patients receiving chemotherapy and/or palliative care with a valid medical order

Adult	Paediatric
(As per valid medical order)	**(As per valid medical order)**

D009 - Droperidol

Presentation	10mg/2ml Ampoule or 2.5mg/1ml Ampoule
Pharmacology	Droperidol is an antipsychotic drug from the butyrophenone group that blocks dopaminergic, histamine, serotonergic and cholinergic receptors in the autonomic nervous system. These effects combine to enable sedation in addition to have anxiolytic and antiemetic properties.
Metabolism	By the liver with excretion in the urine and faeces as inactive metabolites.
Route of Administration	• Intravenous (IV) • Intramuscular (IM)
Notes	• There is no significant difference in the onset of effect following either IM or IV injection. • IV Droperidol administration is only to occur when an IV cannula is already in situ. • Studies have demonstrated no evidence to suggest an increased QT prolongation risk following administration of Droperidol when used for acute behavioural disturbances doses. • Where possible, it is preferential to avoid Droperidol use in combination with other sedatives due to the potentiation of effects, and possibility of respiratory compromise. • Onset: 5–15 minutes • Duration: 4–6 hours • Half Life: N/A.
✔ Indications	• Acute psychosis • Acute agitation and behavioural disturbance (SAT Score 2+).
✘ Contraindications	• Known allergy • Known Parkinsonism • Children <8 years of age • Previous dystonic reaction to Droperidol.
⚠ Precautions	• Elderly and frail • Concomitant use with other CNS depressants • Patients on medications which may cause QT prolongation, or history of congenital long QT syndrome.
⚡ Side Effects	• Brady or tachycardia • Extrapyramidal effect or dystonia (rare) • Hypotension • QT prolongation (rare).

Dose as per Indication

Acute Psychosis and Acute Agitation with SAT Score 2 or >

Adult	Paediatric
>16 and <65 years 10mg IMI *Repeat once if required at 20 min* **Max dose 20mg** **>65 years or frail 5mg IMI** *Repeat once if required at 20 min* **Max dose 10mg**	**8–15 years 0.1mg/kg IMI** *Single maximum dose 5mg* *Repeat once if required at 20 min* **Max dose 10mg** **(Note: paediatric administration for non-ICP is consult only)**
>16 and <65 years 10mg IV *Repeat once if required at 20 min* **Max dose 20mg** **>65 years or frail 5mg IV** *Repeat once if required at 20 min* **Max dose 10mg**	**8–15 years 0.1mg/kg IV** *Single maximum dose 5mg* *Repeat once if required at 20 min* **Max dose 10mg**

D010 - Fentanyl

Presentation	100microg/2ml Ampoule or 250microg /1ml cartridge
Pharmacology	Fentanyl is a synthetic analgesic that acts on the central nervous system by binding with opioid receptors. It can lead to CNS and respiratory depression and is addictive. It has a number of secondary actions including decreasing conduction velocity through the atrioventricular node.
Metabolism	By the liver and excreted by the kidneys.
Route of Administration	• Intramuscular (IM) • Intravenous (IV) • Intraosseous (IO) • Intranasal (IN)
Notes	• Whilst less histamine effects are seen with Fentanyl than Morphine, it should be noted that it is a rapid onset opioid that may potentiate respiratory depression and haemodynamic instability. • Smaller incremental doses should be used in hypotensive patients or when combined with Midazolam for infusion administration. • Fentanyl, wherever possible, should be avoided in patients suffering from overdose of Serotonergic drugs (such as MDMA, SSRIs and Amphetamines), there is a risk of potentiating serotonin syndrome. • *Divide each intranasal dose across both nostrils* • Consult with CMO or receiving ED consultant if IM or IV analgesia required for patient <1 year of age (ICP only). • Onset: <3 minutes • Duration: 30–60 minutes • Half Life: 2–3 hours.
✔ Indications	• Pain relief particularly if contraindicated to morphine • Component of therapy in Medication Assisted Intubation and post intubation ventilation • Autonomic Dysreflexia with SBP >160mmHg.
✘ Contraindications	• Known allergy • Late second stage labour.
⚠ Precautions	• Elderly • Impaired liver function • Conscious state depression • Respiratory depression • Hypotensive patients • Patient on Monoamine Oxidase Inhibitors (MAOI) • Known addiction to narcotics • Rhinitis, rhinorrhoea or facial trauma (IN route only).
⚡ Side Effects	• Respiratory Depression • Apnoea • Rigidity of the diaphragm or respiratory muscles • Bradycardia • Pinpoint pupils.

Dose as per Indication

Pain Relief and Autonomic Dysreflexia

Adult	Paediatric
<65 years 50–100microg IN *Repeat 50microg at 10 minutes as required* **Max dose 300microg IN then consult** **>65 years or frail 50microg IN** *Repeat 25microg at 10 minutes as required* **Max dose 200microg IN then consult**	**>1 year 1.5microg/kg IN** *Max single dose 50microg* *Repeat once at 1.5microg/kg at 10 minutes* **Max dose 100microg IN then consult** *Round up to nearest 25microg*
<65 years 25–100 microg IMI *Repeat up to 25 – 50 microg at 10 minutes as required* **Max dose 200microg IMI** **>65 years or frail, consider half doses** *Repeat 25microg at 10 minutes as required* **Max dose 200microg IM then consult**	**>1 year 1–2 microg/kg IMI** *Max single dose 50microg* *Repeat at 10 minutes as required* **Max dose 100microg IMI**
<65 years 25–50 microg IV/IO *Repeat up to 25 to 50microg at 5 – 10 minutes as required* **300microg max dose then consult, ICP no max dose** **>65 years or frail, consider half doses** *Repeat 25microg at 10 minutes as required* **Max dose 300microg IV/IO then consult, ICP no max dose**	**>1 year 1microg/kg IV/IO** *Single dose not to exceed 25microg* *Repeat 0.5 microg/kg at 5 – 10 minutes as required* **No max dose**

As component of procedural sedation for cardioversion or transthoracic pacing

Adult	Paediatric
50microg IV (with Midazolam 1–2.5mg) *Repeat as required* **No max dose**	**>1 year 1microg/kg IV max single dose 50microg (with Midazolam 0.1mg/kg max single 2.5mg)** *Repeat at 3–5 min as required* **No max dose**

As component of Sedation for Intubation (RSI, SFI and Post Intubation)

Adult	Paediatric
If Ketamine unavailable/unsuitable (RSI):	*If Ketamine unavailable/unsuitable (SFI):*
2microg/kg Fentanyl (+ 0.1mg/kg Midazolam) IV	**2microg/kg Fentanyl (+ 0.2mg/kg Midazolam) IV**
Single dose only	*Single dose only*
Max dose 200microg Fentanyl/ 10mg Midazolam	**Max dose 100microg Fentanyl 10mg Midazolam**
Infusion only, if serotonin syndrome suspected revert to Morphine	*Infusion only, if serotonin syndrome suspected revert to Morphine*
300microg Fentanyl with 30mg Midazolam in 30ml	**300microg Fentanyl with 15mg Midazolam in 15ml**
1–15ml/hr IV	**0.1–0.2ml/kg/hr IV**
No max dose	**No max dose**
If you need to preference analgesia or benzodiazepine over each other consider drawing medication into separate syringes for rate modifications.	*If you need to preference analgesia or benzodiazepine over each other, consider drawing medication into separate syringes for rate modifications.*

D011 - Frusemide

Presentation	40mg/4ml Ampoule
Pharmacology	Frusemide is a potent loop diuretic that acts by inhibiting sodium and chloride absorption in the ascending Loop of Henle. It promotes diuresis and causes venous dilation and reduces venous return.
Metabolism	The majority of parenteral Frusemide is excreted in the urine within 24 hours, the remainder is excreted in faeces.
Route of Administration	• Intravenous (IV)
Notes	• Frusemide may reduce the effect of vasopressor drugs if given concurrently. • Increased dose may be required in patients with chronic renal impairment and who take regular high dose oral Lasix (Frusemide). • Ideally acute cardiogenic pulmonary oedema would be managed with CPAP and GTN; however, if CPAP not available Frusemide may be of some benefit. • Onset: 5 minutes • Duration: 20–60 minutes • Half Life: 2–3 hours.
✔ Indications	• Acute Cardiogenic Pulmonary Oedema.
✘ Contraindications	• Known allergy • Children <12 years.
⚠ Precautions	• Hypokalaemia • Hypotension.
⚡ Side Effects	• Marked diuresis leading to hypotension • Potassium loss associated with diuresis may aggravate or potentiate arrhythmia.

Dose as per Indication

Acute Cardiogenic Pulmonary Oedema

Adult	Paediatric
40mg IV *Repeat at 30 min as required* **Max dose 80mg**	**Not indicated**

D012 - Glucagon

Presentation	1mg/1ml Ampoule (powder and solvent) Hypokit
Pharmacology	Glucagon is a hyperglycaemic agent and a hormone normally secreted by the pancreas that mobilises hepatic glycogen, into glucose released into the blood stream. High dose glucagon has inotropic and chronotropic effects that are not mediated through beta-receptors.
Metabolism	Glucagon is metabolised by the liver, kidneys and in the plasma.
Route of Administration	• Intravenous (IV) • Intramuscular (IM)
Notes	• Not all patients will respond to Glucagon, particularly patients who lack adequate glycogen stores in the liver (i.e. alcohol use disorder, malnourished, hepatic dysfunction and neonates). • Administered for hypoglycaemia if IV Glucose 10% cannot be administered in a suitable timeframe. • Oral carbohydrates should be given when the patient has responded to Glucagon treatment to restore liver glycogen and to prevent secondary hypoglycaemia. • Paramedics should have a low threshold for Glucagon administration in the hypotensive/shocked anaphylaxis patient when presented with a history of heart failure and/or prescribed beta blocker therapy. • Onset: 5 minutes • Duration: 30 minutes • Half Life: 5–10 minutes.
✔ Indications	• Symptomatic Hypoglycaemia • Refractory anaphylaxis.
✘ Contraindications	• Known allergy.
⚠ Precautions	• Nil of significance.
⚡ Side Effects	• Nausea and/or vomiting.

Dose as per Indication

Symptomatic Hypoglycaemia (BGL <4mmOL)

Adult	Paediatric
1mg IMI (1ml) *Reconstitute 1mg or Glucagon with 1ml of water for injection for a concentration of 1mg/1ml* **Max dose 1mg**	**>25kg 1mg IMI (1ml)** **<25 kg 0.5mg IMI (0.5ml)** *Reconstitute 1mg or Glucagon with 1ml of water for injection for a concentration of 1mg/1ml* **Max dose 1mg**

Refractory Anaphylaxis

Adult	Paediatric
1mg IMI (1ml) *Reconstitute 1mg or Glucagon with 1ml of water for injection for a concentration of 1mg/1ml* **Max dose 1mg**	**>25kg 1mg IMI (1ml)** **<25 kg 0.5mg IMI (0.5ml)** *Reconstitute 1mg or Glucagon with 1ml of water for injection for a concentration of 1mg/1ml* **Max dose 1mg**
1mg IV (1ml) *Reconstitute 1mg or Glucagon with 1ml of water for injection for a concentration of 1mg/1ml* **Max dose 1mg**	**Not indicated**

D013 - Glucose Gel

Presentation	15g Glucose Tube (Glutose 15TM)
Pharmacology	Glucose Gel is a form of pure glucose (sugar) that is absorbed quickly in the intestinal tract after ingestion. It is the principal energy source for the body cells, with the brain particularly dependent on normoglycaemia to function.
Metabolism	Glucose is metabolised in all tissues and distributed through the total body water, otherwise stored in the liver as glycogen.
Route of Administration	• Per Oral (PO)
Notes	• Patient should swallow the entire contents of the tube where possible, to maximise the rise in blood glucose levels. • Further more complex oral carbohydrates (biscuits or sandwich) should be given when the patient has responded. • Onset: 10 minutes • Duration: Variable • Half Life: N/A.
✔ **Indications**	• Symptomatic Hypoglycaemia.
✘ **Contraindications**	• Known allergy • Unconscious • Difficulty swallowing • Children <2 years.
⚠ **Precautions**	• Nil of significance.
⚡ **Side Effects**	• Nausea and/or vomiting • Diarrhoea.

Dose as per Indication

Symptomatic Hypoglycaemia (BGL <4mmOL)

Adult	Paediatric
15g PO	**15g PO**
Repeat once at 15 minutes if BGL <4mmOL	*Repeat once at 15 minutes if BGL <4mmOL*
Max dose 30g	**Max dose 30g**

D014 - Glucose 5%

Presentation	100ml infusion soft pack (5g glucose monohydrate and water)
Pharmacology	Glucose 5% is an isotonic crystalloid solution and a form of pure glucose (sugar). It is the principal energy source for the body cells, particularly the brain.
Metabolism	Glucose is metabolised in all tissues and distributed through the total body water, otherwise stored in the liver as glycogen. Water is excreted by the kidneys or distributed in extracellular fluid compartment.
Route of Administration	• Intravenous (IV) • Intraosseous (IO)
Notes	• Onset: 5 minutes • Duration: Variable • Half Life: 20–40 minutes
✔ **Indications**	• A vehicle for delivery of IV/IO emergency medications • Dilution and reconstitution of medications.
✘ **Contraindications**	• Known allergy.
⚠ **Precautions**	• Hyperglycaemia.
⚡ **Side Effects**	• Nil of significance.

Dose as per Indication

Medication delivery, infusion or reconstitution

Adult	Paediatric
As Required	**As Required**
Any remaining Glucose 5% should be discarded	*Any remaining Glucose 5% should be discarded*
No max dose	**No max dose**

D015 - Glucose 10%

Presentation	250ml infusion soft pack (25g glucose monohydrate and water)
Pharmacology	Glucose 10% is a slightly hypertonic crystalloid solution and a form of pure glucose (sugar). It is the principal energy source for the body cells, particularly the brain.
Metabolism	Glucose is metabolised in all tissues and distributed through the total body water, otherwise stored in the liver as glycogen. Water is excreted by the kidneys or distributed in extracellular fluid compartment.
Route of Administration	• Intravenous (IV) • Intraosseous (IO)
Notes	• Glucose 10% is the preferred treatment for hypoglycaemia in patients unable to take oral glucose. This is due to its rapid onset and ability to quickly restore blood glucose concentrations to normal values. • Further oral carbohydrates should be given when the patient has responded. • Onset: 3 minutes • Duration: Variable • Half Life: 20–40 minutes.
✔ Indications	• Symptomatic Hypoglycaemia.
✘ Contraindications	• Known allergy.
⚠ Precautions	• Hyperglycaemia.
⚡ Side Effects	• Nil of significance.

Dose as per Indication

Symptomatic Hypoglycaemia

Adult	Paediatric
15g (150ml) IV/IO *Repeat 10g (100ml) boluses at 10 minutes until blood glucose level >4mmol* **No max dose (watch total volume of fluid administered)**	**0.2g/kg (2ml/kg) IV/IO** *Repeat 0.2g/kg (2ml/kg) once at 10 minutes until blood glucose level >4mmol* **Consult with receiving hospital if BSL not > 4 after two doses**

D016 - Glyceryl Trinitrate

Presentation	400microg NitrolingualTM Spray; 50mg (0.4mg/hr release) Patch
Pharmacology	Glyceryl Trinitrate (GTN) is a potent smooth muscle relaxant. It reduces preload by venous dilatation, promoting venous pooling and decreasing venous return to the heart. It reduces afterload by reducing systemic vascular resistance and arterial pressure. The results are reduced myocardia oxygen demand and reduced blood pressure (SBP, DBP and MAP) whilst maintaining coronary perfusion. Because of this cascade it can assist with coronary artery dilatation of vessels in spasm and may assist the redistribution of blood flow along collateral channels of the heart.
Metabolism	GTN is imetabolised by the liver.
Route of Administration	• Sublingual (SL) • Transdermal (TD)
Notes	• Some patients with normal or low left ventricular filling pressures or pulmonary capillary pressure may be hypersensitive to the effects of GTN. • Both men and women can be prescribed PDE5 inhibitors and all patients should be asked if and when they last had the medication to determine if GTN is contraindicated. • Onset: <2 minutes • Duration: 20–30 minutes • Half Life: 5–10 minutes
✔ Indications	• Acute Coronary Syndrome • Acute Cardiogenic Pulmonary Oedema • Autonomic Dysreflexia (SBP > 160mmHg) • Irukandji Syndrome (SBP >160mmHg).
✘ Contraindications	• Known allergy • Heart rate <50 (excluding dysreflexia) or >150 BPM • SBP <110mmHg (Spray) and <90mmHg (Patch) • Sildenafil Citrate; Vardenafil; Tadalafil in previous 24hrs • Ventricular tachycardia • Inferior STEMI with right ventricular involvement
⚠ Precautions	• CVD, head injuries and CVA • Risk of hypotension and syncope • Elderly • Alcohol intoxication.
⚡ Side Effects	• Tachycardia or bradycardia • Hypotension • Headache • Skin flushing • Dizziness or syncope.

Dose as per Indication

Acute Coronary Syndrome

Adult	Paediatric
400microg SL (1 spray) *Repeat at 5 min as required* **Max dose 1.2mg (3 sprays)**	**Not indicated**
400microg SL *Repeat at 5 min as required* **No max dose** **50mg patch (0.4mg/hr)** *Single dose only*	**Not indicated**

Acute Cardiogenic Pulmonary Oedema, Autonomic Dysreflexia and Irukandji Syndrome

Adult	Paediatric
400microg SL *Repeat at 5 min as required* **No max dose** **50mg patch (0.4mg/hr)** *Single dose only*	**Not indicated**

D017 - Hartmann's (Sodium Lactate)

Presentation	1000ml infusion soft pack
Pharmacology	Hartmann's is a sterile solution for intravenous use containing sodium lactate, sodium chloride, potassium chloride and calcium chloride dehydrate. It is considered a balanced crystalloid and has some benefits over normal saline in terms of iatrogenic metabolic acidosis. It is also associated with reduced acute kidney injury post-administration compared to normal saline in certain instances.
Metabolism	Hartmann's solution has 100% absorption of the active components; excess is excreted by the kidneys.
Route of Administration	• Intravenous (IV) • Intraosseous (IO)
Notes	• A multiple electrolyte IV solution intended for restoring the electrolyte balance and water for hydration. A combination of multiple electrolytes and sodium lactate providing a balanced solution and normalised pH. • Caution should be exercised with regards to fluid admistration in trauma. Paramedics should be mindful of hypothermia and haemodilution, aiming for minimal volumes where indicated. • Hypotension with concurrent Traumatic Brain Injury (TBI) or spinal injury is associated with poor outcomes. In these circumstances a higher-than-normal infusion rate is often required to maintain a SBP of 100–120mmHg to ensure adequate perfusion. • Ideally in trauma a SBP of 70–80mmHg should be sufficient and well tolerated for up to two hours; however, paramedics should prepare for potential deterioration. • Ensure that potential hypovolaemia mimics such as tension pneumothorax, sepsis and environmental exposure have been ruled out. • If haemorrhage is unable to be controlled, prioritise immediate transport. • Onset: 1 minute • Duration: Variable • Half Life: 40–60 minutes.
✔ Indications	• Hypovolaemic shock • Burn Resuscitation with Parkland formula.
✘ Contraindications	• Known allergy • Ceftriaxone in same IV line.
⚠ Precautions	• Heart failure • Renal failure.
⚡ Side Effects	• Fluid overload in excessive administration.

Dose as per Indication

Hypovolaemic Shock

Adult	Paediatric
20ml/kg in 250ml boluses *Continue with boluses until per kg amount reached and reassess. Repeat as required* **Total 40ml/kg** *Consult for further dose if required*	**20ml/kg in 250ml boluses** *Continue with boluses until per kg amount reached and reassess. Repeat as required* **Total 40ml/kg** *Consult for further dose if required*

Significant Burns

Adult	Paediatric
Burns less than eight hours old and >20% non-superficial TBSA >15 years of age: **Adapted Parkland Volume= (2 x non-superficial/ non-first degree TBSA % x mass in kg) mL** **Infuse the Adapted Parkland Volume at a rate that completes administration 8 hours post burn event.** **Max dose 40ml/kg**	*Burns less than eight hours old and >20% non-superficial TBSA > 18 months old, <15 years of age:* **Consult ICP DAT or receiving hospital** **Adapted Parkland Volume= (2 x non-superficial/ non-first degree TBSA % x mass in kg) mL** **Infuse the Adapted Parkland Volume at a rate that completes administration 8 hours post burn event.** **Max dose 40ml/kg**

D018 - Heparin

Presentation	5000 units in 5ml Ampoule
Pharmacology	Heparin is an anticoagulant medication which inactivates Factor IIa and combines with anti-thrombin III to inhibit Factor X and the conversion of pro-thrombin to thrombin. Heparin therefore reduces the propensity for new clot formation and also inhibits other processes in the clotting cascade. Heparin is not a thrombolytic agent.
Metabolism	Heparin is metabolised via biotransformation in the liver and reticulo-endothelial system; metabolites are then excreted by the kidneys.
Route of Administration	• Intravenous (IV)
Notes	• Do not give the Heparin via intramuscular route due to the risks of causing significant haematoma. • Onset: 1 minute • Duration: 3–6 hours • Half Life: 30–60 minutes.
✔ Indications	• Acute STEMI.
✘ Contraindications	• Known allergy or hypersensitivity • Active bleeding (excluding menses) • Bleeding disorders • Current use of anticoagulant medications (i.e. Warfarin) • Previous trauma or surgery in past four weeks • Severe hepatic disease including oesophageal varices.
⚠ Precautions	• Renal impairment • Severe uncontrolled hypertension • TBI, Stroke or TIA in previous three months.
⚡ Side Effects	• Bleeding • Thrombocytopenia • Hyperkalaemia • Pain at injection site.

Dose as per Indication

Acute STEMI

Adult	Paediatric
Post Cardiology Consult and Confirmation of Pre-Hospital Thrombolysis Guideline activation. **4000 units IV** *Repeat 1000 units every 60 minutes* **No max dose**	**Not indicated**

D019 - Hydrocortisone

Presentation	100mg Vial
Pharmacology	Hydrocortisone is an adrenocortical steroid that has an effect on a number of physiological processes, chiefly as an anti-inflammatory hormone (glucocorticoid) but at high doses water and electrolyte balances (mineralocorticoid). Hydrocortisone inhibits the accumulation of inflammatory cells at inflammation sites, phagocytosis, lysosomal enzyme release and synthesis and/or release of mediators of inflammation. Additionally, it prevents and suppresses cell mediated immune reactions.
Metabolism	Hydrocortisone is metabolised in the liver.
Route of Administration	• Intravenous (IV) • Intramuscular (IM)
Notes	• Each 100mg Hydrocortisone vial is to be reconstituted with 2ml of Sodium Chloride 0.9% or water for injection. • Parenteral mediations must be prepared in an aseptic manner. The rubber stopper of all vials must be disinfected with an appropriate antimicrobial swab and allowed to dry prior to piercing. • Onset: 1–2 hours • Duration: 6–12 hours • Half Life: 6–8 hours
✔ Indications	• Moderate to severe asthma • Acute exacerbation of COPD • Severe allergic reactions or anaphylaxis • Symptomatic adrenal insufficiency, e.g. Addisonian Crisis.
✘ Contraindications	• Known allergy.
⚠ Precautions	• Hypertension.
⚡ Side Effects	• Nil of significance.

Dose as per Indication

Asthma, COPD and Adrenal Insufficiency

Adult	Paediatric
100mg IV/IMI	*Asthma*
Slow push over 1 min when given IV	**4mg/kg IV/IMI**
Single dose only	**Single dose not to exceed 100mg**
	Slow push over 1 min when given IV
	Single dose only
	Adrenal Insufficiency
	0–4 years – 25mg IV/IMI
	5–10 years – 50mg IV/IMI
	>10 years – 100mg IV/IMI
	Slow push over 1 min when given IV
	Single dose only

Anaphylaxis

Adult	Paediatric
200mg IV/IMI	**4mg/kg IV/IMI**
Slow push over 1 min when given IV	**Single dose not to exceed 100mg**
Single dose only	*Slow push over 1 min when given IV*
	Single dose only

D020 - Influenza Vaccination

Presentation	Normally Injected (Pre-filled syringe) 0.5 – 1ml (refer seasonal guide)
Pharmacology	Inactivated split virus vaccines for the prevention of predicted southern hemisphere influenza virus types A and B. (Seasonally varied per annum.)
Metabolism	Not Applicable.
Route of Administration	• Intramuscular (IM)
Notes	• Influenza vaccine has been shown to be very effective at preventing influenza. • All influenza vaccinations to members of the public are to be administered from the patient's own prescribed supply unless otherwise operationally updated. • Ensure that the vaccine has been stored in a cool pack or esky as prescribed by the manufacturer. Cold chain management should be managed in accordance with National Vaccine Storage Guidelines. • Adrenaline must always be available when administering vaccine to immediately manage server allergic reaction or anaphylaxis. • Recipients must be observed by a Registered Paramedic for 15 minutes after receiving vaccination. • Onset: Variable • Duration: Up to 100 days • Half Life: N/A.
✔ Indications	• For prevention of seasonal or targeted influenza • Administration as directed by NT Health Communicable Diseases.
✘ Contraindications	• Known allergy to influenza vaccine or its components • Known allergy to eggs or egg products • Current febrile illness with temperature >38.5°C • History of Guillain-Barre Syndrome.
⚠ Precautions	• Latex allergy or sensitivity.
⚡ Side Effects	• Discomfort, redness or swelling at injection site • Headache • Malaise • Mild fever • Allergic reaction.

Dose as per Indication

Influenza Vaccination

Adult	Paediatric
As per manufactures directions or information provided for the use of particular influenza vaccinations, either seasonal or targeted.	*As per manufactures directions or information provided for the use of particular influenza vaccinations, either seasonal or targeted.*
IMI only single dose	**IMI only single dose**

D021 - Ibuprofen

Presentation	200mg Tablet
Pharmacology	Ibuprofen is a non-selective non-steroidal anti-inflammatory drug (NSAID) that inhibits the synthesis of prostaglandins resulting in analgesia, antipyretic and anti-inflammatory actions.
Metabolism	Ibuprofen is metabolised in the liver and excreted mainly by the kidneys.
Route of Administration	• Per Oral (PO)
Notes	• Consider previous doses of analgesia by the patient, carer or guardian. • Ideally administered with food or milk. • Can be used in conjunction with paracetamol for additional pain relief. • Onset: 15 minutes • Duration: 4–6 hours • Half Life: 2 hours.
✔ Indications	• Mild to moderate pain secondary to inflammation or soft tissue injury.
✘ Contraindications	• Known allergy • Current gastrointestinal bleeding or peptic ulcer • Dehydration and/or hypovolaemia • Renal impairment • Heart failure • Pregnancy • Pt taking anticoagulants • Age <13 or >65 years • Patients on ACE Inhibitors or Angiotensin II Receptor blocker drugs.
⚠ Precautions	• Asthma • Liver dysfunction • History of gastrointestinal bleeding or peptic ulcers.
⚡ Side Effects	• Nausea • Dyspepsia • Gastrointestinal bleeding • Dizziness.

Dose as per Indication

Pain relief

Adult	Paediatric
200–400mg PO *Single dose only, do not administer if previously had Ibuprofen within six hours.* **Max dose 400mg**	**Not indicated**

D022 - Ipratropium Bromide

Presentation	250microg/1ml Polyamp (Atrovent)
Pharmacology	Ipratropium Bromide or Atrovent is an antimuscarinic agent which promotes bronchodilation by inhibiting cholinergic bronchomotor tone, i.e. it blocks vagal reflexes which mediate bronchoconstriction.
Metabolism	Ipratropium Bromide is metabolised in the liver and excreted by the kidneys.
Route of Administration	• Nebulised
Notes	• Nebulised Ipratropium Bromide is not to be administered in isolation. It must be administered in conjunction with Salbutamol, the solutions may be mixed and administered concurrently via the same nebuliser. • Ensure that the nebuliser mask is fitted properly during use to ensure that the solution avoids contact with the eyes during nebulisation. (There have been isolated reports of ocular complications, including increased ocular pressure and acute angle glaucoma as a result of direct eye contact.) • Onset: 1–3 minutes • Duration: 4–6 hours • Half Life: 3 hours.
✔ Indications	• Moderate to severe asthma • Exacerbation of COPD.
✘ Contraindications	• Known allergy • Hypersensitivity to Atropine or its derivatives • Age <1 year.
⚠ Precautions	• Glaucoma • Avoid contact with eye wherever possible.
⚡ Side Effects	• Headache • Nausea • Dilated pupils • Dry mouth • Tachycardia and palpitations (rare) • Skin rash.

Dose as per Indication

Asthma, COPD and Bronchospasm

Adult	Paediatric
500microg Neb (2 x Ampoules)	**250microg Neb (1 x Ampoule)**
Single dose only	*Single dose only*
Max dose 500microg	**Max dose 250microg**

D023 - Ketamine

Presentation	200mg/2ml Ampoule
Pharmacology	Ketamine is a rapid acting dissociative anaesthetic agent with analgesic properties. It is primarily an NMDA receptor agonist. It produces a dissociative state characterised by trance-like behaviour with eyes open but no response from patient; nystagmus; profound analgesia; normal pharyngeal and laryngeal reflexes; normal or slightly enhanced skeletal muscle tone; and, occasionally, a transient respiratory depression. Ketamine can also cause issues with perception, resulting in disinhibition and emergence phenomenon.
Metabolism	Ketamine undergoes extensive hepatic metabolism with approximately 90% of the drug excreted in the urine as metabolites.
Route of Administration	• Intravenous (IV) • Intramuscular (IM) • Intraosseous (IO)
Notes	• Ketamine normally has an unappreciable negative inotropic effect that is counteracted by other generalised sympathomimetic effects; but occasionally in highly adrenergic (adrenergically exhausted) states Ketamine can have unexpected, profound negative cardiac output and blood pressure effects. • To avoid the possibility of causing emergence reactions, avoid loud noises or over stimulation of patients wherever possible post-administration. • Emergence reactions, hallucinations or other behavioural disturbances associated with Ketamine administration for analgesia in adult patients may be managed with small doses of midazolam (1–2mg). • Patients administered Ketamine should also be provided with supplemental oxygen therapy. • Hypersalivation may be managed with suctioning, or in severe cases IV or IM Atropine. • Onset: 30 seconds IV up to 10 minutes IM • Duration: 5–20 minutes • Half Life: 10–15 minutes.
✔ Indications	• Severe traumatic pain • Sedation for intubation (RSI and post intubation boluses PRN) • Extreme agitation (SAT Score 2+ - 3+) • Short-term sedation for pain-producing procedure.
✘ Contraindications	• Known allergy • Severe hypertension SBP > 180mmHg • Age <1 year • Pain secondary to Acute Coronary Syndrome.
⚠ Precautions	• Hypertension • Recent AMI or history of CCF • Ensure given slowly for analgesia • Previous CVA • Concurrent use with Midazolam.

Side Effects	• Tachycardia/palpitations • Hypertension • Emergence, dissociation or depression of consciousness • Hypersalivation, nausea and/or vomiting • Pupil dilation • Transient hypertonicity and nystagmus • Respiratory depression • Laryngospasm.

Dose as per Indication

Severe Traumatic Pain and Procedural Sedation

Adult	Paediatric
10–40mg IV/IO/IMI *Repeat at 5–10 min as required, 200mg/20ml preparation preferred.* **Max dose 200mg** *Consider infusion if pain relief required for extended transport* **200mg/50ml commence at 5ml/hr (20mg/hr)** **Max rate 20ml/hr (80mg/hr)**	**0.1–0.2mg/kg IV/IO/IMI** *Repeat at 5–10 min as required, 20mg/20ml preparation preferred.* **Max dose 1mg/kg**

Ketamine should be administered in conjunction with narcotic analgesia to compliment the dissociative effects. Ketamine should not be administered as the only analgesia.

Consider small boluses of Ketamine to assist in pre-oxygenation for airway management.

Extreme Agitation SAT Score > 2+ (Not Suitable for Droperidol)

Adult	Paediatric
200mg IMI *Repeat at 15 min if required* **Max dose 400mg IMI**	**8 to 15 years of age 4mg/kg IMI**

Drug Induced Psychosis SAT Score 3+

Adult	Paediatric
<60kg – 200mg IMI **60–80kg – 300mg IMI** **>90kg – 400mg IMI** *Maintain sedation with 2.5–5mg Midazolam at 5 min intervals as required* **Max dose 400mg IMI** Ketamine infusion via syringe driver commenced at 1 mg/ IBW kg/ h (titrating to effect within range 0.5- 2mg/ IBW kg/ h) NB for this infusion only draw up Ketamine 200 mg up to a volume of 50 mL to give a final concentration of 4 mg/ mL	**Not indicated**

Sedation for Intubation

Adult	Paediatric
0.5- 2mg/kg IV/IO *Single dose only, consider addition of Fentanyl or Midazolam in GCS >10 induction* **Max dose 200mg**	**0.5mg/kg IV/IO** *Single dose not to exceed 100mg. Consider addition of Fentanyl or Midazolam in GCS>10 inductions* **Max dose 100mg**

Serotonetic drugs (MDMA, SSRIs and Amphetamines) resulting in an unconscious overdose may lead to serotonin syndrome. Caution and awareness should be exercised with use of further Ketamine in these circumstances. Consider use of Midazolam only for airway management.

D024 - Levetiracetam

Presentation	500mg/5ml Ampoule (Keppra)
Pharmacology	Levetiracetam is a second generation non-sedating anticonvulsant, the precise mechanism of actions is not fully understood.
Metabolism	Non-hepatic hydrolysis and hydroxylation, excreted by the kidneys.
Route of Administration	• Intravenous (IV)
Notes	• All parenteral mediations must be prepared in an aseptic manner. The rubber stopper of all vials must be disinfected with an appropriate antimicrobial swab and allowed to dry prior to piercing. • Onset: 30 minutes to 2 hours • Duration: 1–2 days • Half Life: 6–8 hours.
✔ Indications	• Status Epilepticus refractory to Midazolam.
✘ Contraindications	• Known allergy • Age <1 year.
⚠ Precautions	• Nil of significance.
⚡ Side Effects	• Drowsiness • Dizziness • Headache • Fatigue.

Dose as per Indication

Status Epilepticus

Adult	Paediatric
30mg/kg over 15 min	**>16 kg=30mg/kg over 15 min**
Single dose only	*Single dose only*
Max dose 2g	**Max dose 2g**
Given via infusion.	*Given via infusion.*
	<16 kg=30mg/kg over 10 min
	Single dose only
	Max dose 500mg
	Given via infusion

D025 - Lignocaine 2%

Presentation	100mg/5ml
Pharmacology	Lignocaine is a local anaesthetic with some antiarrhythmic properties. It is a fast sodium channel blocking agent which stabilises all potentially excitable membranes and prevents the initiation and transmission of impulses- in the nervous or cardiac conduction systems.
Metabolism	80% metabolised in the liver and remainder excreted by the kidneys.
Route of Administration	• Intravenous (IV) • Intramuscular (IM) • Subcutaneous (SC) • Intraosseous (IO)
Notes	• Local anaesthesia injections should always be administered slowly with frequent aspirations to avoid inadvertent intravascular injection. • Lidocaine 2% is only to be used in conscious VT where Amiodarone is contraindicated or unavailable. • All IV doses are to be given slowly over at least two minutes. • Symptoms and signs of toxicity including peri-oral tingling, light headedness, progressing to coma, seizure or arrhythmias and cardiac arrest. • Onset: 1–10 minutes • Duration: 1 hour • Half Life: 30 minutes.
✔ Indications	• Local anaesthetic for invasive procedures or nerve block • Diluent for Ceftriaxone administration • Conscious VT (where Amiodarone is C/I or unavailable) • Intraosseous or thoracentesis needle placement for injection site pain.
✘ Contraindications	• Known allergy • Conscious VT associated with: › Bradycardia › Current heart failure › Torsade de Pointes › Conduction defects or heart blocks.
⚠ Precautions	• Hypotension and poor perfusion in the conscious VT • Arrhythmias if given inadvertently IV during IM/SC administration.
⚡ Side Effects	• Convulsions • Hypotension • Nausea • Tinnitus.

Dose as per Indication

Diluent for Ceftriaxone

Adult	Paediatric
7ml IMI *Dilute with 2g Ceftriaxone* **Single dose only given over two IM sites**	**7ml IMI** *Dilute with 2g Ceftriaxone,* ***then administer per weight chart in CPG*** **Single dose only given over two IM sites if greater than 4ml**

Conscious VT

Adult	Paediatric
1.5mg/kg IV up to 150mg *Repeat once, half initial dose at 10 min as required* **Max dose 300mg IV**	**Not indicated**

Pain for IO Insertion

Adult	Paediatric
60mg IO *40mg followed by 10ml flush, then remaining 20mg* **Single dose only**	**1mg/kg IO** *Single dose only* **Max dose 20mg**

Local Anaesthesia

Adult	Paediatric
3mg/kg SC/IMI *Total maximum infiltrate 10ml* **Max dose 200mg**	**3mg/kg SC/IMI** *Total maximum infiltrate 7.5ml* **Max dose 150mg**

D026 - Loratadine

Presentation	10mg Tablet
Pharmacology	Loratadine is a long acting, second generation peripheral histamine H-1 receptor antagonist used to treat allergies.
Metabolism	Absorbed in the gastrointestinal tract with a rapid first-pass hepatic metabolism.
Route of Administration	• Per Oral (PO)
Notes	• May be given without food. • Antihistamines have no role in the treatment or prevention of respiratory or cardiovascular symptoms in anaphylaxis. Adrenaline should be administered in these circumstances. • Onset: 15 minutes • Duration: 4–6 hours • Half Life: 2 hours.
✔ Indications	• Mild allergic reaction (rash) without evidence of anaphylaxis.
✘ Contraindications	• Known allergy • Anaphylaxis.
⚠ Precautions	• Severe liver impairment • Increased risk of sedation and anticholinergic effects in older people.
⚡ Side Effects	• Drowsiness • Fatigue • Headache • Nausea • Dry mouth.

Dose as per Indication

Mild Allergic Reaction

Adult	Paediatric
10mg PO	**>8 years – 10mg PO**
Single dose only	*Single dose only*
Max dose 10mg	**Max dose 10mg**
Avoid administration within 24 hours of previous antihistamine administration.	*Avoid administration within 24 hours of previous antihistamine administration.*

D027 - Magnesium Sulphate

Presentation	10mmoL (2.47g)/5ml Ampoule
Pharmacology	Magnesium is an electrolyte that has an important cofactor in multiple processes, including causing vasodilation and bronchodilation through inhibition of smooth muscle contraction. Magnesium ions also possess anticonvulsant and anti-arrhythmic properties.
Metabolism	Magnesium is filtered in the kidneys and excreted predominantly in urine with a small amount in faeces and saliva.
Route of Administration	• Intravenous (IV) • Intraosseous (IO)
Notes	• Irukandji Syndrome is described as a tropical sting (usually minimal discomfort) followed by 15–45 minutes of significant systemic symptoms of pain, agitation, restlessness and clinically associated signs of catecholamine excess (palpitations, tachycardia, hypertension, diaphoresis, anxiety, headache, nausea and/or vomiting.) • Onset: 1 minute • Duration: 30 minutes • Half Life: Variable.
✔ Indications	• Severe life-threatening asthma • Torsades de Pointes VT • Marine Envenomation (Box Jellyfish and Irukandji Syndrome) • Eclampsia.
✘ Contraindications	• Known allergy • Atrioventricular block • Renal failure.
⚠ Precautions	• Renal impairment.
⚡ Side Effects	• Pain at cannula site • Magnesium toxicity (hypotension, respiratory depression, loss of deep tendon reflexes, coma).

Dose as per Indication

Eclampsia

Adult	Paediatric
20mmoL IV/IO over 20 min *Administered via infusion* **Single dose only**	**Not indicated**

Torsades de Pointes VT

Adult	Paediatric
10mmoL IV/IO *Repeat once at 10 min, administered via infusion.* **Max dose 20mmoL**	**0.1mmoL/kg IV/IO** *Single dose not to exceed 5mmoL* *Repeat at 10 min* **Max dose 10mmoL**

Marine Envenomation

Adult	Paediatric
10mmoL IV/IO over 20 min *Repeat once at 20 min, administered via infusion.* **Max dose 20mmoL**	**0.1mmoL/kg IV/IO over 15 min** *Single dose not to exceed 5mmoL* *Repeat at 15 min* **Max dose 10mmoL**

Severe Asthma

Adult	Paediatric
10mmoL IV/IO over 20 min *Single dose only, administered via infusion* **Max dose 10mmoL**	**0.1mmoL/kg IV/IO over 10 min** *Single dose not to exceed 5mmoL, administered via infusion. Single dose only* **Max dose 5mmoL**

Mix either 10 or 20mmoL with NaCl 0.9% up to a total of 20ml and run the driver at 60ml/hr for 20 minute administration. For 10 minute administration mix 10mmoL with NaCl 0.9% up to a total of 10ml and run the driver at 60ml/hr.

D028 - Methoxyflurane

Presentation	3ml Bottle (Pethrane/Penthrox)
Pharmacology	Methoxyflurane is a volatile, self-administered inhalational analgesic at low concentrations and is indicated for short-term pain relief. Methoxyflurane is more susceptible to metabolism than other halogenated ethers and has a greater propensity to diffuse into fatty tissue.
Metabolism	By the liver and excreted mainly by the lungs.
Route of Administration	• Inhalation (INH)
Notes	• Should only be provided to patients that can self-administer. Patient should be monitored whilst self-administering and not left unattended. • Avoid administration in confined spaces for extended periods of time. • Maximum initial dose is 3ml. • Patients should not receive more than 15ml per week, and administration on consecutive days should be avoided. • Ensure adequate vehicle ventilation during administration. • Onset: 1–3 minutes • Duration: 5–10 minutes • Half Life: N/A.
✔ Indications	• Moderate pain.
✘ Contraindications	• Personal or first degree relative history of malignant hyperthermia • Age <1 year • Pre-existing renal disease or impairment • Pre-existing hepatic disease • Current use of tetracycline antibiotics.
⚠ Precautions	• Altered level of consciousness • Intoxicated or drug affected patients • Pre-eclampsia • Concurrent use with Oxytocin may cause hypotension.
⚡ Side Effects	• Altered level of consciousness • Cough • Renal or liver failure post repeated high doses.

Dose as per Indication

Pain relief

Adult	Paediatric
3ml INH	**>1 year 3ml INH**
Repeat once at 20 min	*Single dose only*
Max dose 6ml	**Max dose 3ml**

D029 - Midazolam

Presentation	5mg/1ml or 15mg/3ml Ampoule
Pharmacology	Midazolam is a short-acting central nervous system (CNS) depressant with anxiolytic, amnesia, anaesthesia, sedative, anticonvulsant and hypnotic effects. It achieves this by enhancing the action of the inhibitory neurotransmitter gamma-amino butyric acid (GABA). Depressant effects occur at all levels of the CNS, including respiratory drive.
Metabolism	In the liver and excreted by the kidneys.
Route of Administration	• Intravenous (IV) • Intramuscular (IM) • Intraosseous (IO)
Notes	• Midazolam should be avoided in traumatic head injury or cerebral agitation; judicious use of appropriate analgesia is recommended in these circumstances. • Focal seizure activity in a patient who is unconscious or has altered level of consciousness (GCS <12) should be treated as a generalised seizure. • The first dose of midazolam for seizures should be administered via the intramuscular route, unless an intravenous cannula is already in situ. • Onset: 30 seconds IV or 5–10 minutes IM • Duration: 5–10 minutes • Half Life: 2 minutes.
✔ Indications	• Seizures with GCS<12 • Extreme agitation (SAT Score 2+ - 3+ post Ketamine) • Sedation for cardioversion or transthoracic pacing • Sedation for intubation (post-intubation, SFI and RSI).
✘ Contraindications	• Known allergy.
⚠ Precautions	• Consider reduced doses for elderly/frail, patients with chronic renal failure, congestive cardiac failure or shock • CNS depression effects of benzodiazepines are potentiated in the presence of narcotics and tranquillisers, including alcohol • Can cause severe respiratory depression, particularly in patients with COPD • Myasthenia Gravis • Multiple Sclerosis.
⚡ Side Effects	• Decreased level of consciousness • Loss of airway control • Respiratory depression • Hypotension.

Dose as per Indication

Seizures

Adult	Paediatric
10mg IMI (>60kg); or	**Small Infant (<3mths) 0.5mg IMI**
5mg IMI (frail or <60kg)	**Large Infant (up to 12mths) 1mg IMI**
Repeat 5–10mg IMI at 10 min if required	**Small Child (1–4 years) 2.5mg IMI**
Max dose 30mg (both IMI and IV combined)	**Large Child (4–11 years) 2.5–5mg IMI**
	Repeat original dose at 10 min once only
	Max 2 doses only
5mg IV/IO (>60 kg); or	**Newborn (<24hr) 0.2mg IV**
2.5mg IV (frail or <60kg)	**Large Infant (up to 12mths) 0.5mg IV**
Repeat 2.5–5mg IV at 5 min if required	**Small Child (1–4 years) 1mg IV**
Max dose 30mg (IMI and IV combined)	**Large Child (4–11 years) 1–2mg VI**
	Repeat at 5 min if required
	Max of 5 doses in total (IMI and IV combined)

For Ketamine emergence phenomena or post ketamine sedation

Adult	Paediatric
1–2.5mg IV (emergence)	**1mg IV (emergence)**
Repeat at 5 min as required	*Repeat at 5 min as required*
Max dose 20mg	**Max dose 10mg**
2.5–5mg IV (post-Ketamine sedation)	**2.5 IV (post-Ketamine sedation)**
Repeat at 5 min as required	*Repeat at 5 min as required*
Max dose 20mg	**Max dose 10mg**

Sedation (procedural and for intubation)

Adult	Paediatric
Airway	*Airway*
Full: 0.1mg/kg IV (max bolus 10mg)	**0.2mg/kg IV**
Half: 0.05mg/kg IV (max bolus 5mg)	**Max dose 5mg**
Low BP or frail 1mg IV	
Procedural	*Procedural*
1–2.5mg IV (with Fentanyl)	**0.1mg/kg IV (single dose not more than 2.5mg)**
Repeat 2.5mg 2–3 min IV only until tolerant of procedure, whilst preserving cardiorespiratory function	**Max dose 5mg**
No maximum dose	
Infusion	*Infusion*
30mg added to other analgesia (Fentanyl or Morphine) to 30ml, or run independently, made up to 30ml with NaCl 0.9%.	**15mg added to other analgesia (Fentanyl or Morphine) to 15ml, or run independently, made up to 15ml with NaCl 0.9%.**
Rate 1–15ml/hr IV	**Rate 0.1–0.2mg/kg/hr IV**

Acute Psychosis and Acute Agitation with SAT Score of 2+, Secondary to drug induced psychosis:

Adult	Paediatric
Midazolam 2.5–5mg IV (Adult), 2.5mg (Paed), as required to maintain sedation for transport. *Consider Ketamine infusion if unsuccessful or prolonged transport;*	**Not indicated**

D030 - Morphine Sulphate

Presentation	10mg/1ml Ampoule
Pharmacology	Morphine is an opiate analgesic that acts on the central nervous system by binding with opioid receptors, altering processes affecting pain perception and emotional response to pain, respiratory depression (and relief of dyspnoea) along with other CNS depressant effects. It also decreases the rate of AV conduction and can precipitate vasodilatation.
Metabolism	By the liver and excreted by the kidneys. Active metabolites accumulate in renal impairment.
Route of Administration	• Intramuscular (IM) • Intravenous (IV) • Intraosseous (IO) • Subcutaneous (SC)
Notes	• Reduced doses and ICP back up recommended if use intended in hypotensive patients (SBP<90mmHg). • Caution with morphine's longer duration of action, particularly, on withdrawal of painful stimulus (eg splinting, nerve block) a rebound cardiorespiratory and CNS decline may ensue; for short painful stimulus Methoxyflurane or Fentanyl are often better suited. • Take care to monitor and manage the patient's perfusion when Morphine and Midazolam are being utilised concurrently. • Onset: 2–5 minutes IV/IO or 5–10 minutes IM • Duration: 1–2 hours • Half Life: 2 hours.
✔ Indications	• Pain Relief • Sedation for intubation (post-intubation, SFI and RSI) • Autonomic Dysreflexia with SBP >160mmHg • Dyspnoea in palliative patient with valid medical order.
✘ Contraindications	• Known allergy • Renal impairment or failure • Labour and post-partum • Breastfeeding.
⚠ Precautions	• Elderly • Hypotension • Respiratory depression • Known addiction to narcotics • Concomitant Monoamine Oxidase Inhibitors (MAOI) therapy.
⚡ Side Effects	• Bradycardia • Hypotension • Drowsiness • Respiratory depression • Euphoria • Nausea and/or Vomiting • Pinpoint pupils.

Dose as per Indication

Pain Relief and Autonomic Dysreflexia

Adult	Paediatric
2.5–10 mg IMI/SC *Repeat up to 5mg at 15 minutes as required* **Max dose 20mg**	**0.1mg/kg IMI (>1 year)** *Single dose not to exceed 5mg* *Repeat at 15 minutes as required* **Max dose 0.2mg/kg**
2.5–5mg IV/IO *Repeat up to 5mg at 5–10 minutes as required* **30mg max dose then consult, ICP no max dose**	**0.1mg/kg IV/IO (>1 year)** *Single dose not to exceed 2.5mg* *Repeat 0.05mg/kg at 5–10 minutes as required* **No max dose**

Sedation for Intubation (SFI)

Adult	Paediatric
Infusion only – if Fentanyl unavailable or serotonin syndrome suspected: **30mg Morphine with 30mg Midazolam in 30ml** **1–10ml/hr IV** **No max dose**	*Infusion only – if Fentanyl unavailable or serotonin syndrome suspected:* **15mg Morphine with 15mg Midazolam in 15ml** **0.1–0.2ml/kg/hr IV** **No max dose**

D031 - Naloxone

Presentation	400microg Ampoule
Pharmacology	Naloxone is a competitive opioid antagonist that prevents or reverses the effects of opioids including respiratory depression, sedation and hypotension.
Metabolism	Metabolised in the liver.
Route of Administration	• Intravenous (IV) • Intramuscular (IM)
Notes	• Naloxone should only be administered following adequate patient oxygenation, or where necessary ventilation. • The duration of the narcotic (dose dependent) may exceed that of naloxone and the patient may again suffer effects of narcotic. • Paramedics must be aware that narcotics may not be the only medication taken, naloxone administration may unmask unwanted effects of a polypharmacy overdose. • Naloxone should not be administered to a newborn, even in the setting of opioid exposure or overdose of the mother. Naloxone may precipitate acute withdrawal and/or seizures. • Onset: 1–5 minutes • Duration: 60 minutes • Half Life: 60 minutes.
✔ Indications	• Respiratory depression secondary to narcotics.
✘ Contraindications	• Known allergy. • Newborn.
⚠ Precautions	• Patients with pre-existing cardiac disease • Breastfed infants of opioid-dependent mothers • Patients with known dependence, be prepared for agitation and possible combativeness.
⚡ Side Effects	• Narcotic withdrawal: combative, vomiting, nausea, sweating, tachycardia and hypertension • Convulsions • Pulmonary oedema.

Dose as per Indication

Respiratory depression secondary to narcotics

Adult	Paediatric
1.6–2mg IMI *Repeat at 10 min as required* **Max dose 4mg**	**0.1mg/kg IMI** *Single dose only, not exceeding 2mg* **Max dose 2mg**
0.1mg IV *Repeat at 2 min as required until self-ventilating* **Max dose 2mg IV**	**0.02mg/kg IV** *Single dose only, not to exceed 0.8mg* **Max dose 0.8mg**

D032 - Noradrenaline

Presentation	2mg/2ml or 4mg/4ml Ampoule
Pharmacology	Noradrenaline is a vasopressor which acts predominantly on alpha receptors, and to a much lesser extent beta receptors, thereby causing peripheral vasoconstriction and increasing vascular tone.
Metabolism	Noradrenaline is primarily metabolised by monoamine oxidase at the synaptic level, finally excreted by the kidneys.
Route of Administration	• Intravenous (IV) as infusion only
Notes	• Noradrenaline must be administered via a dedicated IV line. If a central venous line is not inserted, short term administration via a separate peripheral line may be undertaken, with care to avoid extravasation. • Close monitoring of the patient's perfusion status is required, with preference given to invasive monitoring if available. • Onset: 1 minute • Duration: 5 minutes • Half Life: 2 minutes.
✔ Indications	• Poor Perfusion Secondary to Sepsis.
✘ Contraindications	• Known allergy • Hypovolaemic shock without adequate fluid replacement • Patients with peripheral vascular ischaemia.
⚠ Precautions	• Hypertension • Hypovolaemic shock • Patients on monoamine oxidase inhibitors (MAOI) • Avoid leakage of drug into the tissues (Necrosis).
⚡ Side Effects	• Hypertension • Extravasation Necrosis • Reflex Bradycardia • Ventricular Arrhythmia • Peripheral ischaemia.

Dose as per Indication

Poor Perfusion refractory to adequate fluid resuscitation (Non-Cardiac) or refractory hypotension in TBI

Adult	Paediatric
Infusion	*Infusion*
3mg/50ml (1ml/hr = 1microg/min) commence at 5microg/min (5ml/hr)	**300microg/50ml (0.1microg/min = 1ml/hr) commenced at 0.05microg/kg/min**
Max rate 50microg/min	**Max rate 0.5microg/kg/min**
	Consider adult preparation if rate exceeds 60ml/hr, and adjust to concentration accordingly
	(Via Consult or Patient Transfer Only)

D033 - Olanzapine

Presentation	10mg Orally Dissolving Tablet (ODT)
Pharmacology	Atypical antipsychotic, antagonist at multiple receptor sites, particularly serotonin 5-HT, dopamine and histamine.
Metabolism	Metabolised in the liver and excreted by the kidneys and in faeces.
Route of Administration	• Sublingual (SL)
Notes	• For use on patients aged 16 years and over – consult for <16 years. • ODT is dissolved in the mouth (sub-lingual). • Onset: 15 minutes • Duration: 12–24 hours • Half Life: 6–8 hours.
✔ Indications	• Mild to moderate agitation, SAT Score 1–2.
✘ Contraindications	• Known allergy.
⚠ Precautions	• Alcohol intoxication, avoid over sedation • Elderly, frail and young children are more susceptible to adverse effects • May be less effective with alcohol withdrawal and patients on stimulant • In pregnancy only administer if benefit outweighs any potential risks • Similar presentation to Ondansetron, care must be taken to ensure right medication given.
⚡ Side Effects	• Dizziness • Sedation • QT prolongation and extrapyramidal reactions unlikely at approved doses.

Dose as per Indication

Agitation

Adult	Paediatric
10mg SL or 5mg SL if <60kg, frail or elderly *Repeat after 30 min* **Max dose 20mg**	**Consult only for <16 years**

D034 - Ondansetron

Presentation	4mg Orally Disintegrating Tablet or 8mg/4ml Ampoule
Pharmacology	Ondansetron is a serotonin 5-HT3 receptor antagonist used primarily as an antiemetic. Ondansetron reduces the activity of the vagus nerve, which activates the vomiting centre in the medulla oblongata, and also blocks serotonin receptors in the chemoreceptor trigger zone.
Metabolism	Ondansetron is metabolised in the liver and excreted by the kidneys.
Route of Administration	• Intravenous (IV) • Intramuscular (IM) • Per Oral (PO) • Sublingual (SL)
Notes	• Ondansetron ampoules and ODT (wafers) should be protected from light. • Can be administered in first trimester of pregnancy for uncontrolled hyperemesis. • Onset: 5 minutes • Duration: Several hours • Half Life: 3–4 hours.
✔ Indications	• Nausea and vomiting • Motion sickness secondary to road or aeromedical transport • Suspected spinal injury.
✘ Contraindications	• Known allergy • Congenital long QT syndrome • Hypokalaemia or hypomagnesaemia • Current Apomorphine therapy • Age <3 years.
⚠ Precautions	• Hepatic impairment • Patients at risk of QT prolongation or cardiac arrhythmias • Intestinal obstruction • Pregnancy • Current Tramadol therapy.
⚡ Side Effects	• Constipation • Headache • Dizziness • QT prolongation and sequelae • Serotonergic syndrome in combination with other serotonergic drugs

Dose as per Indication

Nausea, vomiting, motion sickness or spinal injury

Adult	Paediatric
4mg ODT SL/PO *Repeat 4mg after 5 min* **Max dose 8mg**	**>3 years – 2mg ODT PO** **>5 years – 4mg ODT PO** *Single dose only* **Max dose x 1 based on age above.**
4-8mg IMI or IV slow push over 30 seconds *Administered over 1 minute. (8mg IMI via 4mg in each deltoid)* **Max dose 8mg**	**>3 years – 0.1mg/kg IMI/IV slowly over 2 min, not exceeding 2mg** **>5 years – 4mg IMI/IV slowly over 2 min** *Single dose only* **Max dose x 1 based on age above**

D035 - Oxygen Therapy

Presentation	Gas via portable C or CD cylinder and vehicle D cylinders
Pharmacology	A colourless, odourless gas essential for the production of cellular energy.
Metabolism	N/A.
Route of Administration	• Inhalation (INH) • LMA or ETT • BVM or BPAP
Notes	• Must be run at 8lpm to drive nebulisers • Must be run at or above manufacturer-specified minimum flow rates to prevent hypercapnoea and possible asphyxia • Titrate delivery and rate to desired effect. • Onset: Immediate • Duration: N/A • Half Life: N/A.
✔ Indications	• Correction or management of hypoxaemia as indicated within CPGs. • 'On spec' at highest concentration possible for Carbon Monoxide poisoning
✘ Contraindications	• Paraquat poisoning with SpO_2 >88% • Bleomycin therapy with SpO_2 >88%.
⚠ Precautions	• Prolonged administration to premature neonates • Lung injury may occur if oxygen given to Paraquat and Bleomycin patients – avoid oxygen unless SpO_2 falls below 88% • Caution with STEMI and SpO_2 >94%.
⚡ Side Effects	• Hypoventilation in some COPD patients • Drying oral mucosa.

Dose as per Indication

Oxygen Therapy Guide

Critical illnesses requiring HIGH levels of oxygen	Serious illness with hypoxaemia requiring MODERATE levels of oxygen	Conditions requiring CONTROLLED or LOW DOSE oxygen	Oxygen monitoring only unless hypoxaemic
Aim for 100% SpO_2	Aim for at least 92–96% SpO_2	Aim for 88–92% SpO_2	Manage if falls below 92–96% SpO_2
Cardiac arrest / resuscitation	Acute hypoxaemia (unknown cause)	COPD	AMI / ACS
Shock	Acute asthma	Exacerbation of cystic fibrosis	Pregnancy and obstetric emergencies
Sepsis	Pneumonia	Chronic neuromuscular disorders	Stroke
Major trauma	Lung cancer	Chest wall disorders	Headache
Trauma in pregnancy	Post-operative breathlessness	Morbid obesity	Post convulsion
Near-drowning	Acute heart failure		Abdominal pain
Anaphylaxis	Pulmonary embolism		Hyperventilation or dysfunctional breathing
Major pulmonary haemorrhage	Pleural effusion/s		Poisoning and drug overdoses
Major head injury	Deterioration of lung fibrosis or other interstitial lung disease		Poisoning with Paraquat or Bleomycin therapy (88%)
Carbon monoxide poisoning	Severe anaemia		Metabolic and renal disorders
Active seizure	Pneumothorax		Heat exhaustion/ stroke
Hyperkalaemia	Sickle cell crisis		Cardiac rhythm disturbances
Ketamine Sedation			Non-traumatic chest pain
			GI Haemorrhage

D036 - Oxytocin

Presentation	10iu/1ml Ampoule
Pharmacology	Synthetic oxytocin is a uterine stimulant that causes uterine contractions by changing calcium concentrations within uterine muscle cells. Oxytocin administration during third stage of labour assists with placental separation, raises the tone of the uterine musculature and minimises further uterine blood loss.
Metabolism	Metabolised by the liver and excreted by the kidneys.
Route of Administration	• Intramuscular (IM)
Notes	• Consent should be sought from the patient for active management of third stage labour. • The use of uterotonics for the prevention of postpartum haemorrhage during third stage labour is recommended for all births. • When Oxytocin is administered for the management of third stage labour, a remaining intrauterine sibling (multi-gestation pregnancy) must be excluded prior • To allow the benefits of delayed cord clamping, it is acceptable to do a modified active third stage by waiting until the cord has stopped pulsating, then administering Oxytocin. This is particularly important in neonatal resuscitation where the baby is resuscitated between the mother's legs (where appropriate) to receive any benefit from placental perfusion. • Skin-to-skin contact and initiation of breastfeeding, thus stimulating the nipples, should occur in addition to the use of uterotonics to promote natural Oxytocin release, normothermia, bonding between mother and child and early breastfeeding. • Onset: 2–4 minutes • Duration: 30–60 minutes • Half Life: N/A.
✔ Indications	• Active management of third stage labour • Management of PPH.
✘ Contraindications	• Known allergy • Undelivered foetuses • Severe toxaemia (pre-eclampsia).
⚠ Precautions	• Concurrent use with analgesia, including Methoxyflurane may potentiate hypotension • Myocardial ischaemia.
⚡ Side Effects	• Nausea and/or vomiting • Headache • Bradycardia • Tachycardia.

Dose as per Indication

Active management of 3rd stage labour or PPH

Adult	Paediatric
10iu/1ml IMI *Repeat once at 5 min if bleeding continues (PPH only)* **Max dose 10iu (3rd stage labour), 20iu (PPH)**	**Not indicated**
Oxytocin infusion **(*only if second IM dose has not been given*)** 40 IU in 500 mL Normal Saline infused over 4 h at 125 mL/ h CAUTION not to fluid overload mother	**Not Indicated**

D037 - Paracetamol

Presentation	500mg Tablet,120mg/5ml Elixir
Pharmacology	Paracetamol is an analgesic, more specifically a 4-aminophenol derivative that exhibits analgesic and antipyretic activity. However, it does not possess a significant anti-inflammatory activity.
Metabolism	Metabolised in the liver and excreted mainly by the kidneys.
Route of Administration	• Per Oral (PO)
Notes	• Consider previous doses of analgesia by the patient, carer or guardian. • Can be administered with or without food. • Can be used in conjunction with Ibuprofen and narcotic analgesia for additional pain relief especially in orthopaedic injury. • Onset: 10–60 minutes • Duration: 4 hours • Half Life: 2 hours.
✔ Indications	• Mild to moderate pain • Fever causing distress.
✘ Contraindications	• Known allergy • Age <1 month • Ischaemic chest pain.
⚠ Precautions	• Liver dysfunction • Elderly or Frail • Malnourished.
⚡ Side Effects	• Nausea • Skin rash (rare) • Haematological reaction (rare).

Dose as per Indication

Pain relief and Fever

Adult	Paediatric
500mg–1g PO	**15mg/kg PO**
Single dose only	*Rounded to nearest ml per manufactures direction*
Max dose 1g	**Single dose only**

D038 - Packed Red Blood Cells

Presentation	200–400ml bag, Group O negative PRBC
Pharmacology	Packed red blood cells (PRBC) replace lost haemoglobin, aiming to improve oxygen carrying capacity of the blood and volume replacement.
Metabolism	N/A.
Route of Administration	• Intravenous (IV)
Notes	• This guideline in intended for support provided on request for patients who are refractory to appropriate resuscitative strategies and are still some way from definitive care. • PRBC should be mixed thoroughly by gentle inversion before use, then transfused through an approved intravenous line for blood administration, incorporating a standard filter. • Patients receiving transfusions shall be monitored for signs of potential complications with vital signs at least every 15 minutes during and for the first half hour afterwards. Severe reactions are most likely within the first 15 minutes. Reactions present with tachycardia, hypertension, fever, rigors, headache, myalgia, altered level of consciousness, bronchospasm, pulmonary oedema and worsening coagulopathy. If a reaction occurs, cease the infusion immediately. • If available a fluid warning device should be used to administer PRBC. • Completed documentation required on all administrations include bag/serial numbers, exact time and amount into ePCR. • PRBC requires strict cold chain management and adherence to administration procedures. • In the conscious patient, there should be a discussion around the administration of blood products, also the risk v benefits to ensure informed consent or refusal. • Onset: Immediate • Duration: Variable • Half Life: N/A.
✔ Indications	• Haemodynamic Instability Secondary to Haemorrhage.
✘ Contraindications	• Known allergy • Known religious objection in the non-consenting patient.
⚠ Precautions	• Previous transfusion reactions • Immunosuppressed patients • Hyperkalaemia.
⚡ Side Effects	• Anaphylaxis • Infection • Acute transfusion reaction • Hypocalcaemia and other electrolyte imbalances • Hypothermia.

Dose as per Indication

Haemodynamic compromise post adequate IV fluid resuscitation

Adult	Paediatric
1–4 units (~300 – 1200ml) as required *Repeat as required* **No max dose**	**Consult Only (Generally 10- 20ml/ kg)**

D039 - Prochlorperazine

Presentation	12.5mg/1ml Ampoule
Pharmacology	Prochlorperazine is an antiemetic and antipsychotic drug that acts on several central neurotransmitter systems. The medication also has a mild anxiolytic property.
Metabolism	By the liver with excretion in the urine and faeces as inactive metabolites.
Route of Administration	• Intramuscular (IM)
Notes	• Must only be given via the IM route. • Dystonic reactions have been noted in patients up to 21 years of age (rare), however more common in children. • Onset: 5–10 minutes • Duration: 40 minutes to 2 hours • Half Life: 4–8 hours.
✔ Indications	• Nausea • Motion sickness • Severe headache and migraine.
✘ Contraindications	• Known allergy • Circulatory collapse/shock • Age <18 years • Pregnancy • Altered consciousness.
⚠ Precautions	• Age 18–21 years • Hypotension • Epilepsy • Patient on anti-depressants or affected by alcohol.
⚡ Side Effects	• Drowsiness • Blurred vision • Hypotension • Tachycardia • Skin rash • Extrapyramidal reaction (Dystonia).

Dose as per Indication

All Indications

Adult	Paediatric
12.5mg IMI *Single dose only* **Max dose 12.5mg**	**Not indicated**

D040 - Rocuronium

Presentation	50mg/5ml or 100mg/10ml Ampoule
Pharmacology	Rocuronium is a non-depolarising skeletal muscle relaxant. It acts by competing with the natural neurotransmitter acetylcholine and blocks the receptors at the motor neuron endplate in striated muscle, inducing skeletal muscle paralysis.
Metabolism	It is metabolised in the liver with hepatobiliary excretion.
Route of Administration	• Intravenous (IV) • Intramuscular (IM)
Notes	• Always to be drawn up in red plunger syringe and labelled • Medication be stored cool 2–8°C, once out of refrigeration it should not be returned, but rather kept between 8–30°C for a maximum of 12 weeks before needing replacement. • Renal or hepatic dysfunction may lead to prolonged neuromuscular blockade. • Burns patients may develop a resistance and require more frequent dosing. • Onset: 60–90 seconds • Duration: 45 minutes • Half Life: 15–20 minutes.
✔ Indications	• To facilitate paralysis for endotracheal intubation • To maintain paralysis for endotracheal intubation.
✘ Contraindications	• Known allergy to any muscle relaxant • Muscular dystrophies and myotonias.
⚠ Precautions	• Anticipated airway difficulties • Sedatives must always be administered prior to Rocuronium • Must have functional SpO_2 and $EtCO_2$ • Status epilepticus.
⚡ Side Effects	• Critical illness myopathy and polyneuropathy.

Dose as per Indication

All Indications

Adult	Paediatric
Intubation	*Intubation*
1.5mg/kg IV	**1.5mg/kg IV**
Single dose only	*Single dose only*
Post-intubation Paralysis	*Post-intubation Paralysis*
1mg/kg IV as required	**0.5mg/kg IV as required**

D041 - Salbutamol

Presentation	5mg/2.5ml Polyamp or 100microg pMDI Inhaler
Pharmacology	Salbutamol is a direct acting sympathomimetic agent which mainly affects B2 – adrenoceptors. It primarily acts as a bronchodilator but also has B1 (positive inotropic and chronotropic) actions. Additionally, it lowers serum potassium levels through its direct stimulation of the sodium/potassium ATPase pump, drawing potassium into cells. Salbutamol is also used IV, in obstetrics for tocolysis.
Metabolism	Salbutamol is metabolised in the liver and excreted by the kidneys.
Route of Administration	• pMDI with Spacer • Nebulised
Notes	• The manufacturer recommends that polyamps be stored within their foil packaging and should be discarded three months after opening. The date the packet is opened should be placed clearly on the packet. • When indicated for bronchodilation, Salbutamol should be administered using a pMDI *with spacer* in preference to a nebuliser, to minimise aerosol generation and often to better clinical effect. • Nebulised Salbutamol will reduce serum potassium by 0.5–1mmoL within 30 minutes. • Onset: 2–5 minutes • Duration: 15–60 minutes • Half Life: 1–2 hours.
✔ Indications	• Moderate to severe asthma • Exacerbation of COPD • Bronchospasm from other causes (OC spray, smoke inhalation, anaphylaxis) • Suspected hyperkalaemia with ECG changes.
✘ Contraindications	• Known allergy • Age <1 year.
⚠ Precautions	• Acute pulmonary oedema • Ischaemic heart disease.
⚡ Side Effects	• Anxiety • Tremors • Tachyarrhythmia • Hypokalaemia • Metabolic acidosis in large doses.

Dose as per Indication

Asthma, COPD and Bronchospasm

Adult	Paediatric
Mild to Moderate Respiratory Distress: **1.2mg (12 puffs) pMDI via spacer** *Repeat at 10–15 min as required* **No max dose**	*Mild to Moderate Respiratory Distress:* **600microg (6 puffs) pMDI via spacer (<6yrs), >6yrs per adult dose.** *Repeat at 10–15 min as required* **No max dose**
Severe Respiratory Distress: **10mg/5ml via nebuliser** *Repeat 5mg/2.5ml at 5 min intervals as required* **No max dose**	*Severe Respiratory Distress:* **5mg/2.5ml via nebuliser** *Repeat 5mg/2.5ml at 5 min intervals as required* **No max dose**

Suspected hyperkalaemia with ECG changes

Adult	Paediatric
10 mg/5ml via nebuliser *Repeat as required* **Max dose 30 mg**	**5mg/2.5ml via nebuliser** *Repeat as required* **Max dose 15 mg**
Unable to use nebuliser: **1.2mg (12 puffs) pMDI via spacer** *Repeat at 5 min* **No max dose**	*Unable to use nebuliser:* **600microg (6 puffs) pMDI via spacer** *Repeat at 5 min* **No max dose**

D042 - Sodium Bicarbonate 8.4%

Presentation	100ml Glass Bottle
Pharmacology	Sodium Bicarbonate is a hypertonic solution that acts as a buffer. Excess serum hydrogen ions react with the bicarbonate resulting in the formation of carbon dioxide and water. This action assists in restoring pH to within normal ranges.
Metabolism	Sodium Bicarbonate is metabolised in the liver and excreted by the kidneys.
Route of Administration	• Intravenous (IV) • Intraosseous (IO)
Notes	• Care must be taken to avoid extravasation into tissues as necrosis may occur. • Onset: Immediate • Duration: Variable • Half Life: Variable.
✔ Indications	• Tricyclic Antidepressant Overdose (TCA OD) • Cardiac arrest secondary to TCA OD or hyperkalaemia • Suspected hyperkalaemia, second line to Calcium Gluconate • Crush Syndrome.
✘ Contraindications	• Known allergy.
⚠ Precautions	• Ensure adequate ventilation and perfusion to remove the excess CO2 produced • Tissue necrosis if extravasation occurs • Ensure IV lines as flushed, avoid mixing with other drugs or solutions.
⚡ Side Effects	• Cerebral oedema • Congestive cardiac failure and pulmonary oedema. • Can cause respiratory acidosis if adequate ventilation and circulation is not present.

Dose as per Indication

TCA OD (with hypotension, wide QRS or ventricular arrhythmia) or severe hyperkalaemia

Adult	Paediatric
100ml IV/IO	**1ml/kg IV/IO**
Repeat at 10 min if required	*Repeat once*
Max dose 200ml	**Max dose 100ml**

Cardiac Arrest from TCA OD, Hyperkalaemia or Crush

Adult	Paediatric
100ml IV/IO	**1ml/kg IV/IO**
Single dose only	*Single dose only*
Max dose 100ml	**Max dose 50ml**

D043 - Sodium Chloride 0.9%

Presentation	10ml Polyamp; 500 and 1000ml Infusion Soft Pack
Pharmacology	Sodium Chloride is an isotonic crystalloid that acts as a vehicle for many parenteral drugs and as an electrolyte replenisher for maintenance or replacement of fluid deficits.
Metabolism	This fluid has 100% bioavailability, excess sodium is predominantly excreted by the kidneys
Route of Administration	• Intravenous (IV) • Intraosseous (IO)
Notes	• Avoid over administration in the uncontrolled haemorrhaging patient with hypovolaemia. • Caution should be exercised with regards to fluid administration in trauma. Paramedics should be mindful of hypothermia and haemodilution, generally aiming for minimal volumes unless in arrest. • Hypotension with concurrent Traumatic Brain Injury (TBI) is associated with poor outcomes. In these circumstances a higher-than-normal infusion rate is often required to maintain a SBP of 100–120mmHg to ensure cerebral perfusion. • Ideally in trauma a SBP of 70–80mmHg should be sufficient and well tolerated for up to two hours; however, paramedics should prepare for potential deterioration. • Ensure that potential hypovolaemia mimics such as tension pneumothorax, sepsis and environmental exposure have been ruled out. • Rapid infusion without a fluid deficit may result in CCF and APO. • Fluid should be administered titrating to effect, reassess with every 250–500ml in adults and 10ml/kg in paediatric. • Onset: Immediate • Duration: Variable • Half Life: N/A.
✔ Indications	• A vehicle for delivery of IV/IO emergency medications • Dilution and reconstitution of medications • Inadequate or poor perfusion/shock.
✘ Contraindications	• Known allergy.
⚠ Precautions	• Patients with acute or history of heart failure • Pre-existing renal failure • Uncontrolled haemorrhage • Fluid temperature and hypothermia in significant infusion. • Haemodilution.
⚡ Side Effects	• Fluid overload • Metabolic acidosis and secondary acute kidney injury.

Dose as per Indication

Inadequate or poor perfusion (Non-Cardiac Non-Hypovolaemic)

Adult	Paediatric
Suspected Sepsis:	*Suspected Sepsis:*
20ml/kg IV/IO administered bolus	**10–20ml/kg IV/IO administered bolus**
Ensure chest is clear and request ICP. Titrate fluid to patient response. Avoid fluid overload. Manage ongoing poor perfusion with Noradrenaline or Adrenaline infusion.	*Ensure chest is clear. Titrate fluid to patient response. Avoid fluid overload. Manage ongoing poor perfusion with Noradrenaline or Adrenaline infusion.*
Max dose 20ml/kg, consult for further	**Max dose 20ml/kg, consult for further**
Max dose 40ml/kg ICP only	**Max dose 40ml/kg ICP only**

Inadequate or poor perfusion (Cardiogenic)

Adult	Paediatric
10ml/kg IV/IO, assess effect at 250ml increments	**10ml/kg IV/IO, assess effect at 250ml increments.**
Ensure chest is clear and request ICP. Titrate fluid to patient response. Avoid fluid overload. Manage ongoing poor perfusion with Noradrenaline or Adrenaline infusion.	*Ensure chest is clear and request ICP. Titrate fluid to patient response. Avoid fluid overload. Manage ongoing poor perfusion with Noradrenaline or Adrenaline infusion.*
Max dose 10ml/kg	**Max dose 10ml/kg**

Inadequate or poor perfusion (Hypovolaemia)

Adult	Paediatric
20ml/kg IV/IO as required	**20ml/kg IV/IO as required**
Titrate fluid for effect and patient response. Avoid fluid overload, haemodilution and hypothermia.	*Titrate fluid for effect and patient response. Avoid fluid overload, haemodilution and hypothermia.*
Max dose 40ml/kg, consult for further	**Max dose 40ml/kg, consult for further**

Significant Burns and Hartmann's unavailable or contraindicated

Adult	Paediatric
Burns less than eight hours old and >20% non-superficial TBSA >15 years of age:	*Burns less than eight hours old and >20% non-superficial TBSA > 18 months old, <15 years of age:*
Adapted Parkland Volume= (2 x non-superficial/ non-first degree TBSA % x mass in kg) mL	**Consult receiving hospital**
Infuse the Adapted Parkland Volume at a rate that completes administration 8 hours post burn event.	**Adapted Parkland Volume= (2 x non-superficial/ non-first degree TBSA % x mass in kg) mL**
Max dose 40ml/kg	**Infuse the Adapted Parkland Volume at a rate that completes administration 8 hours post burn event.**
	Max dose 40ml/kg

D044 - Tenecteplase

Presentation	50mg Vial and Pre-Fill Syringe
Pharmacology	Tenecteplase is a thrombolytic agent which combines with the fibrin component of the thrombus and converts thrombus-bound plasminogen to plasmin. This degrades the fibrin matrix of the thrombus.
Metabolism	Hepatic.
Route of Administration	• Intravenous (IV) as infusion only
Notes	• Weight optimised dosing improves efficacy and safety outcomes in drugs with a narrow therapeutic index. • Other drugs which effect on the clotting process may increase the risk of bleeding associated with Tenecteplase. • Administered concurrently with Heparin. • Onset: 15 minutes • Duration: Several hours • Half Life: 2 hours.
✔ Indications	• Acute STEMI.
✘ Contraindications	• Known allergy to Tenecteplase or Gentamicin • Major surgery, trauma or head injury in the past three months • Stroke or TIA in the past three months • Any history of intracranial haemorrhage • Gastrointestinal or genitourinary bleeding in the past month • Current bleeding disorders/tendencies, active bleeding (exl. menses) • Anticoagulants or glycoprotein IIb/IIIa inhibitors • Active tuberculosis • Suspected aortic dissection • Age <18 years.
⚠ Precautions	• Age >75 years • Non-compressible vascular puncture • History of liver disease • SBP >160mmHg or DBP >110mmHg • Low body weight • Active peptic ulcer • Anaemia • Acute pericarditis or subacute bacterial endocarditis • Trauma or prolonged (>10 min) CPR • Pregnancy or within 1 week post-partum • HR >120bpm.
⚡ Side Effects	• Haemorrhage and increased bleeding tendencies • Transient hypotension • Transient arrhythmia • Allergic reactions (rare).

Dose as per Indication

Acute STEMI

Patient Weight (kg)	Tenecteplase dose to be administered (mg)	Corresponding volume of reconstituted solution (ml)
<60	30	6
>60 – <70	35	7
>70 – <80	40	8
>80 – <90	45	9
>90	50	10

D045 - Tranexamic Acid

Presentation	1g/10ml Ampoule (TXA)
Pharmacology	Tranexamic Acid (TXA) competitively inhibits plasminogen activation by formation of a reversible complex displacing plasminogen from fibrin. This inhibits the process of fibrinolysis in addition to the protein breakdown caused by plasmin
Metabolism	Metabolised in the liver and excreted by the kidneys.
Route of Administration	• Intravenous (IV) • Intraosseous (IO)
Notes	• Does not replace physical measures to arrest bleeding- direct pressure, elevation, pressure points, haemostatic dressings, toruniquets, aortic compression, minimising movement and preventing hypothermia and acidosis. • There is no current role in traumatic cardiac arrest for the use of Tranexamic Acid. • Onset: 1–3 minutes • Duration: 7–8 hours • Half Life: 2 hours.
✔ Indications	• Recent (<3 hours) traumatic injuries and COAST score 3 or > • Post-Partum Haemorrhage.
✘ Contraindications	• Known allergy. • Do not administer in same line as blood products
⚠ Precautions	• Nil of significance.
⚡ Side Effects	• Headache • Nausea and/or vomiting • Seizures.

Dose as per Indication

Traumatic Injuries with a COAST Score ≥ 3; or PPH

Adult	Paediatric
Via Clinical Consult Only – ICP-DAT / CMO	**Via Clinical Consult Only – ICP-DAT / CMO**
1g IV/IO *Slow push over 2-3 min* **Max dose 1g**	**15mg/kg IV/IO** *Slow push over 2-3 min* **Max dose 1g (single dose only)**

COAST Score

Variable	Value	Score
Entrapment	Yes	1
	No	0
Systolic Blood Pressure (mmHg)	>100	0
	90–100	1
	<90	2
Temperature (ºC)	>35	0
	32–35	1
	<32	2
Major chest injury needing intervention	Yes	1
	No	0
Likely intra-abdominal or pelvic injury	Yes	1
	No	0

D046 - Water for Injection

Presentation	10ml Polyamp
Pharmacology	Water for injection is sterilised water used to dilute or dissolve drugs and is slightly hypotonic.
Metabolism	This fluid has 100% bioavailability.
Route of Administration	• Intravenous (IV) • Intraosseous (IO) • Intramuscular (IM) • Nebulised
Notes	• Approved for dilution with Ceftriaxone; Glucagon; Hydrocortisone, Salbutamol and Ketamine. • May also be used to assist in swallowing oral medications when drinking water unavailable. • Onset: Immediate • Duration: Variable • Half Life: N/A.
✔ **Indications**	• Dissolve or dilution of drugs.
✘ **Contraindications**	• Known allergy.
⚠ **Precautions**	• Nil of significance.
⚡ **Side Effects**	• Nil of significance.

Dose as per Indication

Dissolve or Dilute Drugs

Adult	Paediatric
As required to dilute or dissolve drugs per DTP or CPG	*As required to dilute or dissolve drugs per DTP or CPG.*

AR01 - Antacid

Presentation	Aluminium Hydroxide 200mg; Magnesium Hydroxide 200mg; Simethicone 20mg (Mylanta Chewable)
Pharmacology	Helps reduce stomach acidity; act as anti-flatulent and reduce build-up of gas in the stomach.
Metabolism	N/A.
Route of Administration	• Per Oral (PO)
Notes	• Adults 2–4 tablets chewed and swallowed. • Ideally between meals. • Maximum 3–4 times daily as required. • Permitted in sport.
✔ Indications	• Gastric upset, bloating and heartburn.
✘ Contraindications	• Known allergy • Age 12 or under • Patient who is unable to understand instructions for self-administration • Vomiting • Patient who has antacid tablets continuously for past 14 days • Taking of following medication types in the previous two hours: for heart disease; diabetes; gout; high blood pressure; epilepsy; arthritis; bacterial or fungal infection.
⚠ Precautions	• Cardiac pain may mimic indigestion. If signs or symptoms appear similar to cardiac chest pain, manage per acute coronary syndrome and request appropriate assistance from a paramedic or health professional • Always check the dose before administering, as different presentations of similar medications exist. Follow manufacturer's directions.
⚡ Side Effects	• Constipation or diarrhoea.

AR02 - Artificial Tears

Presentation	0.4ml Eye Drip Single Dose Unit (Refresh)
Pharmacology	Stabilises the pre-corneal tear film; lubricates the eye and eyelid, assists in tear production.
Metabolism	N/A.
Route of Administration	• Eye Drops
Notes	• Two drops per eye. • May be repeated as required. • Eyes should be cleaned with saline or sterile water prior to use of this medication. • Multiuse preparations containing preservatives should be avoided with the preference for single-use packaging preparations. • Permitted in sport.
✔ Indications	• Relief of irritated, dry, sore and tired eyes.
✘ Contraindications	• Known allergy • Hypersensitivity to polyvinyl alcohol or povidone.
⚠ Precautions	• Only to be used in the eye • Avoidance of high particulate content environment (smoke/dust) is advised following treatment.
⚡ Side Effects	• Nil of significance.

AR03 - Rapaid Topical Cream

Presentation	25g Tube
Pharmacology	Gives relief from pain due to minor bites and stings; Contains a natural anaesthetic and anti-inflammatory agent; helps prevent infection.
Metabolism	N/A.
Route of Administration	• Topical
Notes	• For both adults and children. • Liberally apply to the affected area. • Cover if necessary. • Repeat as required
✔ Indications	• Treatment of simple skin reactions such as from bites or stings.
✘ Contraindications	• Known allergy to Tea Tree Oil (Melaleuca).
⚠ Precautions	• For topical use only.
⚡ Side Effects	• Nil of significance.

AR04 - Oral Rehydration Salts

Presentation	4.9g Sachets (Gastrolyte)
Pharmacology	Contains electrolytes, starch and proteins. Oral rehydration therapy enables a patient to rehydrate quicker; rice protein-based rehydration solutions appear to aid in stool output in patients with diarrhoea.
Metabolism	N/A.
Route of Administration	• Topical
Notes	• 1 sachet of powder per 200ml of cooled water (mixed), may be repeated as required. • Mix well until the contents are dissolved over approximately 2–minutes. • Do not add further water to already dissolved solution after it is mixed. • Permitted in sport.
✔ Indications	• Oral correction of fluid and electrolyte loss.
✘ Contraindications	• Known allergy • Phenylketonuria (Gastrolyte contains aspartame) • Age <2 years.
⚠ Precautions	• Nil of significance.
⚡ Side Effects	• Nil of significance.

Version Control and Change History

This document is now a controlled document and is not to have its contents amended or changed without progression through the St John Ambulance NT clinical governance review process, then approval of Operational Leadership, Clinical Steering Group and endorsement of Medical Advisory Panel.

Version	Date Approved	Date Superseded	Amendment/Change
Draft	22/04/2021	31/05/2021	Draft approved and issued by OLG, CSG & MAP
Draft	31/05/2021	07/05/2021	Proof reading complete, preproduction updates for print and application development.
Draft	05/08/2021	18/08/2021	Edits by CMO et al and final review.
1.0	19/08/2021	12/10/2021	Approved for publishing
1.1	13/10/2021	30/11/2021	Minor grammatical errors and procedural and drug therapy updates.
1.2	01/12/2021	31/03/2022	For Amendment/Change: Minor changes to Clinical Procedures, Clinical Guidelines and Drug Therapy Guides
1.3	01/04/2022	Current	For Amendment/Change: Updated Foreword, Minor changes to Clinical Procedures, Clinical Guidelines and Drug Therapy Guides

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