



Clinical Practice Guidelines

ALS and MICA Paramedics



AmbulanceVictoria





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COVID-19 Modifications to usual care CPG COVID0001

Care Objectives

- To provide modified care to patients presenting with elevated risk, while maintaining a safe work environment during the COVID-19 pandemic.

General Notes

Intended Patient Group

- Patients ≥ 16 years of age. There are no modifications to the care of patients < 16 years of age.

COVID-19 Quick links

AV Staff only

Decontamination

Case Definition & PPE Matrix

Vehicle Cleaning &

This guideline is intended to be used to modify care for **all patients ≥ 16 years of age**.

Patients with known or strongly suspected COVID-19 infection should be managed under CPG COVID0002 as well:

Go to COVID-19 Management CPG

Risk assessment

- Treatment decisions should be guided by the following risk categories. Appropriate PPE should be worn in all circumstances. Guidance on PPE can be found [here](#).

HIGH RISK

Confirmed (positive COVID-19 test)

OR

Suspected – High Risk

OR

Any patient in a COVID-19 / Active / Peak area

- Modify clinical care** as per this CPG

Low Risk

Suspected – Low Risk (Symptoms or unknown)

OR

Nil COVID (None of the above criteria)

- **Provide usual clinical care**

Suspected – Low Risk

- **Signs and symptoms**
 - *Acute respiratory infection* (e.g. runny nose, shortness of breath, cough, sore throat, loss or change in sense of smell or taste)
 - *Fever ($\geq 37.6^{\circ}\text{C}$) or history of fever* (e.g. night sweats, chills) without another immediately apparent cause such as urinary tract infection or cellulitis

OR

- **Unknown:** Where a history cannot be obtained (critically ill, unconscious, cardiac arrest, intoxicated, confused)

Suspected – High Risk

- A person who has worked in / volunteered at / been released from a hotel quarantine site and / or other port of entry in the last 14 days, with or without signs / symptoms

OR

- *Suspected – Low Risk* criteria

AND ALSO HAS

- Any of the following epidemiological criteria in the 14 days prior to illness onset:
 - Contact with a confirmed case or an exposure site as defined by public health
 - Was employed in an area where there is an increased risk of coronavirus (COVID-19) transmission for example:
 - aged care workers/ healthcare workers or other high-risk industries (such as abattoirs) working in a location where there are active outbreaks or high levels of community transmission
 - Lived in or visited a geographically localised area at high risk as determined by public health.

Non-invasive ventilation (NIV) / CPAP

High risk patient

- CPAP prohibited
 - Ensure maximal supplemental oxygen (e.g. NC or NRBM at 15 L/min)
 - Tolerate hypoxia if supplemental oxygen is insufficient

- Ensure management of APO with GTN is optimised
- Progress to BVM only for patients requiring active airway management and ventilation (e.g. in preparation for intubation).

Low risk patient

- Airborne transmission risks associated with CPAP may be further reduced where:
 - A viral filter is attached directly to the mask in between the mask and outflow port / manometer (Fig 1)
 - Therapy is commenced in a large well ventilated space
 - An adequate mask seal can be achieved prior to loading the patient and maintained during transport



Figure 1: CPAP with filter applied

Nebulised medications

High risk patient

- Nebulised therapy prohibited
- Severe asthma: Consider early IM adrenaline and dexamethasone
- COPD: Salbutamol pMDI and spacer, 4-12 puffs (no repeat dose)
- Administer Ipratropium bromide pMDI where available and indicated. Follow patient's prescribed management plan. If a plan is not available administer Ipratropium bromide 8 puffs.

Low risk patients

- If providing nebulised therapy:
 - Avoid nebulising medications in the ambulance or any other confined space if possible

- Where possible, commence nebulised therapies in a large well ventilated space

Intubation

High risk patient

- Avoid intubation in the ambulance or any other confined space if possible.
 - Intubate outdoors or in a large well-ventilated area if possible
 - If loaded, move the patient out of the vehicle if intubation is required
 - Intubation in the ambulance should only be used as a last resort (e.g. scene safety, inclement weather)
- Paramedics may elect to withhold intubation in any instance where, in their judgement, there is an unacceptable risk.
- Do not use apnoeic oxygenation
- Use a video laryngoscope for all attempts to increase the distance between intubator and patient's mouth.

Low risk patients

- No modifications required.

Cardiac arrest

- The current default position for the cardiac arrest patient is that they are **Low Risk** for COVID-19 unless the circumstances, bystanders or family suggest they meet **High Risk** criteria.
- **Witnessed arrest:** If a P2 mask, eye protection and gloves are worn by the paramedic, it is safe to defibrillate and commence chest compressions prior to applying a gown where the patient is wearing a surgical mask. This principle also applies when the patient is found to be in cardiac arrest on arrival despite not having been dispatched as a cardiac arrest.

High risk patient

- Breathing check: Look, but do not listen or feel for breathing.
- Place a surgical mask on the patient (if available) prior to compressions and defibrillation.
- Consider deferring BVM ventilation in favour of immediate:
 - **ETT**
 - **SGA** if ETT delayed or not available
 - **NRB at 15 L/min over surgical mask** if ETT/SGA delayed or not available
 - Progress to BVM where arrest duration > approx. 8 minutes / 4 cycles.
 - BVM ventilation (two-person technique) may be required earlier in cardiac arrest of respiratory aetiology.
- **mCPR:** No modification to indication or use

Withholding or ceasing resuscitation

- There are no modifications to withholding or ceasing resuscitation, regardless of COVID-19 status.
- COVID-19 may increase the chance of arrhythmia in patients who are not otherwise critically ill. Cardiac arrest does not necessarily constitute irrecoverable deterioration of severe disease. COVID-19 status should not influence the decision to withhold or cease resuscitation.

Oxygen therapy

High risk patient

- Administer supplemental oxygen as per the indications and SpO₂ targets included in CPG A0001 Oxygen Therapy. The strong preference is to achieve these using a nasal canula (2 – 15 L/min) under a surgical mask where possible.
 - Other oxygen therapy methods are permitted if clinical judgement indicates the need for alternative treatment.
- **Note:** While mask wearing is mandatory for all patients, this approach will apply to every instance of care (regardless of risk category) unless it is not feasible.

Home ventilated patients

- Home-ventilated patients on CPAP or BiPAP and those with tracheostomy (with or without ventilation) who would otherwise be considered *High Risk* cannot have their treatment discontinued. Transport with airborne PPE. The rationale for this is that some of these patients are fully dependent on their home ventilation. Contact the clinician for the Victorian Respiratory Support Service (VRSS – via Austin switchboard) for advice.
- Maintain patient's usual ventilation support for transport where clinically appropriate with PPE.

Other considerations

The following considerations introduced during the COVID-19 pandemic improve infection control and / or the quality of care regardless of COVID-19 status. They remain considerations for all patients and will be transitioned into the relevant CPGs or CWIs when those documents are next updated.

- Two-handed face mask grip technique reduces the risk of aerosol generation and improves the efficacy of BVM ventilation
- Attach viral filter directly to face mask, CPAP mask, ETT or SGA
- Insert nasogastric tube with syringe already connected immediately following placement of SGA/ETT. If nasogastric tube not available, use tape to cover the OG port on the SGA.
- Ensure SGA is seated appropriately and taped in place (capnography may assist in identifying leakage).
- **Spontaneously ventilating paediatric patients:** Gentle assisted ventilation is required to prevent rebreathing of CO₂

- Preference for closed circuit suction where available
- Self-administration and hand hygiene when handling oral medications or administering pMDI/spacer.
- **Deceased patients:** wear appropriate PPE, avoid unnecessary handling of the body, leave viral filters attached to SGA/ETT and cover any wounds with dressing where possible.



Figure 2. Two-handed face mask grip

Transport

- Refer to [Operational Response](#) in relation to family members or bystanders accompanying patients to hospital.
- Where specific transport criteria are met (e.g. stroke, STEMI, major trauma, cardiac arrest) patients must be transported to the hospital appropriate for that condition **according to the relevant CPG**.

Referral

- Patients should be managed in the most appropriate location for their care needs as per standard AV practice. Patients who do not need hospital care should not be attending hospital.
- **Patients with COVID-19 symptoms:** may be referred to a GP respiratory clinic or assessment centre for testing and ongoing management if they:

COVID-19 Modifications to usual care CPG COVID0001

- Do not meet any Clinical Red Flags as per **CPG A0108 Patient Safety / Clinical Flags**, AND
- Are not hypoxic ($\text{SpO}_2 < 92\%$ or less than normal for patient)
- Have no other clinical need for transport

Australian Government COVID-19 hotline [1800 675 398](tel:1800675398)

Inter-facility transfers – High Risk

At the referring hospital

- Receive handover from the staff at a distance from the patient. This should include the transferring health services understanding of the COVID risk, any testing that has been undertaken, results of these tests, and reason for transfer.
- Apply appropriate PPE before patient contact. The hospital may have a designated area where you can do this.
- Ensure that the Duty Manager / ARV Coordinator is aware that you are about to enter an isolation area and may be difficult to contact.
- Only bring the equipment into the patient's environment that you are likely to need. Prepare infusions and other items required for the transfer outside of the patient environment wherever possible.
- If the patient is intubated and equipment is available at the referring facility, a closed suction system (in-line) maybe attached to the circuit (between the ETT and the viral filter). Do not remove these items if they are already in place.
- If no AGP is performed at the referring hospital, the PPE worn there should be kept on for the duration of the transfer if possible (to decrease risk of staff exposure while doffing). If in close proximity when an AGP is performed, consider changing PPE prior to transfer if able to do so safely.

Ventilation

- Patients should be kept deeply sedated and paralysed for the duration of the transfer.
- Contact the ARV Clinical Coordinator if advice is needed on ventilation.

Related Resources

- [Consensus statement: Safe Airway Society principles of airway management and tracheal intubation specific to the COVID-19 adult patient group.](#)
- <https://av-digital-cpg.web.app/assets/pdf/MAC/COVID-19 CPG v3-MAC paper FINAL clean.pdf>

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2. Australasian College of Emergency Medicine. for the management of COVID-19 in Australasian emergency departments v3.0. 2020. Available from: <https://acem.org.au/Content-Sources/Advancing-Emergency-Medicine/COVID-19/Resources/Clinical-Guidelines/Adult-Cardiac-Arrest-Management>.
3. National COVID-19 Clinical Evidence Taskforce. Management of patients with moderate to severe COVID-19 disease. 2020. Available from: <https://covid19evidence.net.au/>
4. Craig S, Cubitt M, Jaison A, Troupakis S, Hood N, Fong C, Bilgrami A, Leman P, Ascencio-Lane JC, Nagaraj G, Bonning J, Blecher G, Mitchell R, Burkett E, McCarthy SM, Rojek AM, Hansen K, Psihogios H, Allely P, Judkins S, Foong LH, Bernard S, Cameron PA. Management of adult cardiac arrest in the COVID-19 era: consensus statement from the Australasian College for Emergency Medicine. Med J Aust. 2020 Jul 12. doi: 10.5694/mja2.50699.

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Figure 1. CPAP image. Ambulance Victoria. 20/04/2020.

Figure 2. 'Vice Grip' diagram by Nicholas Chrimes. Licensed mdi CC BY 4.0.

Care Objectives

- Identify severity of disease and risk
- Identify an appropriate care pathway
- Provide oxygen and other supportive care as required
- Transport severe patients to ICU capable hospital (where possible)

General Notes

Intended Patient Group

- Patients ≥ 16 years of age with confirmed or strongly suspected COVID.
- This guideline is approved for use by both ALS and MICA paramedics.

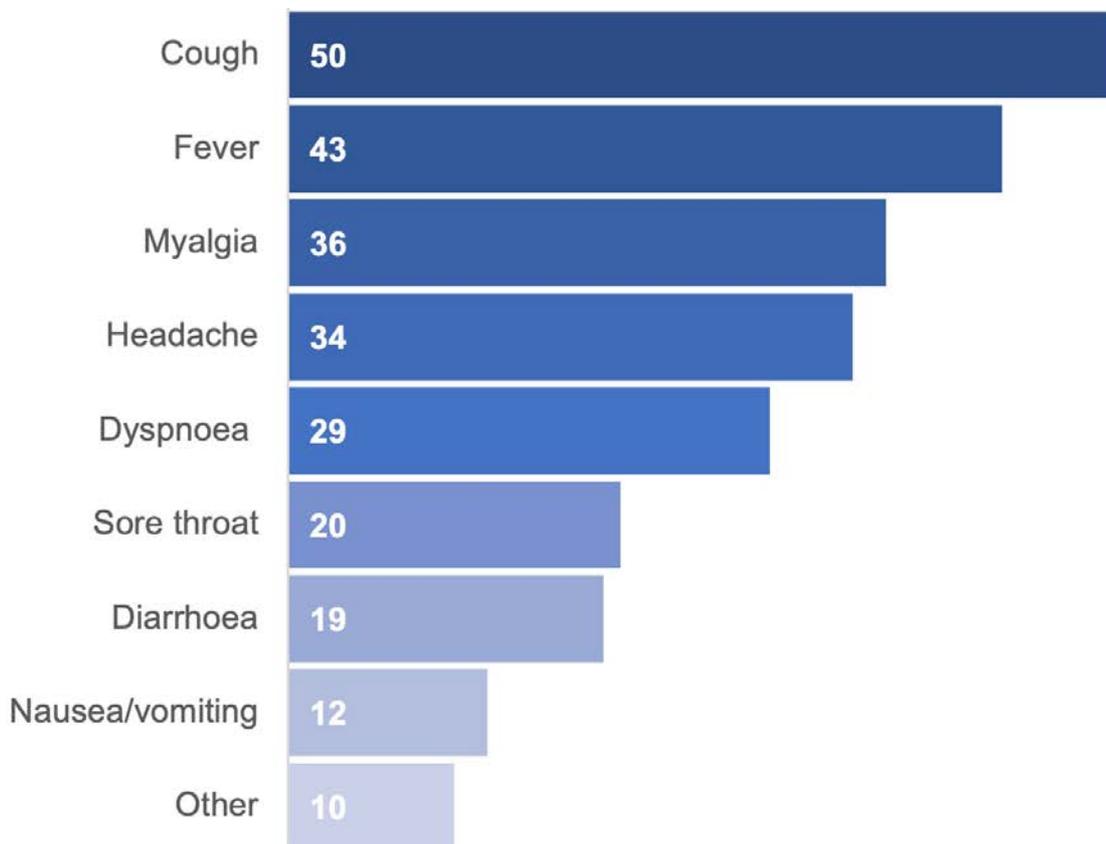
This guideline is intended to be used to triage and treat patients **who have COVID**, as determined by a confirmed positive test or where it is strongly suspected. This is a higher level of suspicion than patients who simply meet PPE / testing criteria.

All patients ≥ 16 years of age should continue to be managed under CPG COVID0001:
Go to COVID-19 Modifications to usual care CPG

Overview

COVID-19 is the illness caused by infection with SARS-CoV2. It has multisystem features, but upper and lower respiratory features are most prominent. Other clinical presentations include gastrointestinal illness, neurological dysfunction and cardiac dysfunction.

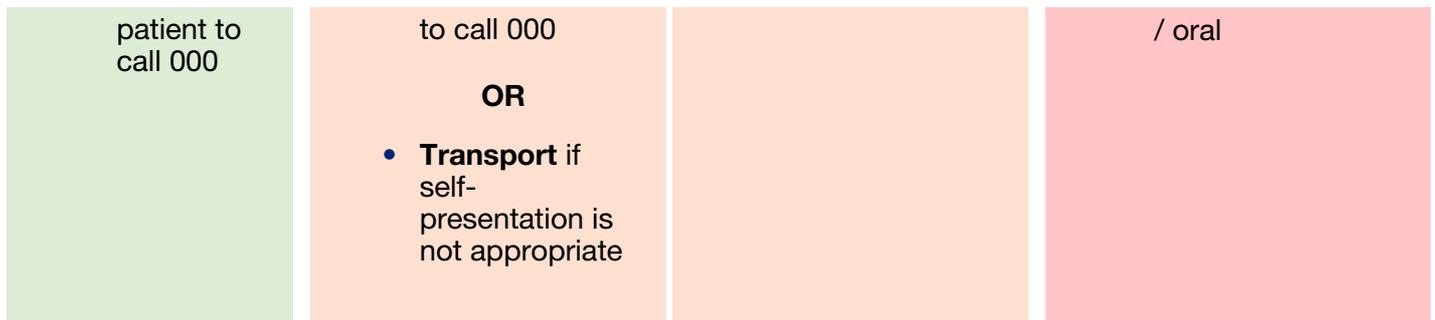
COVID-positive patients must be fully assessed to exclude other serious conditions, particularly as the disease has the potential to cause or exacerbate other pathologies.



Flowchart

Mild	Moderate	Severe / Critical
Symptoms	Symptoms + Lung involvement	Symptoms + Lung

			involvement + Hypoxia / Shock
Cough	Low risk	High risk	
Fever	SpO ₂ ≥ 92% at rest	SpO ₂ ≥ 92% at rest	SpO ₂ < 92%
Myalgia	SOB – exertional, mild	SOB – at rest or worsening	Severe SOB
Headache	RR 20 - 24	RR 25 - 29	RR ≥ 30
Sore throat	Mild chest discomfort	Exertional hypoxia	HR ≥ 120
	Productive cough	Borderline hypoxia	BP < 90
	Rigors	Moderate-severe chest pain	Altered conscious state
	Severe fatigue	Severe dehydration, or likely in future	Confusion / drowsiness
	Severe myalgia	Low / no urine output	Cyanosed / cold / pale / mottled skin
	Fever > 48 hrs	Syncope / dizziness	Haemoptysis
		Significant risk factors with inadequate support	Respiratory failure
Self-care	Timely medical review	Hospitalisation	Urgent prehospital care
<ul style="list-style-type: none"> Refer patient back to CPPP contact Self-care advice Safety netting <p>OR</p> <ul style="list-style-type: none"> Self-present if CPPP has already advised 	<ul style="list-style-type: none"> Patient to contact CPPP immediately Advise the patient to self-present to ED if CPPP cannot be contacted within 2 hrs Safety netting <p>OR</p> <ul style="list-style-type: none"> Self-present if CPPP has already advised patient 	<ul style="list-style-type: none"> Transport 	<ul style="list-style-type: none"> Oxygen 2 – 15 L/min via NC Prone position for refractory hypoxia (conscious patient only) Manage inadequate perfusion as per CPG A0705 Transport to ED with ICU Consider* Dexamethasone 6 mg (1.5 mL) IV



*Prolonged transport time or significant delays at hospital. Don't obtain IV access only to give dexamethasone.

CPPP



COVID Positive Pathway Program (CPPP)

- COVID positive patients in the community should be contacted by a health service to enrol the patient in a COVID Positive Pathway. A clinical and social assessment will be undertaken and the patient allocated to an appropriate pathway:
 - **Mild disease / low risk:** Self-care with telehealth check-ins from a GP or another healthcare professional
 - **Moderate illness / moderate risk:** Hospital in the home (or other intensive community-based management)
 - **Severe illness / high risk:** Hospital admission to a selected site as per the COVID-19 streaming model
- This guideline mirrors those management pathways.
- Patients with moderate disease can usually be managed in the community with intensive support. However, patients may sometimes require transport where they demonstrate high risk factors for deterioration or there is inadequate support.
- Some patients may be given pulse oximeters and asked to use smartphone apps to assist with monitoring.

Assessment

Shortness of breath

- Shortness of breath is one of the strongest predictors of deterioration to severe illness. However, some patients with mild breathlessness on exertion may be managed at home with regular monitoring by a CPPP.
- Less concerning SOB may be considered *Moderate - Low Risk* while more concerning SOB should be considered *Moderate - High Risk* or *Severe/Critical*.

Shortness of breath

Less concerning	More concerning
Mild sensation Only on exertion / intermittent No increased work of breathing Stable	Moderate or severe At rest / persistent Increased work of breathing Worsening

Chest pain

- COVID may present with chest pain or discomfort of varying causes. Minor discomfort may be caused by LRTI or coughing. However, COVID may also increase the risk of acute coronary syndrome and pulmonary embolism. Chest pain should be assessed in its own right. Do not automatically exclude more severe causes. Less concerning chest discomfort may be considered *Moderate - Low risk* while more concerning chest pain should be considered *Moderate - High risk patients*:

Chest pain

Less concerning	More concerning
Age < 40 Tightness on inspiration Discomfort when coughing Normal 12-Lead ECG	Age > 40 Constant, at rest Consistent with ACS presentation Abnormal ECG PHx same pain of cardiac cause PHx PE/thromboembolic events

Mild

Mild Symptoms only

Cough Fever Myalgia Headache Sore throat

- Mild symptoms of upper respiratory tract infection or asymptomatic (especially if vaccinated).
- Normal SpO₂ for patient and no signs of lower respiratory tract infection.
- Mild tachypnoea (RR 16 – 20 per minute), mild tachycardia (100 – 120 beats per minute) and temperature > 38.0°C may be present.
- Most patients with mild COVID can be managed in the community.
- Patients should be transported to hospital if they present with:
 - Clinical Red Flags as per **CPG A0108 Patient Safety / Clinical Flags**
 - *Moderate or Severe* COVID
 - Other clinical need for transport (e.g. acute coronary syndrome)

Referral

- **Strongly suspected COVID and no positive test:** Refer the patient for test in addition to safety netting and self-care advice.
- **COVID positive and not enrolled in CPPP:** Refer the patient to the CPPP team appropriate to their location. Contact details can be [accessed here](#).
- **COVID positive and enrolled in CPPP:** Refer the patient back to their CPPP. Availability will depend on operating hours and differing after-hours arrangements.

Safety netting notes

Provide information regarding the symptoms and expected course of mild disease.

Provide **Health Information Sheet** if possible.

- **Mild deterioration**
e.g. symptoms of *Moderate – Low Risk*
Mild SOB on exertion, mild chest discomfort when coughing or breathing deeply, rigors, productive cough, severe myalgia, severe fatigue, fever > 48 hrs

Patient to contact CPPP or GP

- **Significant or rapid deterioration**
e.g. symptoms of *Moderate – High Risk* or *Severe* disease
SOB at rest or that is worsening, chest pain, confusion, fainting/dizziness, severe vomiting, no urine output, etc.
Patient to call 000

Moderate

Moderate

Symptoms + Signs of lung involvement

SpO₂ ≥ 92% SOB Productive cough Rigors Severe fatigue Severe myalgia
Fever > 48 hrs

- COVID symptoms (often of greater severity) with signs of lung involvement / lower respiratory tract infection.
- SpO₂ ≥ 92% at rest (≥ 88% in COPD)
- Some patients with *Moderate Disease* may rapidly deteriorate, usually 5-10 days following onset of symptoms.

Low Risk - Moderate

- Significant signs and symptoms include:
 - Mild SOB or exertional SOB
 - RR 20 – 24
 - Mild chest discomfort (with normal 12-lead ECG)
 - Productive cough
 - Rigors
 - Severe fatigue
 - Severe myalgia
 - Fever > 48 hours
- **Disposition:**
 - If the patient is capable and willing to seek further help and self-present if required:
 - **Ask the patient to contact the CPPP** immediately and inform them they may be put on hold or asked to leave a message.
 - Availability will depend on operating hours and differing after-hours arrangements. It is possible that the CPPP will not be able to contact that them within a reasonable timeframe to organise a review. You must ensure the patient understands that they should self-present to an emergency department if unable to contact the CPPP within two hours.
 - If there are any concerns about the patient's ability to seek further help (e.g. health literacy) or they cannot self-present (e.g. no access to transport), transport the patient in the first instance.

High – Risk Moderate

- Moderate COVID patients presenting with certain signs and symptoms are at high risk of deterioration to *Severe Disease* and require transport to hospital in most circumstances.
- Transport if any of the following risk factors are present:
 - Exertional hypoxia (a drop in SpO₂ by > 3 percentage points during gentle exertion such as

- talking or walking)
- Borderline hypoxia (92 - 94%) in young otherwise healthy patients
- Moderate-severe chest pain
- Severe dehydration, or likely in future
 - Hypotension, tachycardia, dizziness, or postural changes
 - Decreased sweating, poor skin turgor, dry mouth / tongue
 - Fatigue, altered conscious state
 - Severe vomiting / diarrhoea (e.g., ≥ 4 x day, ≥ 4 days) and unable to tolerate oral intake (or not feeding / drinking)
- Low / no urine output (> 48 hours)
- Syncope (or pre-syncope / dizziness)
- Significant risk factors with inadequate support (see below)

General patient safety risk

- Comorbidities, demographic and environmental risk factors are associated with worse outcomes.
- There is no specific number or type of risk factors that dictates transport vs non-transport. The greater the number of risk factors, the higher the overall risk.
- Where there are multiple significant risk factors present and little support available, consider transport if there is no other way to address risk.

Demographic	Comorbidities	Environmental
<ul style="list-style-type: none"> • Elderly / frail (risk increases with age) • Indigenous • Morbid obesity • History of smoking • Low health literacy • Low digital literacy • Unvaccinated • Pregnant 	<ul style="list-style-type: none"> • Lungs: chronic lung disease of any cause (e.g. asthma, COPD, bronchiectasis) • Heart: conditions affecting the heart or circulatory system (CVD, IHD, CCF, HTN) • Immune system: any immunocompromise (e.g. diabetes, chronic kidney or liver disease, chemotherapy, steroids, other immune suppressants) • Mental health conditions: serious mental health problems (e.g. schizophrenia, bipolar disorder, major depressive disorder) • Disability: Significant physical or intellectual disability 	<ul style="list-style-type: none"> • Risk of violence, abuse or neglect • Poor access to care • Remote location

Severe / Critical

Severe / Critical Symptoms + Lung involvement + Hypoxia / Shock

SpO₂ < 92% Severe SOB RR ≥ 30 HR ≥ 120 BP < 90 Altered conscious state
Confusion

- COVID symptoms, lung involvement and signs of respiratory failure or shock such as hypoxia refractory to oxygen therapy, significantly altered vital signs, confusion or altered conscious state. Other typical signs of critical illness such as pallor, cold peripheries or agitation may also be present.
- Hypoxia may not respond adequately to maximal supplemental oxygen. In these cases, consider prone positioning.
- Severe patients are likely to require ICU admission. Preferentially transport patients with Severe COVID to hospitals with ICU capabilities. This includes rural hospitals with critical care capabilities and telehealth.
- The management outlined in this CPG can be applied to patients where COVID is strongly suspected. A positive PCR test is not required.

Dexamethasone

- There is strong evidence that early administration of dexamethasone to patients with moderate or severe COVID who require oxygen decreases ICU admission, need for intubation and 28-day mortality. This benefit is more pronounced in ICU patients requiring mechanical ventilation than in patients just requiring oxygen therapy. There is no benefit in patients not requiring oxygen.
- Consider administering dexamethasone to *Severe / Critical* COVID patients on oxygen where there are likely to be substantial delays to receiving it in the emergency department. This is not urgent and should not delay transport.

Prone position

- May improve oxygenation in patients with persistent hypoxia despite maximal oxygen therapy.
- Must only be attempted for patients who are alert and co-operative.
- Procedure:
 1. Ask the patient to turn onto their front and find a position of comfort
 2. Provide pillows or blankets to prop up their chest and improve comfort
 3. Laying in the lateral position is a reasonable alternative if the patient cannot tolerate the prone position
 4. Securing patient with seatbelts is still required.
- **CPR:**
 - If the patient suffers a cardiac arrest in the prone position, roll the patient and commence CPR.
 - If the patient cannot be rolled without additional help (e.g. during transport), remove any pillows/blankets commence CPR in the prone position until the patient can be rolled.

Related Resources

- [PPE Requirements](#)
- [Vehicle cleaning and decontamination](#)
- [CPR on prone position patients](#)

Walkthrough Videos

- [CPG Walkthrough - September 2021](#)
- [CPG Update - October 2021](#)

References

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Care Objectives

- Identify severity of disease and risk
- Identify an appropriate care pathway
- Provide oxygen and other supportive care as required
- Transport severe patients to ICU capable hospital (where possible)

General Notes

Intended Patient Group

- Patients < 16 years of age with confirmed or strongly suspected COVID.
- This guideline is approved for use by both ALS and MICA paramedics.

This guideline is intended to be used to triage and treat patients < 16 years of age **who have COVID**, as determined by a confirmed positive test or where it is strongly suspected. This is a higher level of suspicion than patients who simply meet PPE / testing criteria.

There are **no modifications** to the care of any patient < 16 years of age.

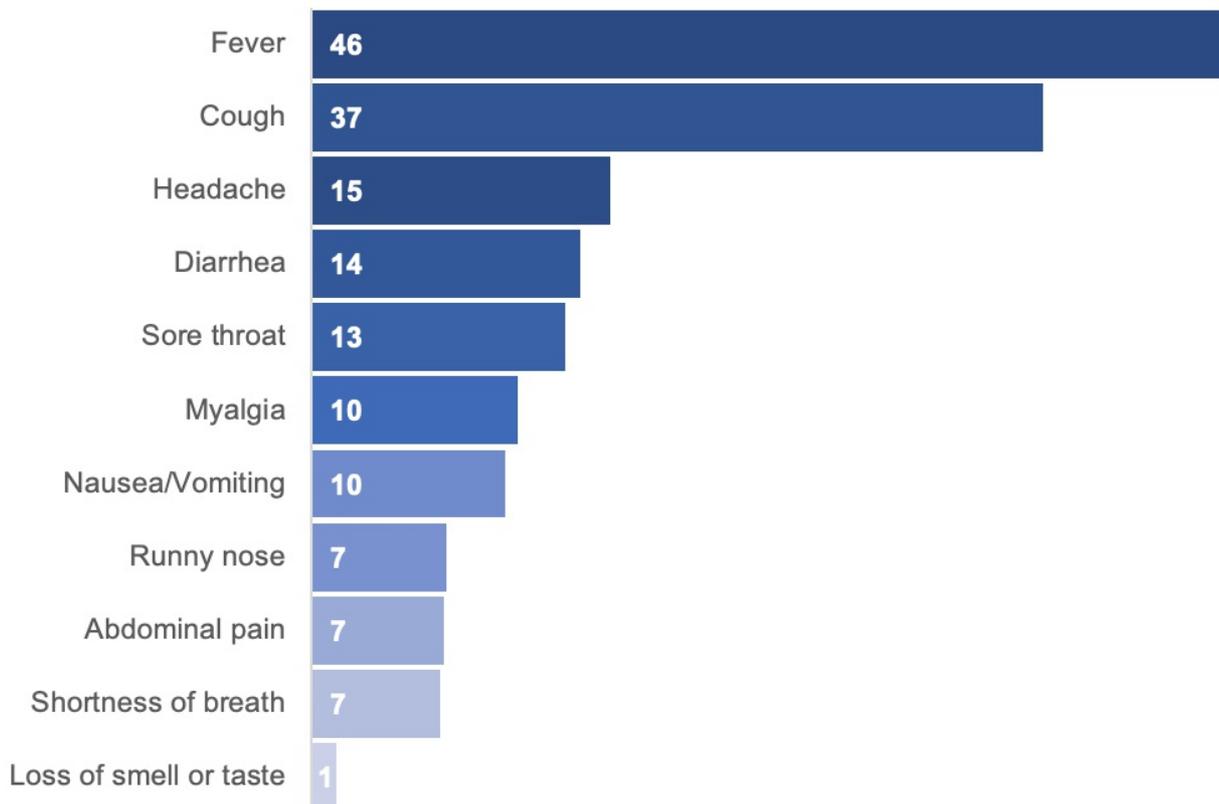
Nebulised therapy should **not** be withheld from any paediatric patients who require it.

Overview

COVID-19 is the illness caused by infection with SARS-CoV2. It has multisystem features, but upper and lower respiratory features are most prominent. Other clinical presentations include gastrointestinal illness, neurological dysfunction and cardiac dysfunction.

COVID-positive patients must be fully assessed to exclude other serious conditions, particularly as the disease has the potential to cause or exacerbate other pathologies.

Clinical features in children



Features in children

- COVID-19 affects children of all ages. Asymptomatic infection is common. Symptoms are generally less severe than in adults. Severe disease is rare (~1%).
- Shortness of breath is not included in this CPG due to difficulty in assessing this symptom reliably in younger patients and its poor predictive value in older children.
- Smaller children and infants may be less able to tolerate fluid losses associated with GI symptoms.

Mild	Moderate		Severe / Critical
Symptoms	Symptoms + Lung involvement		Symptoms + Lung involvement + Hypoxia / Shock
Cough Fever Myalgia Headache Sore throat	Low risk Mild chest discomfort Rigors Fever > 48 hours	High risk Increased WOB Moderate-severe chest pain Severe dehydration, or likely in future Low / no urine output Syncope Significant risk factors with inadequate support Croup Severe lethargy Carer concern	SpO ₂ < 96% Severe respiratory distress Any Red Flag vital signs Altered conscious state Confusion / drowsiness Cyanosed / cold / pale / mottled skin Haemoptysis Respiratory failure Agitation Pauses in breathing / irregular breathing Febrile (< 3 months old)
Self-care	Timely medical review	Hospitalisation	Urgent prehospital care
<ul style="list-style-type: none"> Self-care advice 	<ul style="list-style-type: none"> Consult receiving 	<ul style="list-style-type: none"> Transport 	<ul style="list-style-type: none"> Oxygen

<ul style="list-style-type: none"> • Safety netting • Refer to GP for follow-up if appropriate <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • Self-present if CPPP has already advised patient to call 000 	<p>hospital via the AV Clinician</p> <hr/> <ul style="list-style-type: none"> • Mx as per <i>Mild</i> if appropriate <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • Self-present if CPPP has already advised patient to call 000 <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • Transport if self-presentation is not appropriate 		<ul style="list-style-type: none"> • Prone position for refractory hypoxia • Transport to ED with ICU
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CPPP



COVID Positive Pathway Program (CPPP)

- COVID positive patients in the community should be contacted by a health service or partnering GP. However, most children are not enrolled in a CPPP unless they are at elevated risk. Assessment includes disease severity and risk factors:
 - **Mild disease / risk:** Self-care, usually not enrolled in CPPP
 - **Moderate illness / risk:** Paediatric hospital in the home (or other intensive community-based management)
 - **Severe illness / risk:** Hospital admission
- This guideline mirrors those management pathways.
- Patients with moderate disease can usually be managed in the community with intensive support. However, patients may sometimes require hospitalisation if they have high risk factors for deterioration or if there is inadequate support.

Assessment

Chest pain

- COVID may present with chest pain or discomfort of varying causes. Minor discomfort may be caused by LRTI or coughing. However, COVID may also increase the risk of cardiac complications and pulmonary embolism. Chest pain should be assessed in its own right. Do not automatically exclude more severe causes. Less concerning chest discomfort may be considered *Moderate – Low risk* while more concerning chest pain should be considered *Moderate – High risk patients*:

Chest pain

Less concerning	More concerning
Tightness on inspiration Discomfort when coughing	Constant, at rest Consistent with ACS presentation PHx same pain of cardiac cause PHx PE/thromboembolic events

Mild

Mild Symptoms only

Cough Fever Myalgia Headache Sore throat

- Mild symptoms of upper respiratory tract infection or asymptomatic.
- Normal SpO₂ for patient and no signs of lower respiratory tract infection.
- Most children with mild COVID can be managed in the community. They are generally not enrolled in a CPPP unless there are extenuating circumstances such as both parents also being COVID positive.
- Patients should be transported to hospital if they present with:
 - Clinical Red Flags as per **CPG P0108 Patient Safety / Clinical Flags**
 - *Moderate – High Risk or Severe / Critical COVID*
 - Other clinical need for transport

Referral

- **Strongly suspected COVID and no positive test:** Refer the patient for test in addition to safety netting and self-care advice.
- **COVID positive and not enrolled in CPPP:** Patients with mild illness don't require support from a CPPP. Refer the patient to a GP if required to ensure appropriate follow up.
- **COVID positive and enrolled in CPPP:** Refer the patient back to their CPPP if not transporting. Availability will depend on operating hours and differing after-hours arrangements.

Safety netting notes

Provide information regarding the symptoms and expected course of mild disease.

- **Mild deterioration**
e.g. symptoms of *Moderate – Low Risk*
Rigors, mild chest discomfort, persistent fever > 48 hours

Patient to contact GP or CPPP if enrolled

- **Significant or rapid deterioration**
e.g. symptoms of *Moderate – High Risk or Severe / Critical* disease
Increased WOB, moderate-severe chest pain / pressure, confusion, syncope, severe & prolonged GI symptoms, develops barking cough (croup), not feeding / drinking, not filling nappies or going to the toilet (reduced urine output), any significant concern the child is getting worse (carer concern).

Patient to call 000

Moderate

Moderate

Symptoms + Signs of lung involvement

SpO₂ ≥ 96% Increased WOB Rigors Fever > 48 hours

- COVID symptoms (often of greater severity) with signs of lung involvement / lower respiratory tract infection.
- SpO₂ ≥ 96% at rest
- Some patients with *Moderate Disease* may rapidly deteriorate, usually 5-10 days following onset of symptoms.

Low Risk - Moderate

- Significant signs and symptoms include:
 - Mild chest discomfort
 - Rigors
 - Fever > 48 hours
- Contact the receiving hospital to discuss care at home vs transport.
- If the patient requires assessment in hospital, consider the appropriateness of self-presentation to ED.
- If there are any concerns about the patient or carer's ability to seek further help (e.g. health literacy) or they cannot self-present (e.g. no access to transport), transport the patient in the first instance.

High – Risk Moderate

- *Moderate* COVID patients presenting with certain signs and symptoms are at high risk of deterioration to *Severe Disease* and require transport to hospital in most circumstances.
- Transport if any of the following risk factors are present:
 - Increased work of breathing
 - Moderate-severe chest pain / pressure
 - Severe dehydration, or likely in future
 - Hypotension, tachycardia, dizziness, or postural changes
 - Decreased sweating, poor skin turgor, dry mouth / tongue
 - Fatigue, altered consciousness
 - Severe vomiting / diarrhoea (e.g., ≥ 4 x day, ≥ 4 days) and unable to tolerate oral intake (or not feeding / drinking)
 - Low / no urine output (> 48 hours)
 - Syncope (or pre-syncope / dizziness)
 - Significant risk factors with inadequate support (see below)
 - Croup
 - Severe lethargy
 - Carer concern

- COVID may increase the risk of cardiac complications and pulmonary embolism. Chest pain should be assessed in its own right. Do not automatically exclude more severe causes.
- Preferentially transport patients to the Royal Children’s Hospital or Monash Children’s Hospital where possible (e.g. < 1 hour transport time). Alternatively, transport to a regional health service with critical care capabilities and telehealth.

General patient safety risk

- Comorbidities, demographic and environmental risk factors are associated with worse outcomes.
- There is no specific number or type of risk factors that dictates transport vs non-transport. The greater the number of risk factors, the higher the overall risk.
- Where there are multiple significant risk factors present and little support available, consider transport if there is no other way to address risk.
- Severe obesity, immunosuppression and complex / severe medical conditions are very significant risk factors for children. History of asthma alone is not a significant risk factor.

Demographic	Comorbidities	Environmental
<ul style="list-style-type: none"> • Indigenous • Morbid obesity • History of smoking • Low health literacy • Low digital literacy • Unvaccinated • Pregnant • Infant 	<ul style="list-style-type: none"> • Lungs: chronic lung disease (not including asthma) • Heart: conditions affecting the heart or circulatory system • Immune system: any immunocompromise (e.g. diabetes, chronic kidney or liver disease, chemotherapy, steroids, other immune suppressants) • Mental health conditions: serious mental health problems • Disability: Significant physical or intellectual disability 	<ul style="list-style-type: none"> • Risk of violence, abuse or neglect • Poor access to care • Remote location

Severe / Critical

Severe / Critical
Symptoms + Lung involvement + Hypoxia / Shock

SpO₂ < 96% Severe respiratory distress Red Flag vitals Pale/mottled/cyanosed
Febrile < 3 mths

- COVID symptoms, lung involvement and signs of respiratory failure or shock such as hypoxia refractory to oxygen therapy, significantly altered vital signs, confusion, agitation or altered conscious state. Other typical signs of critical illness in children such as pallor, cold peripheries, irregular breathing, or pauses in breathing may also be present.
- Febrile children < 3 months old are at greater risk of adverse outcomes from infections of any cause and are less likely to develop abnormal vital signs even when severely ill.
- Hypoxia may not respond adequately to maximal supplemental oxygen. In these cases, consider prone positioning.
- The management outlined in this CPG can be applied to patients where COVID is strongly suspected. A positive PCR test is not required.

Prone position

- May improve oxygenation in patients with persistent hypoxia despite maximal oxygen therapy.
- Must only be attempted for patients who are alert and co-operative.
- Procedure:
 1. Ask the patient to turn onto their front and find a position of comfort
 2. Provide pillows or blankets to prop up their chest and improve comfort
 3. Laying in the lateral position is a reasonable alternative if the patient cannot tolerate the prone position
 4. Securing patient with seatbelts is still required.
- **CPR:**
 - If the patient suffers a cardiac arrest in the prone position, roll the patient and commence CPR.
 - If the patient cannot be rolled without additional help (e.g. during transport), remove any pillows/blankets commence CPR in the prone position until the patient can be rolled.

Related resources

- [PPE Requirements](#)
- [Vehicle cleaning and decontamination](#)

References

1. Stokes EK, Zambrano LD, Anderson KN, et al. Coronavirus Disease 2019 Case Surveillance — United States, January 22–May 30, 2020. MMWR Morb Mortal Wkly Rep 2020;69:759–765. DOI: <http://dx.doi.org/10.15585/mmwr.mm6924e2>

COVID Case Study 1

Dispatch: ALS crew dispatched to patient having *'Difficulty Speaking Between Breaths With Flu Symptoms'* (Code 1)

History of presenting of illness:

- 56 YOF (confirmed COVID+) being managed at home
- Background of breast cancer
- Experienced rigors and headache initially
- Patient reports gradually worsening SOB and dry cough on days 10 & 11 of COVID symptoms, with low SpO₂ reading prompting request for AV attendance.

On Examination:

- Dyspnoea, nausea, lethargy, dry cough, increased thirst
- Right-sided chest pain, described as a 'mild tightness' during inspiration

VSS Position	Sitting	Temp	38.4	Allergies	
Pulse	102 Regular	Temp Route	Tympanic	No Known Allergies >>	
Pulse Site	Radial	BSL	6.9 mmol/l	Current Medications	
BP	113 / 58	Heart Rate	102	Sumatriptan >>	
RR	16	12 Lead Status		Anastrozole >>	
GCS Eyes	4 - Spontaneous	Rhythm	Sinus Tachycardia	Citalopram hydrobromide >>	
GCS Verbal	5 - Orientated	Ischaemia		Pre-Existing Conditions	
GCS Motor	6 - Obeys Command	Appearance	Calm / Quiet	Breast Cancer	
GCS Score	15	Speech	Clear and Continuous		
SpO₂	84%, Room Air	Rhythm	Regular		
Pain Score	No Pain	Effort	Normal		
Skin Temperature	Warm	UA Sounds	Clear		
Skin Colour	Normal	CW Status	Equal Expansion		
Skin Moisture	Normal	Sounds (R)	Crackles Basal - Coarse		
		Status	Normal Respiratory Status		

Management:

- Oxygen 4 L/min via nasal cannula
- Wheelchair extrication
- IV access
- Dexamethasone 6 mg IV
- Ondansetron 8 mg IV
- Semi-recumbent positioning with legs elevated on stretcher to manage SOB and labile BP

Discussion:

- This patient initially had mild to moderate disease (headache, rigors) but has shown a rapid deterioration in SOB and oxygen saturation around day 10.
- This is an interesting example of significant hypoxia presenting without increased work of breathing,

COVID Case Study 1

distress, or tachypnoea. The crew even note: “Nil signs of respiratory distress despite SpO₂ 85% RA”. Silent or “happy” hypoxia involves significantly reduced SpO₂ that is “well tolerated by early-stage patients with [no sensation of dyspnoea or increased respiratory work](#)”. This patient has SOB, so it is not truly silent hypoxia. However, we are seeing patients who have hypoxia with no other abnormal vital signs or symptoms at all. This underscores the importance of pulse oximetry in all COVID positive patients, regardless of presentation.

- A history of cancer here is a [predictor of deterioration](#). It is one of several risk factors included in the CPG.
- The patient responded well to supplemental oxygen with an improvement in SOB and an improvement in SpO₂ to 97%.
- Dexamethasone was appropriate given the patient was hypoxic and qualifies under the Severe disease pathway.
- This patient would have been admitted to a COVID inpatient ward on high flow nasal cannulae and monitored very closely for deterioration. She would receive a 10-day course of dexamethasone plus a course of remdesivir, an antiviral drug that reduces the need for intubation in those on oxygen. Patients with COVID who deteriorate to the extent that they need intensive care often deteriorate around day 10 post symptom onset.

COVID Case Study 2

Dispatch: ALS crew dispatched to patient '**Not Alert With Flu Symptoms**' (Code 1)

History of the presenting illness

- 54 YOF (confirmed COVID+) being managed at home with paracetamol and ibuprofen
- Background of previous PE
- Complaining of COVID symptoms for approx. 10 days, increasing lethargy, SOB and dizziness prompting call to AV.

On Examination:

- Dyspnoea, lethargy, dizziness, dry cough, loss of taste
- Diaphoretic, pale, severe respiratory distress with profound hypoxia

VSS Position	(R) Lateral	Heart Rate	104	Allergies	
Pulse	100 Irregular	Rhythm	Sinus Tachycardia	No Known Allergies >>	
Pulse Site	Radial	Ectopy	Premature Vent Contractions	Current Medications	
BP	88 / 60	Appearance	Calm / Quiet	other eliquis	
RR	40	Speech	Short Phrases	Somac Heartburn Relief >>	
GCS Eyes	4 - Spontaneous	Rhythm	Regular	Candesartan cilixetil >>	
GCS Verbal	5 - Orientated	Effort	Increased	Minims, Prednisolone >>	
GCS Motor	6 - Obeys Command	UA Sounds	Clear	Chem mart Diazepam >>	
GCS Score	15	Sounds (L)	Clear	Pre-Existing Conditions	
SpO₂	70%, Room Air	Sounds (L2)	Crackles Mid-Zone - Coarse	Hysterectomy	
Pain Score	No Pain	CW Status	Equal Expansion	Pulmonary Embolus	
Skin Temperature	Warm	Sounds (R)	Clear	COVID-19 positive >> pt stated has a weed of symptoms prior to g	
Skin Colour	Pale	Sounds (R2)	Crackles Mid-Zone - Coarse		
Skin Moisture	Clammy	Status	Normal Respiratory Status		
Temp	36.9				
Temp Route	Tympanic				

Management:

- Oxygen 5 L/min via nasal cannula
 - SpO₂ improved to 95%

Discussion:

- This patient is a clear example of Severe/Critical illness - hypoxia, hypotension and tachypnoea.
- Her hypoxia responded well to oxygen therapy. If it didn't, awake proning could be considered.
- The management of a critical COVID patient should also include treating inadequate perfusion and escalation of care (e.g. MICA back up) as you would for a patient presenting similarly of any other cause.
- In hospital it is noted that many COVID patients are quite dehydrated, likely due to several days of poor oral intake, diarrhoea and increased insensible water loss through tachypnoea. This creates a dilemma as these patients tend to have non cardiogenic pulmonary oedema (this patient had bilateral crackles) but they will often respond well to small fluid boluses. Fluid must be given with great care

COVID Case Study 2

though – e.g. 250mL boluses.

- History of PE raises an interesting potential for PE. There is clear evidence that COVID-19 increases risk of PE. While it wouldn't change their prehospital care, emphasising their history at handover is reasonable.
- Dexamethasone may have been appropriate if there was going to be a substantial delay to receiving it in ED. Dexamethasone is not essential and the judgement of the crew in this case was that the delay was not significant.

COVID Case Study 3

Dispatch: MICA crew dispatched to patient having
'Breathing Problems: Difficulty Speaking Between Breaths' (Code 1)

History of the presenting illness:

- 48 YOM (confirmed COVID+) being managed at home with paracetamol – unvaccinated
- 6 days of COVID symptoms (cough, sore throat, fever & general malaise)
- Mild shortness of breath on exertion prompting request for AV attendance

On Examination:

- Dyspnoea, myalgia, productive cough, fever, sore throat.

YSS Position	Sitting	Temp	39.3	Allergies	
Pulse	100 Regular	Temp Route	Tympanic	No Known Allergies	>>
Pulse Site	Radial	Heart Rate	100	Current Medications	
BP	109 / 80	Rhythm	Sinus Rhythm	Nil Current Medications	
RR	18	Ischaemia	No Ischaemic Changes Noted	Pre-Existing Conditions	
GCS Eyes	4 - Spontaneous	Appearance	Calm / Quiet	Nil Known	
GCS Verbal	5 - Orientated	Speech	Clear and Continuous		
GCS Motor	6 - Obeys Command	Rhythm	Regular		
GCS Score	15	Effort	Normal		
SpO₂	95%, Room Air	UA Sounds	Clear		
Pain Score	2 - Mild	CW Status	Equal Expansion		
Skin Temperature	Normal	Status	Normal Respiratory Status		
Skin Colour	Normal				
Skin Moisture	Normal				

Management:

- Referred to their COVID+ pathway program for review
- Advice provided to patient and family members

Discussion:

- This patient sits in the *Moderate - Low Risk* category. Their presentation is more concerning than normal URTI symptoms, particularly the SOB. Although not stated, it's likely the patient had a fever for greater than 48 hrs. They should be reviewed by their COVID Positive Pathway Program. The family had the capacity and willingness to self-present and to engage in the safety netting plan to call 000 if the patient's condition worsened suddenly.

COVID Case Study 4

Dispatch: ALS crew dispatched to patient having *'Difficulty Speaking Between Breaths With Flu Symptoms'* (Code 1)

History of the presenting illness:

- 58 YOF (confirmed COVID+) being managing at home with some improvement in recent days
- On day 9 of COVID symptoms, noted increase in SOB, dry cough and lethargy (over a period of approx. 12 hours) prompting call to AV.

On Examination:

- Dyspnoea, dry cough, anxiety, sore throat, diaphoresis

VSS Position	Sitting	Temp	36.5	<p style="text-align: center;"><i>Allergies</i></p> <p>No Known Allergies</p> <hr/> <p style="text-align: center;"><i>Current Medications</i></p> <p>Nil Current Medications</p> <hr/> <p style="text-align: center;"><i>Pre-Existing Conditions</i></p> <p>Nil Known</p>
Pulse	124 Irregular	Temp Route	Tympanic	
Pulse Site	Radial	BSL	8.4 mmol/l	
BP	128 / 78	Heart Rate	124	
RR	40	12 Lead Status		
GCS Eyes	4 - Spontaneous	Rhythm	Atrial Fibrillation	
GCS Verbal	5 - Orientated	Blocks	Other - Specify : ? RBB	
GCS Motor	6 - Obeys Command	Ischaemia	No Ischaemic Changes Noted	
GCS Score	15	Appearance	Anxious, Distressed	
SpO₂	70%, Room Air	Speech	Short Phrases	
Pain Score	No Pain	Rhythm	Regular	
Skin Temperature	Warm	Effort	Increased	
Skin Colour	Normal	UA Sounds	Clear	
Skin Moisture	Dry	Sounds (L)	Clear	
		Sounds (R)	Clear	
		Status	Severe Respiratory Distress	

Management:

- Oxygen 15L/min via nasal cannulae
 - persisting respiratory distress and refractory hypoxia noted, SpO₂ improved to 90%
- Wheelchair extrication
- Signal 1 transfer with notification

Discussion:

- This patient has *Severe/Critical* COVID-19 due to tachypnoea, hypoxia, and tachycardia. Interestingly, atrial fibrillation is documented but she doesn't have a history of arrhythmia and is otherwise healthy. She is also noted to have anxiety. This is perhaps an example of anxiety and agitation sometimes associated with critical illness more akin to a "feeling of impending doom". It highlights the importance of exploring causes of anxiety other than behavioural disturbance.
- Hypoxia improved with oxygen but didn't completely resolve, perhaps highlighting the seriousness of the underlying injury to her lungs. Asking the patient to adopt an awake prone position could have been considered, assuming the patient was capable of doing so.
- She deteriorated into cardiac arrest on arrival at hospital. This highlights the speed with which COVID

COVID Case Study 4

patients can progress to a critical state. It took 12 hours to deteriorate from an apparent improvement in her symptoms to cardiac arrest. It also highlights the importance of escalation of care in this group.

- It is common for patients with COVID pneumonia to deteriorate very quickly, especially around day 10 post symptom onset. A small number of COVID patients will have a cardiac arrest while in AV care or will be found deceased at home. The cause of the cardiac arrest or death for these patients isn't yet clear, but it is likely either hypoxia or massive PE. It is notable that this patient had tachycardia, new AF, RBBB, anxiety and a feeling of impending doom with a clear chest – this would be quite suggestive of a PE.

COVID Case Study 5

Dispatch: ALS crew dispatched to a case triaged by REFCOM as **'Urgent Within 25 mins'** (Code 2)

History of the presenting illness:

- 30 YOF (confirmed COVID+) and pregnant at 13/40 gestation
- On day 3 of COVID symptoms, patient requested AV attendance, reporting 2/7 progressively worsening SOB, chest pain and two pre-syncopal episodes
- Pt liaised with midwife who advised to attend ED for further investigation

On Examination:

- Fever, lethargy, dizziness and productive cough
- Heavy centralised chest pain
- Dyspnoea but no increased WOB

VSS Position	Sitting	Temp	37.2	Allergies	
Pulse	116 Regular	Temp Route	Tympanic	No Known Allergies >>	
Pulse Site	Radial	BSL	5.5 mmol/l	Current Medications	
BP	122 / 85	Heart Rate	116	Thyroxine sodium >>	
RR	22	12 Lead Status		Ferro-F-tab >>	
GCS Eyes	4 - Spontaneous	Rhythm	Sinus Tachycardia	Pre-Existing Conditions	
GCS Verbal	5 - Orientated	Ischaemia	Other - Specify : inferolateral ST depression. Elevation aVR -- Mild	Pregnancy Gravida 5 , Para 1 , >> 13/40 gestation.	
GCS Motor	6 - Obeys Command	Appearance	Calm / Quiet		
GCS Score	15	Speech	Clear and Continuous		
SpO₂	98%, Room Air	Rhythm	Regular		
Pain Score	5 - Moderate	Effort	Normal		
Skin Temperature	Normal	UA Sounds	Clear		
Skin Colour	Normal	Sounds (L)	Clear		
Skin Moisture	Normal	CW Status	Equal Expansion		
		Sounds (R)	Clear		
		Status	Mild Respiratory Distress		

Management:

- IV access
- Aspirin
- IV Morphine 2.5 mg
- Transport

Discussion:

- This patient has Moderate – High Risk COVID by virtue of her moderate chest pain, worsening SOB, and recent reported pre-syncopal episodes group. Pregnancy increases the risk of deterioration (see demographic risk factors). The nature of the chest pain (constant/at rest, abnormal ECG, and heavy nature) place the patient in the 'more concerning' category of chest pain as outlined in the guideline notes.

COVID Case Study 5

- It's worth noting that pre-syncope is not listed in the guideline flowchart but is covered in the expanded notes as a less overt but still concerning symptom.
- It's also worth noting that this patient had relatively normal vital signs but with the risk factors present she is clearly moderate – high risk and the paramedics involved definitely made the right decision by transporting her.

COVID Case Study 6

Dispatch: MICA crew dispatched to patient having '*Difficulty Speaking Between Breaths*' (Code 1)

History of the presenting illness:

- 30 YOM (confirmed COVID+) with 6 days of COVID symptoms including SOB when coughing, productive cough, lethargy, myalgia.
- Yesterday he vomited 6 times and had a syncopal episode.

History of the presenting illness:

- Worsening myalgia described as 7/10 in severity, minimally relieved by 4-hourly Paracetamol and Ibuprofen.
- Dizzy when moving, headache, diarrhoea x 2 one day ago, hearing loss, lethargy, loss of appetite.

VSS Position	Sitting	Temp	36.0	Allergies No Known Allergies >> Current Medications Nil Current Medications Pre-Existing Conditions COVID-19 positive Test Date 19/09/2021
Pulse	80 Regular	Temp Route	Tympanic	
Pulse Site	Radial	BSL	4.8 mmol/l	
BP	130 / 90	Heart Rate	80	
RR	18	Rhythm	Sinus Rhythm	
GCS Eyes	4 - Spontaneous	Appearance	Calm / Quiet	
GCS Verbal	5 - Orientated	Speech	Clear and Continuous	
GCS Motor	6 - Obeys Command	Rhythm	Regular	
GCS Score	15	Effort	Normal	
SpO₂	92%, Room Air	UA Sounds	Clear	
Pain Score	7 of 10	Sounds (L)	Clear	
Skin Temperature	Normal	CW Status	Equal Expansion	
Skin Colour	Normal	Sounds (R)	Clear	
Skin Moisture	Normal			

Management:

- Transport

Discussion:

- This patient is *Moderate – High Risk*. While his vital signs are unremarkable, he has a range of more significant symptoms indicative of moderate COVID including severe myalgia, intermittent SOB when coughing, and a productive cough. Most importantly he had a syncopal episode and presents with persistent dizziness. Transport was the appropriate course of action.
- His vomiting and diarrhea appear to be worsening. For a young otherwise health person, it is unlikely this would cause severe dehydration at the time of presentation. However, the likelihood of these symptoms going on to cause severe dehydration and the patient's ability to prevent or manage that progression would be important. This would be an important consideration had he not presented with a clear *High- Risk* symptom – syncope.

COVID Case Study 7

Dispatch: ALS crew dispatched to a case triaged by REFCOM as **'Non-Urgent, Within 1 hour'** (Code 3)

History of the presenting illness:

- 48 YOF (confirmed COVID+) being managed at home under a CPPP.
- Day 7 of COVID symptoms including fever, sore throat, dry cough, lethargy, myalgia, nausea, loss of smell.
- Myalgia well managed with paracetamol.
- Multiple episodes of vomiting (10 per day) & diarrhoea (4 per day).
- Tolerating 5 x cups water per day.
- Loss of appetite, reduced food intake but still eating small meals.
- Concern regarding potential for dehydration prompted request for AV attendance.

On Examination:

- Symptoms as above.
- Skin turgor is normal, moist mucosa.

VSS Position	Sitting	Temp	39.4	<p style="text-align: center;"><i>Allergies</i></p> <p>No Known Allergies</p> <p style="text-align: center;"><i>Current Medications</i></p> <p>Efexor >> Nexium >> Chemists' Own Paracetamol 500 mg Tablets >></p> <p style="text-align: center;"><i>Pre-Existing Conditions</i></p> <p>Ulcer ?Peptic Hysterectomy Pneumonia occurrence 6 Year/s ago</p>
Pulse	96 Regular	Temp Route	Tympanic	
Pulse Site	Radial	BSL	6.2 mmol/l	
BP	120 / 84	Heart Rate	96	
RR	16	Rhythm	Sinus Rhythm	
GCS Eyes	4 - Spontaneous	Appearance	Calm / Quiet	
GCS Verbal	5 - Orientated	Speech	Clear and Continuous	
GCS Motor	6 - Obeys Command	Rhythm	Regular	
GCS Score	15	Effort	Normal	
SpO₂	95%, Room Air	UA Sounds	Clear	
Pain Score	No Pain	Sounds (L)	Clear	
Skin Temperature	Normal	CW Status	Equal Expansion	
Skin Colour	Normal	Sounds (R)	Crackles Mid-Zone - Coarse	
Skin Moisture	Moist	Status	Mild Respiratory Distress	

Management:

- Advice provided to patient regarding symptom management, hydration, expected clinical course and steps to follow in the event of deterioration (safety netting).
- Referred back to CPPP.

Discussion:

- This patient is *Moderate – Low Risk*. The prolonged fever warrants a review. The pronounced and prolonged GI symptoms raise the possibility of significant dehydration. However, her fluid intake is reasonable and does not appear dehydrated. She is young, otherwise healthy and likely to tolerate mild dehydration without deterioration.
- The crew have documented a thorough process of care planning, safety netting and referral. The patient was health literate and there were no barriers acting on the plan agreed on with the crew.

COVID Case Study 7

- If there were any concerns about the ability to link back in with the CPPP or ability of the patient to self care, transport would also have been appropriate.

COVID Case Study 8

Dispatch: ALS crew dispatched to patient with '**Chest Pain: Difficulty Speaking Between Breaths**' (Code 1)

History of the presenting illness:

- 22 YOF (confirmed COVID+) being managed at home
- Independent, lives with others
- 2 days of COVID symptoms, unvaccinated

On Examination:

- Headache, generalised muscle aches, lethargy, dry cough, nausea, nil vomiting
- Isolated tachycardia
- No SOB

VSS Position	Sitting	Temp	36.5	Allergies	
Pulse	114 Regular	Temp Route	Tympanic	Penicillin >>	
Pulse Site	Radial	Heart Rate	114	Current Medications	
BP	110 / 70	12 Lead Status	12 Lead ECG Taken	Pregabalin >>	
RR	16	Rhythm	Sinus Tachycardia	Pre-Existing Conditions	
GCS Eyes	4 - Spontaneous	Ischaemia	No Ischaemic Changes Noted	COVID-19 positive Test Date 23/09/2021 00:00	
GCS Verbal	5 - Orientated	Appearance	Calm / Quiet	Back Pain	
GCS Motor	6 - Obeys Command	Speech	Clear and Continuous		
GCS Score	15	Rhythm	Regular		
SpO₂	97%, Room Air	Effort	Normal		
Pain Score	4 of 10	UA Sounds	Clear		
Skin Temperature	Normal	CW Status	Equal Expansion		
Skin Colour	Normal	Status	Normal Respiratory Status		
Skin Moisture	Normal				

Management:

- Referral advice – CPPP nurse, GP if nausea persists

Discussion:

- This is an example of *Mild COVID*.
- This patient is a good example of a young, otherwise healthy person who presents with normal vital signs other than her heart rate. In the context of the pandemic, COVID with mild tachycardia can still be considered mild illness in the absence of other concerning signs and symptoms. A heart rate of 114 remains a very concerning finding in other contexts.
- While the patient has nausea there is no active vomiting and therefore is unlikely to qualify as *Moderate-High Risk* under the 'dehydration, or likely in future' criterion. There were no social or demographic risk factors. She appeared health literate and capable of managing her symptoms.

Care Objective

- To ensure all patients receive a structured and comprehensive assessment of their health status that leads to their healthcare needs being addressed.

Intended patient group

- All patients

This CPG represents a minimum standard of assessment. If a full assessment is not completed or is deemed unnecessary the rationale **MUST** be documented.

Pre-arrival

Biases & human factors

- Cognitive bias and human factors have a significant impact on decision making and should be considered and discussed frequently throughout the entire process of patient care.
- Early diagnostic closure based on dispatch information presents a particular risk to patient safety.
- Patients from marginalised populations are at greater risk of harm from unconscious bias. These risks include low socioeconomic status, culturally and linguistically diverse, Aboriginal or Torres Strait Islander, substance affected, have a mental health related presentation or behaviours of concern.
- Human factors and their potential impact on patient care should be considered and acknowledged prior to arrival and throughout patient assessment:
 - Hungry
 - Angry
 - Late
 - Tired
 - Stressed

Assessment

Information on the patient's health status is collected in a structured, reproducible and comprehensive way.

- Assessment is a cyclic process. Certain information may need to be prioritised upon initial assessment in high acuity patients or where urgent care is required (e.g. extreme pain). Where this is the case, a second or third cycle should involve more thorough and complete information collection.

Rapid assessment

- Immediate impression based on the presence of altered conscious state, increased work of breathing and obvious skin signs (e.g. diaphoresis, cyanosis) that informs:
 - The need for a formal primary survey
 - The urgency with which the patient should be assessed and the need for simultaneous collection of information

Primary survey

- If a patient deteriorates the default position should be to return to the primary survey for reassessment.
- **Exposure:** Refers to both exposing the patient for assessment (e.g. to locate possible major haemorrhage) and exposure to environmental conditions. Patient dignity should be maintained as much as possible while managing the risk of potential life-threatening conditions. Prevent hypothermia following exposure.

History of the presenting illness

- Avoid interrupting or redirecting the patient where possible during initial history taking.
- **Appears well / non-serious complaint:** Avoid concurrent vital signs and other assessment elements where possible to allow for uninterrupted, thorough history taking.
- **Appears unwell / serious complaint:** Concurrent assessment as required (e.g. 12 lead ECG in chest pain, SpO₂ in acute SOB).

Accountability and responsibilities

- All paramedics at scene are accountable for ensuring the patient receives appropriate and safe care. Where two paramedics attend a case, both should be present for assessment if possible to allow for shared decision making.
- **Attendant 1:** Assess the patient directly, taking the lead in history taking and physical examination.
- **Attendant 2:** Observes assessment and scene with minimal cognitive load, collects information and identifies missed information, errors or opportunities.

Vital signs & adjuncts

- BSL must be measured in patients with:
 - Altered conscious state
 - History of diabetes
 - Medical patients with undifferentiated acute illness

Physical examination

- **Focussed examination:** found in specific CPGs indicated for particular complaints (e.g. ACT-FAST/MASS, AEIOUTIPS, Spinal neurological examination, etc.)
- **General physical examination:** Any other physical assessment informed by the paramedic's evolving understanding of the patient's presenting illness

Social / Environmental factors

- May present a range of hazards and health risks which influence their care plan as much as the diagnosis or clinical problems.

Diagnosis

Information related to the patient's presentation is subjected to a process of critical analysis to identify and define the patient's healthcare needs.

- **Diagnosis:** Any clinically useful characterisation of the patient's health status that leads to a care plan that meets the patient's needs. This includes a likely underlying pathology and/or a simple statement of clinical problems to be addressed.
- All stages of the diagnostic process should be discussed between AV staff and with the patient / family where possible and appropriate.

Risk

- The identification of risk and the subsequent escalation of care is more important than a precise diagnosis and allows for safe decision making where there is diagnostic uncertainty (this is expected to be frequent).
- Initial assessment captures a single moment in time. The patient's trajectory or expected clinical course should be considered despite an unremarkable initial assessment.

Differential Diagnosis

- Diagnostic uncertainty is common and should be acknowledged. Where the underlying cause is uncertain, a care plan may be based on clinical problems (e.g. hypotension) and/or risks (e.g. elderly and frail).

Clinical judgement

- Clinical judgement is a subjective process to establish the most appropriate and accurate characterisation of the patient's condition that leads to a safe and effective care plan.
 - Most appropriate diagnosis based on a balance of the urgency and likelihood of possible conditions
 - A hierarchy of clinical problems requiring management
 - The risks to patient safety
- Expert consultation and/or the escalation of care (e.g. transport) is recommended where clinical judgement does not lead to a satisfactory diagnosis, clinical problem and risk profile (e.g. staff on scene cannot agree).

Care pathway

A care plan that addresses the patient's needs is developed, applied and evaluated.

- **Treatment:** Apply the appropriate CPG, CWI, direct care (e.g. wound dressing) or the patient's own care plan as required (e.g. palliative patients, medically prescribed crisis medications)

Escalation of care

- Escalation of care should occur as soon as possible after recognition of deterioration. This may include transport to ED or specialist facility, MICA, HEMS, PIPER, expert consultation, etc.
- Family members / carers may be able to identify deterioration earlier in the patient's course. Family / carer concern should be considered in decisions relating to escalation of care.
- Care can be escalated at any stage and for any reason at the judgement of the paramedic.

Referral

- A referral resource containing a summary of the assessment, care plan, safety netting and referral instructions **MUST** be provided and explained to the patient in all instances of non-transport including refusal.
- **Safety netting:** A plan to address unexpected but possible adverse events or deterioration. Apply the concept of safety netting in all patients who are not transported to hospital.
- A patient treated with the intention of referral away from ED must be reassessed prior to departure. If the patient has deteriorated or has not responded to treatment as expected, then revise the care plan and transport them to ED.

Access to care

- In order to be safe and effective, the care plan must be feasible and the patient must have access to the resources necessary to enact the plan. The following barriers should be considered:
 - Socio-economic status & health literacy
 - Logistic issues (e.g. opening times, transport)
 - Patient's location in relation to health services
 - Linguistic or cultural barriers
 - Disability related barriers

Reassessment

- 15-minutely VSS reassessment is the minimum standard. Where it is impossible or clinically unnecessary, the rationale **MUST** be documented. Where a patient is considered unwell or deteriorates, reassessment should be performed more frequently and care escalated as appropriate.
- Reassessment should include:
 - SpO₂, HR, BP, RR, GCS and any other observation that was initially found to be abnormal (e.g. haemorrhage, pain, SOB)
 - The efficacy and safety of any treatments (e.g. tourniquets, CPAP, splint, thoracostomies, ETT)

Transfer of care

Continuity of care is supported through a seamless and safe transfer of care.

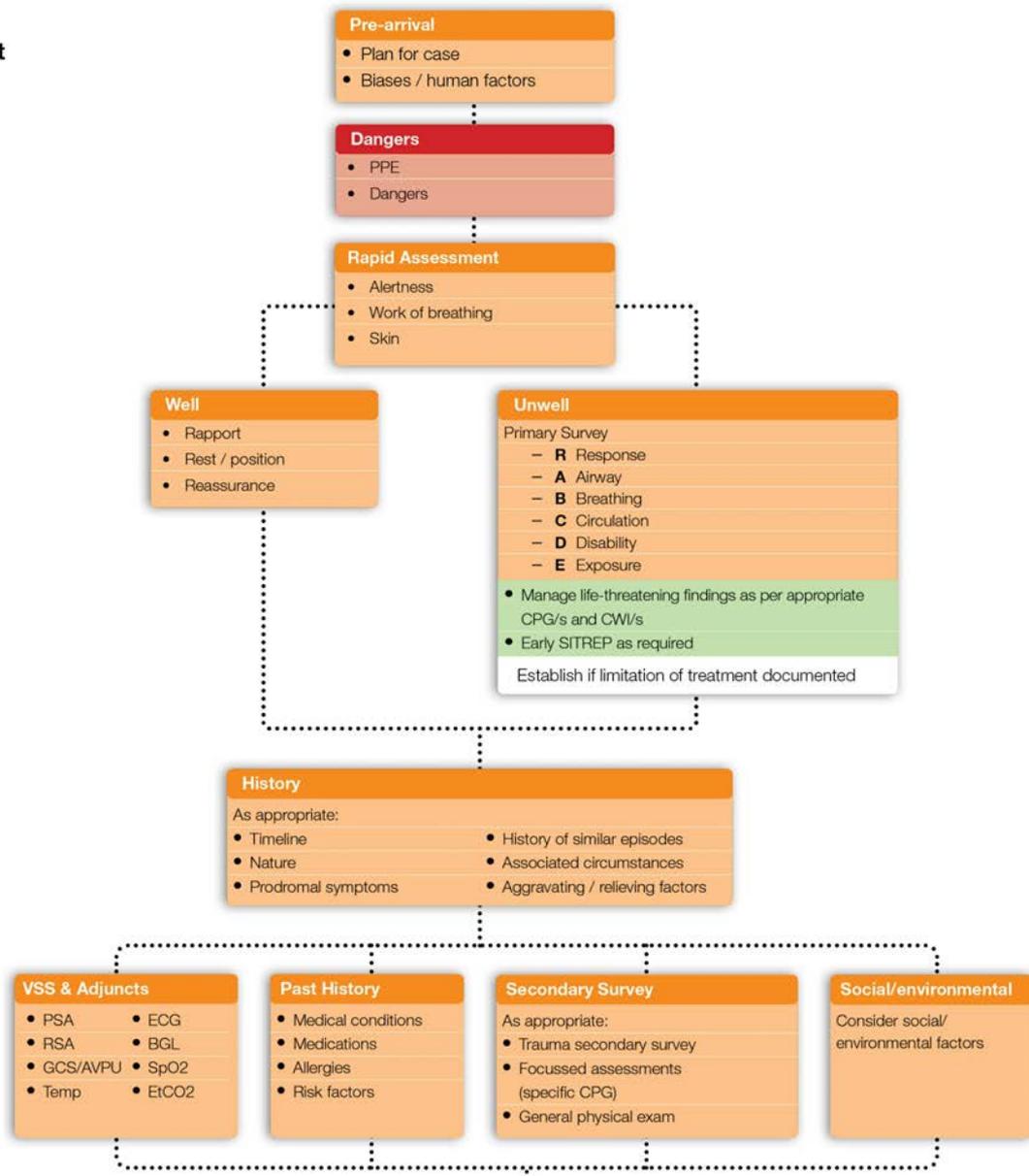
- Where the patient is referred into the community, the effective transfer of information from paramedics to other healthcare professionals is as important as handover in an ED.
- Attempt to make direct contact with the healthcare professional and include relevant information regarding the patient's presentation in the referral resource.
- Avoid the transmission of bias to other healthcare professional by the use of biased language at handover or in documentation.

Flowchart

AV staff have a shared responsibility for all aspects of patient care, patient safety, and paramedic safety.

Dynamic Risk Assessment

Assessment



Diagnosis

Discuss each stage with other AV staff and patient where possible

Care Pathways

Transfer of care

⋮

Risk and Patient Safety

Clinical red flags mandate transport

- Summarise findings and pertinent negatives
- Identify and verbalise risk as per **CPG A0108 Clinical flags / Patient Safety**
- Time criticality as per **CPG A0105 Time critical guidelines**

⋮

Differential diagnosis

- Identify possible causes
- Refine list of possible causes
- Prioritise based on urgency and likelihood
- Identify provisional diagnosis and/or clinical problems

⋮

Clinical judgement

- Establish the best balance of the following that most accurately characterises the patient's presentation:

Risks	Diagnosis	Clinical problems

The diagnosis, clinical problems and risks MUST account for all clinical findings

⋮

Plan

- **Discuss** possible care pathways / treatment options and risks / benefits
- **Consent** as per **CPG A0111 Consent and capacity**
- **Decide** and establish collective understanding of plan amongst AV staff and patient
- **Prepare** logistics, resources, task allocation and contingency planning as required.
 - Consider extrication as per **CPG A0112 Ambulation Risk Assessment**

The care pathway MUST address ALL risks, diagnoses and clinical problems

⋮

Implement

- **Escalation of care** (as required)
- **Treatment**
- **Transport / Referral**

⋮

Reassess

- **Monitor** trends (minimum 15 minutely VSS)
- **Identify** deterioration and escalate care as required
- **Review** diagnosis and evaluate / adjust treatment

⋮

Transfer of care

- **Handover** (IMIST-AMBO)

OR

- **Referral** – complete Referral Resource and make direct contact with HCP where possible

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/CPG Clin approach consent and capacity_clin flags.pdf

General Notes

These observations and criteria need to be taken in context with:

- The patient's presenting problem.
- The patient's prescribed medications.
- Repeated observations and the trends shown.
- Response to management.

BP alone does not determine perfusion status.

Perfusion definition

The ability of the cardiovascular system to provide tissues with an adequate oxygenated blood supply to meet their functional demands at that time and to effectively remove the associated metabolic waste products.

Perfusion assessment

Other factors may affect the interpretation of the observations made, including:

- ambient temperature
- anxiety
- any cause of altered consciousness.

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

Respiratory 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 No crackles or scattered fine basal crackles, e.g. postural	Able to cough Asthma: mild expiratory wheeze LVF: may be some fine crackles at bases	Able to cough Asthma: expiratory wheeze, +/- inspiratory wheeze LVF: crackles at bases - to mid-zone	Unable to cough Asthma: expiratory wheeze +/- inspiratory wheeze, maybe no breath sounds (late) 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 – 100 bpm	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

Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC CPG A0103 Respiratory Assessment May 2015.pdf>

Glasgow Coma Scale

The GCS is an objective measure of consciousness. The score should not be estimated.

The principle in each category of the GCS is that the patient should receive the highest score in that category based on their response.

The application of painful stimuli should be performed in a professional manner as part of a clinical assessment.

Painful stimuli should not be repeatedly applied to a patient if the expected response is not elicited.

A low score on the GCS in isolation does not dictate the need for airway management. Airway management should be considered based on the clinical presentation, of which GCS is one part.

If the patient has clinical or social issues such as aphasia/ dysphasia, facial injuries or language barriers then AVPU is an appropriate tool to assess consciousness.

Eye opening	
Spontaneous	4
To voice	3
To pain	2
None	1
Verbal response	
Orientated	5
Confused	4
Inappropriate words	3
Incomprehensible sounds	2
None	1

Motor response	
Obeys command	6
Localises to pain	5
Withdraws to pain	4
Flexion to pain	3
Extension to pain	2
None	1

AVPU (Alert, Voice, Pain, Unresponsive)

AVPU is quick and simple to apply and is appropriate to determine conscious state whilst initial assessment is conducted and treatment is being established. A formal GCS should be undertaken in more complex presentations.

As a generalisation patients responding to voice correlate to an approximate GCS of 10 – 14, responding to pain GCS 7 – 9 and unresponsive patients will be below GCS 7. These approximations do not replace a formal GCS for advanced clinical decision making such as RSI.

AVPU is an appropriate assessment for both adult and paediatric patients, and is the preferred option for paediatric patients where adapting the GCS can be problematic.

When assessed, is the Pt:

AVPU	
alert?	A
responds to voice?	V
responds to pain?	P
unresponsive?	U

Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC CPG A0104 Conscious State May 2015.pdf>

General Notes

The concept of the Time Critical patient allows the recognition of the severity of a patient's condition or the likelihood of deterioration. This identification directs appropriate clinical management and the appropriate destination to improve outcome. Covered within the Time Critical Guidelines are:

- Triage decisions for a patient with major trauma.
- Triage decisions for a patient with significant medical conditions.
- Requests for additional resources including MICA and Aeromedical services.
- Judicious scene time management (e.g. should not exceed 20 minutes for non-trapped major trauma patient).
- Appropriate receiving hospital and early notification.

It is important to note that the presence of time criticality does not infer a directive for speed of transport, but rather the concept implies there be a "time consciousness" in the management of all aspects of patient care and transport.

Time critical definitions

Actual	At the time the vital signs survey is taken, the patient is in actual physiological distress.
Emergent	At the time the vital signs survey is taken, the patient is not physiologically distressed but does have a pattern of injury or significant medical condition which is known to have a high probability of deteriorating to actual physiological distress.
Potential	At the time the vital signs survey is taken, the patient is not physiologically distressed and there is no significant pattern of actual Injury/illness, but there is a mechanism of injury/illness known to have the potential to deteriorate to actual physiological distress.

Trauma triage

Patients meeting the criteria for major trauma should be triaged to the highest level of trauma care available within 45 minutes transport time of the incident in accordance with Victorian State Trauma System requirements and AV policies and procedures.

The receiving hospital must also be notified to ensure an appropriate reception team and facilities are available.

All maternity patients who meet the time critical trauma criteria, or any patient who is > 24 weeks gestation with any trauma or potential harm to the unborn child, should be transported to the Royal Melbourne Hospital if within 45 minutes. If > 45 minute travel time, transport to the nearest alternative highest level of trauma service. Pregnant women must not be taken to The Alfred Hospital unless in cardiac arrest and the Alfred is closest.

Mechanism of injury (MOI)

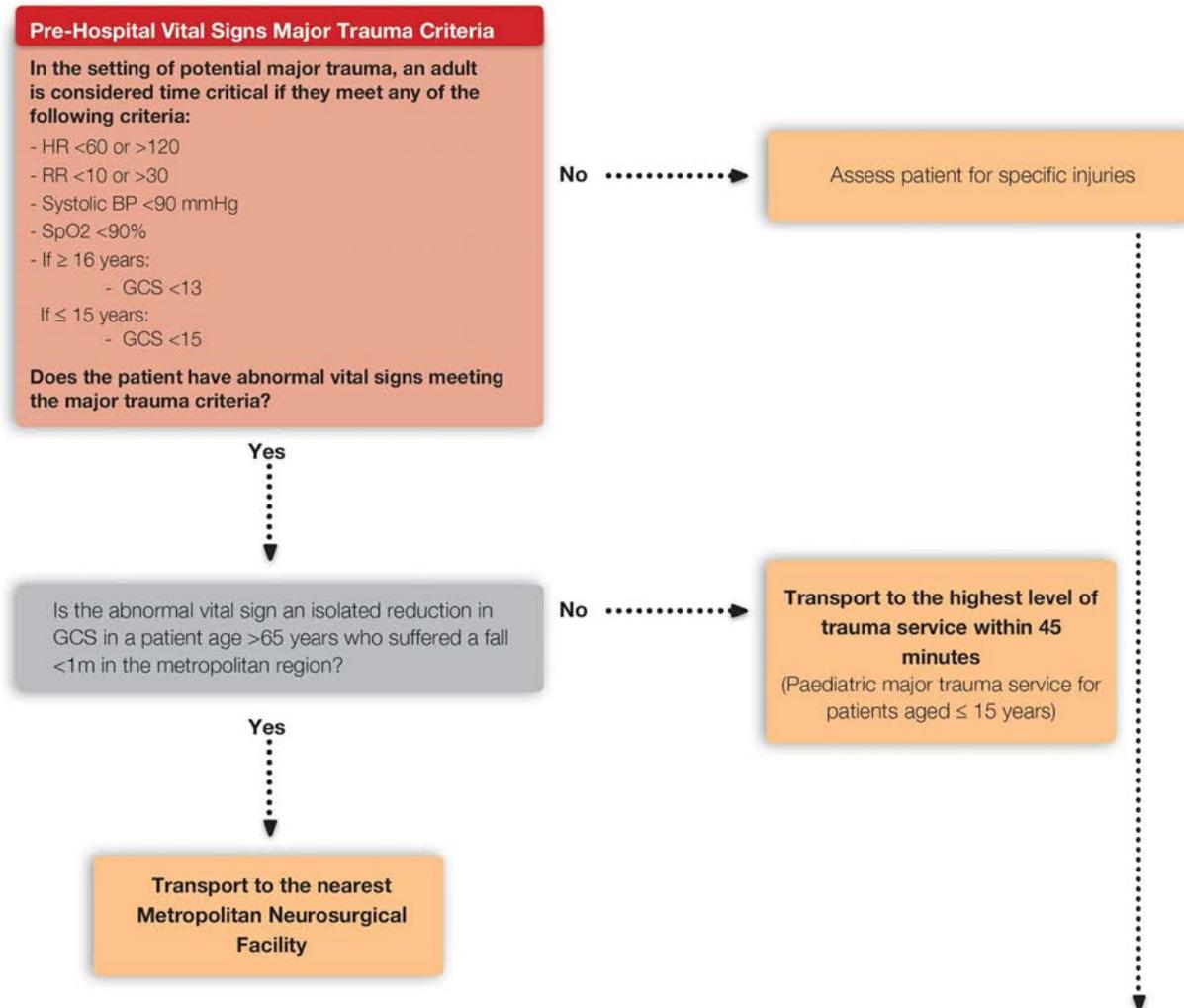
A patient under the Trauma Triage Guidelines meets the criteria for major trauma if they have a combination of MOI and other co-morbidities constituting:

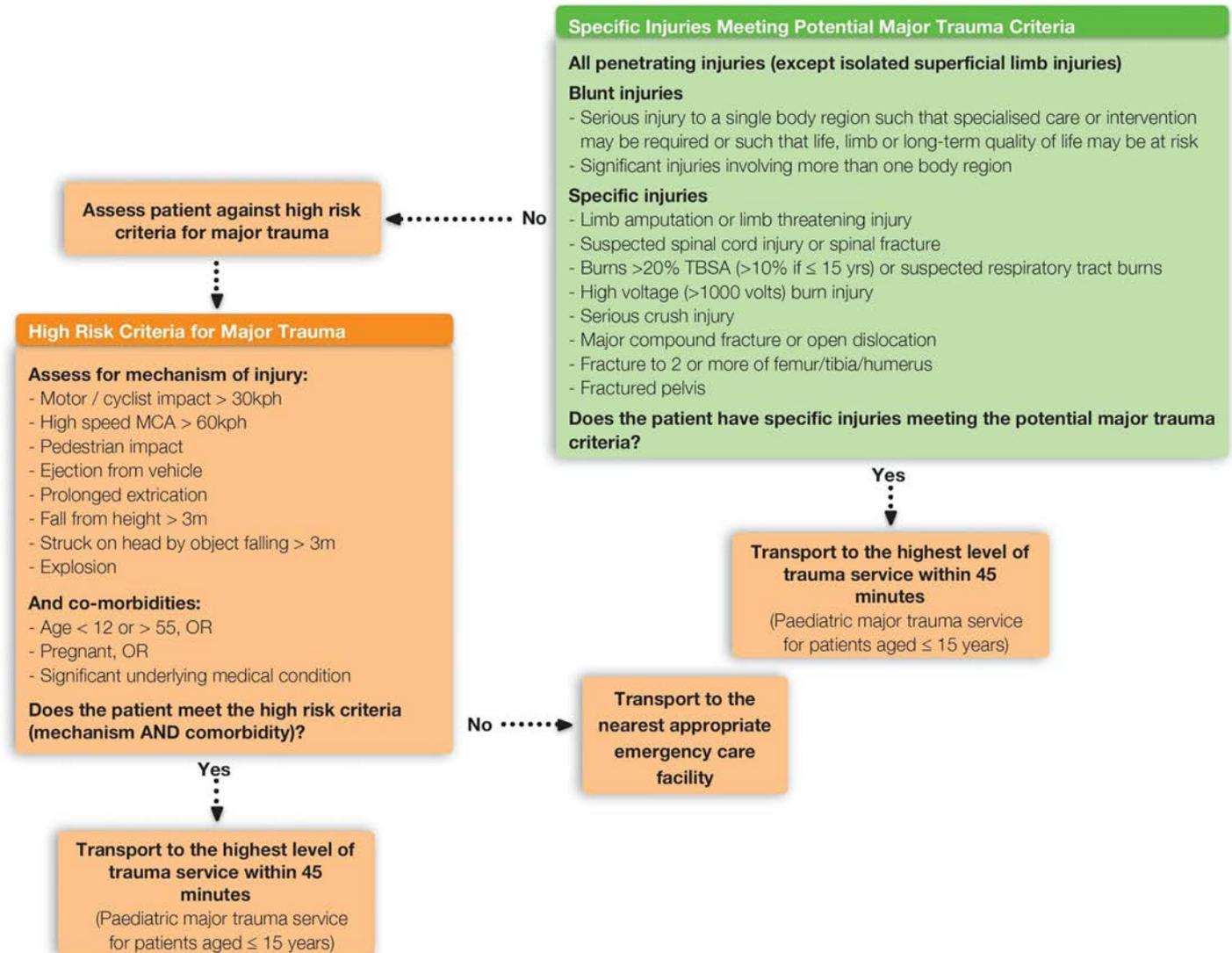
- Systemic illness limiting normal activity / systemic illness constant threat to life. Examples include:
 - Poorly controlled hypertension
 - Obesity
 - Controlled or uncontrolled CCF
 - Symptomatic COPD
 - Ischaemic heart disease
 - Chronic renal failure or liver disease
- Pregnancy
- Age < 12 or > 55

Medical triage

Patients meeting the time critical criteria for medical conditions are regarded as having, or potentially having, a clinical problem of major significance. These patients are time critical and should be transported to the nearest appropriate hospital. Critically unwell patients who are pregnant should not be transported past a level 1 or level 2 ED to a primary obstetric facility. Transport all maternity patients who meet the medical time critical criteria to the nearest major emergency department capable of accepting a critically unwell adult patient and with some associated obstetric support. Ideally this will be an emergency department linked with a level 1 obstetric facility such as the Royal Melbourne ED (RWH), Austin ED (Mercy) or Monash Clayton. This should occur even if it is believed that the criticality is caused by a maternity condition e.g. ectopic pregnancy.

Flowchart





General Notes

- Almost half of Australians aged 16-85 will experience a mental health disorder at some point in their life. Mental health related cases comprise approximately 10% of the AV caseload.
- The most effective way to ascertain if a patient is considering self-harm is to ask them directly. Questions such as “Are you thinking of killing yourself?” or “Have you thought about how you would do it?” helps to avoid misinterpretation and they do not encourage a person to engage in self-harm.
- The Mental Status Assessment is a systematic method used to evaluate a patient’s mental function. In undertaking a mental status assessment, the main emphasis is on the person’s behaviour. This assessment is designed to provide Paramedics with a guide to the patient’s behaviour, not to label or diagnose a patient with a specific condition.
- The Mental Status Assessment is to be used to indicate some of the clinical triggers that determine the necessity of a patient being transported to hospital. Mental health encompasses a varied range of conditions and presentations and these guidelines are not prescriptive for all complaints or statuses. It is expected that Paramedics will continue to use their clinical judgement for the most appropriate treatment options for this patient cohort.
- Patients with a history of mental illness are overrepresented in mortality rates in a number of areas and should not be underestimated due to their underlying mental health history. If the patient has a primary complaint other than a mental health crisis then this should be assessed appropriately as per any other patient, with a conscious acknowledgement that the patient is at higher risk of death from a variety of causes if they are not treated seriously.
- Patients demonstrating high-risk symptoms should not be considered for non-transport options. Consideration for police support should be made early if it is apparent that the patient is resistant to transport to an ED.
- Patients meeting the criteria for needing immediate support may be considered for non-transport if the available options for further care are in both the patient and Paramedic's judgement suitable to meet the needs of the patient and address the crisis. If the available care options are inadequate or unavailable then transport remains the default option.

Assessment table

LOOK FOR, LISTEN TO & ASK ABOUT ALL CATEGORIES BELOW THE PATIENT MAY BE SUFFERING FROM SOME OF THE FOLLOWING EXAMPLES <i>*Remember verbal de-escalation strategies, active listening and calm/open body language*</i>		
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 overuse 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 exhibiting signs of impairment such as; poor ability to organise thoughts, short attention span, poor memory, disorientation, impaired judgement, lack of insight.
DISCUSS	Thought Content	May be dominated by; delusions, obsessions, preoccupations, phobias, suicidal/depressed 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).

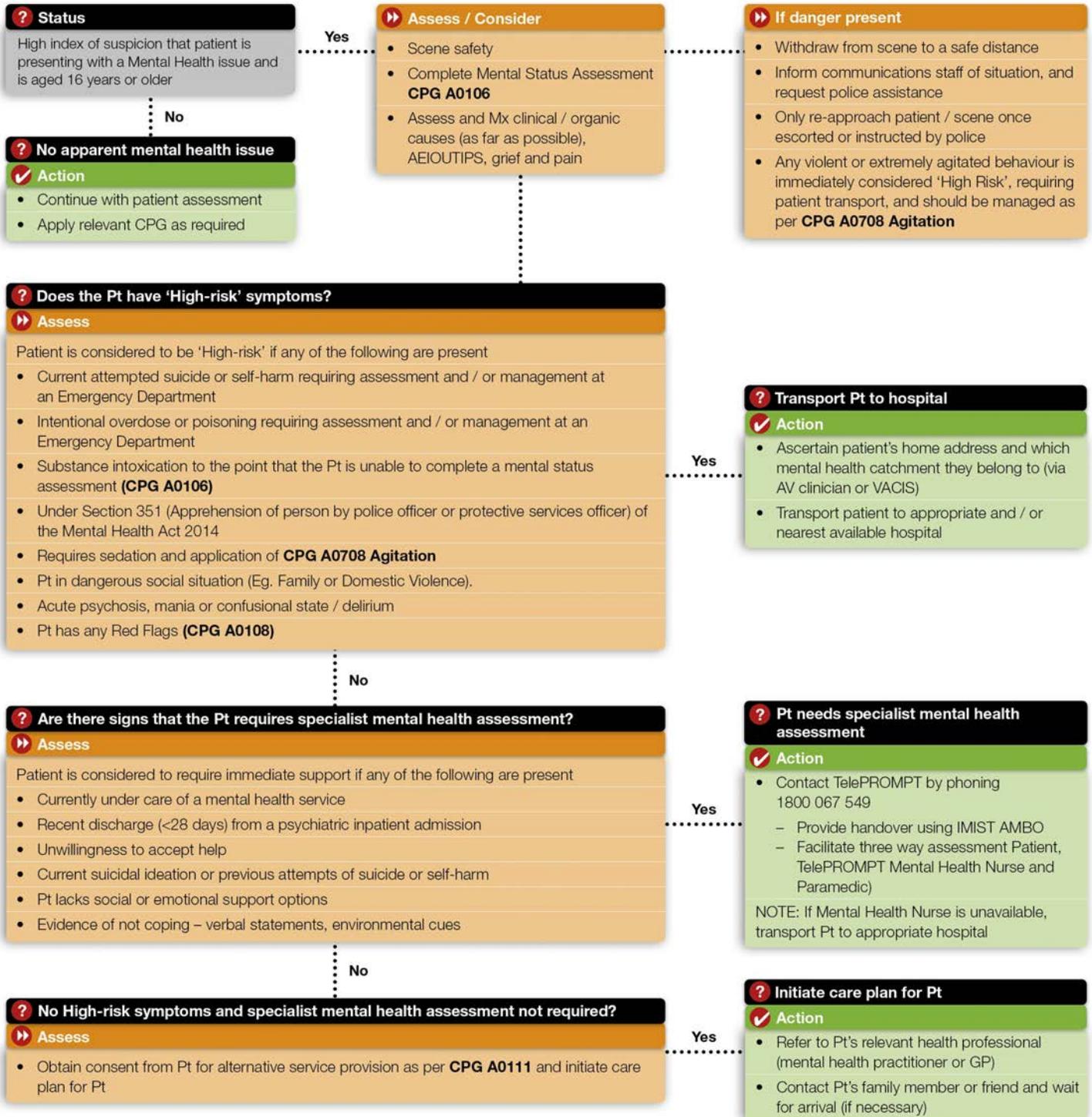
Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC CPG A0106 Mental Status Assessment Sept 2015.pdf>

General Notes

- NB. A care plan established by a specialist mental health service (such as TelePROMPT) may occasionally include a request for the attending paramedics to administer olanzapine and permit the patient to be left at home.
- Use the **Mental Health Destination Tool**, VACIS or AV Clinician to select appropriate destination if transporting the patient to hospital.

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/Mental Health CPG - MAC paper.pdf>

Care Objectives

- To accurately assess patient safety risk
- To transport patients who are at risk of deterioration or adverse outcome

General Notes

Intended patient group

- All patients

Patient Safety Risk

- The Patient Safety Risks are a selection of general risk factors that should be considered as part of the Diagnostic Phase for all patients. No specific combination of risks mandates transport, but any patient judged to be at risk of deterioration or adverse outcome should be transported to hospital.
- The presence of significant risk of any kind should outweigh an apparently benign diagnosis in determining the care plan.

Diagnostic uncertainty

- Diagnostic uncertainty is a significant source of risk. The recognition of significant risk (i.e. where a diagnosis is uncertain or the patient otherwise presents an unacceptable level of risk independent of their diagnosis) should prompt a change in the care plan. This will frequently include transport to hospital.

Elderly / frail

- **Increased diagnostic uncertainty:** Elderly and frail patients have a higher risk of occult illness and atypical presentations.
- Communication barriers, challenges in accessing appropriate health services and social / environmental issues are also a source of risk in this group.
- **Increased risk of deterioration:** Elderly and frail patients typically have reduced coping capacity and physiological reserve.

Clinical course / deterioration

- Many patients will present without any obvious concerning findings at the time of assessment but may go on to deteriorate in a predictable way. In addition to the patient's condition at the time of assessment, paramedics must consider the likely or possible clinical course and where the patient currently sits on that trajectory. An appropriate care plan may include transporting patients who do not have concerning findings at the time of assessment but who still present a reasonable risk of deterioration.

Bias and human factors

- Biases can influence assessment and decision making. No individual is immune to bias, but recognising and acknowledging that a bias is present can help to mitigate the impact on subsequent decisions.
- Patients with mental health problems, substance dependence and Aboriginal and Torres Strait Islanders are at particular risk of the unconscious bias of health care professionals.

Clinical Flags

- **Red Flags** mandate transport. Where paramedics believe transport is not required, they must contact the AV Clinician.
- The Red Flags are not an exhaustive list. Where patients present with abnormal vital signs that do not meet Red Flag criteria, staff are encouraged to maintain a high index of suspicion for serious illness. Similarly, there are other specific conditions that will require transport not listed here.
- If a patient does not meet any Red Flags, but staff have a non-specific concern (“gut instinct”) about their health or welfare, the patient should be transported to ED.
- The Red Flags do not indicate a need for MICA, however, any patient with deranged vital signs is at risk of deterioration. Escalation of care, including MICA, should be considered.
- **Ectopic pregnancy:** Women of reproductive age presenting with any combination of pain in the abdomen/pelvis/shoulder tip/rectum, PV bleeding, or dizziness/syncope should be considered at risk of having an ectopic pregnancy.
- Some patients will meet the abnormal vital sign criteria at initial presentation but will respond well to treatment, such as heroin overdose or hypoglycaemia. It is reasonable to treat these patients and reassess, with transport or non-transport decisions being based on subsequent sets of vital signs. If patients do not respond to treatment as expected, transport is required.
- **Yellow Flags** do not mandate transport. However, patients with one or more yellow flags must be advised to attend hospital or GP within two hours via their own transport arrangements. If this is not possible for any reason, the other options to escalate care should be explored (e.g. Patient Transport or transport via emergency ambulance).
- For the purposes of the Yellow Flags, “immunocompromised” includes:
 - Chemotherapy or radiotherapy for cancer
 - Organ transplant
 - HIV / AIDS
 - Rheumatoid arthritis therapies (other than NSAIDs)

Patient Safety Risk

Patients at risk of deterioration or adverse outcome if not transported must be taken to hospital by ambulance. Transport by other means may be appropriate in some circumstances.

Consider risk of **diagnostic error**:

- Diagnostic uncertainty
- Bias and human factors
- Elderly or frail (incl. age, comorbidities and baseline functioning)
- Communication difficulties (e.g. non-verbal, NESB, intellectual disability, developmental delay, dementia)
- Current drug or alcohol intoxication
- History of mental health problems
- Aboriginal or Torres Strait Islander
- Multiple comorbidities / complex medical history / ≥ 5 medications
- Rare medical condition
- Highly emotive scene

Consider risk of **deterioration**:

- Expected clinical course / trajectory
- Borderline vital signs
- Past history of falls, stroke, TIA, AF, anticoagulation
- Failure to respond to community based treatment as expected

Consider **social / environmental risk**:

- Risks to the safety of the patient
- Poor health literacy
- Adequate shelter and warmth

Consider **access to care**:

- The supply of required medications
- Ability to access necessary health services or further help if required

Red Flags

Patients meeting any of the following criteria must be **transported to hospital by ambulance***. Consider notification.

- Abnormal vital sign

HR bpm	RR breath / min	SBP mmHg	SpO ₂	GCS
> 120	> 30	< 90	< 90 % Unless chronic hypoxaemia	< 13 (<15 if age ≤ 15 years)

N.B. In the setting of trauma consider **CPG A0105 Time Critical Guidelines (Trauma Triage)**

Specific Conditions:

- Stridor
- First presentation seizure
- Anaphylaxis (including resolved or possible anaphylaxis or the post-adrenaline patient)
- Acute coronary syndrome (even if resolved)
- Ectopic pregnancy
- Primary obstetric issue
- Stroke / TIA
- Sudden onset headache
- Unable to walk (when usually able to walk)
- Post-tonsillectomy bleeding (of any amount) up to 14 days post-operation

*** Where the patient refuses transport or paramedics believe transport is not warranted, the AV Clinician must be contacted.**

Yellow Flags

Patients meeting any of the following criteria must be advised to attend **hospital or GP within two hours** via own transport arrangements.

- Ongoing patient or carer concern
- Infection not responding to community based care (e.g. oral antibiotics)
- Immunocompromised with suspected infection (attend hospital with relevant history where appropriate)
- Surgical procedure within past 14 days
- Significant unexplained pain (e.g. ≥ 5)
- Syncope (asymptomatic, normal vital signs, normal ECG)
- Abdominal pain

AND patient must:

- Have capability to attend hospital / GP
- Be read Referral Advice Script

Referral Advice Script

"Our assessment indicates that you do not currently require transport to hospital in an emergency ambulance.

However, we believe you need to be reviewed by a medical doctor within the next two hours, and we would recommend that you attend your GP or the emergency department in your own vehicle.

If you are unable to do so on your own we will assist you."

This script does not remove the need to seek valid consent including a full explanation of the clinical findings, possible diagnosis, limitations of assessment, and any risks associated with a care pathway.

No flag criteria met

Where the patient does not meet any Red or Yellow Flags and is assessed as being suitable for non-transport, consider encouraging patient to see GP for follow-up within 48 hours.

Related Resources

- [CPG Walkthrough - Clinical Flags / Patient Safety](#)
- https://av-digital-cpg.web.app/assets/pdf/MAC/CPG Clin approach consent and capacity_clin flags.pdf
- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC June 2018 CPG A0108 Clinical Flags Mandated transport for patients with abnormal vital signs.pdf>



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



2 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.



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



4 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.



5 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.



6 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.



7 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).



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



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

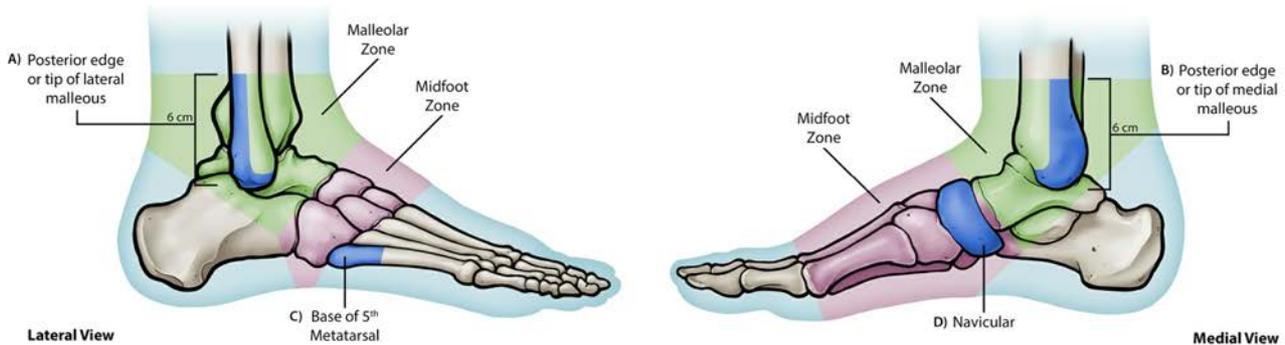
Scoring frailty in people with dementia

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. They can do personal care with prompting.

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

Flowchart



A) An ankle x-ray series is only required if there is any pain in malleolar zone and any of these findings:

1. bone tenderness at **A**
OR
2. bone tenderness at **B**
OR
3. inability to bear weight on both immediately and in ED

B) A foot x-ray series is only required if there is any pain in midfoot zone and any of these findings:

1. bone tenderness at **C**
OR
2. bone tenderness at **D**
OR
3. inability to bear weight on both immediately and in ED

Recommendations

Apply the Ottawa Ankle Rules accurately:

- palpate the entire distal 6cm of the fibula and tibia
- do not neglect the importance of medial malleolar tenderness
- do not use for patients under age 18

Clinical judgement should prevail over the rules if the patient:

- is intoxicated or uncooperative
- has other distracting painful injuries
- has diminished sensation in the legs
- has gross swelling which prevents palpation of malleolar bone tenderness

Give written instructions and encourage follow-up in 5 to 7 days if pain and ability to walk are not better.

Care Objectives

- To gain valid consent where possible
- To establish decision-making capacity where required
- To support the patient's right to make informed decisions regarding the care they receive

General Notes

Intended patient group

- All patients (or their legal guardian / medical treatment decision maker)

Emergency treatment

- Consent is not required to provide Emergency treatment that is needed urgently. Paramedics should still attempt to explain the treatment and reassure the patient where possible.
- While consent is not required, a patient with decision-making capacity may still refuse treatment in an emergency. This is expected to be very rare.
- **Agitation:** Sedation and restraint of the agitated patient constitutes emergency treatment. Where possible an attempt to de-escalate the situation should still occur.

Advance care directives (ACDs)

- If a patient does not have decision-making capacity, paramedics must make a reasonable effort in the circumstances to locate an ACD or a medical treatment decision maker. The amount of time spent doing this depends on the urgency of treatment and on clinical judgement.
- Treatment should not proceed if an ACD exists that specifically refuses that treatment, however emergency treatment should not be delayed to search for an ACD.
- Where an ACD is not immediately available, paramedics may accept, in good faith, advice from those present at the scene that a relevant ACD exists.
- Paramedics must comply with an ACD even if the patient's condition is unrelated to any underlying condition for which the ACD was completed.
- An ACD refusing care does not apply where the patient has attempted suicide and in these circumstances paramedics should provide appropriate care including resuscitation.

Decision-making capacity

- Patients ≥ 18 years are presumed to have decision-making capacity unless there is evidence to the contrary.
- It cannot be assumed that a patient lacks decision-making capacity because paramedics believe the decision is unwise. In these cases, paramedics must explicitly establish that the patient has decision-making capacity and ensure that they are fully informed including the risks associated with their decision. This must be fully documented in the ePCR.

Patients < 18 years

- **Mature minor:** Considered to have decision-making capacity and may therefore consent to their own treatment.
- **Not a mature minor:** May not consent to their own treatment and consent must instead be sought from the child's parent or guardian (or other person with parental responsibility).
- Whether a child is a mature minor depends on the capacity of the child to understand the nature and consequences of the required treatment.
- Where the patient is not a mature minor, attempt to contact the parent/guardian. Ideally they should accompany the patient to hospital.
- Emergency treatment can be provided without the consent of the child's parent/guardian.

Valid consent

The consent offered by a patient with decision-making capacity (or a medical treatment decision maker) is considered valid if it is:

- **Voluntary:** Paramedics may outline what they believe to be the best course of action, but this cannot include undue pressure or coercion. Coercion includes any behaviours that may manipulate a patient's decision-making but that are not a transparent and balanced description of clinical issues. Discouraging a patient from attending hospital by discussing waiting times or hospital delays is coercion and is specifically prohibited.
- **Informed:** Informed consent requires that the following information is presented in a balanced way to avoid coercion:
 - Results of assessment and implications of those results (this must include any abnormal clinical findings)
 - Diagnostic uncertainty and the limitations of prehospital assessment
 - Care pathway options including risks, benefits and implications of each
 - A recommended course of action if appropriate
 - Consequences of refusing a recommended treatment (where appropriate)

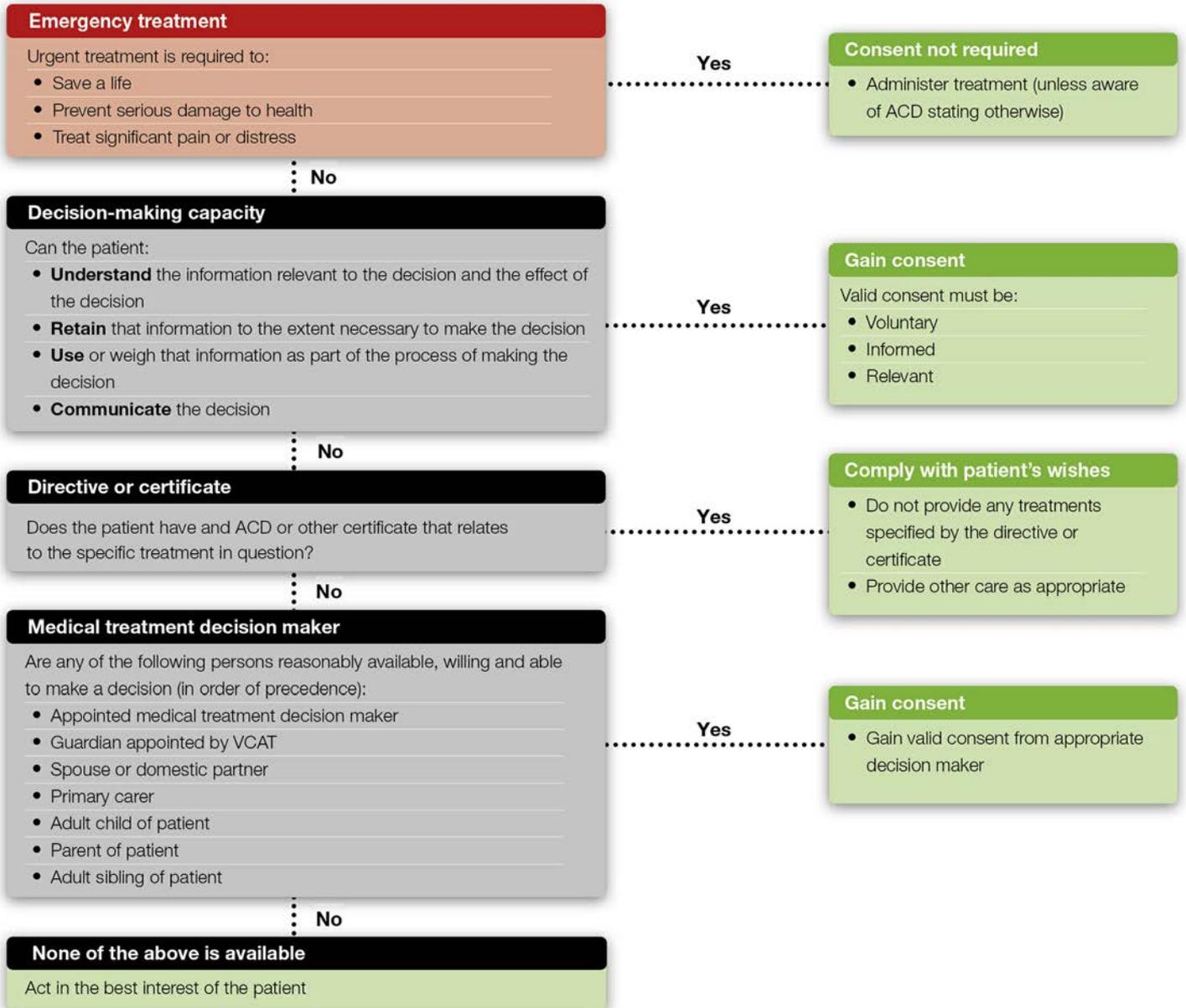
Discussion of risks/benefits is proportionate to the situation and the relative likelihoods.

- **Relevant:** Consent should be specific to the context or procedure. Consent to one type of assessment or treatment does not constitute consent to another.

Patients with mental illness

- Consent is not required to transport compulsory patients or those apprehended by police under section 351 of the Mental Health Act.
- Compulsory/section 351 patients may still have the capacity to make decisions regarding other treatments. Where other treatment is required, the capacity to make decisions/give consent should be considered independently to their status as a compulsory patient.

Flowchart



Related Resources

- [CPG Walkthrough - Consent and Capacity](#)
- <https://av-digital-cpg.web.app/assets/pdf/MAC/CPG Clin approach consent and capacity clin flags.pdf>

Care Objectives

- Preserve both paramedic and patient safety
- Select extrication techniques that are most clinically appropriate
- Early identification of extra resources required to safely move the patient

General Notes

Intended patient group: All adult and paediatric patients

Forming a plan

Manual handling support options

- Specialist manual handling resources
- Nearby crew
- Other services (SES, FSV)

Risk minimisation strategies

- **Sit / Stand / Walk Test:** Careful assessment of VSS, mobility, and patient presentation with each positional change.
- Where the patient can rest if required.
- Redundancy options: An alternative method to move the patient that will be employed if the original attempt fails.

The patient who improves

- High-acuity patients who respond to treatment will still require extrication assistance regardless of how well they have progressed with initial therapy.

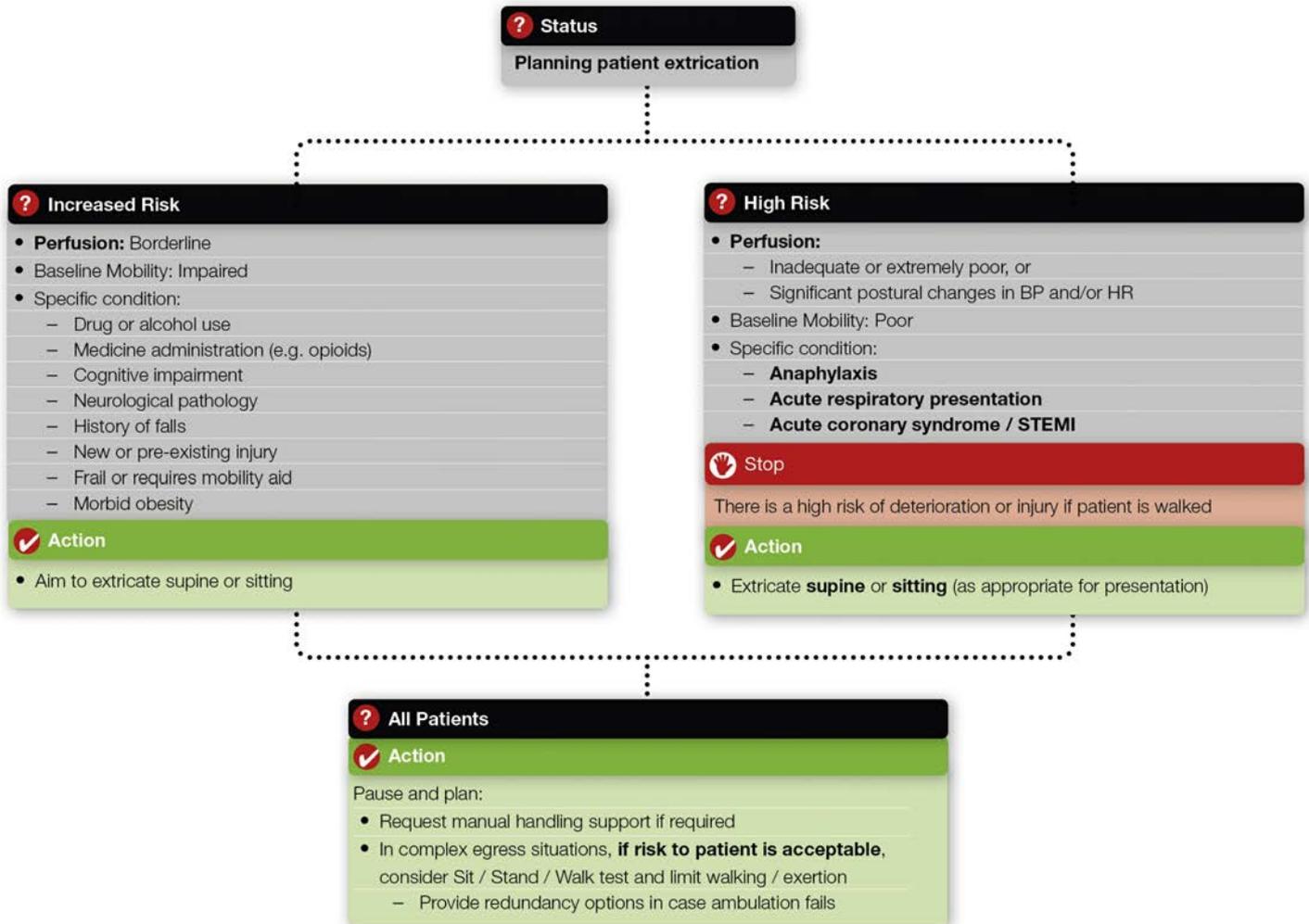
The patient who deteriorates

- Assessment is continuous and the plan may need to change if the patient's condition changes during extrication.
- Patients initially assessed to have an Increased Risk or no risk factors may require escalation to a higher risk category if decreased capability becomes evident with attempts to ambulate.
- Accordingly, the deteriorating patient will require a more conservative extrication plan.

Specific circumstances

- Some conditions have specific advice regarding optimal patient position and movement considerations, for example, hyper- and hypothermic patients and patients with a diving-related illness.
- This advice should be followed in conjunction with the principles contained within this CPG.

Flowchart



General Notes

This CPG should only be applied to patients aged ≥ 12 years.

Mx principles

- O₂ is a treatment for hypoxaemia, not breathlessness. O₂ has not been shown to have any effect on the sensation of breathlessness in non-hypoxaemic patients.
- Treatment is aimed at achieving normal or near normal SpO₂ in acutely ill patients. O₂ should be administered to achieve a target SpO₂ while continuously monitoring the patient for any changes in condition.
- O₂ should not be administered routinely to patients with normal SpO₂. This includes those with stroke, ACS and arrhythmias.
- In patients who are acutely short of breath, the administration of O₂ should be prioritised before obtaining an O₂ saturation reading. O₂ can later be titrated to reach a desired target saturation range.
- If pulse oximetry is not available or unreliable, provide an initial O₂ dose of 2 - 6 L/min via nasal cannulae or 5 - 10 L/min via face mask until a reliable SpO₂ reading can be obtained or symptoms resolve.

Special circumstances

- Early aggressive O₂ administration may benefit patients who develop critical illnesses and are haemodynamically unstable, such as cardiac arrest or resuscitation; major trauma / head injury; shock; severe sepsis; and anaphylaxis. In the first instance, O₂ should be administered with the aim of achieving an SpO₂ of 100%. Once the patient is haemodynamically stable, the O₂ dose should be titrated to 92 - 96%.
- Patients with chronic hypoxaemia (e.g. COPD, neuromuscular disorders, obesity etc.) who develop critical illnesses as above should have the same initial aggressive O₂ administration. Once the patient is haemodynamically stable, the O₂ dose should be titrated to the same target saturations as other critically ill patients.
- COPD should be suspected in any patient over 40 years old who is: a smoker or ex-smoker, experiencing dyspnoea that is progressive, persistent and worse with exercise, has a chronic cough or chronic sputum production, has a family history of COPD.
- Special circumstances occur in the setting of paraquat and bleomycin poisoning where the use of O₂ therapy may prove detrimental to the patient. The maintenance of prophylactic hypoxaemia in these patients (SpO₂ of 85 - 88%) is recommended.

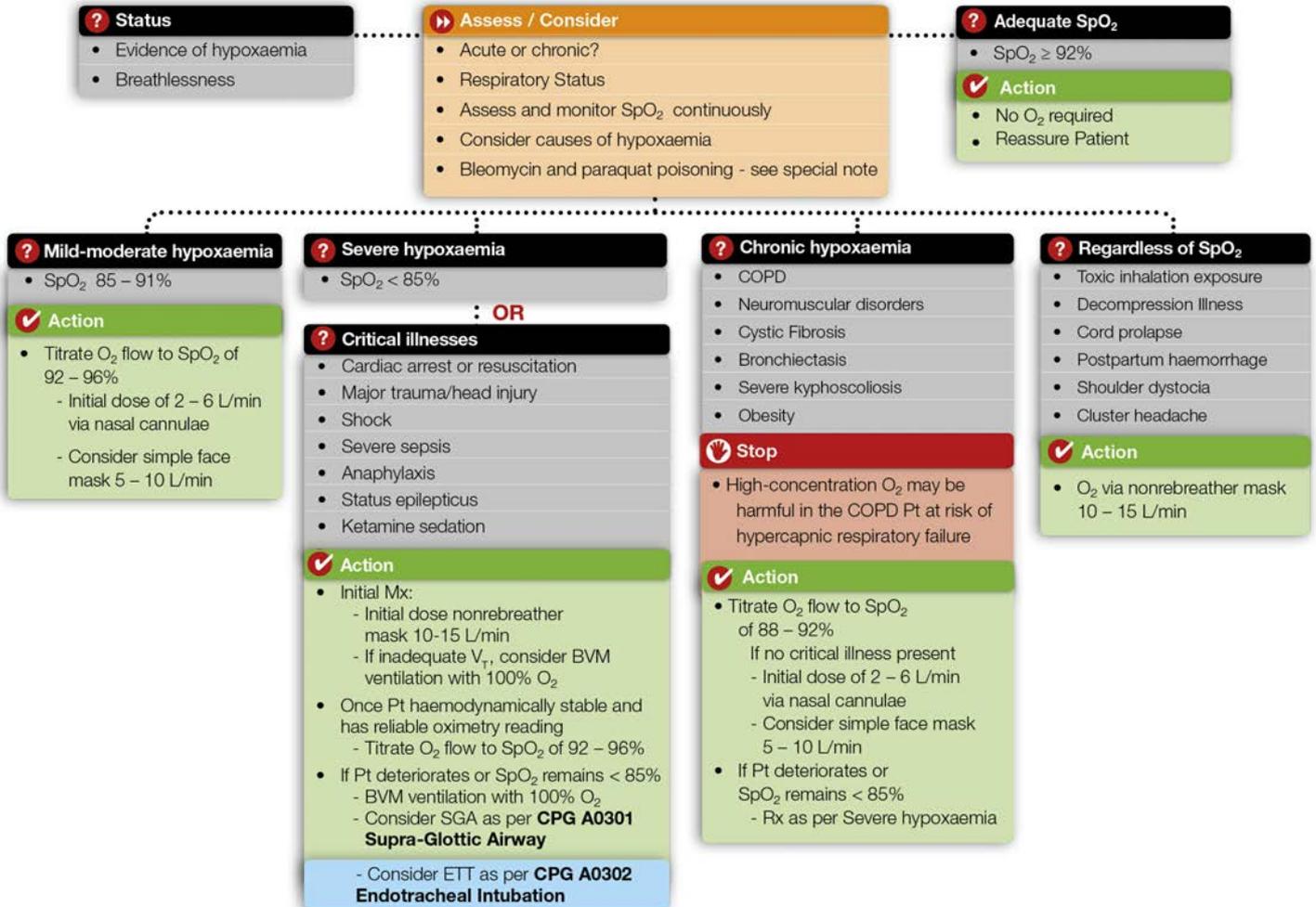
Further Notes

- Pulse oximetry may be particularly unreliable in patients with peripheral vascular disease, severe asthma, severe anaemia, cold extremities or peripherally 'shut down', severe hypotension and carbon monoxide poisoning.
- Pulse oximetry can be unreliable in the setting of severe hypoxaemia. An SpO₂ reading below 80%

increases the chance of being inaccurate.

- All patients suspected of having inhaled potentially toxic gases (e.g. house fires, carbon monoxide poisoning, etc.) should be given high dose O₂ until arrival at hospital. In these clinical situations, patients who show no signs of breathlessness may still benefit from this treatment.
- Where the patient may have been exposed to other poisons, administer O₂ to maintain an SpO₂ of 92- 96%. Poisons information can be contacted via the clinician on 13 11 26.
- Patients with medically diagnosed pneumothorax, but without an intercostal catheter in situ, may benefit from high dose O₂ regardless of SpO₂.
- Irrespective of SpO₂, patient tidal volume should be assessed to ensure ventilation is adequate.
- O₂ exchange is at its greatest in the upright position. Unless other clinical problems determine otherwise, the upright position is the preferred position when administering O₂.
- Ensure the patient's fingertip are clean of soil or nail polish. Both may affect the reliability of the pulse oximeter reading. The presence of nail infection may also cause falsely low readings.
- Take due care with patients who show evidence of anxiety/panic disorders (e.g. hyperventilation syndrome). O₂ is not required however no attempt should be made to retain CO₂ (e.g. paper bag breathing).
- All women with evidence of hypoxaemia who are more than 20 weeks pregnant should be managed with left lateral tilt to improve cardiac output.
- Face masks should not be used for flow rates < 5 L/min due to the risk of CO₂ retention.
- Nasal cannulae are likely to be just as effective with mouth-breathers. However, where nasal passages are congested or blocked, face masks should be used to deliver O₂ therapy.

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC June 2017 CPG A0001 Oxygen review.pdf>

Care Objectives

- **High-Performance CPR:** Commence immediately and maintain with minimal chest compression interruption
- **Rapid defibrillation** of VF / Pulseless VT (**if in doubt**, shock)
- 2-minute rotations and rhythm checks

General Notes

Ratio of compressions to ventilations

No ETT/SGA

- 30 compressions : 2 ventilations
- Pause for ventilations

ETT/SGA insitu

- 15 compressions : 1 ventilation
- 6-8 ventilations per minute
- No pause for ventilations

Medical Cardiac Arrest

- **If any doubt exists as to the presence of a pulse**, chest compressions must be commenced
- Carotid pulse checks are only required for a potentially perfusing rhythm i.e. the presence of QRS complexes which may be accompanied by a rise in EtCO₂
- A **supra-glottic airway** is an appropriate option to manage the airway initially and to facilitate continuous compressions. When **ETT** is attempted, it should not interrupt compressions
- **EtCO₂** can be used as a surrogate marker of cardiac output and may approach physiological values with high quality CPR
- A gradual fall in EtCO₂ may suggest CPR fatigue
- **Fluid administration** in shockable rhythms may be detrimental and should be limited to medication flush and TKVO only
- Where clear signs of prolonged cardiac arrest are present, or continued resuscitation may be futile, consider **CPG A0203 Withholding or Ceasing Resuscitation**

High-Performance CPR

- **Time to first defibrillation** ≤ 2 minutes
- **Perform high-quality CPR:**
 - Rate: 100 - 120 compressions per minute

- Depth: ≥ 5 cm, allow for full recoil
- Ventilation duration: 1 second per ventilation
- 2 minute rotations of compressor
- **Minimise interruptions to chest compressions ≤ 3 seconds**
 - Focus on team performance and communication
 - Charge defibrillator during compressions
 - On-screen rhythm analysis
 - Hover hands over chest and resume compressions immediately after defibrillation or disarm
- **Utilise Team Leader and checklist**

Mechanical CPR (mCPR)

- High-Performance CPR with minimal interruptions to chest compressions is the initial priority in cardiac arrest
- **mCPR should not occur prior to 16 minutes** into the resuscitation unless in the setting of inadequate resources (i.e. < 3 CPR trained rescuers) or crew fatigue affecting compression quality
- **Minimise interruptions to compressions** by using communication, planning and teamwork to apply the device
- **ROSC:** If immediately available but not yet in situ, apply mCPR device in anticipation of potential re-arrest
- **Transport with mCPR** (if immediately available) if **ALL** of the following criteria are met:
 - Paramedic-witnessed arrest OR presenting rhythm VF/VT refractory to initial Rx
 - Likely reversible with medical intervention
 - Pt ≤ 65 years old and lives independently
 - Alfred Hospital ≤ 60 min from collapse (patients aged 15 - 35), **OR**
 - ECMO or PCI ≤ 45 min from collapse (patients aged 36 - 65)
- Continue other standard cardiac arrest care
- Transporting patients in cardiac arrest without mCPR is associated with poorer outcomes and risks paramedic safety

Pregnant Patient > 20 weeks

- If the patient is pregnant with a known or suspected gestation > 20 weeks and mCPR is available, continue resuscitation and transport for consideration of resuscitative hysterotomy. The uterus should be pushed to the left side during transport to minimise aorto-caval compression (rather than tilting the entire patient to the left)

CPR-interfering patient

Where the patient:

- Interferes with CPR, or
- Gag reflex is present preventing adequate oxygenation/ventilation or SGA/ETT insertion or,

- Suspected awareness/pain/combativeness interrupting resuscitation

Administer:

- **Fentanyl 100 mcg IV every 1 - 2 minutes** (no max. dose).
- Fentanyl ineffective: **Ketamine 50 – 100 mg IV every 1-2 minutes** (no max. dose) (ALS on consult only).
- No IV access: **Fentanyl 200 mcg IM** or **Ketamine 200 mg IM** (single dose).
- AV data suggests that adequate control of patients suffering from intra- or post-arrest agitation occurs after approximately 200 mcg IV Fentanyl. However, in some cases doses may need to exceed this range to provide adequate patient control and permit ongoing management.
- Patient condition and GCS may improve following administration of Fentanyl. The need to provide sedation for agitation does not necessarily mean the patient will remain unconscious and need to be intubated.

Hypothermic cardiac arrest < 30°C

- The primary goal is to prevent further heat loss prior to ROSC or transport - significant improvement in temperature from prehospital intervention is unlikely
- Double the interval for **Adrenaline** and **Amiodarone** doses
- Greater than 3 shocks is unlikely to be successful while patient remains severely hypothermic - consider AAV, mCPR for transport. Where these resources are not available, continue DCCS as per standard cardiac arrest
- For patients in cardiac arrest where hypothermia is clearly the cause, mCPR to hospital may be appropriate in consultation with the Clinician and receiving hospital

PEA reversible causes

- - Tension pneumothorax
 - Upper airway obstruction
 - Exsanguination
 - Asthma
 - Anaphylaxis
 - Hypoxia
- **Tension pneumothorax**
 - Where tension pneumothorax is considered to be the cause of cardiac arrest, in either medical or traumatic arrest, decompress chest bilaterally as per **CPG A0802 Chest Injuries**
 - Chest decompression should not be routine in medical cardiac arrest
- **Hyperkalaemia**
 - Suspect hyperkalaemia where the patient has a Hx of renal failure / dialysis or presents with significant crush injury
 - Flush with 10 mL Normal Saline between administration of Sodium Bicarbonate and Calcium Gluconate.

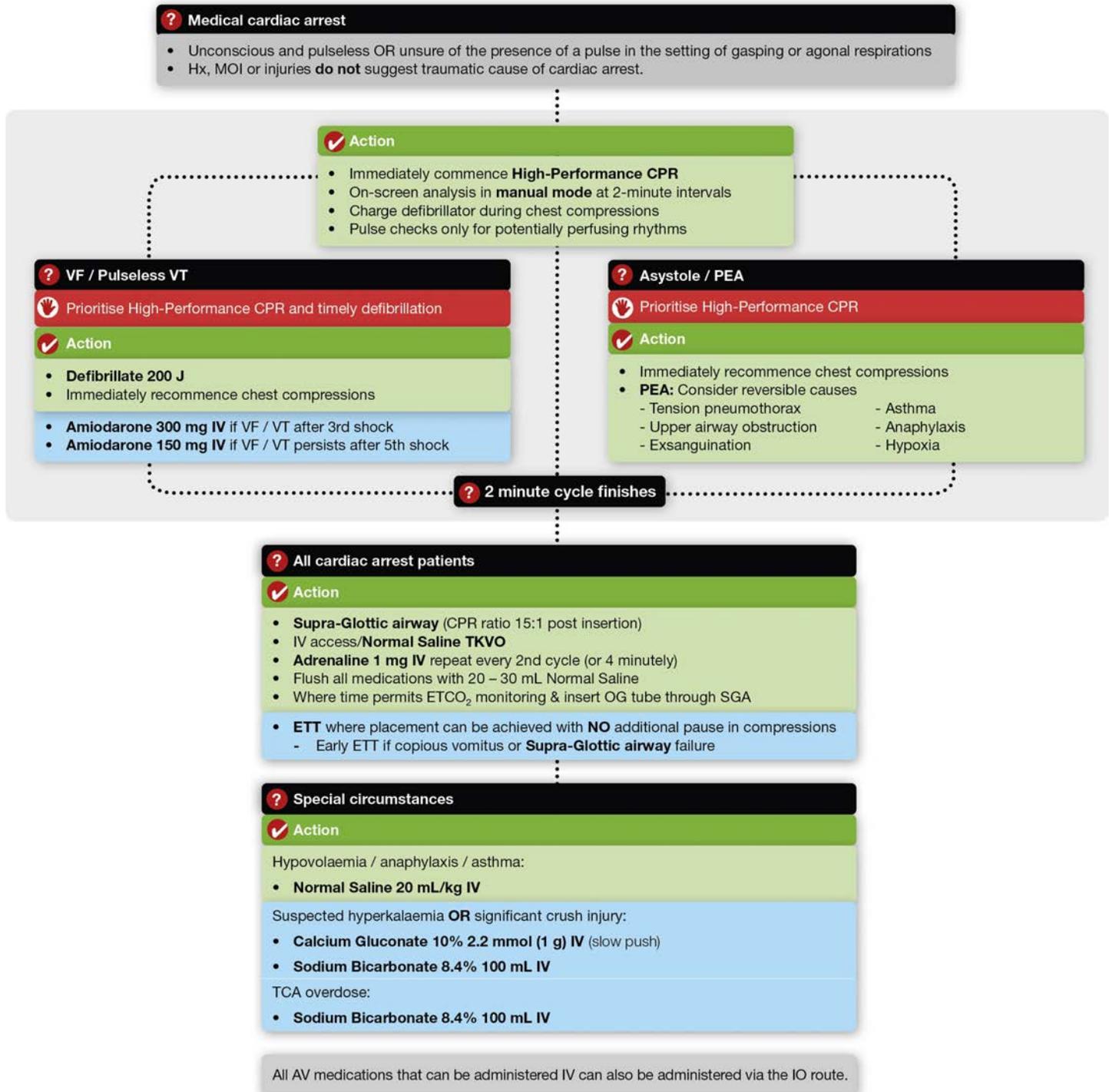
- **Hypovolaemia / anaphylaxis / asthma**

- In PEA arrest where hypovolaemia, anaphylaxis or asthma is suspected or the patient has a rhythm that may be fluid responsive, administer **Normal Saline 20 mL/kg IV**

- **Hypoglycaemia**

- Hypoglycaemia in cardiac arrest is rare. However, BGL should be measured and hypoglycaemia treated as per **CPG A0702 Hypoglycaemia**
- All other management to be prioritised above BGL measurement

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/CPRIC and Agitation post-ROSC MAC Feb 2021.pdf>
- <https://av-digital-cpg.web.app/assets/pdf/MAC/Calcium Review - MAC paper v2.pdf>

Care Objectives

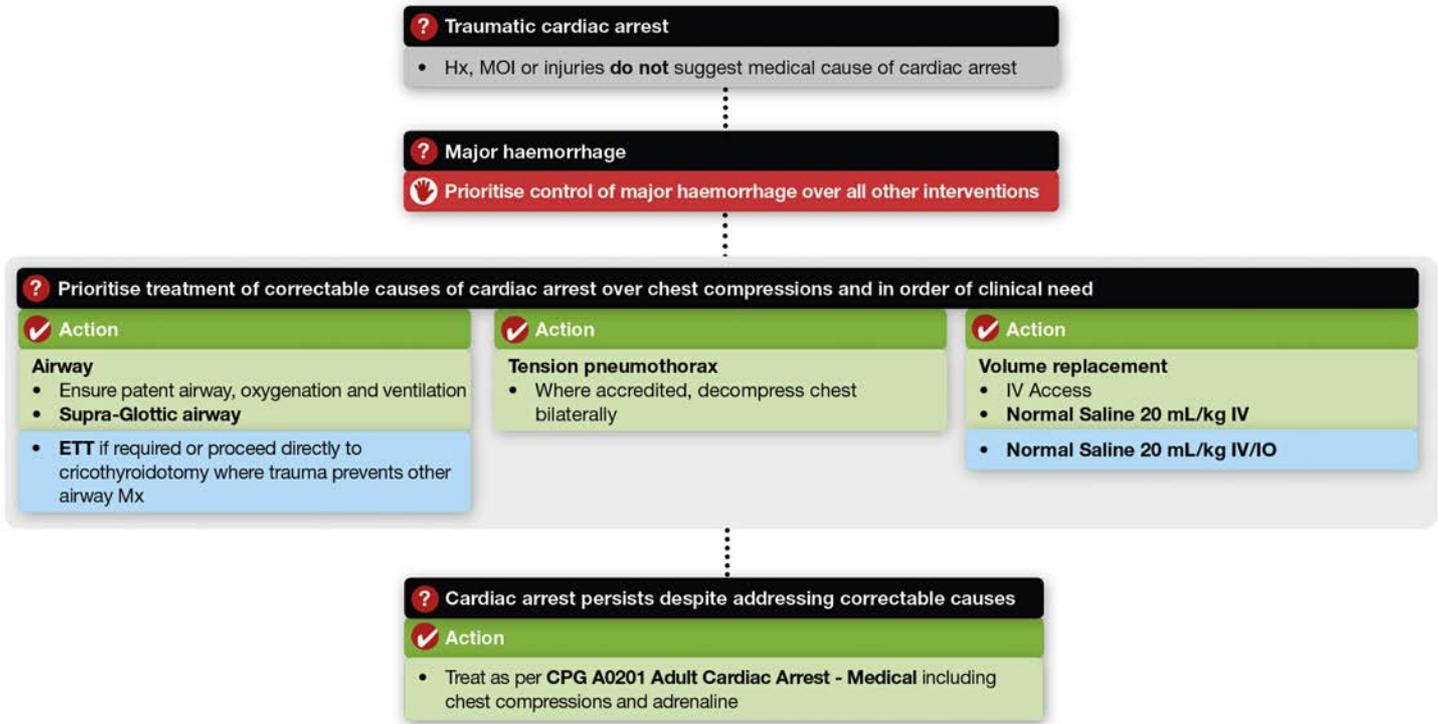
- **Major haemorrhage control** over all other interventions
- Management of **correctable causes** in order of clinical need:
 - Oxygenation / ventilation
 - Exclusion of tension pneumothorax by insertion of bilateral intercostal catheters
 - Administration of Normal Saline 20mL/kg IV/IO
- Standard cardiac arrest management including rhythm check following the trauma priorities

General Notes

Traumatic Cardiac Arrest

- **Consider medical cause:** In cases where the Hx, MOI or injuries are inconsistent with traumatic cardiac arrest, or patient is in VF / VT
- **If any doubt exists as to the cause of arrest**, treat as per Medical Cardiac Arrest
- **Control of major haemorrhage** can be achieved with tourniquets, haemostatic dressings and/or direct pressure
- **Undifferentiated blunt trauma:** A pelvic splint should be applied after other interventions. Where pelvic fracture is clearly contributing to cardiac arrest, a pelvic splint may be applied earlier
- Traumatic cardiac arrest: if the presenting rhythm is asystole, consider early cessation of resuscitation once reversible causes have been managed and the patient remains in asystole.
- In the setting of penetrating trauma and PEA arrest, emergency thoracotomy is a priority over standard traumatic cardiac arrest management when it can be performed within 20 minutes of collapse. If transport to a MTS is achievable in this timeframe then do not delay this for MICA, IV or ETT insertion. Compressions are not required during transport.
- Cardiac arrest in the setting of severe crush injury should be managed with **Sodium Bicarbonate 8.4%** and **Calcium Gluconate 10%** as per **CPG A0201 Cardiac arrest medical - "Hyperkalaemia"**.

Flowchart



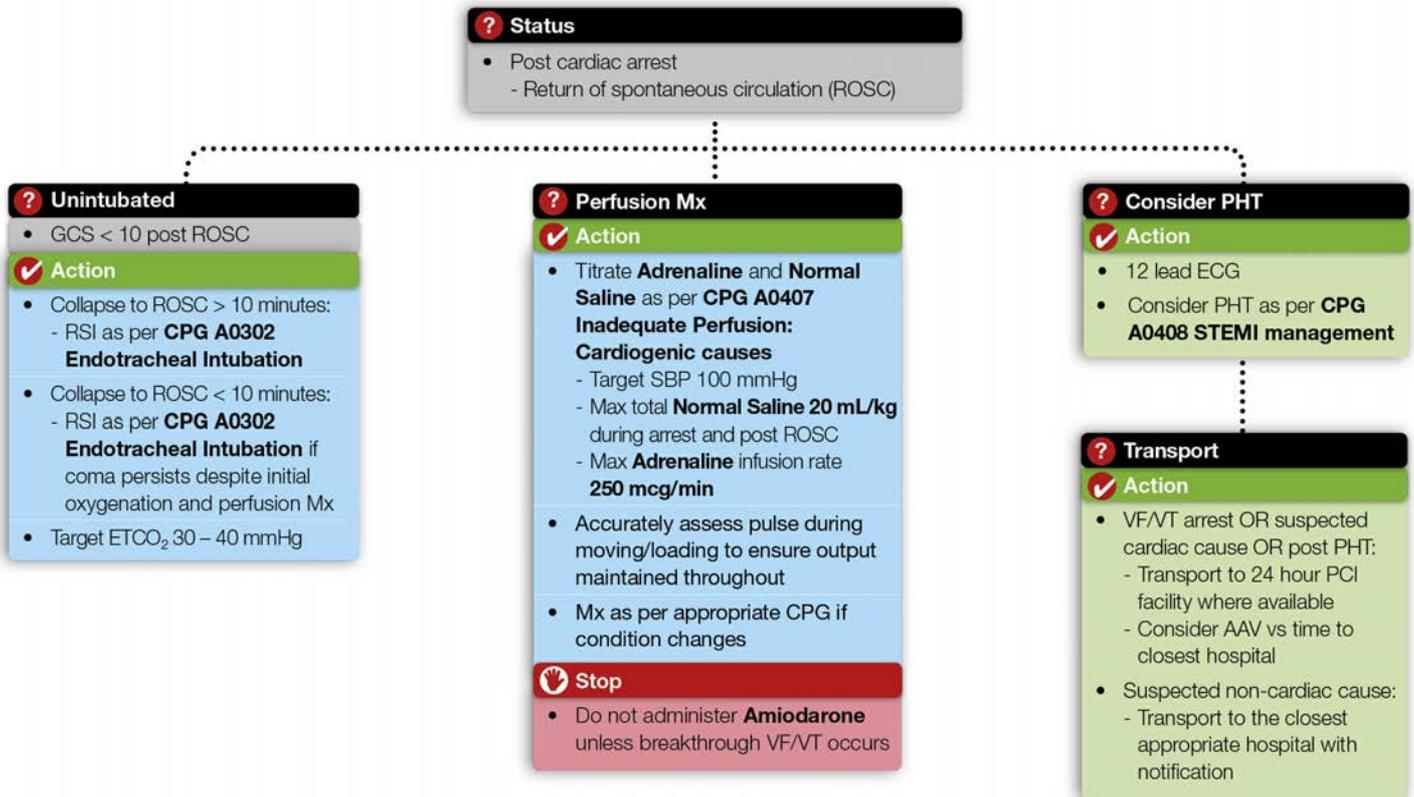
General Notes

- Excessive fluid administration during the intra-arrest and post-ROSC period may be detrimental. Judicious administration of fluid may be especially important in VF/ VT. The total volume of fluid administered during cardiac arrest and post-ROSC management, including RSI, should not exceed **20 mL/kg** unless correcting suspected hypovolaemia.
- Where the cause of arrest is unclear, paramedics should assume a cardiac cause and transport to a PCI capable facility where possible.
- Where resources allow and other priorities have been addressed, BGL should be measured post ROSC and hypoglycaemia treated as per **CPG A0702 Hypoglycaemia**.

The extremely combative patient

- Severe post-ROSC agitation / combativeness that is obstructing further care (e.g. oxygenation and ventilation in preparation for RSI) may be sedated using the following dose regimen:
 - **Fentanyl 100 mcg IV every 1 - 2 minutes** (no max. dose)
 - Fentanyl ineffective: **Ketamine 50 – 100 mg IV every 1 - 2 minutes** (no max. dose) (ALS on consult only)
 - No IV access: **Fentanyl 200 mcg IM** or **Ketamine 200 mg IM** (single dose).
- AV data suggests that adequate control of patient's suffering from intra- or post-arrest agitation occurs after approximately 200 mcg IV Fentanyl, however in some cases doses may need to exceed this range to provide adequate patient control and permit ongoing management

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/CPRIC and Agitation post-ROSC MAC Feb 2021.pdf>
- [https://av-digital-cpg.web.app/assets/pdf/MAC/MAC CPG A0203 Return of Spontaneous Circulation \(ROSC\) NOV 2016.pdf](https://av-digital-cpg.web.app/assets/pdf/MAC/MAC CPG A0203 Return of Spontaneous Circulation (ROSC) NOV 2016.pdf)

General Notes

Withholding resuscitation

- **Mass casualty incidents** are in part characterised by the available resources being overwhelmed by larger patient numbers. Where this is the case, the AV Emergency Management Unit provides trauma triage guidelines for patient assessment that may differ significantly from guidelines used in other situations.
- **Injuries incompatible with life** are those where survival is impossible (e.g. decapitation, incineration, cranial and cerebral destruction, hemicorporectomy) and should be combined with the absence of signs of life in order to withhold resuscitation. This is distinct from injuries that the paramedic believes are not survivable due to severity. Traumatic cardiac arrest outcomes are not futile.
- **No prospect of resuscitation:** In unwitnessed arrests (i.e. not seen or heard to arrest), an initial rhythm of asystole is associated with extremely high morbidity and mortality. In these cases resuscitation should be withheld if the estimated downtime between collapse and arrival of the first ambulance (or first responder) exceeds 10 minutes. Bystander CPR alone does not improve outcomes in this population and is not considered a compelling reason to continue.

Ceasing resuscitation

- The duration of resuscitation should be based on the *initial rhythm* rather than the rhythm the patient is in at the time of deciding to cease resuscitation. “Initial rhythm” refers to the results of the first rhythm analysis conducted on the patient, regardless of provider (i.e. including public access defibrillation, EMR, etc.).
- Paramedics should defer all prognostication decisions until after the minimum duration of CPR has been provided.
- **Non-Shockable (PEA / Asystole):** Prognostic factors such as advanced age (particularly dependent ADLs), unwitnessed arrests, no bystander CPR, and prolonged downtime before AV arrival can help guide the length of resuscitation following the minimum duration (30-45 mins).

Advance Care Directives

- Ambulance Victoria supports a person’s right to articulate wishes for medical treatment and care in advance through an Advance Care Directive.
- A paramedic may provide or withhold treatment based upon the patient’s wishes as recorded on an Advance Care Directive that is sighted by them or paramedics may accept, in good faith, the advice from those present at the scene of the patient’s wishes and that this supporting documentation exists.
- A patient’s Advance Care Directive must be followed even where the emergency is not directly related to a pre-existing illness. If the person’s wishes are unknown or there is doubt about the documentation or its existence, paramedics are to provide routine care.
- Paramedics are required to include discussions of patient’s wishes and decisions in their documentation.
- For more information, visit: <http://www.health.vic.gov.au/acp/>

Voluntary Assisted Dying

In Victoria, patients with a terminal diagnosis may choose to undertake Voluntary Assisted Dying (VAD).

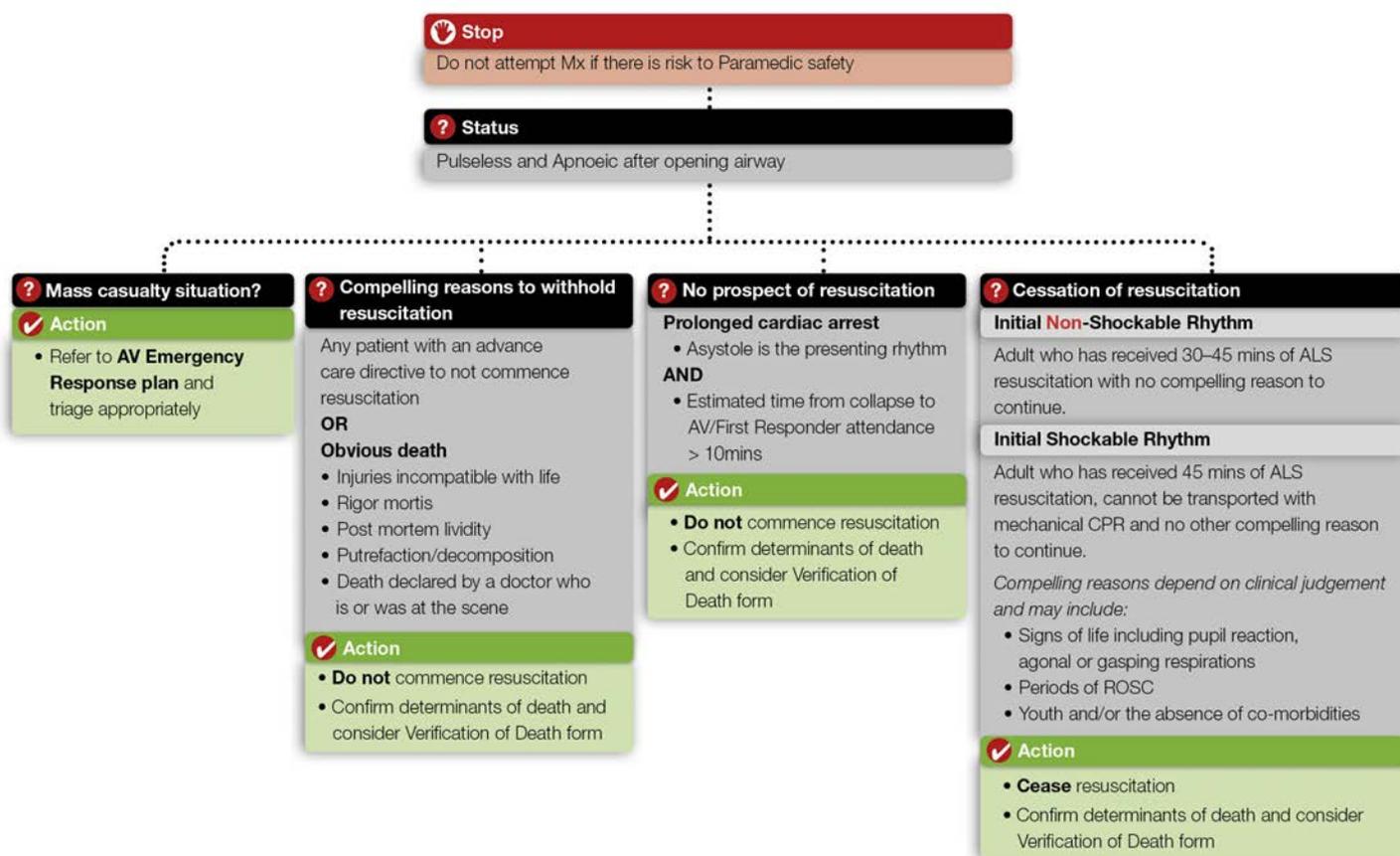
The medication used will be a barbiturate that leads to deep sedation and respiratory depression. In most patients, death from respiratory depression occurs within one hour after oral ingestion.

In the unlikely event that AV attends a patient who is actively involved in a VAD case, it is important to note:

- There will be a documented instructional Advance Care Directive for "no resuscitation".
- Family members or other health professionals (including paramedics) are **not permitted** to assist in the administration of the VAD medicine.
- Attending staff are **not** to administer active clinical therapy or resuscitation such as oxygen therapy, assisted ventilation or IV drug / fluid administration.
- Supportive care such as positioning and other comfort measures are encouraged.

If the dying process is prolonged, paramedics / remote area nurses are encouraged to contact the patient's specialist VAD doctor or the palliative care team. If this is unsuccessful, and the family require support, transport to hospital may be required. If in doubt, contact AV Clinician for advice.

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Dec 2017 CPG A0203 Withholding or Ceasing CPG.pdf>



Verification of death

- Verification of Death refers to 'establishing that a death has occurred after thorough clinical assessment of a body'.
- Qualified Paramedics can provide verification if in the context of employment and if there is certainty of death. Providing verification of death is not mandatory for Paramedics.
- Certification of death must still ultimately be provided by a Medical Practitioner as to cause of death. This falls outside the scope of verification of death.
- Clinical assessment of a deceased person includes 6 clinical elements. These are the 'determinants of death':
 - No palpable carotid pulse.
 - No heart sounds heard for 2 minutes.
 - No breath sounds heard for 2 minutes.
 - Fixed (non-responsive to light) and dilated pupils (may be varied from underlying eye illness).
 - No response to centralised stimulus (supraorbital pressure, mandibular pressure or sternal pressure).
 - No motor (withdrawal) response or facial grimace to painful stimulus (pinching inner aspect of elbow or nail bed pressure).

N.B. ECG strip that shows asystole over 2 minutes is a seventh and optional finding that may be included. Ideally the determinants of death should be evaluated 5 - 10 minutes after cessation of resuscitation to ensure late ROSC does not occur.

- The Verification of Death form should include all findings along with the full name of person (if known), location of death, estimated date and time of death (if known), name of the Paramedic conducting the assessment and if the treating doctor has been notified.
- Police must be notified in cases of reportable or reviewable death with the attending crew remaining on scene until their arrival. Cases of SIDS are considered reportable.
- A reportable death would include unexpected, unnatural or violent death, death following a medical procedure, death of a person held in custody or care (alcohol or mental health), a person otherwise under the auspice of the Mental Health Act but not in care or a person unknown.
- A reviewable death is required following death of a child (< 18 years) where the death is the second or subsequent death of a child of the parent, guardian or foster parent.
- The original Verification of Death form should be left with the deceased and the copy attached to the printed PCR.

General Notes

- A supra-glottic airway (SGA) provides improved airway and ventilation management compared to a bag-valve-mask and OPA. It does not offer the same level of protection against aspiration as intubation, however is it often quicker and easier to insert and may be an appropriate initial method of managing the airway.
- If an SGA is placed, the insertion of an orogastric tube may provide benefit in decompressing the stomach and allowing drainage of gastric contents.
- In the setting of cardiac arrest, insertion of an orogastric tube must not delay or interfere with higher priority actions such as uninterrupted compressions or defibrillation.
- Patients who require higher airway pressures e.g. pregnancy, morbid obesity, decreased pulmonary compliance (pulmonary fibrosis) or increased airway resistance (severe asthma) should be carefully monitored to ensure effective ventilation is being achieved and passive regurgitation avoided.
- If an SGA is inserted, ventilation proves difficult or inadequate and trouble-shooting fails to correct the issue, consider removing the SGA if ventilation is possible through another airway management plan.
- Three attempts in total at SGA insertion are permitted irrespective of skill-set (ALS, MICA, MFP). If difficulty is encountered in the placement of an SGA, problem solving aimed at improving the chance of success should occur prior to subsequent attempts.

Flowchart

? Status

- Unconscious Pt without gag reflex
- Ineffective ventilation with BVM and basic airway Mx
- > 10 minutes assisted ventilation required
- Unable to intubate



Stop

- **Contraindications**
 - Intact gag reflex or resistance to insertion
 - Strong jaw tone or trismus
 - Suspected epiglottitis or upper airway obstruction



Consider

- **Precautions**
 - Inability to prepare the Pt in the sniffing position
 - Pts who require high airway pressures
 - Paediatric Pts who may have enlarged tonsils
 - Vomit in the airway
- **Side effects**
 - Correct placement does not prevent passive regurgitation or gastric distension

i-gel quick reference guide

i-gel size	Pt weight guide*	Max size of gastric tube
1.0	2 – 5 kg	N/A
1.5	5 – 12 kg	10
2.0	10 – 25 kg	12
2.5	25 – 35 kg	12
3.0	30 – 60 kg	12
4.0	50 – 90 kg	12
5.0	90+ kg	14

*This is a guide only. Please ensure correct size is chosen corresponding to Pt airway size

Care Objectives

- Ensure safe and effective airway management throughout entire episode of care.

General Notes

Intended patient group

- Patient \geq 12 years of age.

Risk-benefit analysis

- A dynamic risk-benefit analysis is required for every prehospital intubation and should include evaluation of any precautions alongside the clinical context. Prehospital RSI may cause patient harm.
- Minimising scene times should be prioritised over the decision to perform prehospital RSI.
- Physiological derangement refractory to or requiring significant resuscitation, such as hypotension, hypoxia and/or metabolic acidosis may be exacerbated by RSI and precipitate cardiac arrest.
- In rural and regional areas RSI may be undertaken or withheld by single-responder MICA Paramedics following consideration of risk-benefit analysis.

Rapid Sequence Intubation (RSI)

Medication

- Ketamine is the preferred sedation induction agent for all RSI unless contraindicated by BP > 180 mmHg in the setting of NTBI.
- Fentanyl and Midazolam dosage should be based on assessment of cardiovascular and frailty status at the time of RSI.
- Patients with traumatic brain injury should receive hemodynamic support via **Normal Saline 10 mL/kg** during preparation for RSI, however administration must not delay RSI.
- Calculated Ketamine and Rocuronium doses should be rounded up to the nearest 10 mg.
- Avoid Fentanyl and Ketamine administration in the setting of serotonin syndrome/hyperthermia by using Morphine and Midazolam to facilitate RSI.

Delayed Sequence Intubation (DSI)

- This pathway is intended for patients with respiratory failure and combativeness preventing pre-oxygenation.
- In these cases, optimisation of oxygen saturation is the goal prior to paralytic administration (as opposed to *normalisation*).
- The only sedation medication approved for DSI is Ketamine. It should be administered via slow IV push to preserve airway reflexes and maintain respiratory rate.

Capnography

- The recording of pre- and post-intubation capnography is necessary to accurately describe the

therapeutic effect of ETT placement. Post-intubation capnography is essential for confirmation of tracheal placement **and must be noted by all paramedics**. If there is **any** doubt about tracheal placement the ETT **must be immediately removed**.

The extremely combative patient

- Pre-RSI combativeness in TBI should be managed judiciously with analgesia as per **CPG A0501 Pain Relief**.
- In rare cases, IM or IV Ketamine may be required for control of a combative patient who endangers crew and prevents full assessment.

The hypertensive patient

- In the absence of any precautions, Ketamine may be considered in the setting of severe hypertension BP > 180mmHg (e.g. asthma or severe pain aetiology such as burns).
- Ketamine is the ideal agent for RSI in patients with burns. Expect high BP in this patient group and manage with aggressive opioid analgesia prior to RSI. If BP remains > 180mmHg, RSI with Ketamine is still appropriate.

Unassisted intubation

- Unassisted intubation is permitted in patients with a GCS of 3 where there are no airway reflexes present, excluding TBI / NTBI.
- Unassisted intubation is permitted in the setting of pre- and peri-arrest multi-trauma with TBI and no airway reflexes, however transport unintubated is preferred.
- In this cohort, gentle laryngoscopy should be undertaken during intubation attempts and suction prepared. ETI should be abandoned if airway reflexes interfere with laryngoscopy or intubation.
- Unassisted intubation is not a shortcut. Prepare and anticipate the need for rapid post ETT sedation and paralysis.

Flowchart - Indications & Preparation

? Indication

Airway not patent

- Inability to support own airway such that ongoing airway maintenance and/or clearance is required

Respiratory failure

- Refractory to non-invasive ventilation and medications

OR

- Requiring ongoing assisted manual ventilation

Targeted treatment required

- E.g. status epilepticus, refractory hyperthermia, TCA overdose, TBI, ROSC, airway burns

Precautions

- Baseline neurological function, significant comorbidities or advanced care directive may preclude intubation
- Anticipated difficult BVM or intubation (e.g. situation, anatomical, physiological, resourcing)
- Intubation is likely to cause harm in hypovolemic shock and multitrauma (including TBI)
- Scene delay for RSI may be harmful where there is need for rapid in-hospital management
- Avoid RSI in the setting of severe hypothermia < 30°C

Risk v Benefit Analysis

- Is prehospital intubation the most appropriate management for this patient?

? Preparation

✓ Action

- Medications prepared
- Laryngoscope + blade x 2
- Video laryngoscope
- ETT + 1 smaller
- Introducer / stylet
- Difficult airway setup
- Suction tested

? Position

✓ Action

- Optimise environment
- Optimise patient position – ‘ear to sternum’
- C-spine considerations

? Perfusion

✓ Action

- IV / IO access x 2
- Prehydration
- Consider TPT
- Blood pressure optimised
- Adrenaline bolus prepared

? Pre-oxygenation

✓ Action

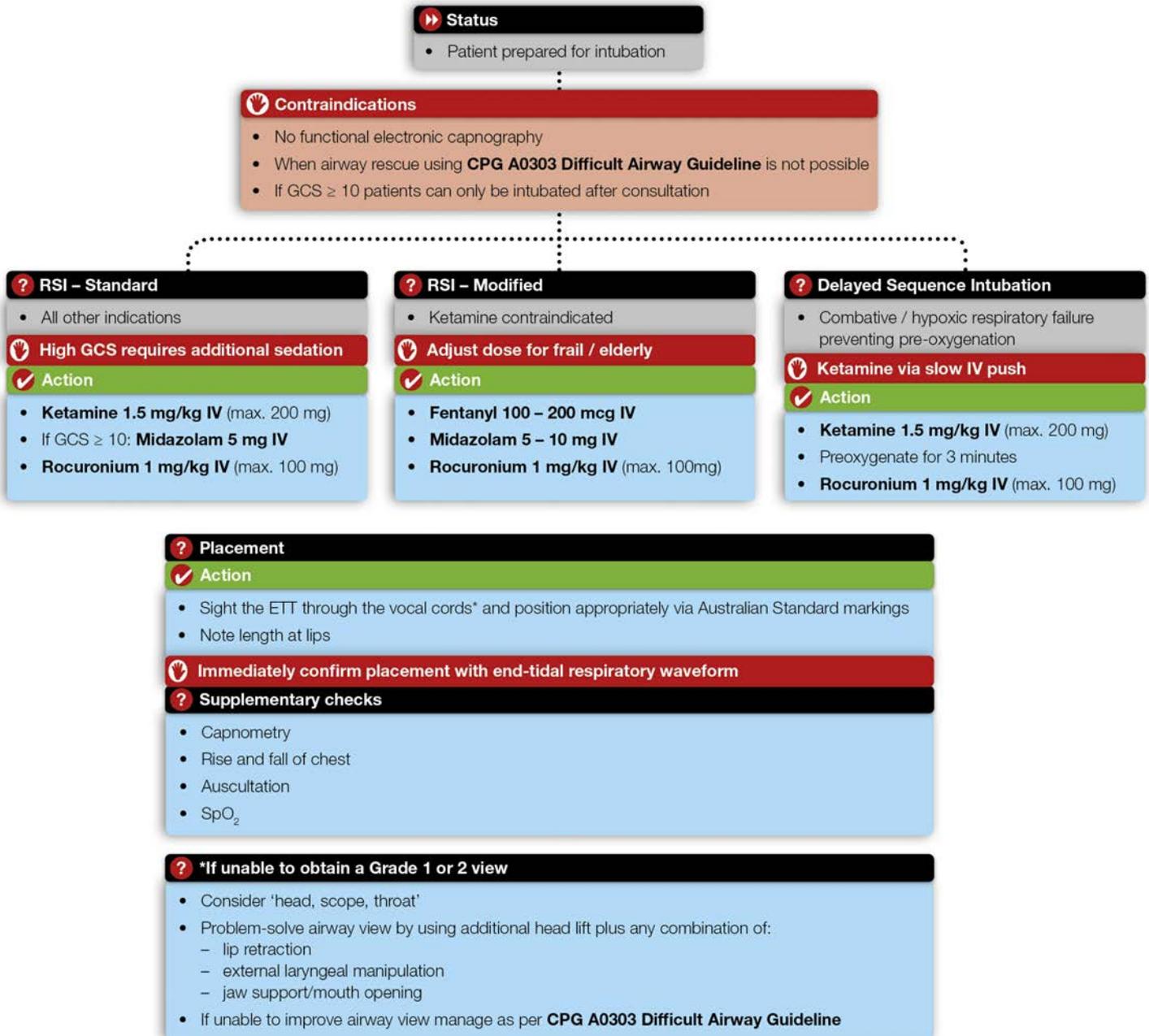
- BVM with 5 cmH₂O PEEP and FiO₂ 1
- Note EtCO₂ reading and confirm functional
- Apnoeic oxygenation via nasal cannula @ 15 L/min

? People

✓ Action

- Ensure adequate crew resources
- Identify team leader
- Allocate roles
- Briefing
- Complete **RSI Checklist**

Flowchart - Procedure



Related Resources

- [https://av-digital-cpg.web.app/assets/pdf/MAC/Endotracheal intubation \(adult\) MAC Paper.FINAL.pdf](https://av-digital-cpg.web.app/assets/pdf/MAC/Endotracheal%20intubation%20(adult)%20MAC%20Paper.FINAL.pdf)
- [https://av-digital-cpg.web.app/assets/pdf/MAC/MAC CPG A0501-1 Hypersalivation management post ketamine \(atropine\).pdf](https://av-digital-cpg.web.app/assets/pdf/MAC/MAC%20CPG%20A0501-1%20Hypersalivation%20management%20post%20ketamine%20(atropine).pdf)

General Notes

Guideline Principles

- This guideline applies to all patients (≥ 12 years of age) undergoing medication assisted intubation. However, the principles may also be applied to unassisted intubation.

Oxygenation

- A critical desaturation threshold should be identified by the team. For the adequately oxygenated patient this may be defined as $< 90\%$. In difficult to oxygenate patients this will be lower, but a critical threshold should still be verbalized.
- Rescue airway strategies should be used at any time during the procedure to correct critical desaturation.

Crew Resource Management

- RSI is a team-based procedure. Team roles, anticipated challenges and airway plan must be verbalized prior to commencement.
- Difficulties encountered during the procedure must be communicated to the team to ensure a shared awareness and prompt corrective actions.

Plan A: OPTIMISED First intubation attempt

- First pass intubation is the key objective of this guideline.
- The strategy of 'Head-Scope-Throat' is a rapid analysis of intubation difficulties and appropriate equipment selection. 'Head-Scope-Throat' should be performed when difficulties are encountered and/or between first and second attempt.
- Equipment selection is based on paramedic preference and clinical context (i.e. anatomy, airway complications). However it is recommended that Plan A should include the use of a bougie.

Plan B: ALTERNATIVE second intubation attempt

- A second intubation attempt must involve an alternative strategy that corrects identified issues.
- Alternative strategies should include the bougie and/or video laryngoscope if not previously utilized.

Plan C: Rescue Airway Strategy

- If intubation is unsuccessful following two attempts, rescue airway strategies must be implemented with the key objective of achieving adequate oxygenation.
- The preferred airway rescue strategy is the SGA. However there may be clinical circumstances where reverting to two-handed BVM combined with basic airway adjuncts is appropriate.

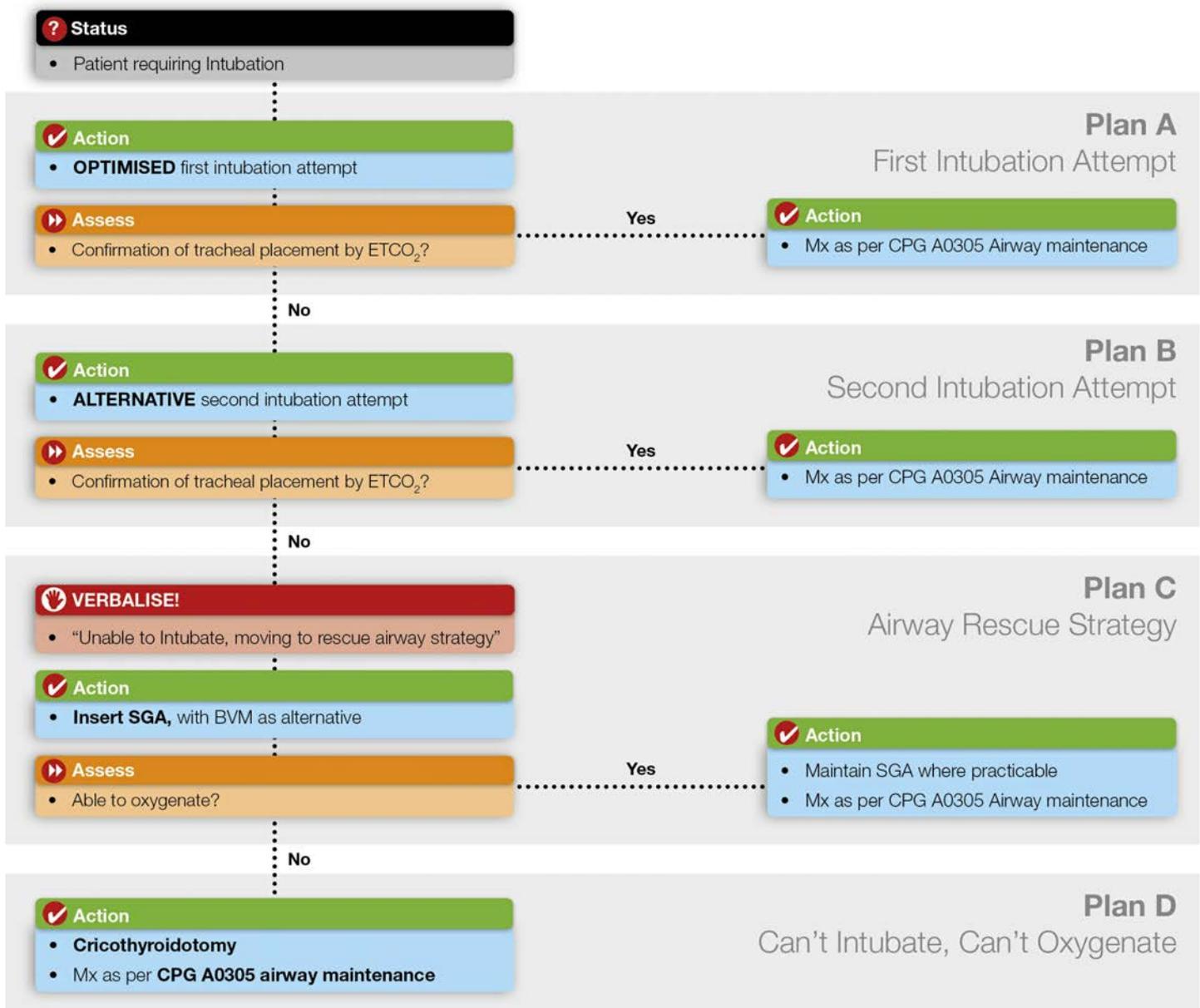
Plan D: Can't Intubate Cant Oxygenate

- A can't intubate, can't oxygenate (CICO) situation is a life-threatening emergency that requires cricothyroidotomy.
- While rare, in critical desaturation where the patient is deemed to be at immediate risk of arrest,

moving directly to Plan D may be appropriate.

- Cricothyroidotomy is a primary airway method when intubation is deemed impossible, and other airway techniques (i.e. SGA and BVM) are not possible or ineffective. Refer CPG A0304 Cricothyroidotomy

Flowchart



Flowchart

? Status

- Unconscious patient unable to be oxygenated and ventilated using BVM and OPA, NPA, LMA or ETT where:
 - RSI has been attempted but intubation has not been achieved
 - RSI is not authorised
 - Massive facial trauma is present and RSI is considered unsafe due to the inability to undertake the Difficult Airway Guideline
 - RSI is not possible due to lack of IV / IO access
 - Upper airway obstruction is present due to a pharyngeal or an impacted foreign body which is unable to be removed using manual techniques and Magill's forceps
 - Partial airway obstruction is present and transport by Air Ambulance is required and expertise for alternative techniques is not available.

Stop

• Contraindications

- There are no C/Is when oxygenation and ventilation cannot occur with other techniques
- The use of a mechanical ventilator is contraindicated if the airway is being managed with a cricothyroidotomy (except for AAV)

✓ Action

- Perform cricothyroidotomy using approved kit
- Provide post cricothyroidotomy sedation and paralysis as per **CPG A0305 Airway maintenance**

Cricothyroidotomy is always an option if a patient cannot be ventilated/oxygenated. Whilst other techniques to manage the airway emergency may be attempted first, if they are unsuccessful MICA Paramedics are explicitly authorised to perform this skill prior to the patient going into cardiac arrest.

Related Resources

<https://av-digital-cpg.web.app/assets/pdf/CWI/CWI OPS 001 Cricothyroidotomy with a QuickTrach II or TracheoQuick Plus.pdf>

Care Objectives

- Optimise sedation +/- paralysis
- Optimise ventilation parameters using lung protective strategies

General Notes

Indications

- Post intubation paralysis is indicated:
 - In all primary neurological patients
 - Where sedation alone is ineffective at maintaining intubation or allowing adequate ventilation/oxygenation
 - To prevent shivering in patients being therapeutically cooled
 - To facilitate mechanical ventilation (continuous mandatory ventilation (CMV) mode)

Status epilepticus

- Status epilepticus patients may require intubation (including paralysis) if there are airway or ventilation compromise which is not able to be managed using BVM and OPA/NPA. Paralysis is never to be used with the intent of terminating the seizure.
- This patient group may require high doses of Midazolam (bolus/independent infusion) post intubation. Rates in excess of 20 mg/hr may be necessary to ensure effective control.
- Cardiovascular support using saline administration and/or adrenaline infusion may be necessary.

Non-traumatic brain injury

- Bolus Fentanyl (25 – 50 mcgs) and Midazolam (2.5 – 5 mg) may be administered to achieve SBP < 140 mmHg post-intubation.
- Normal Saline and adrenaline may be used to achieve SBP > 120 mmHg as per **CPG A0407 Inadequate perfusion (Cardiogenic)**.

Sedation

- Patients should be routinely given a loading dose of sedation prior to commencement of the infusion to ensure a therapeutic level is achieved rapidly.
- 1 – 15 mL/hr is a suggested range only and some patient cohorts will exceed this e.g. high pain and high GCS prior to ETT.
- Consider running independent opioid and Midazolam infusions to allow differing analgesic and sedation doses for specific presentations (e.g. pain-producing pathology/injuries, status epilepticus, etc.).
- Signs of inadequate sedation include cough, gag or patient movement, HR and BP trending up together, lacrimation, diaphoresis, and salivation.

Paralysis

- All patients who are paralysed require ongoing sedation.
- Rocuronium infusions should be prepared with 100 mg in a 10 mL syringe.
- Where access to infusion pumps are limited, preference should be for sedation and inotrope infusion **not** paralysis.

Mechanical ventilation

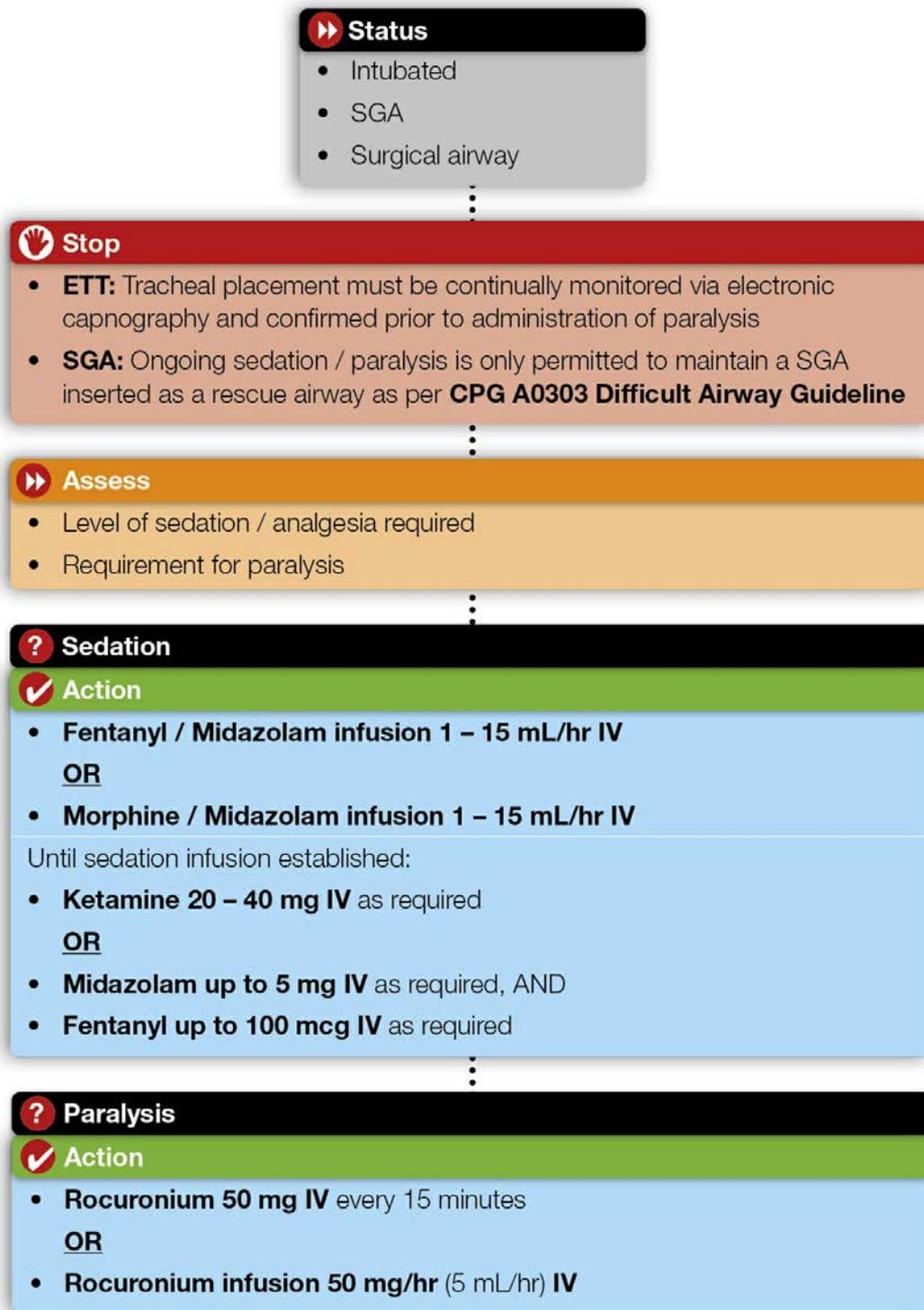
- Attach mechanical ventilator where indicated and use lung protective ventilation strategies.
 - Settings:
 - Ventilate using 100% O₂
 - V_T 6 – 7 mL/kg.
 - Ventilation rate – 12
 - 5 cmH₂O PEEP (in the setting of acute lung injury, if SpO₂ remains < 92% increase to 10 cmH₂O)
 - Maintain:
 - SpO₂ > 95%
 - EtCO₂ at 30 - 35 mmHg
 - EtCO₂ target may vary in the following patient cohorts:
 - **Asthma** - higher EtCO₂ may be appropriate permitted
 - **TCA OD** - maintain EtCO₂ 20 - 25 mmHg
 - **DKA** - EtCO₂ should be maintained at the level detected immediately pre-intubation, with a maximum of 25 mmHg.

General care

- Insert bite block (non-paralysed patients)
- Suction ETT and oropharynx
- Gastric decompression
- Consider disconnecting ETT circuit during transfer if clinically appropriate
- Reconfirm tracheal placement following each movement
- If previously functioning electronic capnography fails (ETT placement previously confirmed), monitor tracheal placement with colorimetric device while troubleshooting
- Position patient in a 30° head-up semi-recumbent position if clinically appropriate
- Check cuff pressure and ensure 20 – 30 cmH₂O
- Maintain normothermia unless otherwise indicated
- Monitor temperature using oesophageal probe where available

- Undertake the **Critical IHT Checklist** to ensure comprehensive patient care post intubation

Flowchart



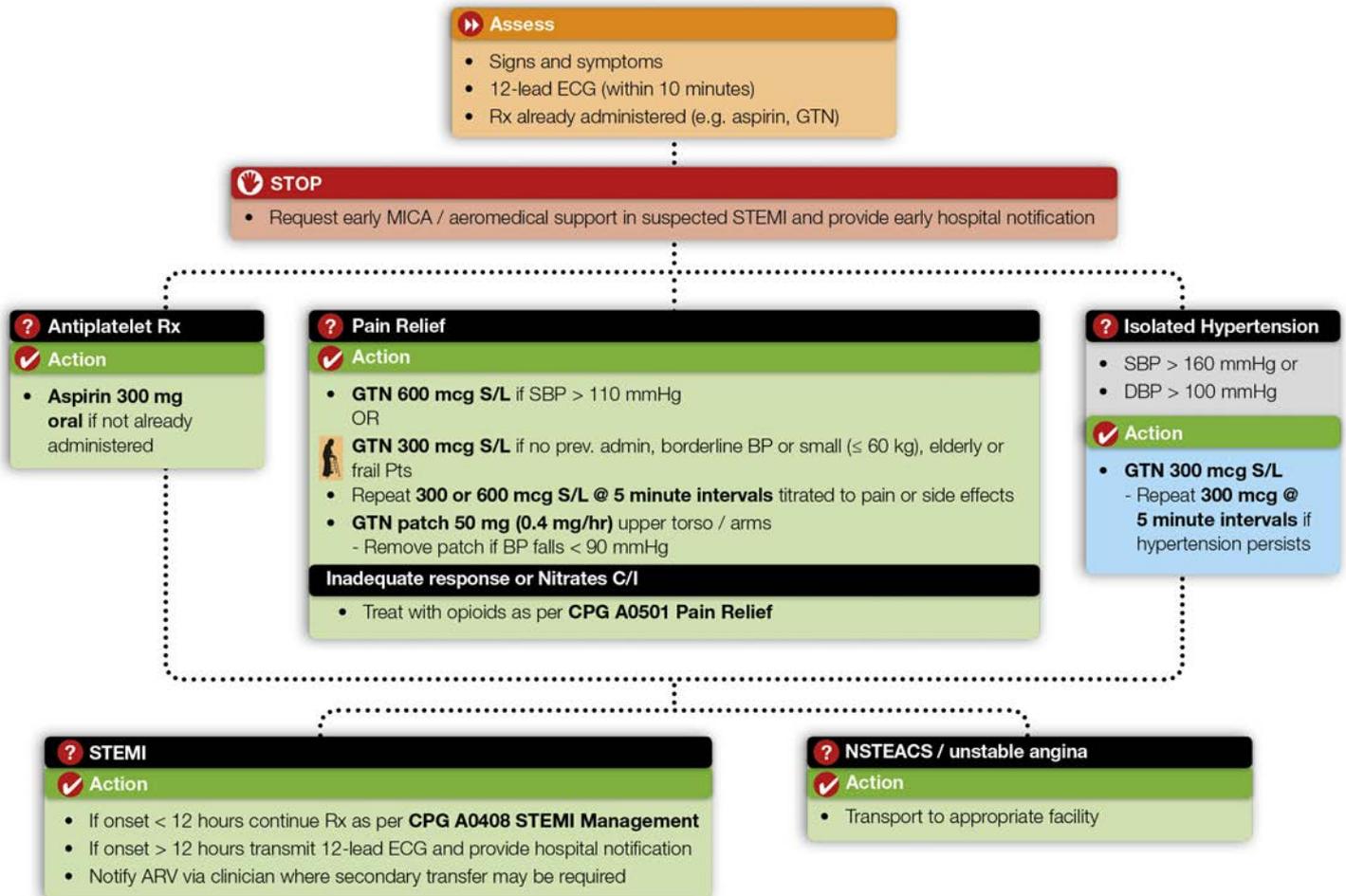
Care Objectives

- Rapid identification of STEMI to facilitate timely reperfusion (PCI or PHT) is the primary goal of prehospital management.
- Provision of antiplatelet rx (aspirin).
- Reduce cardiac workload by treating associated symptoms (e.g. nausea, pain).

General Notes

- The spectrum of ACS encompasses unstable angina, non ST-elevation ACS (NSTEMI) and ST-elevation myocardial infarction (STEMI).
- Not all patients with ACS will present with pain (e.g. elderly, female, diabetes history, atypical presentations).
- The absence of ischaemic signs on the ECG does not exclude AMI. AMI is diagnosed by presenting history, serial ECGs and serial enzyme tests.
- Suspected ACS-related pain that has spontaneously resolved warrants investigation in hospital.
- In patients who may be eligible for thrombolysis, invasive procedures should only be conducted according to clinical need and with the potential for increased bleeding risk in mind.
- Hyperoxaemia has been shown to be detrimental in patients with STEMI. Routine oxygen administration is not required in ACS and should only be provided as per **CPG A0001 Oxygen Therapy**.
- If a lower dose of aspirin has been administered prior to AV arrival, it is reasonable for paramedics to supplement the dose to as close to 300 mg as possible.
- Nitrates are C/I in bradycardia (HR < 50 bpm) due to the patient's inability to compensate for a decrease in venous return by increasing HR to improve cardiac output. **C.O. = HR x SV**
- Where this CPG refers to **GTN S/L**, buccal administration can be substituted if required.
- Pain – treat with nitrates and if unresolved, treat with opioids as per **CPG A0501 Pain relief**. The intent of analgesia in ACS is to make the patient comfortable. Getting the patient completely pain-free is not always possible and in some cases may be detrimental if excessive opioid doses are required to achieve it.
- Nausea/vomiting – treat as per **CPG A0701 Nausea and vomiting**
- LVF – treat as per **CPG A0406 Acute Pulmonary Oedema**
- Inadequate Perfusion – treat as per **CPG A0407 Inadequate Perfusion**
- Dysrhythmias – see appropriate CPG

Flowchart



Related Resources

- [Heart Foundation Resources for Health Professionals](#)
- [Cardiac Clinical Network \(SCV\)](#)
- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Nov 2016 CPG A0401 Acute Coronary Syndrome.pdf>
- <https://av-digital-cpg.web.app/assets/pdf/MAC/Glyceryl Trinitrate MAC March 2021.pdf>

Care Objectives

- To increase heart rate where bradycardia is causing haemodynamic compromise, heart failure or life threatening arrhythmia.

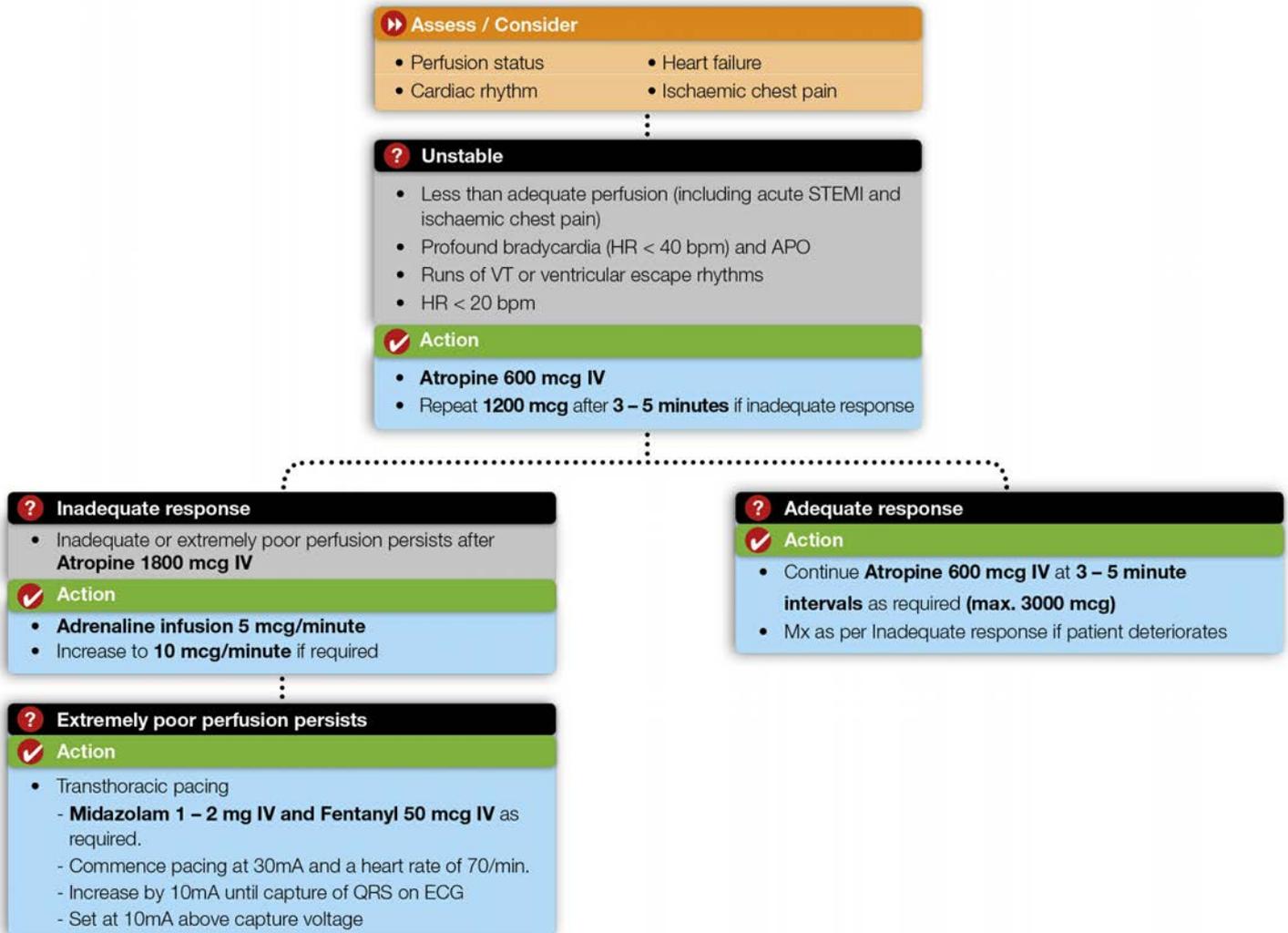
General Notes

- **Atropine** is unlikely to be effective in 2nd degree type II (Mobitz II) and 3rd degree (complete) heart block, however, it should still be administered.
- Where the patient initially responds adequately to two doses of **Atropine** however the effect is not sustained, repeat **Atropine 600 mcg** doses as required (**total maximum of 3000 mcg**).
- **Atropine** is ineffective and potentially harmful in patients who have had cardiac transplant.
- **Atropine** should be used with caution in myocardial infarction as increased heart rate may worsen ischemia.
- Titrate **Adrenaline** to patient response. If no increase in HR after **10 mcg/min**, pacing should be commenced.
- If side effects occur during **Adrenaline** infusion, cease infusion and recommence once side effects resolve or proceed to pacing.
- Adrenaline Infusion
 - Adrenaline 3 mg added to make 50 mL with D5W or Normal Saline
 - 1 mL/hr = 1 mcg/min

Stable bradycardia

- Bradycardia is defined as a heart rate less than 60 beats per minute. In practical terms, many patients will have a normal heart rate between 50 and 60 beats per minute. Consider 50 bpm as a threshold for management. Asymptomatic patients with adequate perfusion and a HR of > 20 may require monitoring and transport but not management.

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Dec 2016 CPG A0402 Bradycardia.pdf>

Care Objectives

- Rapid termination of life threatening arrhythmias and transport to a facility capable of definitive care.
- Rapid transport to facilitate the treatment of the arrhythmia where treatment is not available in the prehospital environment.
- Early termination of stable SVT where possible, following ECG capture.

General Notes

- Adenosine should be administered rapidly through a large vein proximal to the heart such as in the cubital fossa and followed with a Normal Saline bolus flush.
- AF and SVT deteriorating to the point of cardiac arrest should be treated initially with synchronised cardioversion 200J.
- The effectiveness of the patient's respirations should be continuously monitored after sedation.
- Signs and symptoms of an unstable and rapidly deteriorating patient may include:
 - Inadequate perfusion / shock (e.g. hypotension, pallor and diaphoresis)
 - Acutely altered conscious state or loss of consciousness
 - Ischaemic chest pain
 - APO
- These signs and symptoms are usually associated with significant tachycardia (≥ 150 bpm) unless there is impaired cardiac function.

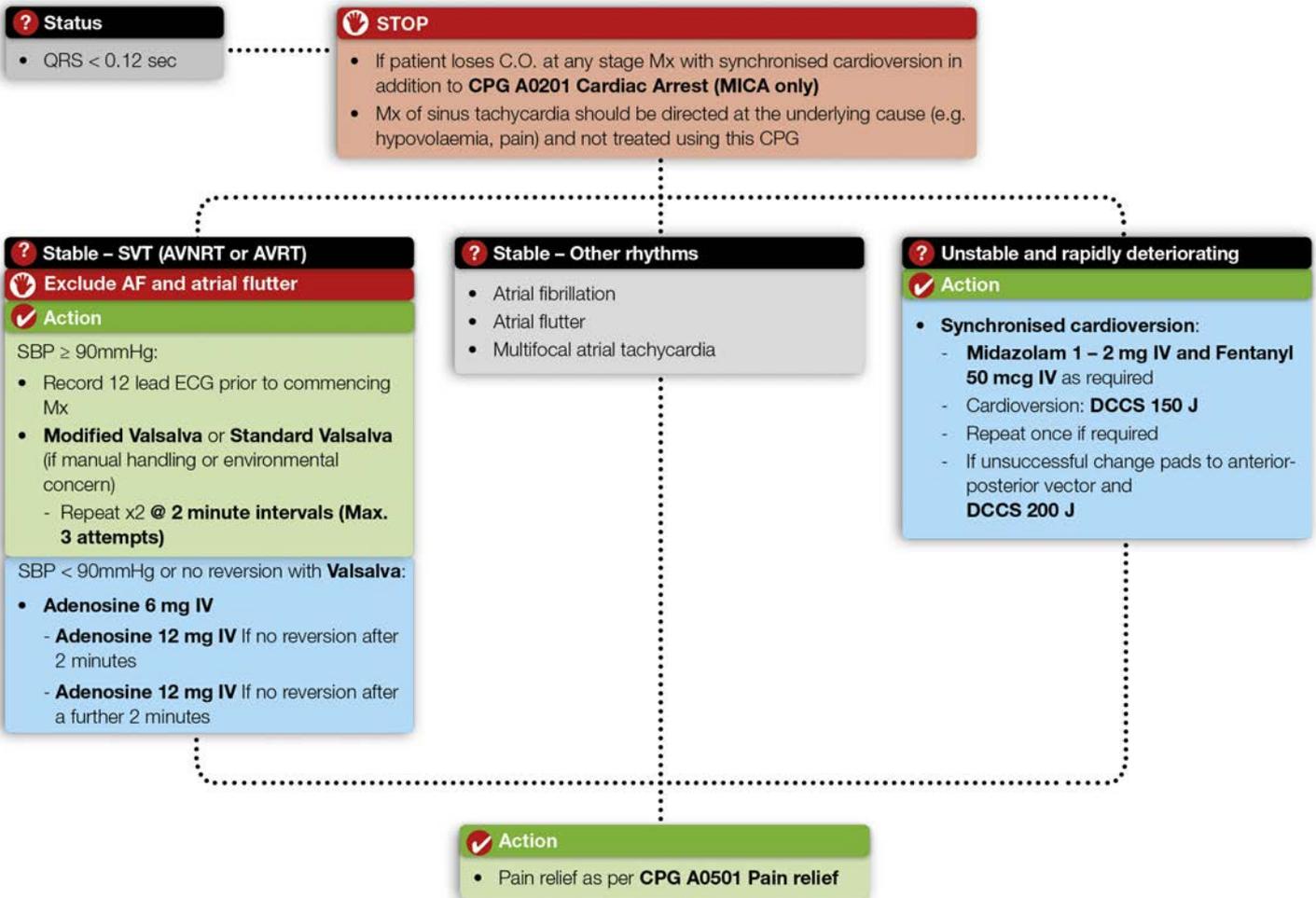
Modified Valsalva

1. Position laying semi-recumbent (45° angle).
2. Forced expiration.
3. Immediately lay the patient flat and raise their legs to a 45° angle for 15 seconds.
4. Return the patient to the semi-recumbent position.

Standard Valsalva

1. Position patient supine.
 2. Forced expiration.
- Evidence suggests the modified Valsalva achieves superior reversion rates in comparison to other techniques. However, the environment, patient size and available resources may influence the choice of manoeuvre.
 - Paramedics should perform a standard Valsalva where they believe the modified Valsalva presents a manual handling risk or is not possible due to environmental concerns.
 - Forced expiration at the target pressure of approximately 40 mmHg can be achieved by blowing for 15 seconds into a 10 mL syringe hard enough to move the plunger.
 - The Valsalva manoeuvre is reserved exclusively for patients with a SBP of ≥ 90 mmHg.
 - A 12 lead ECG should be recorded prior to Mx unless the patient requires immediate treatment.

Flowchart



Related Resources

- [https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Dec 2016 CPG A0404 Tachycardia \(Narrow and Broad\).pdf](https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Dec 2016 CPG A0404 Tachycardia (Narrow and Broad).pdf)

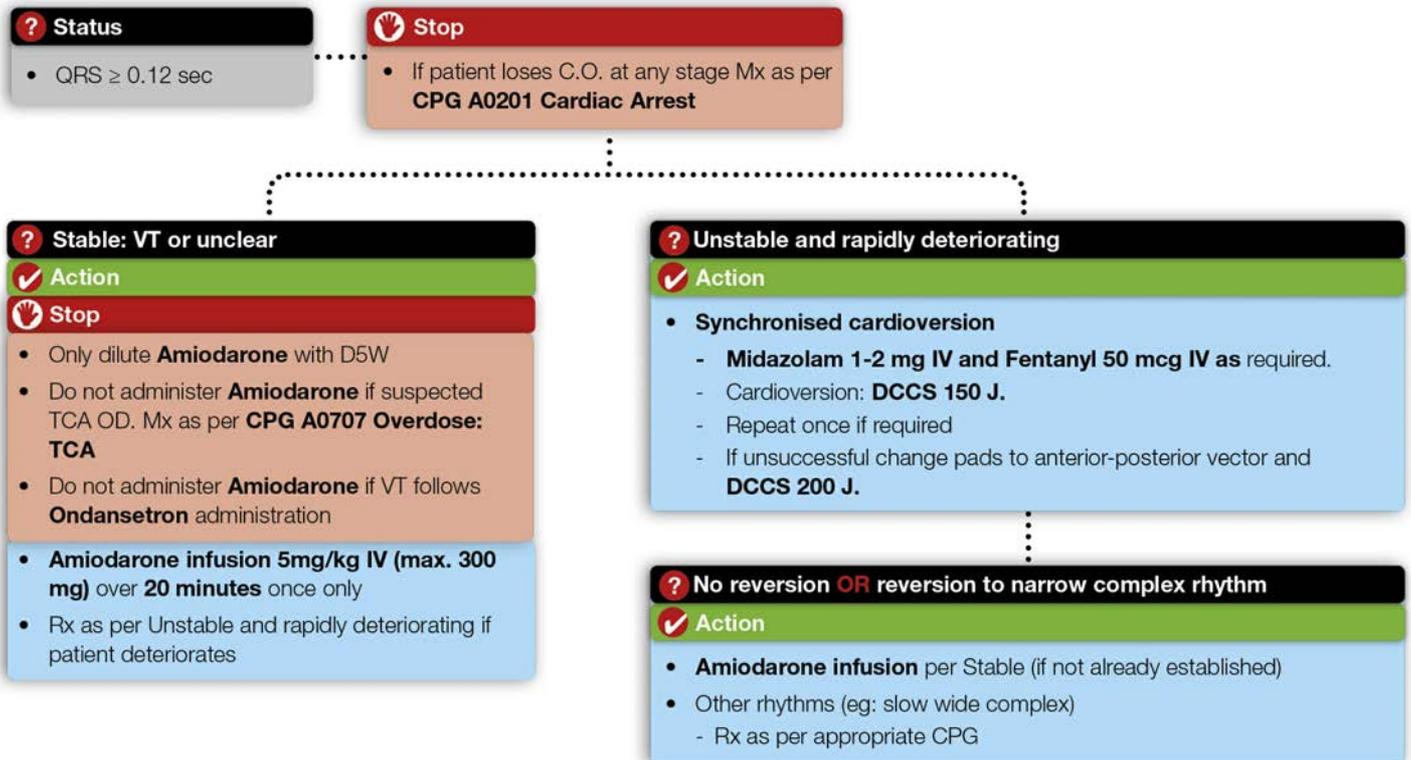
Care Objectives

- Rapid termination of life threatening arrhythmias and transport to a facility capable of definitive care.
- Rapid transport to facilitate the treatment of the arrhythmia where treatment is not available in the prehospital environment.

General Notes

- Ventricular Tachycardia requiring management is defined as:
 - Lasting > 30 seconds
 - Rate > 100
 - QRS > 0.12 seconds
 - Regular (mostly)
 - AV dissociation or absence of P waves
- Where rhythm interpretation is uncertain, a regular broad complex tachycardia should be treated as VT until proven otherwise.
- Signs and symptoms of an unstable and rapidly deteriorating patient may include:
 - Inadequate perfusion / shock (e.g. hypotension, pallor and diaphoresis)
 - Acutely altered conscious state or loss of consciousness
 - Ischaemic chest pain
 - APO
- These signs and symptoms are usually associated with significant tachycardia (≥ 150 bpm) unless there is impaired cardiac function.
- ALS crews should consider the time to get MICA support versus the time to hospital, as these patients are dynamic and have the potential to deteriorate.
- The effectiveness of the patient's respirations should be continuously monitored after sedation.

Flowchart



Related Resources

- [https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Dec 2016 CPG A0404 Tachycardia \(Narrow and Broad\).pdf](https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Dec 2016 CPG A0404 Tachycardia (Narrow and Broad).pdf)

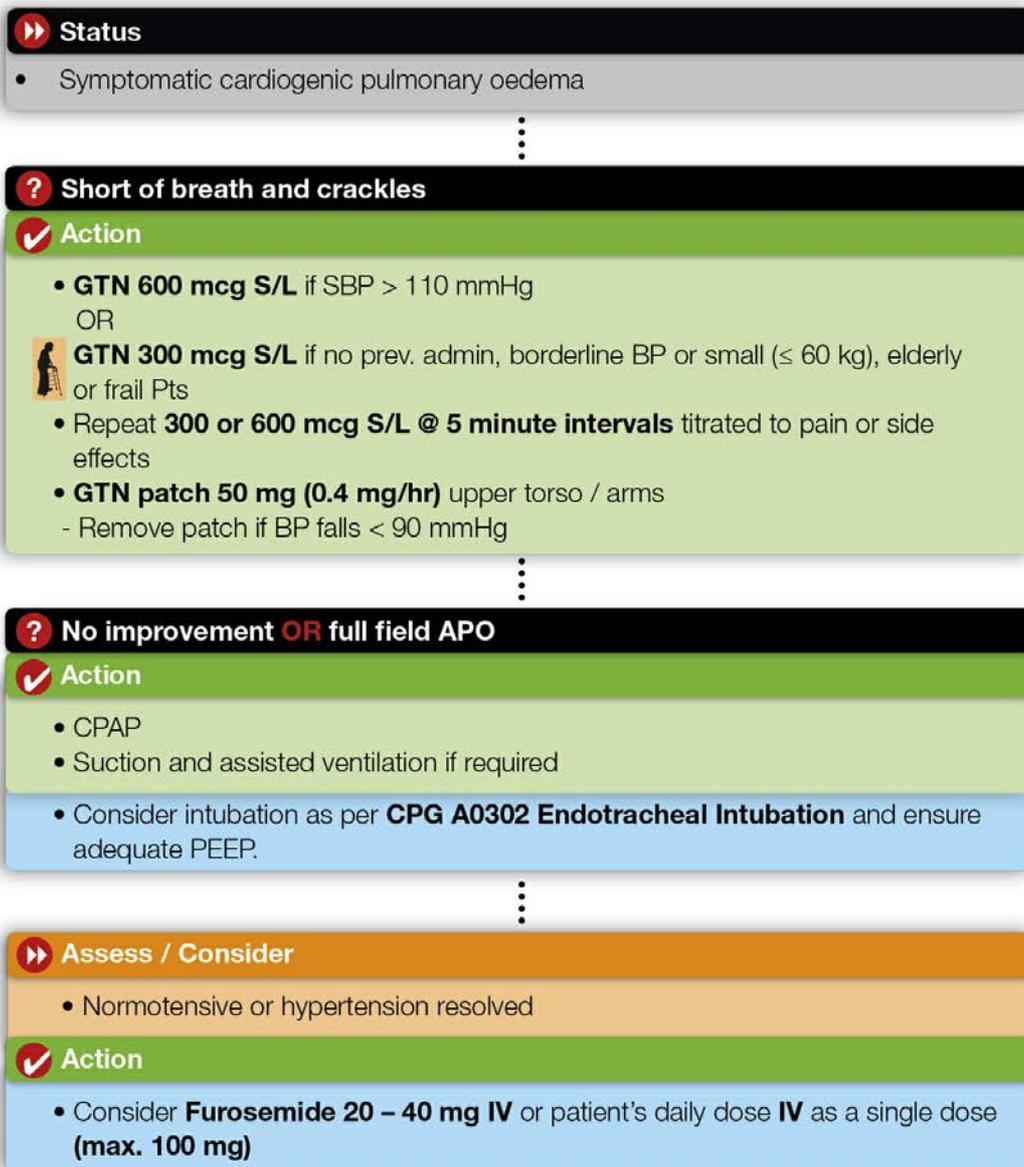
Care Objectives

- Nitrates treat the underlying cause of cardiogenic APO and should be administered to all patients presenting in symptomatic cardiogenic APO unless contraindicated.
- CPAP is an appropriate treatment for respiratory failure associated with APO while the underlying cause is addressed. It may be required in patients unresponsive to nitrates or where respiratory failure is significant enough to require immediate treatment concurrent with nitrates.
- **Furosemide** is not an appropriate first line treatment in hypertensive patients with a sympathetically driven APO. Nitrates and CPAP (where required) should be the initial priority. Where the patient is normotensive, or hypertension has been corrected with nitrates, **Furosemide** may be considered.

General Notes

- **Cardiogenic APO:** This CPG is primarily directed at symptomatic cardiogenic pulmonary oedema, secondary to LVF or CCF. Other medical causes of pulmonary oedema should not be treated under this CPG. Asymptomatic APO does not require treatment.
- **Non-cardiac APO:** causes include smoke/toxic gas inhalation, near drowning (aspiration) and anaphylaxis. In these cases the pulmonary oedema is likely a result of altered permeability and should be treated with supplemental oxygen and assisted ventilation where indicated. They do not require nitrates.
- Mx chest pain as per **CPG A0401 Acute Coronary Syndrome**.
- **Furosemide** should be used cautiously in the hypotensive patient.
- Patients with pulmonary oedema presenting with a wheeze should only be managed as per **CPG A0601 Asthma** if a past history of bronchospasm can be confirmed.
- Avoid the use of **Salbutamol** in the setting of pulmonary oedema where possible.
- Contraindications to CPAP:
 - Airway
 - Inability to manage own airway
Altered conscious state, active vomiting, excessive secretions.
 - Upper airway obstruction
 - Breathing
 - Hypoventilation
Patient must have adequate spontaneous respiration.
 - Untreated tension pneumothorax
Tension pneumothorax must be treated prior to considering CPAP
 - Circulation
 - Haemodynamic instability
Severe hypotension, ventricular arrhythmias etc., should be treated prior to considering CPAP
 - Other
 - Injuries precluding mask application

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Nov 2016 CPG A0406 Pulmonary Oedema.pdf>

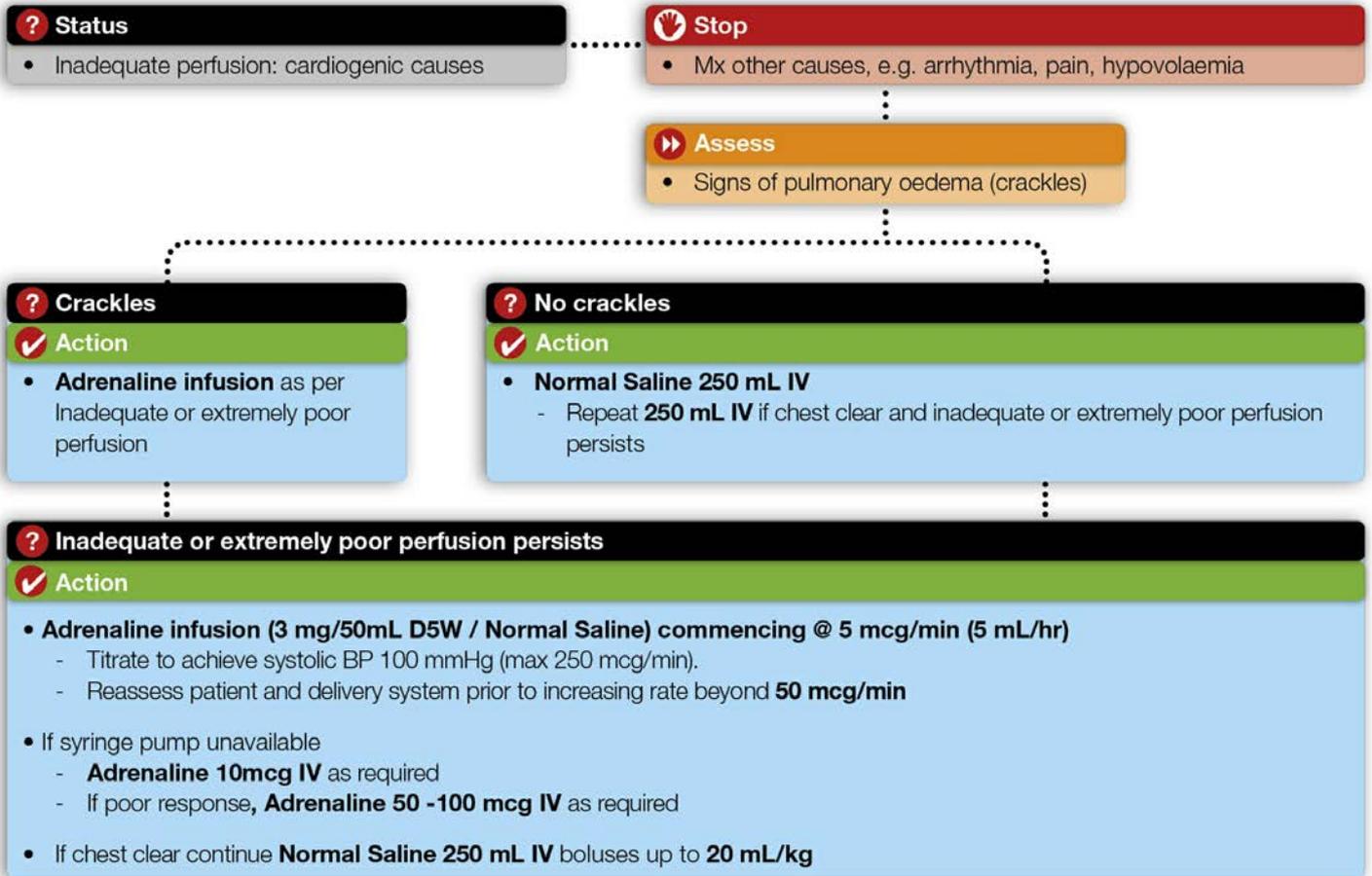
Care Objectives

- To achieve a perfusion target appropriate to the patient's condition.

General Notes

- Any IV infusions established under this CPG must be clearly labelled with the name and dose of any additive medications and their dilution.
- A patient presenting with inadequate to extremely poor perfusion resulting from a cardiac event may not always have associated chest pain, e.g. silent MI, cardiomyopathy.
- Patients presenting with suspected PE with inadequate to extremely poor perfusion should be managed with this CPG. PE is not specifically a cardiac problem but may lead to cardiogenic shock due to an obstruction to venous return and the patient may require fluid and **Adrenaline** therapy.
- **Adrenaline infusion > 50 mcg/min** may be required to manage these patients. Ensure delivery system is fully operational (e.g. tube not kinked, IV patent) prior to increasing dose.
- Unstable patients may require bolus **Adrenaline** concurrently with the infusion.
- **Adrenaline infusion**
 - **Adrenaline 3 mg** added to make **50 mL** with **D5W** or **Normal Saline**.
 - 1 mL/hr = 1 mcg/min
- **Adrenaline infusion > 100 mcg/min** is likely to be harmful to the patient. Paramedics should consider further fluid therapy or accept a lower blood pressure in this setting as it may reflect a better balance between perfusion and the side effects of adrenaline.

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Nov 2016 CPG A0407 Inadequate Perfusion.pdf>

Care Objectives

- In the setting of STEMI, time from onset of symptoms to coronary reperfusion correlates to the amount of permanent myocardial damage and risk of death. Once STEMI is identified, all efforts should aim to expedite coronary reperfusion whether via PCI or PHT. The primary destination is intended to be a PCI centre in all cases.

General Notes

- The time to PCI facility is measured from the time at which the 12-lead ECG changes consistent with a STEMI are identified by a PHT endorsed and equipped paramedic.
- If a 12-lead ECG identifies a potential STEMI and the patient is eligible for thrombolysis, but the paramedic believes the monitor's interpretation of the ECG is incorrect, the cardiology consult service must be contacted.

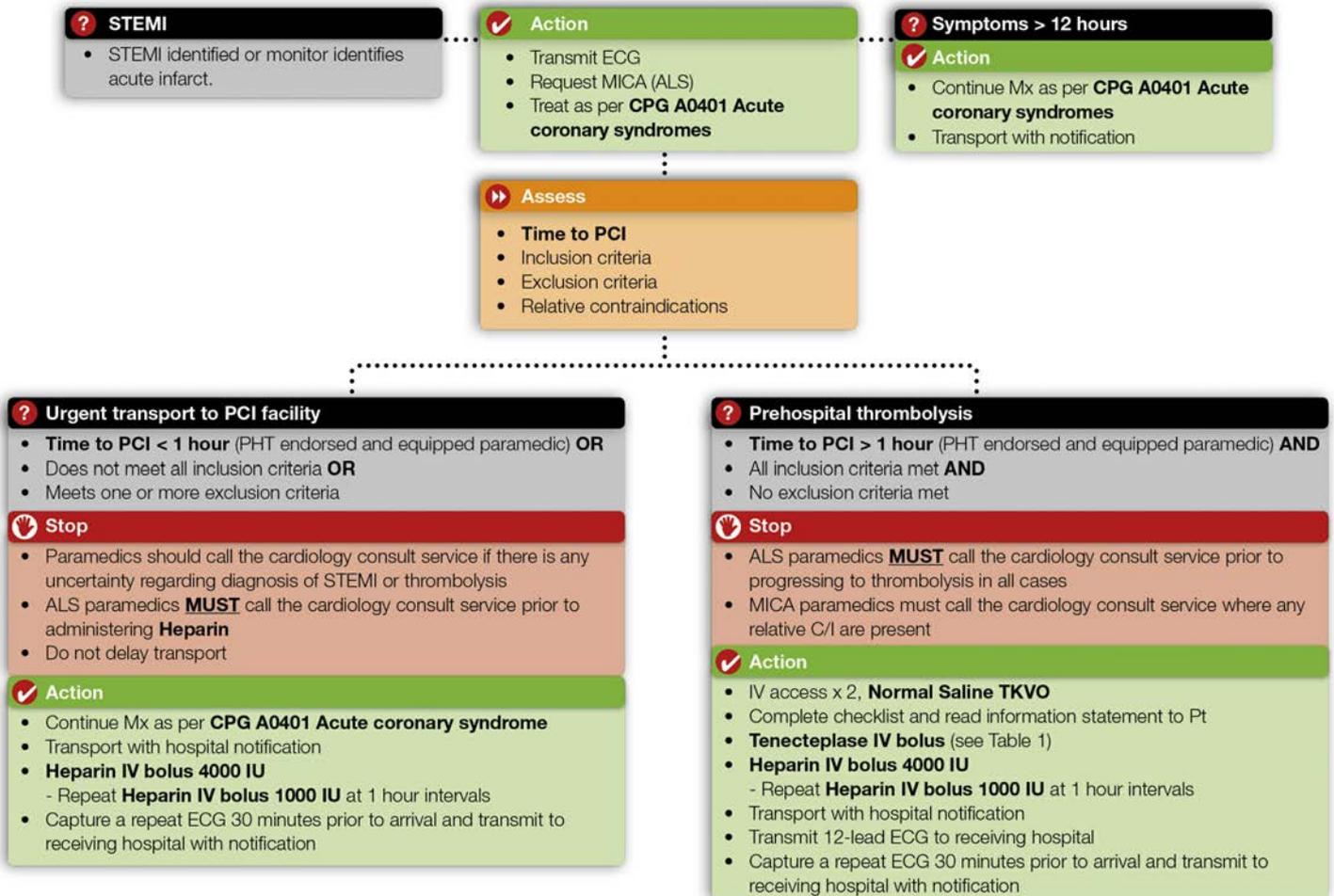
Patient Destination

- Following pre-hospital thrombolysis, aim to transport the patient to the closest PCI facility (in consultation with the Clinician).
- In instances where distance or resourcing precludes travel to a PCI centre as the primary destination, consider the following in consultation with the Clinician:
 - Utilising AAV as a primary transfer option;
 - Transporting the patient to an *interim health care facility (from where secondary transfer to a PCI facility will be co-ordinated between the Clinician and ARV).

** An appropriate interim destination is a facility with a registered emergency department that can provide temporary care for the thrombolysed patient whilst awaiting ARV retrieval to a PCI facility.*

- Contact the cardiology consult service for IO administration of thrombolysis in cases where IV access cannot be achieved.

Flowchart



Tenecteplase Dose Table

Tenecteplase Dose (IV)			
Following consultation for Pts \geq 75 years, the Tenecteplase dose <u>MUST</u> be halved			
Pt weight	mg	IU	mL
< 60 kg	30 mg	6,000 IU	6 mL
60 - 69 kg	35 mg	7,000 IU	7 mL
70 - 79 kg	40 mg	8,000 IU	8 mL
80 - 89 kg	45 mg	9,000 IU	9 mL
\geq 90 kg	50 mg	10,000 IU	10 mL

Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC CPG A0408 STEMI CPG Update June 2017.pdf>

Checklist

Thrombolysis exclusion criteria

The patient **CANNOT** be thrombolysed if they meet **ANY** of the following criteria:

	YES	NO
Has the patient had major surgery in the past 3 months? <ul style="list-style-type: none"> Major surgery is defined as involving a body part where bleeding may prove life-threatening if it develops e.g. intracranial, chest, abdomen, spine or joint replacement 		
Has the patient had a significant head injury in the past 3 months? <ul style="list-style-type: none"> Significant head injury is an injury that was severe enough to result in an injury visible on CT scan 		
Has the patient had major trauma in the past 3 months? <ul style="list-style-type: none"> Major trauma is defined as severe enough to cause an injury where bleeding may prove life-threatening if it develops e.g. multiple rib fractures, intra-abdominal injury or pelvic fractures 		
Has the patient had a stroke/TIA in the past 3 months, or ICH at any time?		
Has the patient had a GI or genitourinary bleed in the past month?		
Does the patient have a current bleeding disorder, active bleeding (excluding menses) or have bleeding tendencies?		
Is the patient currently taking anticoagulants (incl. warfarin, heparin, enoxaparin, dabigatran, rivaroxaban, apixaban) or glycoprotein IIb/IIIa inhibitors (e.g. abciximab, eptifibatide, tirofiban)?		
Does the patient have an allergy to Tenecteplase or gentamicin?		

If the patient answered "yes" to **ANY** exclusion criteria, **do not proceed with thrombolysis.**

Checklist

✓ Thrombolysis inclusion criteria

The patient can **ONLY** be given thrombolysis if **BOTH** of the following inclusion criteria apply:

	YES	NO
Did the symptoms start less than 12 hours ago?		
Does the monitor ECG interpretation indicate STEMI or 12-lead ECG shows ST elevation in two or more contiguous leads: <ul style="list-style-type: none"> • ≥ 2.5 mm ST elevation in leads V2-3 in men aged <40 years, or • ≥ 2 mm ST elevation in leads V2-3 in men aged ≥40 years, or • ≥ 1.5 mm ST elevation in V2-3 in women, or • ≥ 1 mm in other leads, or • New onset left bundle-branch block? 		

If the patient answered "no" to **ANY** inclusion criteria, **do not proceed with thrombolysis.**

Relative contraindications

If **ANY** of the following apply, **call the cardiology consult service** before proceeding with thrombolysis:

	YES	NO		YES	NO
Is the patient aged ≥ 75 years ?			Does the patient have anaemia?		
Does the patient have a non-compressible vascular puncture (e.g. recent organ biopsy or IV central line)?			Does the patient possibly have acute pericarditis or subacute bacterial endocarditis?		
Does the patient have a history of liver disease?			Has the patient received traumatic or prolonged (>10 minutes) CPR?		
Is the SBP > 160 mmHg, or DBP >110 mmHg?			Is the patient pregnant or within 1 week post-partum?		
Is the patient of low body weight?			Is the HR > 120 bpm?		
Does the patient have an active peptic ulcer?					

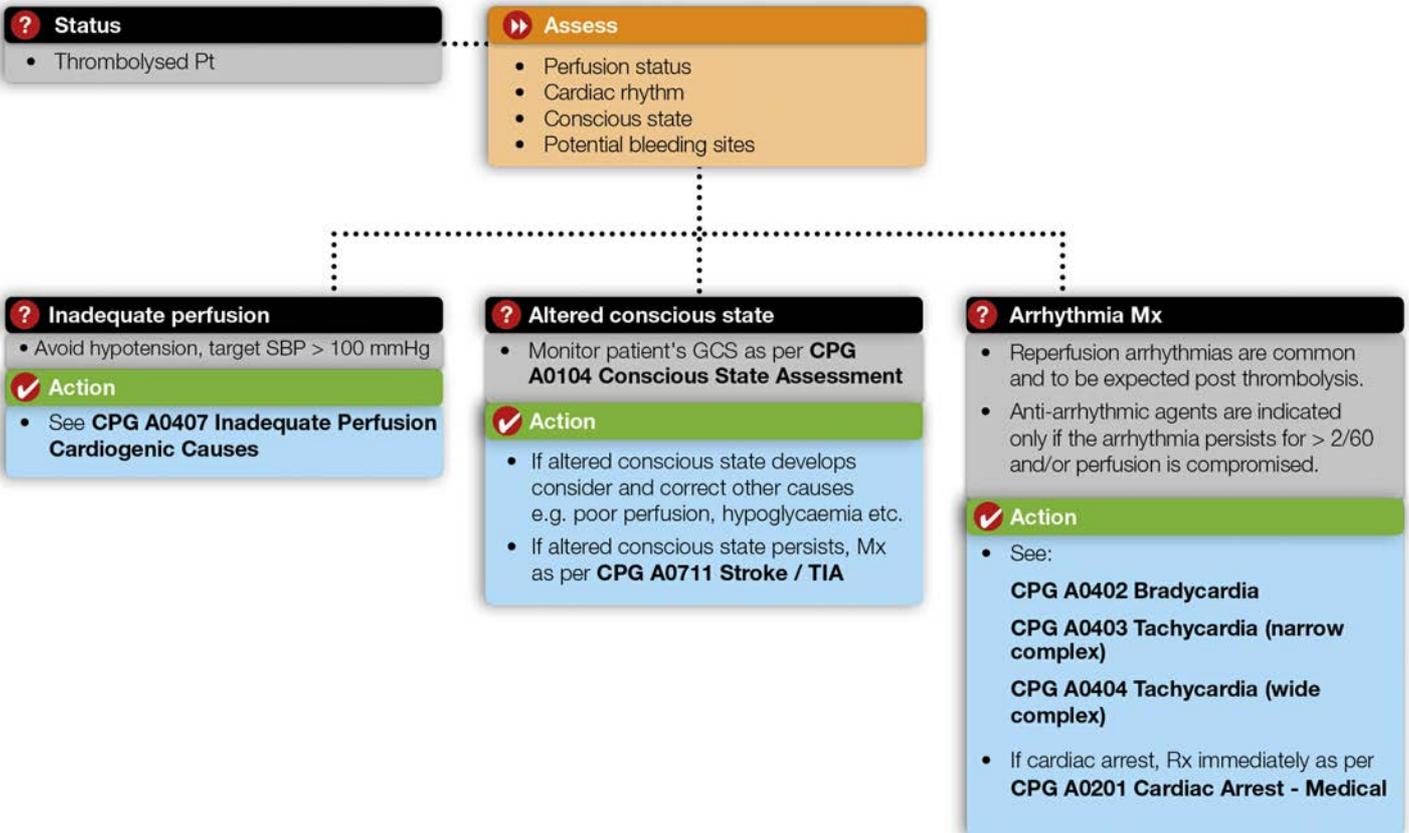
Following consultation for patients ≥ 75 years, the Tenecteplase dose **MUST** be halved.

If the answer is yes to **ANY** relative contraindications, **call the cardiology consult service prior to proceeding to thrombolysis.**

General Care of the thrombolysed patient

- Patients with STEMI are at risk of developing serious complications including bradycardia, tachycardia, poor perfusion, and / or pump failure leading to cardiogenic shock. Therefore, maintain constant cardiac monitoring until arrival at destination and be alert for potential cardiac arrest. Monitor the patient for signs of myocardial reperfusion (such as ectopic beats, self-limiting runs of VT, resolving ST segments, or a return to sinus rhythm).
- Record routine 12-lead ECGs at 15 minute intervals looking for signs of ST segment resolution. Note the time, number in series, and pain score. (Additional 12-lead ECGs should be recorded as required.)
- Success or failure of thrombolysis cannot be known for certain until the vessel is viewed during the PCI procedure. However, a reduction in pain, and of the ST segment by half (or more) of the initial elevation is a positive sign. This could take up to 60 - 90 minutes to occur. Thrombolysis is known to be unsuccessful in approximately 30% of cases.
- Closely monitor obvious and obscure sites for potential bleeding e.g. cannulation sites, PR, GI, and mucous membranes (oral and conjunctival).
- STEMI patients who have failed thrombolysis, or who suffer complications should be managed symptomatically as per the relevant CPGs.
- Continue to manage the patient's:
 - Pain as per **CPG A0401 Acute Coronary Syndrome** and **CPG A0501 Pain Relief**; and
 - Nausea and vomiting as per **CPG A0701 Nausea and Vomiting**.

Flowchart



Patient Information Statement

Patients need to be aware of the potential side-effects of thrombolysis prior to administration. The following statement outlines important key messages and should be read to the patient prior to thrombolysis:

"Your ECG (heart tracing) shows that you are having a heart attack. The best treatment for you right now is a clot dissolving drug called Tenecteplase, and the sooner you receive this medication, the lower your risk of long-term, severe heart muscle damage.

Before I give you this medication, I want to let you know of the potential risks:

The most serious risk of receiving this medication is stroke which affects about 1 in 100 patients. Other risks include bleeding which is not life-threatening and occurs in approximately 4 in 100 patients treated. Some patients can have an allergic reaction or other effects that are generally not cause for concern. We can manage these bleeding and allergy risks if they occur on the way to hospital.

The risks I have just listed will be the same if we delay, and you then go on to receive this treatment in hospital. The longer this treatment is delayed the worse the damage to your heart muscle will be."

Care Objectives

- To reduce the suffering associated with the experience of pain to a degree that the patient is comfortable.

General Notes

Quality Analgesia

- The adequacy of analgesia should be discussed with the patient and balanced against medication side effects. The patient reporting comfort is the most important indicator of adequate analgesia. Distressed appearance, physiological signs of pain and verbal numerical rating may contribute to determining the adequacy of analgesia.
- An inability to report or rate pain (e.g. dementia, intellectual disability, neurodiversity, non-English speaking) should not preclude analgesia. Where discomfort is evident in the setting of possible pain producing stimuli, analgesia may be indicated.
- Consider dose reductions or longer dose intervals in small, frail or elderly patients.
- ALS Paramedics should consult for IV ketamine and / or further doses of opioids in any circumstance where the maximum doses have been reached but the patient remains in pain.
- Multi-modal analgesia is the preferred approach where possible. It involves using smaller doses of multiple different agents instead of larger doses of a single agent (e.g. paracetamol, opioid and methoxyflurane vs morphine alone). The effect is usually improved pain relief and less adverse effects.

Moderate pain

- **IV Opioids + Paracetamol** is the preferred approach if IV access is available / required.
 - The IV route is preferred in frail or elderly patients as the IN route is more variable in effect and difficult to titrate. IN medications may still be considered to expediate time to first analgesic dose or where IV access cannot be achieved.
- **IN Fentanyl or IN Ketamine + Paracetamol** is the preferred approach if:
 - IV access is NOT available / required (i.e. there is no other clinical reason to insert an IV and clinical judgement indicates the patient's pain can be managed with non-IV therapy)
 - IV access is delayed or unsuccessful
 - Consider IN Ketamine if the first line approach with opioids has shown limited or no effect (e.g. minimal reduction in pain following 10 mg IV morphine or 100 mcg IV fentanyl). Clinical judgement is required to balance the ongoing titration of both medications
 - IN Ketamine is the preferred first line approach where opioids are contraindicated, the patient is opioid tolerant, or declines opioids
- Paracetamol should always be administered in addition to other analgesics where the oral route is not contraindicated (e.g. need for possible emergency surgery or procedural sedation).
- IM Morphine:
 - IN fentanyl / IN ketamine is contraindicated / has limited effect **AND** IV access is not available (e.g. no IV access available with facial trauma)

- Methoxyflurane:
 - **Preferred agent for procedural pain** or pain related to movement
 - May also be used as a third line agent if required
 - Should be used with other analgesics to optimise pain management

Severe Pain

- **Opioids + Ketamine** is the preferred approach to managing severe pain.
- There is no requirement that large doses of opioids be given prior to using ketamine. Initial management may include both medications. A short period of time (e.g. 3 – 5 minutes) should ideally be left between the two medications to gauge the patient's response.
- IV Ketamine:
 - MICA paramedics may use IV ketamine in preference to IN ketamine if IV access is immediately available
 - ALS paramedics should consult for IV ketamine where initial IN ketamine analgesic management is inadequate.
- **IN Fentanyl** and / or **IN Ketamine** and / or **Methoxyflurane** should be administered if IV access is delayed or not available. IM morphine may also be considered where the IN route is not available.
- Paracetamol may be administered to patients in severe pain. However, this will frequently be impractical or inappropriate (e.g. likely to require surgery).

Procedural pain

- Procedural pain refers to any situation in which a patient requires supplemental analgesia for short periods of time:
 - **Moderate procedural pain** may include splinting minor fractures, reducing dislocations, transferring patients to or from the stretcher or difficult egress (e.g. rough terrain).
 - **Severe procedural pain** refers to the extrication or manipulation of patients with severe musculoskeletal injury.

Cardiac chest pain

- Ketamine should not be administered to treat chest pain in suspected acute coronary syndrome.
- Where IV access has not been successful, fentanyl IN may be used. Where IN fentanyl is not suitable or available, morphine or fentanyl IM (with or without methoxyflurane) should be administered if required.

Fentanyl

- Studies have found no significant difference between the efficacy of morphine and fentanyl. The pharmacological and pharmacokinetic properties of fentanyl are preferred for the following indications:
 - Contraindication to morphine
 - Short duration of action desirable (e.g. dislocations)
 - Hypotension
 - Nausea and / or vomiting

- Severe headache (refer to **CPG A0502 Headache**)
- Where the IM route is required and morphine is contraindicated (e.g. allergy), fentanyl IM may be used.

Ketamine

- **Anxiety / psychosis history:** Due to the potential side-effects, ketamine as an analgesic should be administered with caution in patients with a history of mental health issues such as psychosis. Consider other agents for moderate pain.
- **Adolescent / elderly / frail patients:** ketamine has been reported to have a greater side-effect profile. Use IN fentanyl in preference to IN ketamine in patients who are elderly, frail or 12-16 years of age where available.
- Ketamine is an effective analgesic for non-traumatic painful conditions such as renal colic.
- Ketamine IM using the IV dose may be considered where the IV and IN route is not available.
- All IN doses require an additional 0.1 mL to account for atomiser dead space.
- Optimal IN absorption occurs with volumes of 0.3 - 0.5 mL. This is also dependent on patient compliance. In some instances it may be appropriate to administer half of the volume into each nostril to obtain the full dose.

Managing side effects

- **Significant respiratory depression** due to opioids:
 - Titrate small doses of IV Naloxone as per **CPG A0707 Overdose – other opioid overdose**. Avoid complete reversal and the return of pain.
- **Hypersalivation** is a known side effect of ketamine:
 - **Suction:** On most occasions suctioning will be sufficient
 - **Atropine 600 mcg IV/IM** (MICA only) where hypersalivation becomes difficult to manage or the airway is compromised
- **Emergence reactions:**
 - Hallucinations or other behavioural disturbance associated with ketamine are less common in low doses as used for pain management.
 - These reactions are transient and can be minimised by administering IV doses slowly (e.g. over 1 – 2 minutes) and by reassuring the patient. This is particularly relevant for frail or elderly patients.
 - Patients with poorly controlled psychiatric conditions involving psychosis such as schizophrenia may find some of the adverse effects of ketamine particularly distressing. Consider this risk against the potential benefit when planning analgesic approach.
 - **Midazolam 0.5 - 1 mg IV** (ALS – consult only) - consider for significant or persistent reactions

Infusion preparation

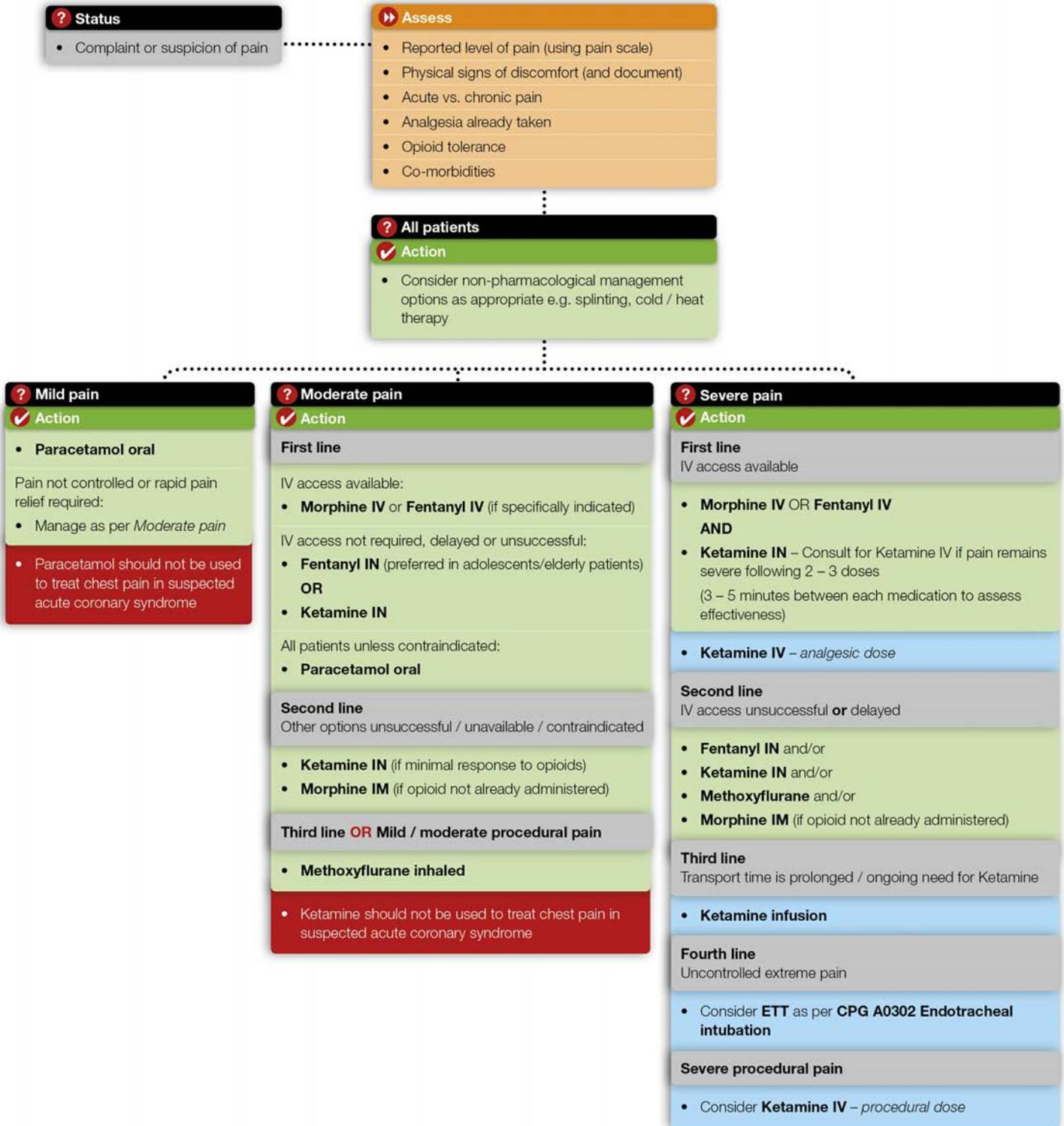
- Ketamine 50 mg up to 50 mL with Normal Saline to make 1 mg/mL dilution.

- Recommended infusion rate: 0.1 – 0.3 mg/kg/hr

Supply issue

- During the COVID-19 pandemic, health care supply chain issues have been experienced globally. For Ambulance Victoria, this has led to interruptions in the supply of medications and related equipment such as the mucosal atomizer device. This guideline includes an expanded range of approved analgesic options to ensure paramedics can continue to provide optimal pain relief in the context of continued shortages. The actual medications and equipment physically available to paramedics may vary over time.

Flowchart



Dose Table

<p>? Paracetamol</p> <p>Oral</p> <ul style="list-style-type: none"> 1000 mg <p>OR</p> <p> 500 mg (< 60 kg / frail / elderly / malnourished / liver disease)</p>	<p>? Morphine</p> <p>IV</p> <ul style="list-style-type: none"> Up to 5 mg at 5 minute intervals <ul style="list-style-type: none"> ALS Consult after 20 mg As above – no max dose <p>IM</p> <ul style="list-style-type: none"> 10 mg <ul style="list-style-type: none"> Repeat 5 mg after 15 minutes if required (once only) <p>OR</p> <p> 0.1 mg/kg (< 60 kg / frail / elderly) <ul style="list-style-type: none"> No repeat dose </p>	<p>? Ketamine</p> <p>IN</p> <ul style="list-style-type: none"> 75 mg <ul style="list-style-type: none"> Repeat 50 mg at 20 minute intervals No max dose <p>OR</p> <p> 50 mg (< 60 kg / frail / elderly) <ul style="list-style-type: none"> Repeat 25 mg at 20 minute intervals No max dose </p> <p>IV – Analgesic dose</p> <ul style="list-style-type: none"> Consult only 10 – 20 mg at 5 – 10 minute intervals <p>IV – Procedural dose</p> <ul style="list-style-type: none"> Consider 20 – 30 mg at 2 minute intervals until patient is dissociated or analgesia is adequate <p>IV – Infusion</p> <ul style="list-style-type: none"> Ketamine infusion 0.1 – 0.3 mg/kg/hr
<p>? Methoxyflurane</p> <p>Inhaled</p> <ul style="list-style-type: none"> 3 mL <ul style="list-style-type: none"> Repeat 3 mL if required (max. 6 mL) 	<p>? Fentanyl</p> <p>IV</p> <ul style="list-style-type: none"> Up to 50 mcg at 5 minute intervals <ul style="list-style-type: none"> ALS Consult after 200 mcg As above – no max dose <p>IN</p> <ul style="list-style-type: none"> 200 mcg <ul style="list-style-type: none"> Repeat up to 50 mcg at 5 minute intervals if required (max. 400 mcg IN) <p>OR</p> <p> 100 mcg (< 60 kg / frail / elderly) <ul style="list-style-type: none"> Repeat up to 50 mcg at 5 minute intervals if required (max. 200 mcg IN) </p> <p>IM</p> <ul style="list-style-type: none"> 100 mcg <ul style="list-style-type: none"> Repeat 50 mcg after 15 minutes if required (once only) <p>OR</p> <p> 1 mcg/kg (< 60 kg / frail / elderly) <ul style="list-style-type: none"> No repeat dose </p>	

Related Resources

- The Pain Management CPG [walkthrough video](#)
- <https://av-digital-cpg.web.app/assets/pdf/MAC/Pain - IN Fent shortage CPG review Sept 2020 MAC paper.pdf>
- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC CPG A0501 Pain Relief and CPG P0501 Pain Relief Paediatric June 2018.pdf>
- [https://av-digital-cpg.web.app/assets/pdf/MAC/MAC May 2015 CPG A0501 Pain relief \(Paracetamol\).pdf](https://av-digital-cpg.web.app/assets/pdf/MAC/MAC May 2015 CPG A0501 Pain relief (Paracetamol).pdf)
- [https://av-digital-cpg.web.app/assets/pdf/MAC/4.1.1 \(5\) Methoxyflurane MAC March 2021.pdf](https://av-digital-cpg.web.app/assets/pdf/MAC/4.1.1 (5) Methoxyflurane MAC March 2021.pdf)

General Notes

- Patients who suffer from chronic pain conditions are not likely to seek emergency help unless their usual pain management plan has failed and they are unable to cope with their current level of pain.
- Common aetiologies of chronic pain include low back pain, headache / migraine, joint pain, and neuropathic pain (e.g. Parkinson's disease, Multiple Sclerosis, poststroke pain).
- Chronic pain can be difficult to assess (may not present with usual signs of pain such as tachycardia and agitation) and complex to manage as the response to pain management may vary significantly between patients.
- Patients with chronic pain may be on a pain management plan that includes a balance between drug therapy, cognitive therapy, and behavioural interventions. Breakthrough pain is common, even in patients with controlled chronic pain under a care plan.

Please consider the following principles when attending patients who present with severe pain and a history of chronic pain:

- The presentation may not be related to the chronic painful condition. A search for the cause of the pain should include the standard clinical approach and assessment techniques to exclude a new aetiology.
- If the patient has a chronic pain management plan, ensure they have followed this plan.
- If possible, consult with their regular health care provider.
- Appropriate analgesic therapy within the AV setting is challenging, and it may be that reassurance and organising a medical review are the best options.
- Unless there is definitive evidence of addiction, chronic pain patients should not be assumed to be "drug seekers".
- Partial relief is a more realistic goal than complete relief of pain.
- The patient in severe breakthrough pain is likely to require medical attention.

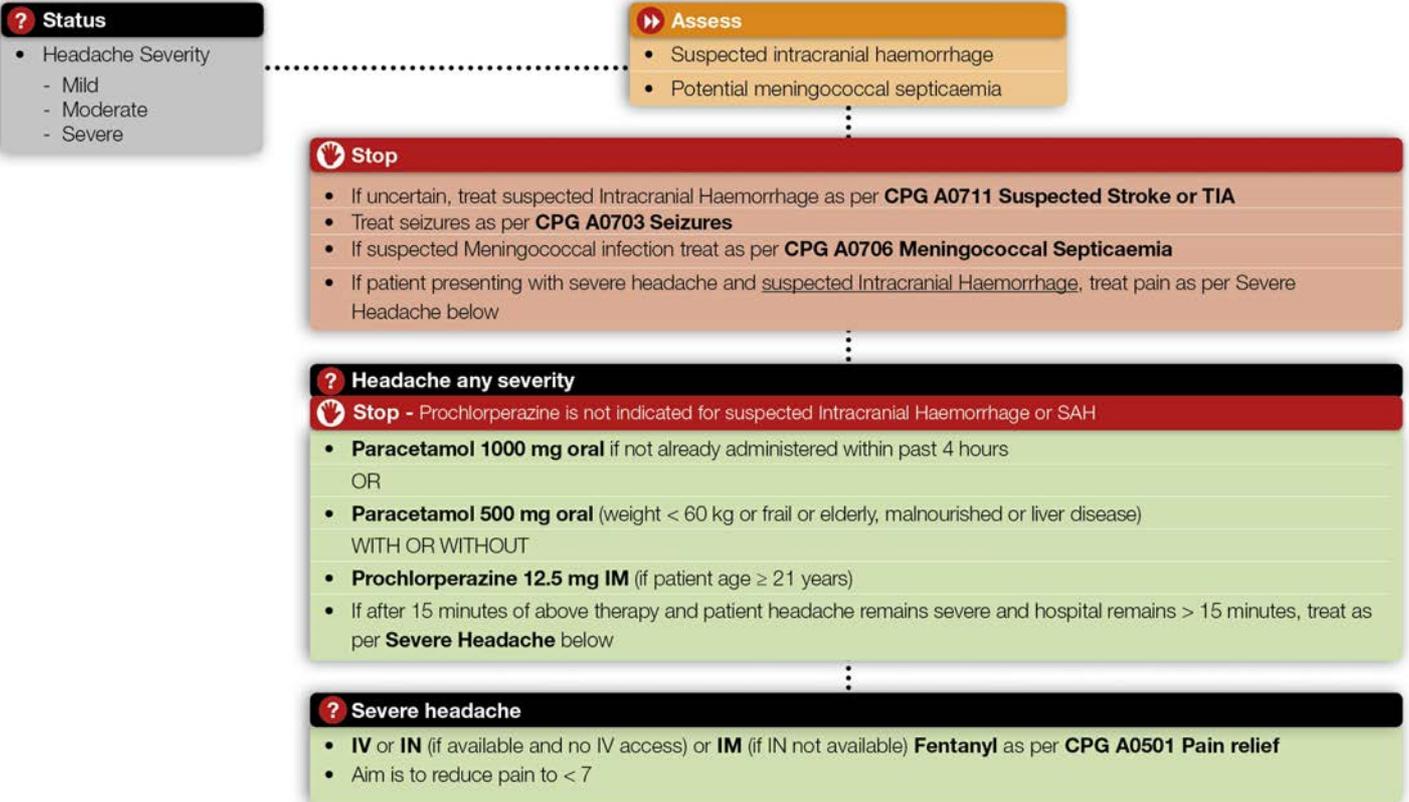
General Notes

- **Paramedics do not diagnose headache.** Headache management is dependent upon an in-hospital diagnosis and tailored accordingly. Pre-hospital management seeks to provide interim relief until diagnosis and more appropriate management can be provided.
- Paramedics are not to administer **Aspirin** for headache.
- Opioids are of limited benefit in the treatment of migraine. **Morphine** may not be effective and may be associated with delayed recovery. **Fentanyl** should only be used to treat **severe headache** where other measures have failed and where transport to the treating facility is prolonged.
- **Paracetamol** and **Prochlorperazine** are indicated for severe headache considered or previously diagnosed to be migraine, irrespective of nausea and vomiting. If the patient's condition remains unchanged and transport time is prolonged, treat as per **Severe Headache** algorithm.
- **Prochlorperazine** is unlikely to offer any clinical benefit for **intracranial haemorrhage** or **SAH**. It may be omitted in this case. Many patients will have signs of CNS depression in which case **Prochlorperazine** should not be administered.

General Care

- Many patients who suffer migraines may already have a pre-set treatment plan in place. Most patients will seek emergency care when such treatment has failed or presentation of headache is different to usual headache (frequency, severity, clinical features).
- Sudden onset severe headache, sometimes referred to as “thunderclap” or “worst in life”, should prompt the Paramedic to suspect serious intracranial pathology. Particular attention should be given to patients whose headache intensity increases within seconds to minutes of onset. Other warning signs that may be suggestive of serious intracranial event include:
 - abnormal neurological findings or atypical aura
 - new onset headache in older patients (age > 50 years) or those with a history of Cancer
 - altered, level of consciousness or collapse
 - seizure activity
 - fever and / or neck stiffness
- The management of severe dehydration (as per **CPG A0701 Nausea and Vomiting**) where indicated may be of assistance in the management of severe headache.
- Patients suffering from previously diagnosed cluster headaches may not gain benefit from analgesia. High flow oxygen may be beneficial if the patient can confirm their diagnosis.

Flowchart



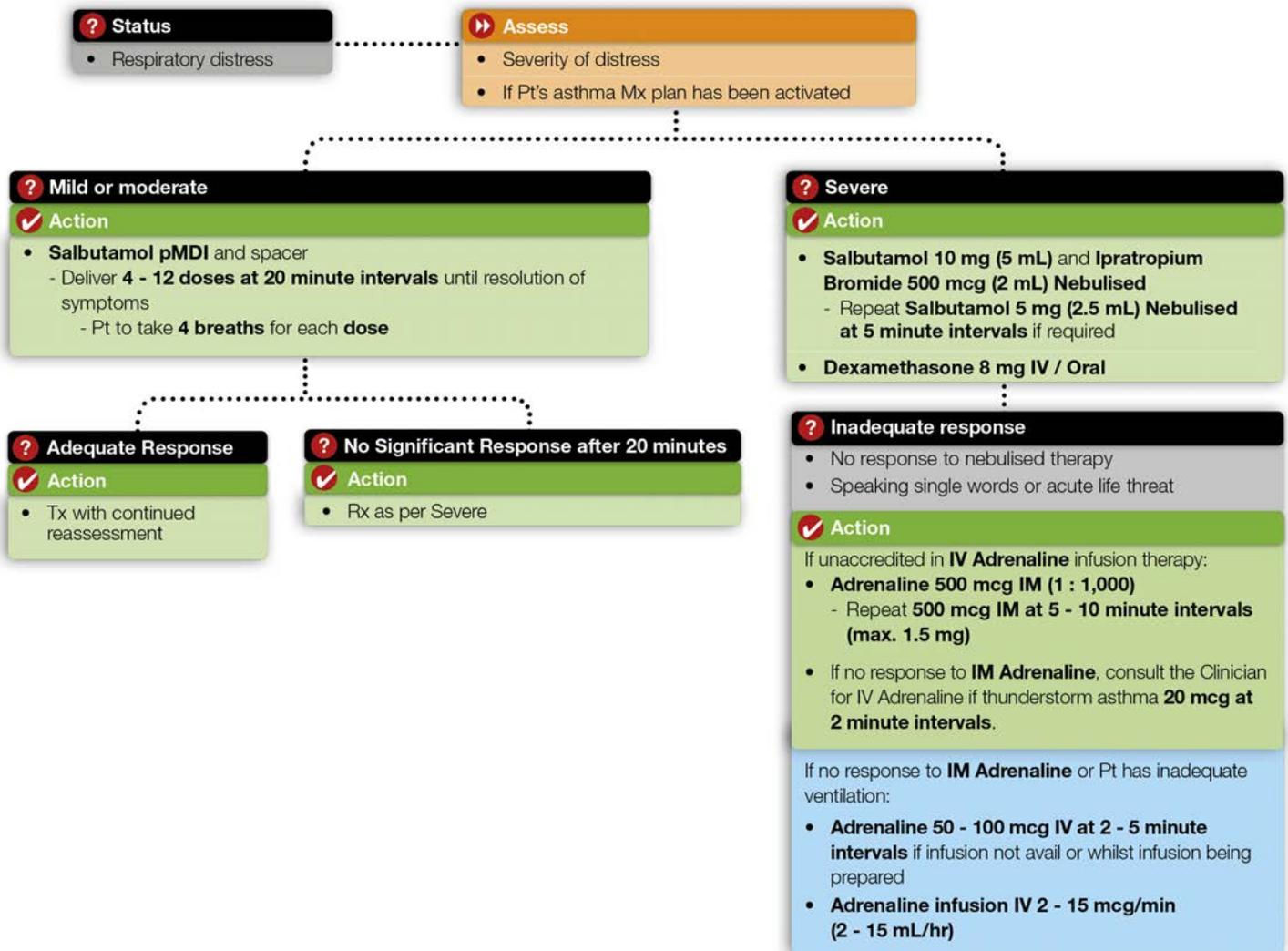
Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC_CPG_A0502_Headache_May_2015.pdf

General Notes

- Asthmatic patients are dynamic and can show initial improvement with treatment then deteriorate rapidly.
- Consider MICA support but do not delay transport waiting for backup.
- Despite hypoxaemia being a late sign of deterioration, pulse oximetry should be used throughout patient contact (if available).
- An improvement in SpO₂ may not be a sign of improvement in clinical condition.
- Beware of patient presenting with wheeze associated with heart failure and no asthma / COPD history.
- **Adrenaline infusion**
 - **Adrenaline 3 mg** added to make **50 mL** with **D5W** or **Normal Saline**
 - 1 mcg/min = 1 mL/hour
 - Dose: 2 - 15 mcg/minute
- A pMDI is the preferred route of administration for **Salbutamol** in patients with mild or moderate respiratory distress. If a pMDI is not available, nebulise **Salbutamol 5 mg at 20 minute intervals** as required.
- Consult the Clinician for **IV adrenaline** if:
 - Thunderstorm asthma (unresponsive to at least 1 dose of IM Adrenaline), **OR**
 - Orolingual oedema secondary to tPA infusion:

Flowchart



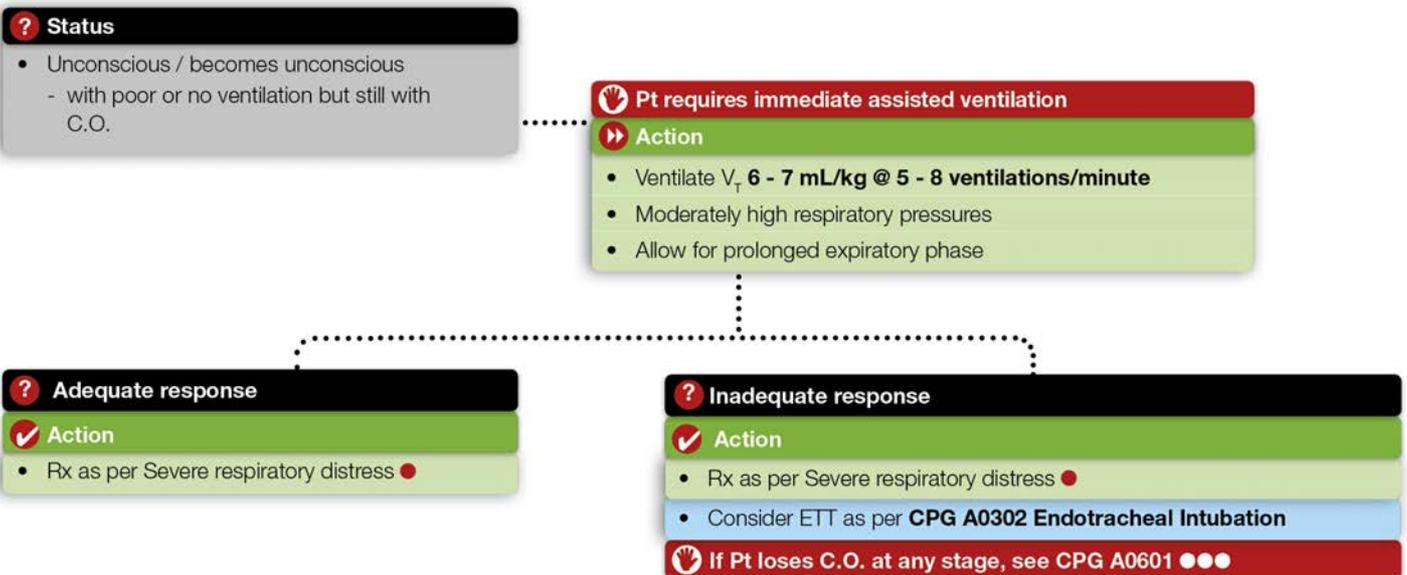
Related Resources

- [National Asthma Handbook](#)
- [VIDEO - IV adrenaline dilution for ALS](#)
- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC April 2016 CPG A0601 P0602 Steroid use in AV.pdf>

General Notes

- High EtCO₂ levels should be anticipated in the intubated asthmatic patient and are considered safe.
- Despite EtCO₂ levels, treatment should not be adjusted and managing ventilation should be conscious of the effect of gas trapping when attempting to reduce EtCO₂.
- Due to high intrathoracic pressure as a result of gas trapping, venous return is compromised and the patient may lose cardiac output. Apnoea allows the gas trapping to decrease.

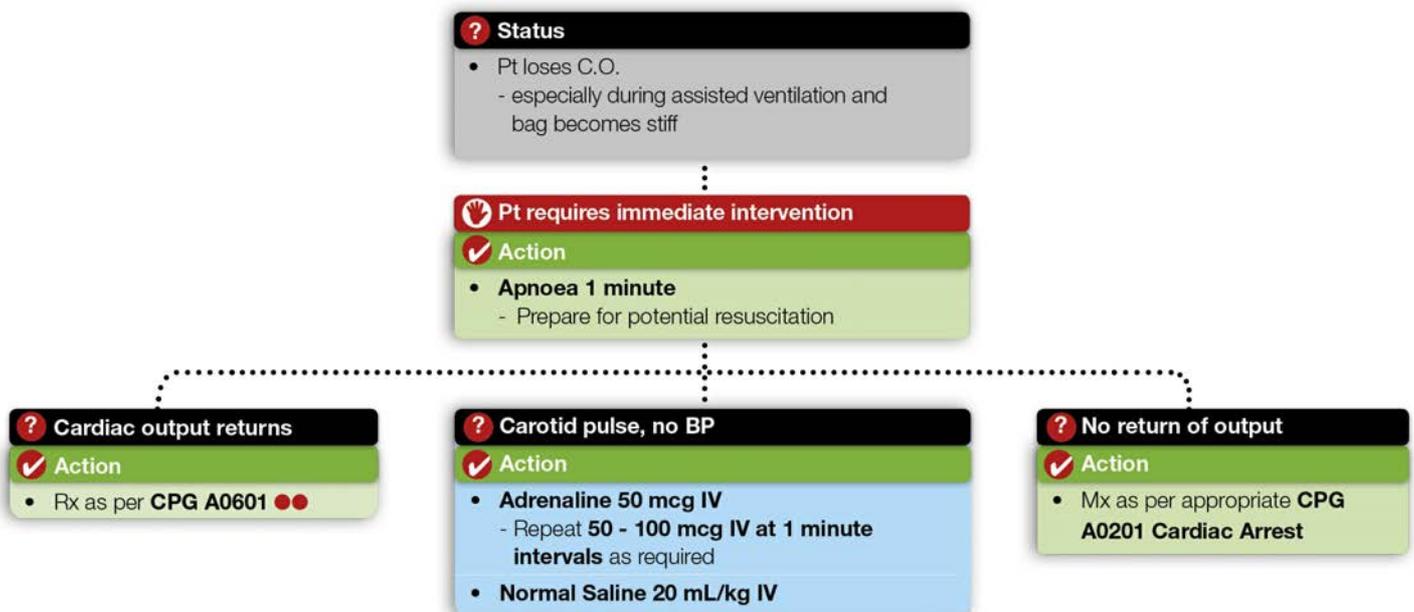
Flowchart



General Notes

- TPT is very unlikely in the spontaneously ventilating patient or patients receiving IPPV via BVM.
- TPT may occur as a result of forceful IPPV via ETT.
- If there are clear signs of unilateral TPT then decompression of the affected side is indicated.
- Exclusion of bilateral TPT by chest decompression should only be considered if all the following criteria are present:
 1. IPPV via ETT
 2. Sudden loss of cardiac output
 3. Rhythm = PEA
 4. Nil response to 1 minute of apnoea + **IV Adrenaline**

Flowchart



General Notes

COPD should be suspected in any Patient over 40 years old who has:

- smoking history (or ex-smoker)
- dyspnoea that is progressive, persistent and worse with exercise
- chronic cough
- chronic sputum production
- family history of COPD.

Exacerbation of pre-existing COPD can be defined as the following:

- increased dyspnoea
- increased cough
- increased sputum production
- complete removal of wheeze in these patients may not be possible due to chronic airway disease.

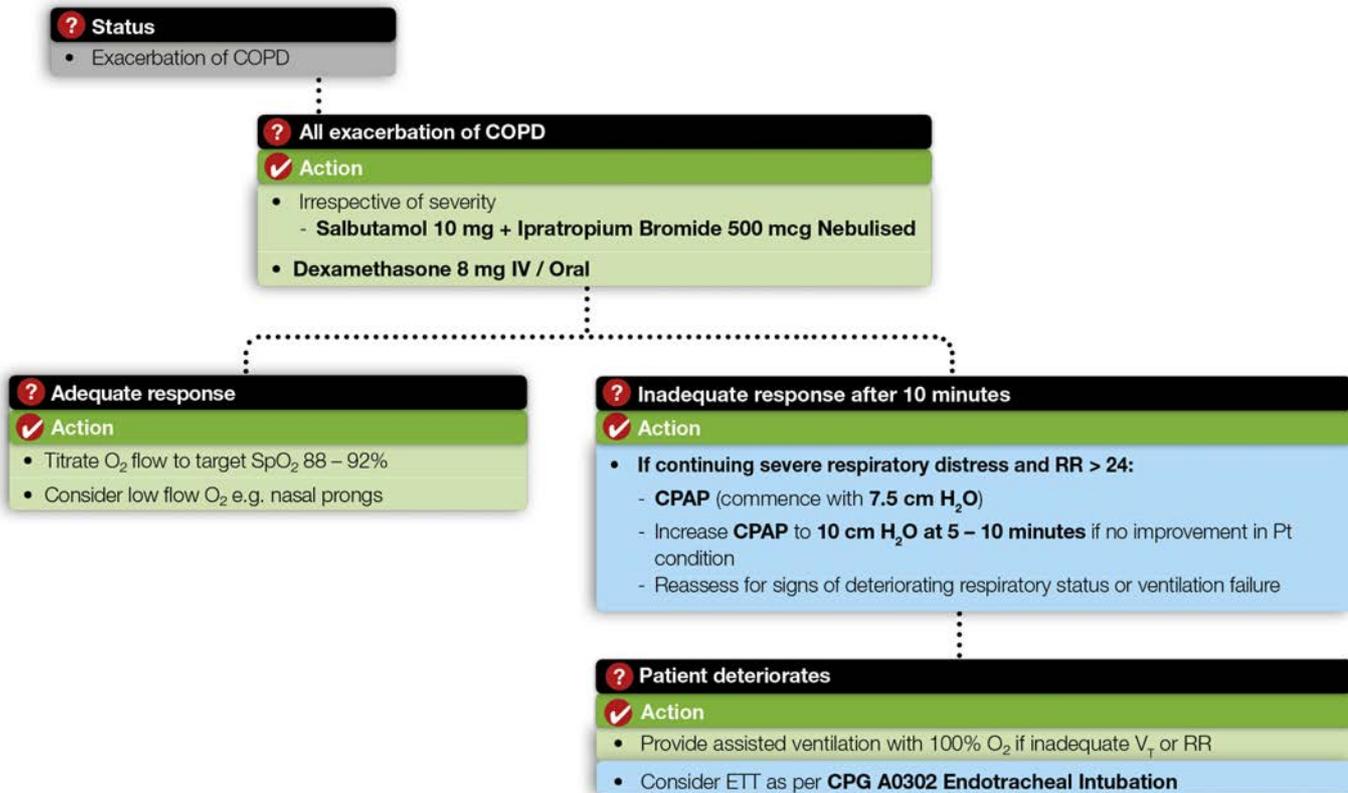
Indications for CPAP

- SpO₂ of < 90% on room air (or < 95% on supplemental O₂).

Indications for the removal of prehospital CPAP

- **Ineffective**
 - cardiac / respiratory arrest
 - mask intolerance / patient agitation
 - nil improvement after 1 hour of treatment
- **Vital Signs**
 - HR < 50 or SBP < 90 mmHg
 - loss of consciousness or GCS < 13
 - decreasing SpO₂
- **Active risk to Patient**
 - loss of airway control
 - copious secretions
 - active vomiting
 - paramedic judgement of clinical deterioration

Flowchart



Related Resources

- [https://av-digital-cpg.web.app/assets/pdf/CWI/CWI OPS 157 Continuous Positive Airway Pressure \(CPAP\) Flow-Safe II Device \[CPG A0602\].pdf](https://av-digital-cpg.web.app/assets/pdf/CWI/CWI OPS 157 Continuous Positive Airway Pressure (CPAP) Flow-Safe II Device [CPG A0602].pdf)
- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC April 2016 CPG A0601 P0602 Steroid use in AV.pdf>
- <https://av-digital-cpg.web.app/assets/pdf/MAC/4.2.9 A0602 COPD CPG.pdf>

Care Objectives

- To identify and treat with the appropriate degree of urgency the potential airway obstruction indicated by stridor in adults.

General Notes

The adult stridor patient

- Stridor in adult patients indicates an airway obstruction of at least 50% of the internal diameter of the upper airway and should be considered an emergency.
- It is rare and can be mistaken for asthma. Bronchodilators will not assist the patient with stridor.
- When auscultating for breath sounds a stridor will be louder in the upper lung fields and loudest if the trachea is auscultated.

History

- Acute onset is most commonly of infectious origin (e.g. epiglottitis, Ludwig's Angina), a foreign body or an allergic reaction.
- Chronic causes include congenital or acquired structural abnormalities, including tumours.
- If a patient has a medical history of stridor, they may have an action plan. This should be followed where possible.
- If the stridor is a result of potential airway burns, treat the patient as per **CPG A0805 Burns**.

Management

- The degree of respiratory distress that the patient is in will dictate the urgency of the situation and the need for intervention. A patient with acute onset stridor is more likely to require intervention than chronic onset.
- Intubating a patient with stridor is likely to be difficult and should prompt immediate consideration of **CPG A0303 Difficult Airway Guideline**, bearing in mind that the supraglottic techniques in that guideline are unlikely to be effective.

Inter-hospital transfer

- If paramedics are called to do an inter-hospital transfer of an adult patient with stridor who is not intubated, Adult Retrieval Victoria must be notified and a plan to best manage the patient's airway en route formulated.

Flowchart

? Status

- Adult patient with **audible stridor**



Stop

- The patient is at imminent risk of having a life-threatening airway obstruction. MICA **MUST** be requested.
- This guideline is not for treating stridor associated with anaphylaxis. See **CPG A0704 Anaphylaxis** for management options.



▶▶ Assess

- Acute or chronic onset
- Respiratory status including SpO₂



? Suspected foreign body obstruction

✓ Conscious

- Encourage patient to cough if able
- 5 back blows
- 5 chest thrusts
- Alternate the above and monitor the patient for deterioration

✓ Unconscious

- Laryngoscope and Magill's forceps
- If unable to remove the obstruction, commence chest compressions
- If patient loses cardiac output, treat as per **CPG A0201 Cardiac Arrest** including forced ventilations

? All other stridor

✓ Action

- **Adrenaline 5 mg nebulised**
 - Consult with Clinician for repeat dose if required.
 - Notify receiving hospital
- **Dexamethasone 8 mg IV / IM**
- If patient is in severe respiratory distress, intubate as per **CPG A0302 Endotracheal Intubation** whilst being fully prepared to progress to cricothyroidotomy as per **CPG A0304 Cricothyroidotomy**

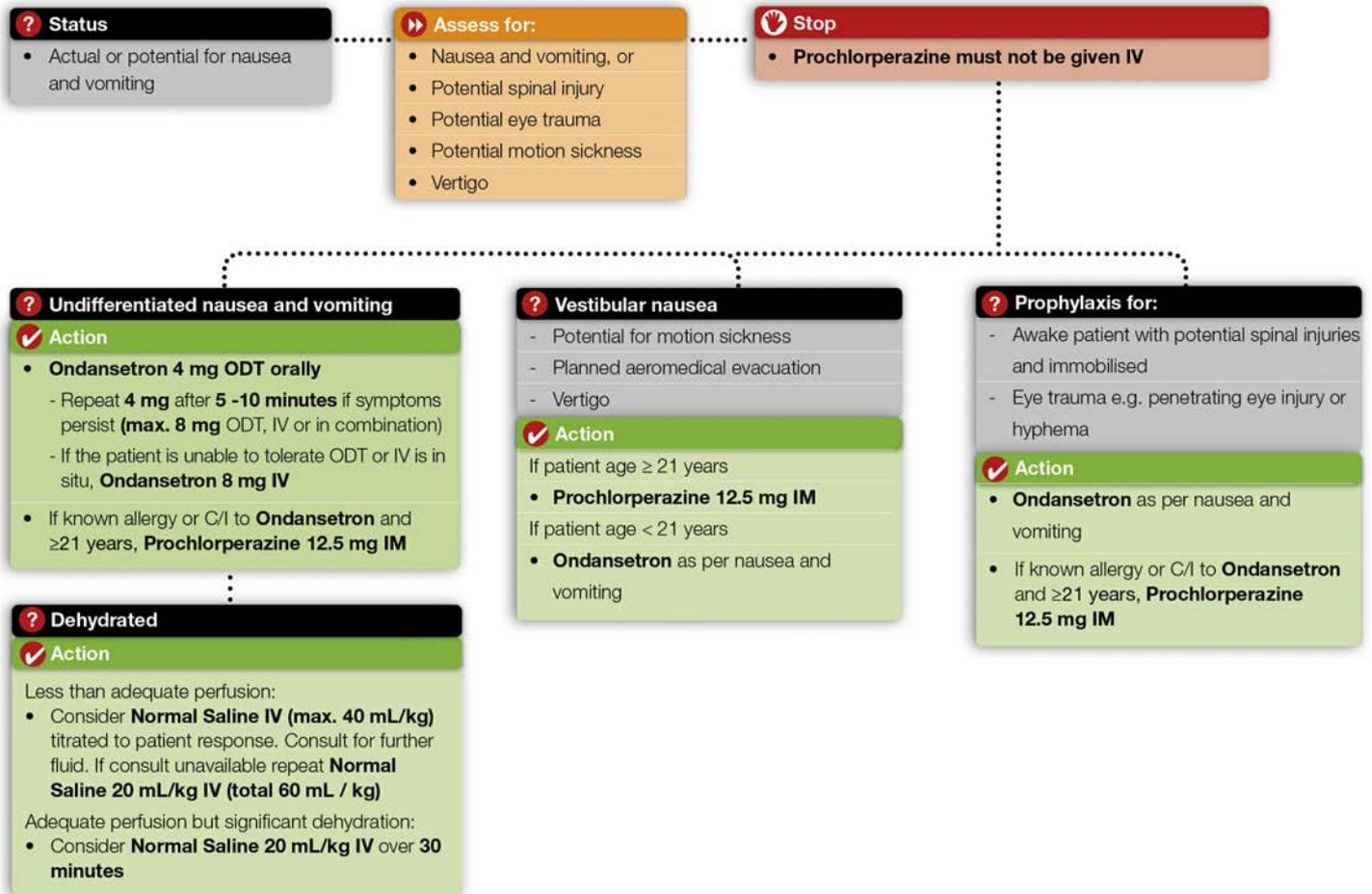
Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/Adult Upper airway obstruction MAC 2019 V3 final.pdf>

General Notes

- Clinical signs of significant dehydration include:
 - postural perfusion changes including tachycardia, hypotension or dizziness
 - decreased sweating and urination
 - poor skin turgor, dry mouth, dry tongue
 - fatigue and altered consciousness
 - evidence of poor fluid intake compared to fluid loss.
- Undifferentiated nausea and vomiting may include but is not limited to:
 - secondary to cardiac chest pain
 - secondary to opioid analgesia
 - secondary to cytotoxic drugs or radiotherapy
 - severe gastroenteritis
- If nausea and vomiting is being tolerated, basic care and transport is the only required treatment.
- IV fluids may be effective in reducing nausea and/or vomiting, irrespective of anti-emetic medication. Unless clinically contraindicated (e.g. Hx of cardiac or renal failure) consideration should be given to administering Normal Saline.
- The preferred treatment for nausea and vomiting in the pregnant patient with signs of dehydration is fluid rehydration where appropriate. Consider transport times and severity of nausea before treating with ondansetron. Prochlorperazine should not be administered during pregnancy.
- **Ondansetron** comes in the form of an Orally Disintegrating Tablet (ODT). The ODT should be placed in the mouth where it will dissolve in a few seconds and can then be swallowed as normal.
- On very rare occasions oral and IV routes of **Ondansetron** may not be possible. In these circumstances, the intramuscular route is permissible. Due to the medication volume, a **4 mg dose** should be administered, however if symptoms are extreme, two injections totalling **8 mg** may be required.
- **Ondansetron** is an antagonist at the same receptor sites where Tramadol is active as an analgesic. If a patient is suffering nausea and/or vomiting following Tramadol administration, **Ondansetron** is not the antiemetic of choice as it will reduce the effectiveness of the analgesia.
- Approximately 1 in 2,500 patients will have Long Q-T Syndrome, whether diagnosed or not. Low-level evidence suggests that **Ondansetron** can prolong the Q-T interval, with a subsequent risk of VT. If Long Q-T Syndrome is known or suspected then **Ondansetron** should not be administered. If VT (including Torsade de Pointe) follows **Ondansetron** administration, **Amiodarone** should **NOT** be administered as it can further prolong Q-T. Treatment should be focussed on transport with cardioversion or (if unconscious or pulseless) defibrillation.
- **Prochlorperazine** must only be administered via the IM route.

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC CPG A0701 Nausea and Vomiting.pdf>
- [https://av-digital-cpg.web.app/assets/pdf/MAC/4.1.1 \(4\) Prochlorperazine MAC March 2021.pdf](https://av-digital-cpg.web.app/assets/pdf/MAC/4.1.1 (4) Prochlorperazine MAC March 2021.pdf)

Care Objectives

- Normalisation of blood glucose level

General Notes

Intended patient group

- All adult patients

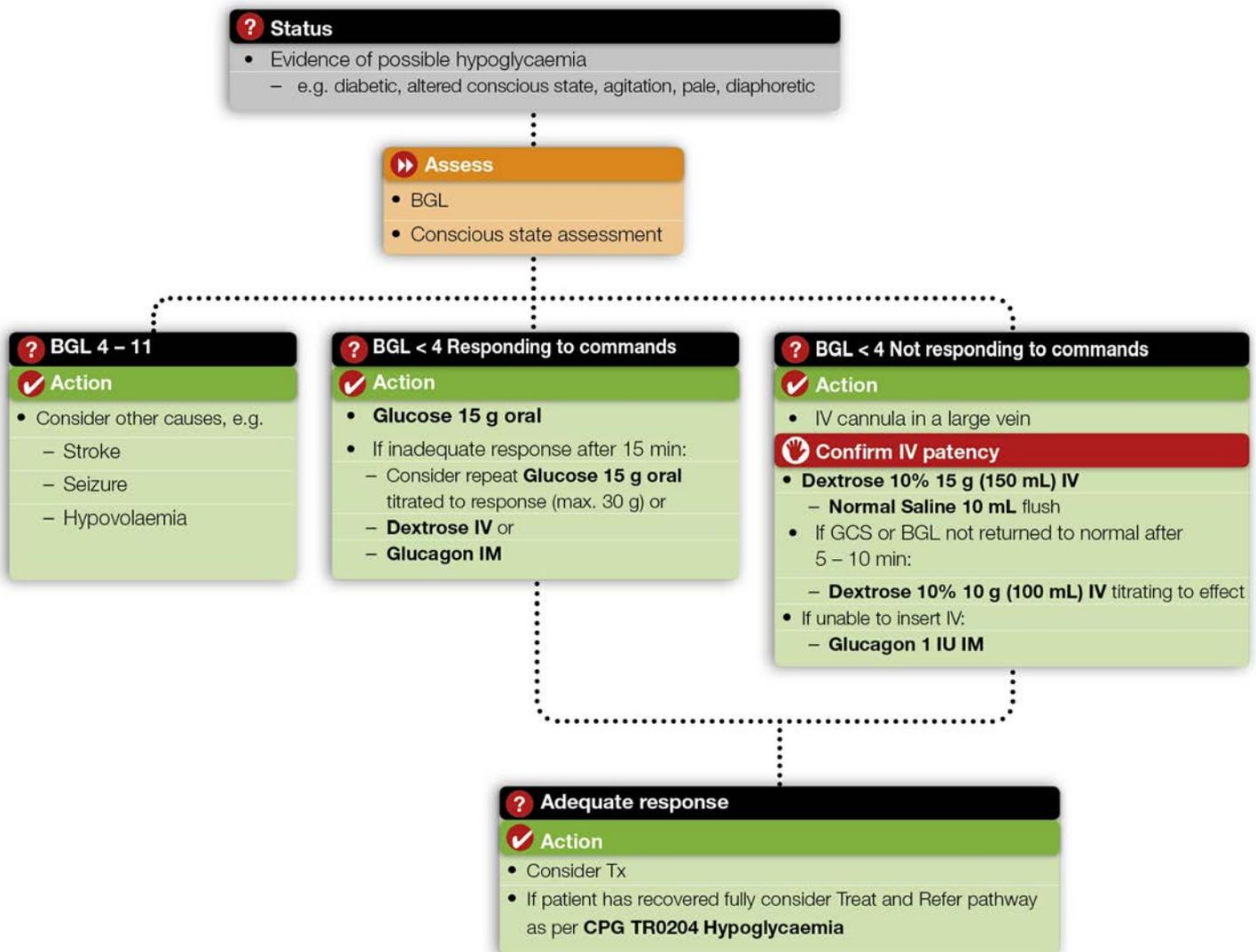
Management

- Patient may be aggressive during management.
- Ensure IV is patent before administering Dextrose. Extravasation of Dextrose can cause tissue necrosis.
- All IVs should be well flushed before and after Dextrose administration (minimum **10 mL Normal Saline**).
- The median time to restoration of normal conscious state after the administration of Dextrose IV can vary from 5 to 15 minutes. A slow response exceeding 15 minutes can also occur occasionally. When considering additional doses of Dextrose IV, it is appropriate to reassess both conscious state and BGL.
- If BGL has returned to normal but the Pt remains altered conscious, consider associated illness (e.g. sepsis, head injury, trauma) and transport without undue delay.
- Further doses of Dextrose 10% IV may be required in some severe hypoglycaemic episodes. Consider consultation if BGL remains less than 4 mmol/L despite Dextrose 10% IV 25 g and unable to administer oral carbohydrates.
- Consult early for Dextrose 10% IV in the setting of an insulin overdose even if BGL > 4 mmol/L and/or patient obeying commands.
- If next meal is more than 20 minutes away, encourage patient to eat a long acting carbohydrate (e.g. sandwich, fruit, glass of milk) to sustain BGL until next meal.
- Maintain general care of unconscious patient and ensure adequate airway and ventilation.

Refusal of transport

- If the patient has fully recovered but not appropriate for the Treat and Refer pathway as per **CPG TR0204 Hypoglycaemia**, and the patient refuses transport, repeat the advice for transport using friend / relative assistance. If patient still refuses transport, document the refusal and leave patient in care of a responsible third person. Advise the third person of actions to take if symptoms reoccur and of the need to make early contact with LMO.
- Ensure sufficient advice on further management and follow-up if patient refuses transport.

Flowchart



Related Resources

- [https://av-digital-cpg.web.app/assets/pdf/MAC/MAC_CPG_A0702_Hypoglycaemia & A0713_Hyperglycaemia.pdf](https://av-digital-cpg.web.app/assets/pdf/MAC/MAC_CPG_A0702_Hypoglycaemia_&_A0713_Hyperglycaemia.pdf)

Care Objectives

- Adequate fluid replacement where indicated

General Notes

Intended patient group

- All adult patients

Diabetic ketoacidosis (DKA)

- Any patient with
 - a pre-existing history of diabetes
 - BGL > 11 mmol/L, and
 - clinical features of DKA (e.g. confusion, signs of dehydration, Kussmaul's breathing) should be transported to hospital for further investigation.
- Approximately one half of diabetic ketoacidosis (DKA) cases will present with low to moderate hyperglycaemia (11-29 mmol/L).
- Occasionally, DKA will occur in patients without previously diagnosed diabetes. Paramedics should be vigilant to assess BGL in all patients with signs or symptoms suggestive of hyperglycaemia.
- Kussmaul's breathing can often be confused for hyperventilation related to anxiety. Any patient with a BGL > 11mmol/L, clinical signs of dehydration and hyperventilation requires further investigation in hospital.
- Clinical features alone may not be sufficient to differentiate between DKA and a Hyperosmolar Hyperglycaemic State (HHS).

Hyperosmolar Hyperglycaemic State (HHS)

- Patients with HHS
 - typically older
 - have higher BGL readings (> 30mmol/L)
 - usually do not present with clinical features of DKA (e.g. Kussmaul's breathing).

Management

- There is no value in differentiating between hyperglycaemic crises in the prehospital setting. Adequate fluid replacement in patients with less than adequate perfusion should be aim of care in symptomatic patients.
- Patients with DKA/HHS who are adequately perfused do not require bolus doses of Normal Saline in the prehospital setting. If transport time is prolonged (> 1 hour), consider a maintenance dose of **Normal Saline IV 500 mL/hr.**
- Patients should not be encouraged to self-administer additional doses of insulin prior to transport to hospital.

Intubation

- Removing the patient's ability to achieve compensatory respiratory alkalosis (i.e. Kussmaul's respirations) can lead to poorer outcomes in DKA patients. As such, endotracheal intubation should be avoided except in cases where the patient is severely obtunded.

Flowchart

? Status

- Evidence of possible hyperglycaemia, e.g.
 - Confusion
 - Dehydration
 - Tachypnoea
 - Polydipsia
 - Polyuria
 - Kussmaul's breathing

▶▶ Assess

- BGL
- Perfusion status assessment

? BGL 4 – 11 mmol/L

✓ Action

- Consider other causes, e.g.
 - Dehydration
 - Sepsis
 - Metabolic disorders

? BGL >11 mmol/L

✓ Action

- Less than adequate perfusion **AND**
- Clinical features of DKA/HHS, e.g.
 - Dehydration
 - Tachypnoea
 - Polydipsia
 - Polyphagia
 - Polyuria
 - Kussmaul's breathing
 - Hx diabetes
- **Normal Saline 20 mL/kg IV** titrated to perfusion status
 - Consult if further doses are required to maintain adequate perfusion.
 - Consider reduced fluid volume for elderly or impaired renal/cardiac function.
 - Consider antiemetic as per **CPG A0701 Nausea and Vomiting**

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC_CPG_A0702_Hypoglycaemia_&_A0713_Hyperglycaemia.pdf

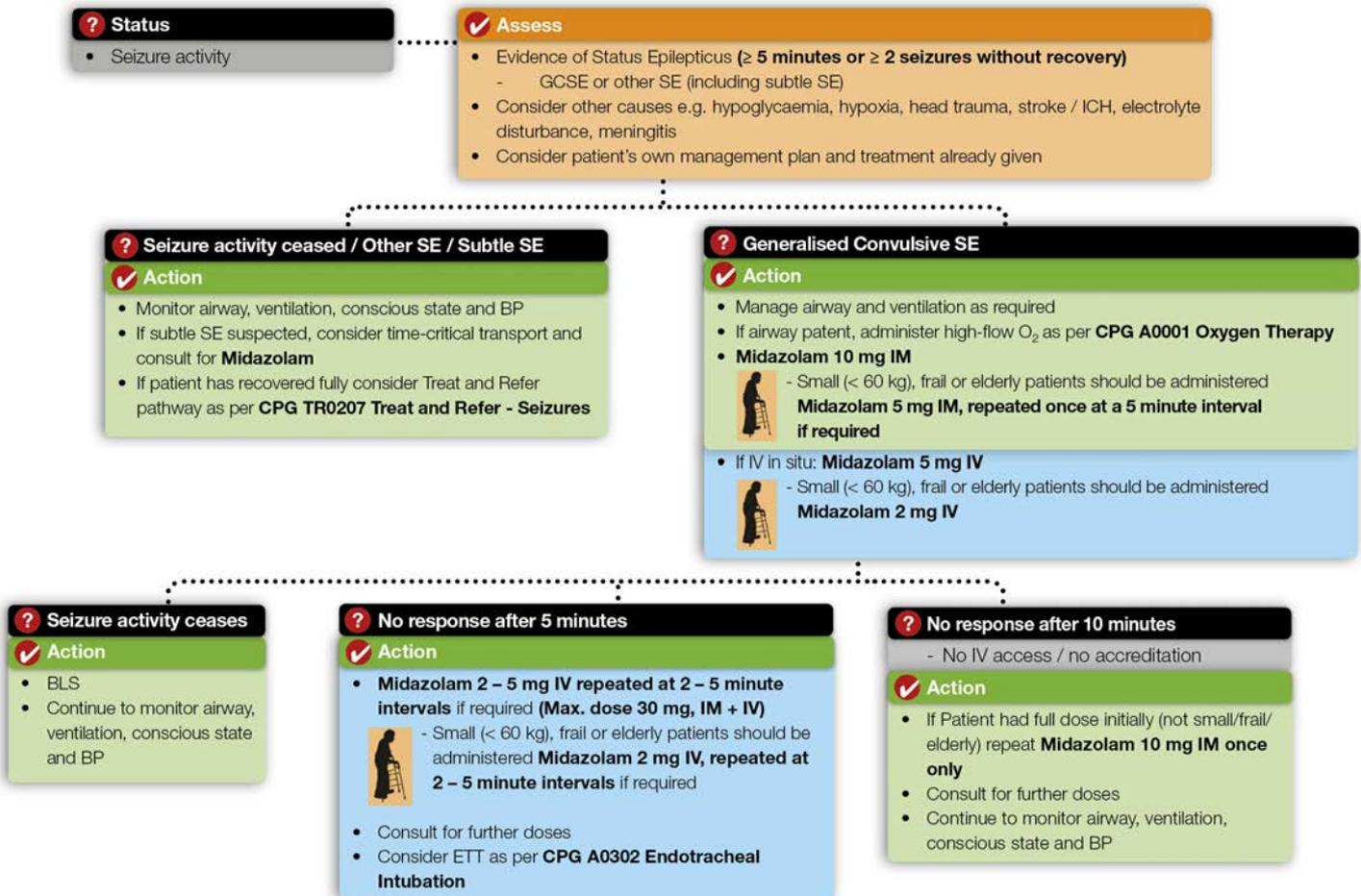
General Notes

- For the purposes of this CPG, Status Epilepticus (SE) refers to either **≥ 5 minutes of continuous seizure activity OR multiple seizures without full recovery of consciousness (i.e. back to baseline) between seizures.**
- Generalised Convulsive Status Epilepticus (GCSE) is characterised by generalised tonic-clonic movements of the extremities with altered conscious state.
- Subtle SE may develop from prolonged or uncontrolled GCSE and is characterised by coma and ongoing electrographical seizure activity with or without subtle convulsive movements (e.g. rhythmic muscle twitches or tonic eye deviation). Subtle SE is difficult to diagnose in the pre-hospital environment but should be considered in patients who are witnessed to have generalised tonic-clonic convulsions initially and present with ongoing coma and no improvement in conscious state (with or without subtle convulsive movements).
- For seizures other than GCSE, **Midazolam** may only be administered following consultation via the Clinician.
- Some patients may be prescribed buccal / intranasal midazolam or rectal diazepam to manage seizures.
- If a single seizure has spontaneously terminated consider **CPG TR0207 Treat and refer Seizures.**
- Ensure accurate dose calculation and confirm with other Paramedics on scene.
- **Frequent errors in drug dosage administration occur within AV in this CPG.**
- **Midazolam can have pronounced effects on BP, conscious state, ventilations and airway tone.**

Seizures in Pregnancy

- Consider eclampsia in pregnant patients with no prior seizure history or have been diagnosed with preeclampsia.
 - Refer to **CPG O0202 Pre-eclampsia / Eclampsia**
 - Eclamptic seizures are rare (0.1% of all births) and usually self-limiting
- **Midazolam** crosses the placenta and administration in pregnant patients may cause adverse effects to the baby. However GCSE is life-threatening to both mother and baby and **Midazolam** is therefore still indicated in this situation.
- Contact Paediatric Infant Perinatal Emergency Retrieval (PIPER) for advice via Clinician or on 1300 137 650.

Flowchart



Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC_CPG_A0703_P0703_June_2015_Seizure_CPG.pdf

Care Objectives

- Adrenaline (IM) with minimal delay
- Airway and perfusion support
- Hospital-based observation (usually 4 hours) at a minimum

General Notes

Intended patient group

- All adult patients ≥ 12 years old

Definition

- Severe, potentially life-threatening systemic hypersensitivity reaction.¹

Pathophysiology and presentation

Overview

- Anaphylaxis can exist with any combination of the signs and symptoms below, but may also be limited to a single body system (e.g. isolated hypotension or isolated respiratory distress in the setting of exposure to an antigen that has caused anaphylaxis in the patient previously).
- Rapid onset (usually within 30 minutes but may be up to 4 hours).
- Anaphylaxis can be difficult to identify. Cutaneous features are common though not mandatory. Irrespective of known allergen exposure, if 2 systemic manifestations are observed then anaphylaxis should be accepted.

Respiratory

- Respiratory distress, shortness of breath, wheeze, cough, stridor
 - Due to inflammatory bronchoconstriction or upper airway oedema

Abdominal

- Pain / cramping
- Nausea / vomiting / diarrhoea
 - Particularly to insect bites and systemically administered allergens (e.g. IV medications)

Skin

- Hives, welts, itching, flushing, angioedema (e.g. lips, tongue)

- Due to vasodilation and vascular hyperpermeability

Cardiovascular

- Hypotension
 - Due to vasodilation and vascular hyperpermeability

Common allergens

Exposure to an allergen may be known or unknown.

- **Insect stings:** Bees, wasps, jumping jack ants
- **Food:** Peanuts / tree nuts, egg, fish/shellfish, dairy products, soy, sesame seeds, wheat
- **Medications:** Antibiotics, anaesthetic drugs, contrast media
- **Exercise-induced:** Typically affecting young adults (rare)
- **Idiopathic anaphylaxis:** No external trigger (rare)

Further information

Anaphylaxis and asthma

- Asthma, food allergy and high risk of anaphylaxis frequently occur together, often in adolescence. Bronchospasm is a common presenting symptom in this group, raising the likelihood of mistaking anaphylaxis for asthma. A history of asthma increases the risk of fatal anaphylaxis.²
- Maintain a high index of suspicion for anaphylaxis in patients with a history of asthma or food allergy.

Other causes of angioedema

- Several types of non-allergic angioedema exist including ACE-inhibitor induced angioedema, hereditary angioedema (HAE) and its broader categorisation: bradykinin-mediated angioedema.
- These may present with similar symptoms to anaphylaxis including abdominal signs and symptoms and laryngeal swelling however will not respond to anaphylaxis management. Urticaria and itching are typically absent and the onset of symptoms is slower than anaphylaxis (several hours).
- Where HAE or bradykinin-mediated angioedema is identified **AND** the patient has their own medication to manage this, follow the patient's treatment plan and use the patient's own medication.
- Otherwise strongly consider standard anaphylaxis management if indicated.

Risk factors for refractory anaphylaxis or deterioration

The presence of the following risk factors may increase the risk of deterioration or symptoms refractory to initial adrenaline. Consider escalation of care (e.g. MICA):

- Expected clinical course (e.g. history of refractory anaphylaxis / ICU admission / multiple adrenaline doses)
- Hypotensive BP < 90 mmHg
- Medication as precipitating cause (e.g. antibiotics, IV contrast medium)
- Respiratory symptoms / respiratory distress
- History of asthma or multiple co-morbidities/medications

OR

- No response to initial dose of IM Adrenaline

Adrenaline

- The primary treatment agent for anaphylaxis.
- **Administration site:** anterolateral mid-thigh.
- Deaths from anaphylaxis are far more likely to be associated with delay in management rather than inadvertent administration of Adrenaline.
- Patients with known anaphylaxis may carry their own Adrenaline autoinjector. If the patient responds well to their own autoinjector dose, further Adrenaline may not be required. Closely monitor for deterioration and transport to hospital.
- Patients should carry their Adrenaline auto-injector with them to hospital.
- **Adrenaline infusion:**
 - Where the initial two doses of IM Adrenaline have not been effective. IM Adrenaline every 5 minutes is appropriate if MICA is not available or while the infusion is being prepared.
 - An infusion is the preferred method of administering IV adrenaline.
- **IV Adrenaline bolus:**
 - Only administer if extremely poor perfusion or cardiac arrest is imminent.
 - IV Adrenaline should be subsequent to IM Adrenaline in all cases with an initial IM therapy option selected for every anaphylaxis patient regardless of presentation.
- **Adrenaline toxicity:** Where the patient develops nausea, vomiting, shaking, tachycardia or arrhythmias but has **some improvement in symptoms and a normal or elevated BP**, consider the possibility of adrenaline toxicity rather than worsening anaphylaxis. Consider whether further doses of adrenaline are appropriate.

Additional therapies

- Adrenaline remains the absolute priority.
- *Additional therapies* may be administered concurrently or in order of clinical need but **must not** delay continued Adrenaline administration.

Bronchospasm

- Where bronchospasm persists despite the administration of adrenaline, administer salbutamol, ipratropium bromide and dexamethasone. These medications should never be the first line treatment for bronchospasm associated with anaphylaxis.

Circulation - Hypotension

- Where hypotension (e.g. BP < 90 mmHg) persists despite initial Adrenaline therapy, IV fluid may be required to support vasopressor administration.

Glucagon

- Glucagon has inotropic, chronotropic, and antibronchospastic effects and is indicated in patients who remain hypotensive after two doses of Adrenaline in the setting of:
 - Past history of heart failure, **OR**
 - Patients taking beta-blocker medication
- Glucagon administration however must not delay continued Adrenaline administration.

Management plans

- Many patients presenting with anaphylaxis will be under the care of a medical specialist and have a prescribed anaphylaxis action plan. Where possible, paramedics should consider the action plan and align the care in accordance to specialist recommendations.

Transport

- All patients with suspected or potential anaphylaxis must be advised that they should be transported to hospital regardless of the severity of their presentation or response to management.
- Hospital-based observation is required for a minimum of **four hours** in case of a biphasic reaction, where symptoms return after an initial resolution. This occurs in approximately 20% of cases.

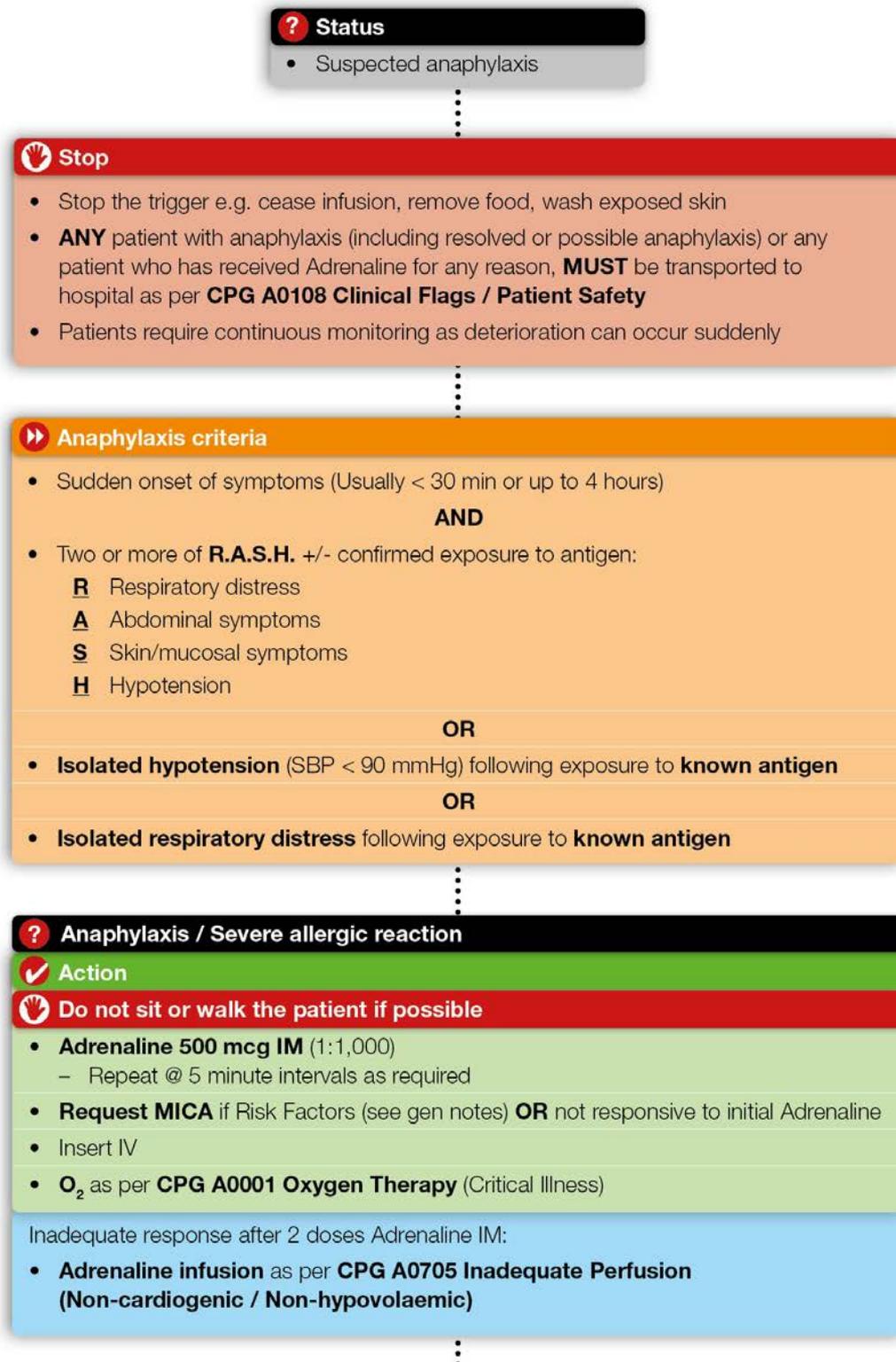
Medication preparation

Adrenaline infusion

(Via syringe pump)

- Dilute **Adrenaline 3 mg** (3 mL of 1:1000) to 50 mL with **5% Dextrose** or **Normal Saline** (in a 50 mL syringe)
- 1 mL = 60 mcg
- 1 mL/hr = 1 mcg/min

Flowchart



✓ **Additional therapies** (in order of clinical need)

👉 **Prioritise repeat Adrenaline doses**

Airway oedema / stridor:

- **Adrenaline 5 mg nebulised**
 - Consult with Clinician for repeat dose if required
 - Notify receiving hospital

Bronchospasm:

- **Salbutamol 5 mg Nebulised** or **pMDI 4 – 12 doses**
 - Repeat at 20-minute intervals if required
- **Ipratropium Bromide 500 mcg Nebulised** or **pMDI 8 doses**
- **Dexamethasone 8 mg IV / Oral**

Cardiovascular – Hypotension (BP < 90) despite initial adrenaline:

- **Normal Saline IV (max. 40 mL/kg)** titrated to response
 - Consult if further fluid is required. If consult unavailable repeat **Normal Saline 20 mL/kg IV**

Inadequate response to Adrenaline with history of heart failure **OR** taking beta blockers:

- **Glucagon 1 mg IV / IM**
 - Repeat once @ 5 minutes if required

? **Extremely poor perfusion OR impending cardiac arrest**

✓ **Action**

- **Bolus Adrenaline IV** as per **CPG A0705 Inadequate Perfusion (Non-cardiogenic / Non-hypovolaemic)**
- Consider intubation

Related Resources

- [CPG Walkthrough: Anaphylaxis](#)
- <https://www.bettersafecare.vic.gov.au/resources/clinical-guidance/emergency-care/anaphylaxis-adults>
- <http://www.allergy.org.au/hp/hp-e-training>
- [https://av-digital-cpg.web.app/assets/pdf/MAC/4.1.2 \(a\) Anaphylaxis CPG Review 2020 MAC FINAL.pdf](https://av-digital-cpg.web.app/assets/pdf/MAC/4.1.2 (a) Anaphylaxis CPG Review 2020 MAC FINAL.pdf)

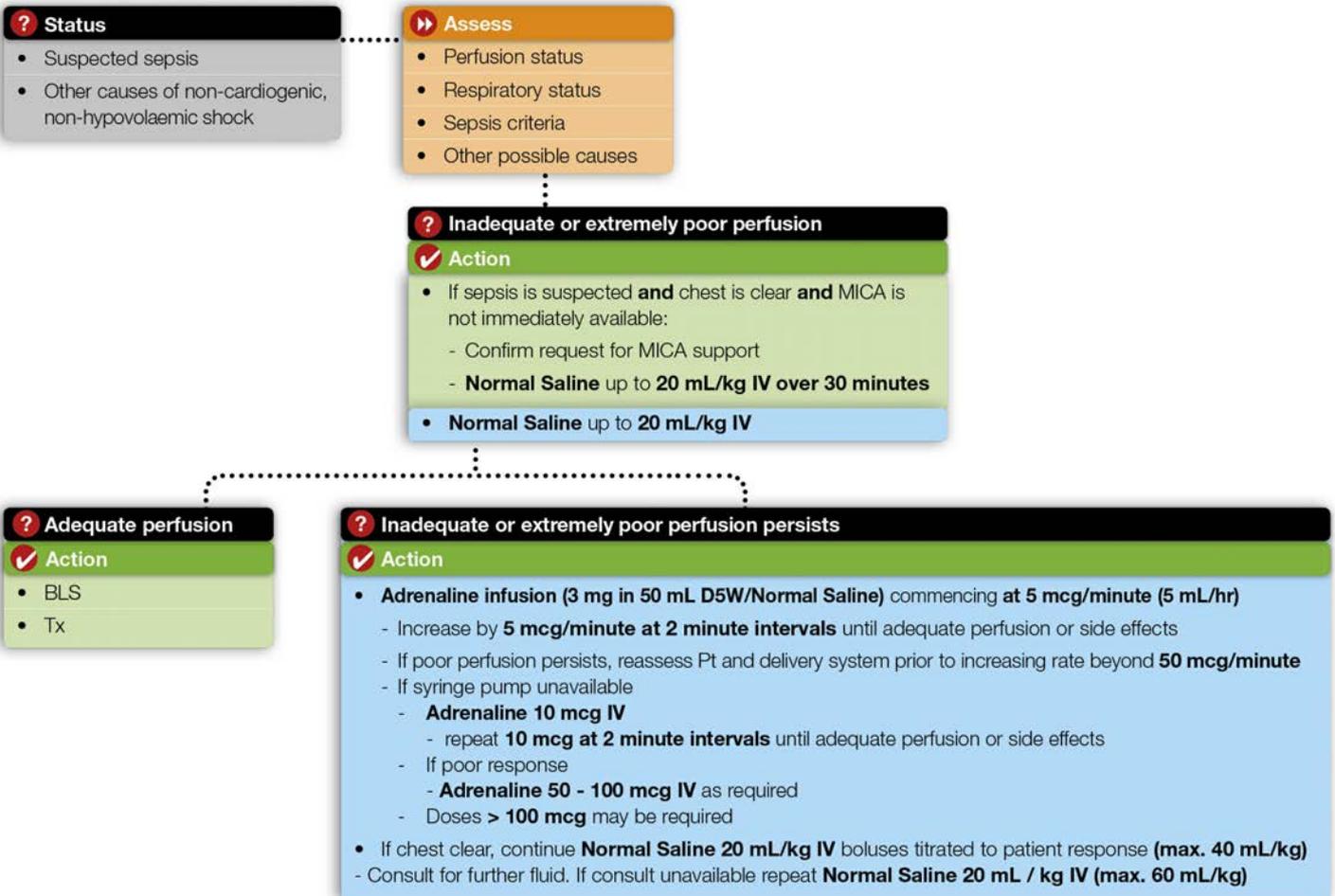
References

1. Safer Care Victoria. Anaphylaxis clinical care standard. 2019 Feb. Available from: <https://www.bettersafecare.vic.gov.au/resources/clinical-guidance/emergency-care/anaphylaxis-adults>
2. Australasian Society for Clinical Immunology and Allergy. Acute management of anaphylaxis. 2019. Available from: <https://www.allergy.org.au/hp/papers/acute-management-of-anaphylaxis-guidelines>

General Notes

- Any infusions established under this CPG must be clearly labelled with the name and dose of any additive drugs and their dilution.
- Sepsis criteria are relevant in the presence of an infection or severe clinical insult such as multi trauma leading to systemic inflammatory response syndrome (SIRS). 2 or more of:
 - Temp > 38°C or < 36°C
 - HR > 90 bpm
 - RR > 20/minute
 - BP < 90 mmHg
- **Adrenaline infusion > 50 mcg/minute** may be required to manage these patients. Ensure delivery system is fully operational (e.g. tube not kinked, IV patent) prior to increasing dose.
- Unstable patients may require bolus **Adrenaline** concurrently with the infusion.
- **Adrenaline infusion**
Adrenaline 3 mg added to make **50 mL** with **5% Dextrose** or **Normal Saline**
1 mL/hr = 1 mcg/min
- If sepsis is suspected and prolonged transport times exist (>1 hour) consider **Ceftriaxone 1g IV** (consult).

Flowchart



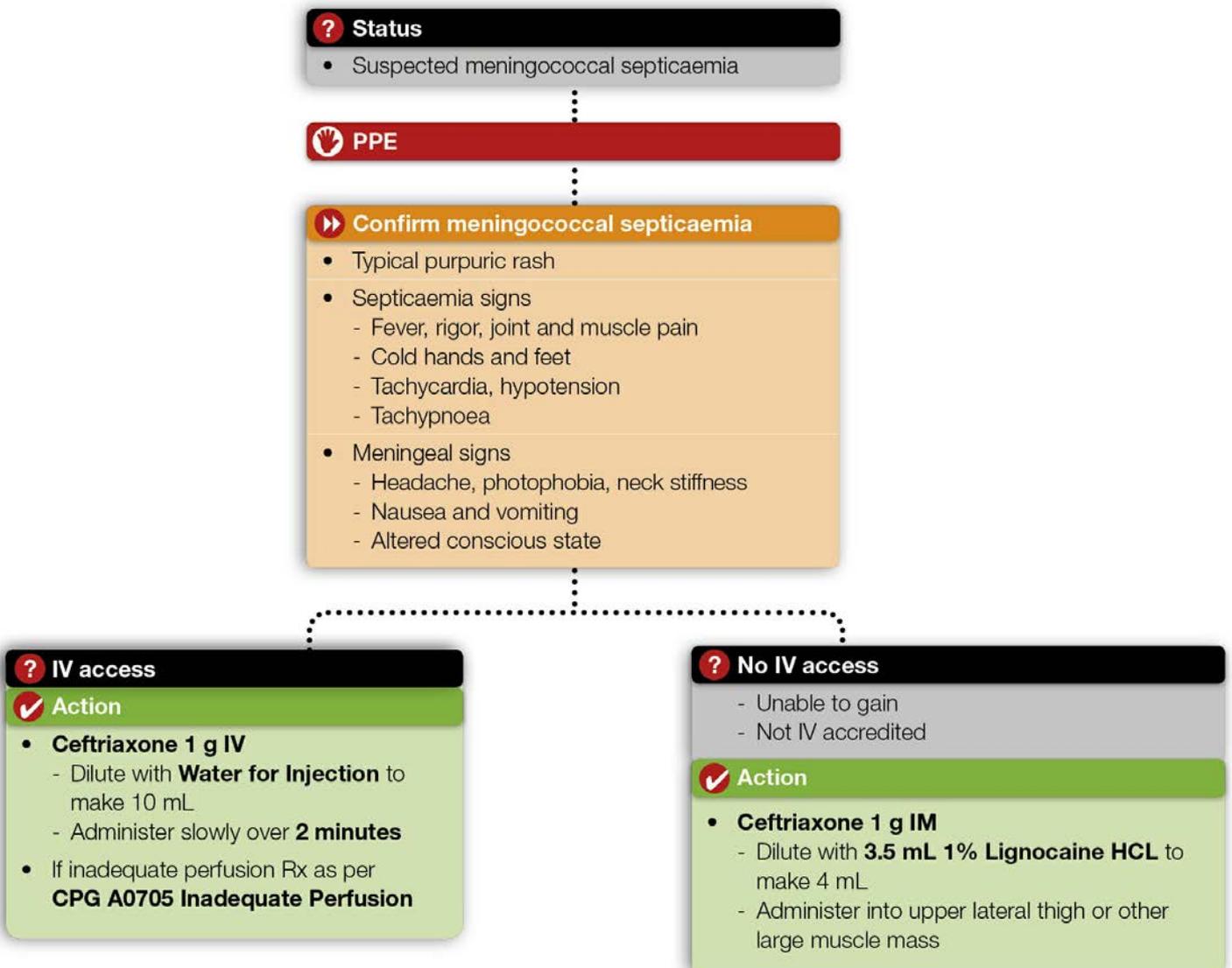
General Notes

- A typical purpuric rash may be subtle in some cases and present as a single 'spot' only.
- The presence of rapid onset symptoms of sepsis +/- rash may be a sign of meningococcal septicaemia.
- Meningococcal is transmitted by close personal exposure to airway secretions / droplets.
- Ensure face mask protection especially during intubation / suctioning.
- Ensure medical follow up for staff post exposure.
- Consider consultation where diagnosis is uncertain.

Ceftriaxone preparation

- Dilute **Ceftriaxone 1 g** with **9.5 mL** of **Water for Injection** and administer **1 g IV** over approximately **2 minutes**.
- If unable to obtain IV access, or not accredited in IV cannulation, dilute **Ceftriaxone 1 g** with **3.5 mL 1% Lignocaine HCL** and administer **1 g IM** into the upper lateral thigh or other large muscle mass.

Flowchart



General Notes

- If patient refuses transport, advise the patient and responsible third person (if available) of follow-up, counselling facilities and actions to take for continuing care if symptoms recur.
- For young persons, Paramedics should strongly encourage them to make contact with a responsible adult.
- Paramedics should contact police if in their professional opinion the patient appears to be a victim of or at increased risk of:
 - Family violence (e.g. from a parent, guardian or care giver).
 - Sexual exploitation or abuse.
Or if:
 - The supply of drugs appears to be from a parent / guardian / caregiver.
 - There is other evidence of child abuse / maltreatment or evidence of serious untreated injuries.
- If the patient claims to have taken an OD of a potentially lifethreatening substance or as a suicide attempt then they must be transported to hospital. Police assistance should be sought to facilitate this as required.
- Documentation of refusal and actions taken must be recorded on the PCR.

When dealing with cases of OD, if Paramedics are unfamiliar with a substance or unsure of the effects it may have, then consultation with Poisons Information should take place. They can be contacted via the Clinician, or on 13 11 26.

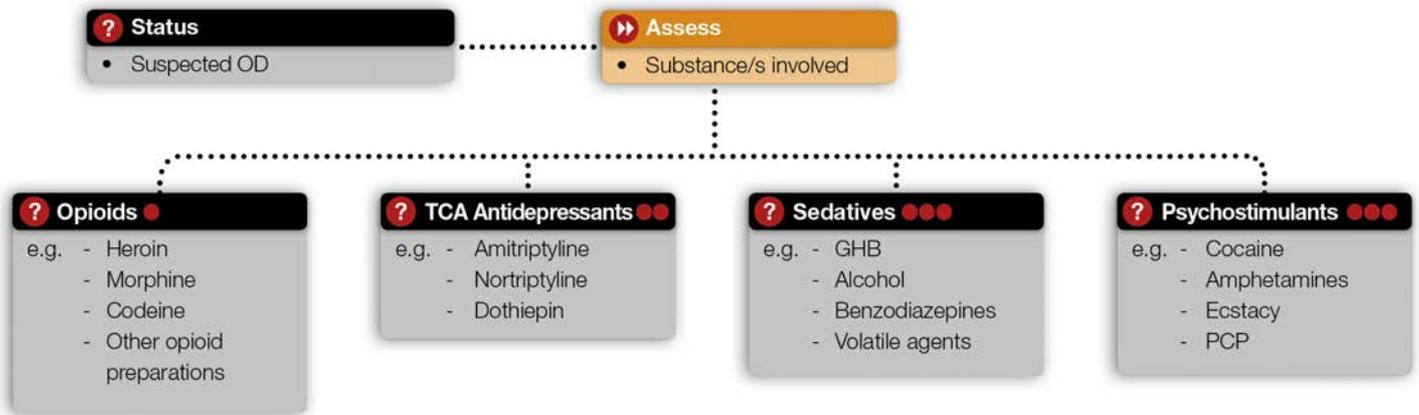
Supportive Care

- Provide supportive care (all cases)
 - Provide appropriate airway management and ventilatory support.
 - If patient is in an altered conscious state, assess BGL and if necessary manage as per **CPG A0702 Hypoglycaemia**.
 - If patient is bradycardic with poor perfusion manage as per **CPG A0402 Bradycardia**.
 - If patient is inadequately perfused, manage as per appropriate CPG.
 - Assess patient temperature and manage as per **CPG A0901 Hypothermia / Cold Exposure**, or **CPG A0902 Environmental Hyperthermia / Heat Stress**.

Further Assessment

- Confirm clinical evidence of substance use or exposure
 - Identify which substance/s are involved and collect any packets if possible.
 - Identify by which route the substance/s have been taken (e.g. ingestion).
 - Establish the time the substance/s were taken.
 - Establish the amount of substance/s taken.
 - Establish what the substance/s were mixed with when taken (e.g. alcohol, water).
 - Establish if any treatment has been initiated prior to Ambulance arrival (e.g. induced vomiting).

Flowchart



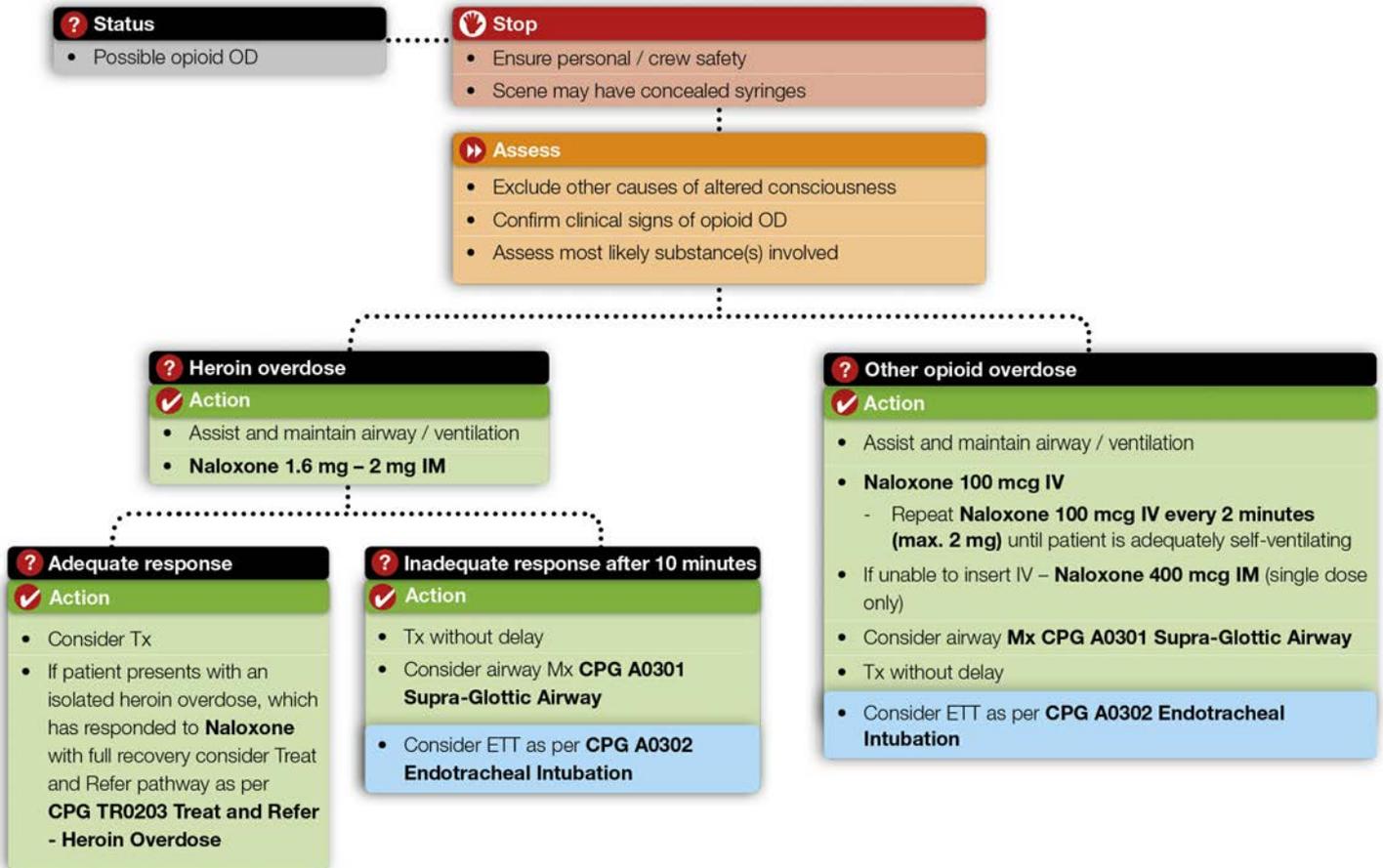
General Notes

- The 'Other opioid overdose' arm of this CPG should be used for:
 - Prescription opioid medication overdose (e.g. oxycodone, morphine, codeine, fentanyl patches, methadone)
 - Iatrogenic opioid overdose (e.g. secondary to opioid analgesia)
 - Polypharmacy overdose involving opioids (e.g. opioid and methamphetamine)
 - Unknown cause of opioid overdose (heroin not suspected)
- Patients who are managed using the 'Other opioid overdose' arm should receive supportive care, transport to hospital and titrated doses of **Naloxone** to target the return of adequate ventilation. Complete reversal of symptoms is generally not advised in these patients.
- Synthetic opioids, especially fentanyl analogues are increasingly used recreationally. These may require higher doses of **Naloxone** than usual to reverse their effects.

General Care

- Ensure paramedic health and safety
- If inadequate response after 10 minutes, the patient is likely to require transport without delay
- Maintain general care of the unconscious patient and ensure adequate airway and ventilation
- Consider other causes e.g. head injury, hypoglycaemia, polypharmacy OD.
- Beware of the patient becoming aggressive

Flowchart



Related Resources

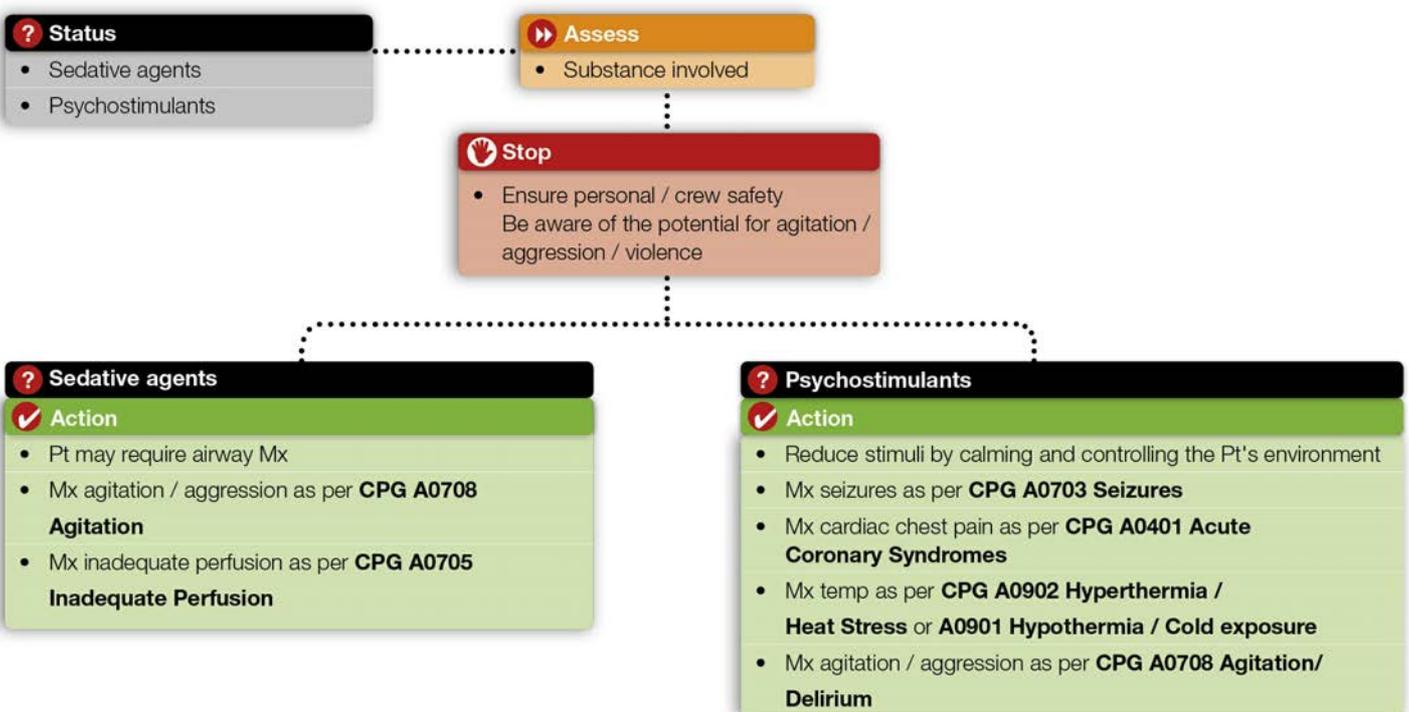
- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Sept 2016 CPG A0707 P0707 - Opioid Overdose.pdf>

General Notes

Hyperthermic psychostimulant OD

In hyperthermic psychostimulant OD the trigger point for intervention in the management of agitation / aggression is lowered. Sedation should be initiated early to assist with cooling and avoid further increases in temperature associated with agitation.

Flowchart



General Notes

Signs and symptoms of TCA toxicity

- Mild to moderate OD
 - Drowsiness, confusion
 - Tachycardia
 - Slurred speech
 - Hyperreflexia
 - Ataxia
 - Mild hypertension
 - Dry mucus membranes
 - Respiratory depression

- Severe toxicity (within 6 hours ingestion)
 - Coma
 - Respiratory depression / hypoventilation
 - Conduction delays
 - PVCs
 - SVT
 - VT
 - Hypotension
 - Seizures
 - ECG changes

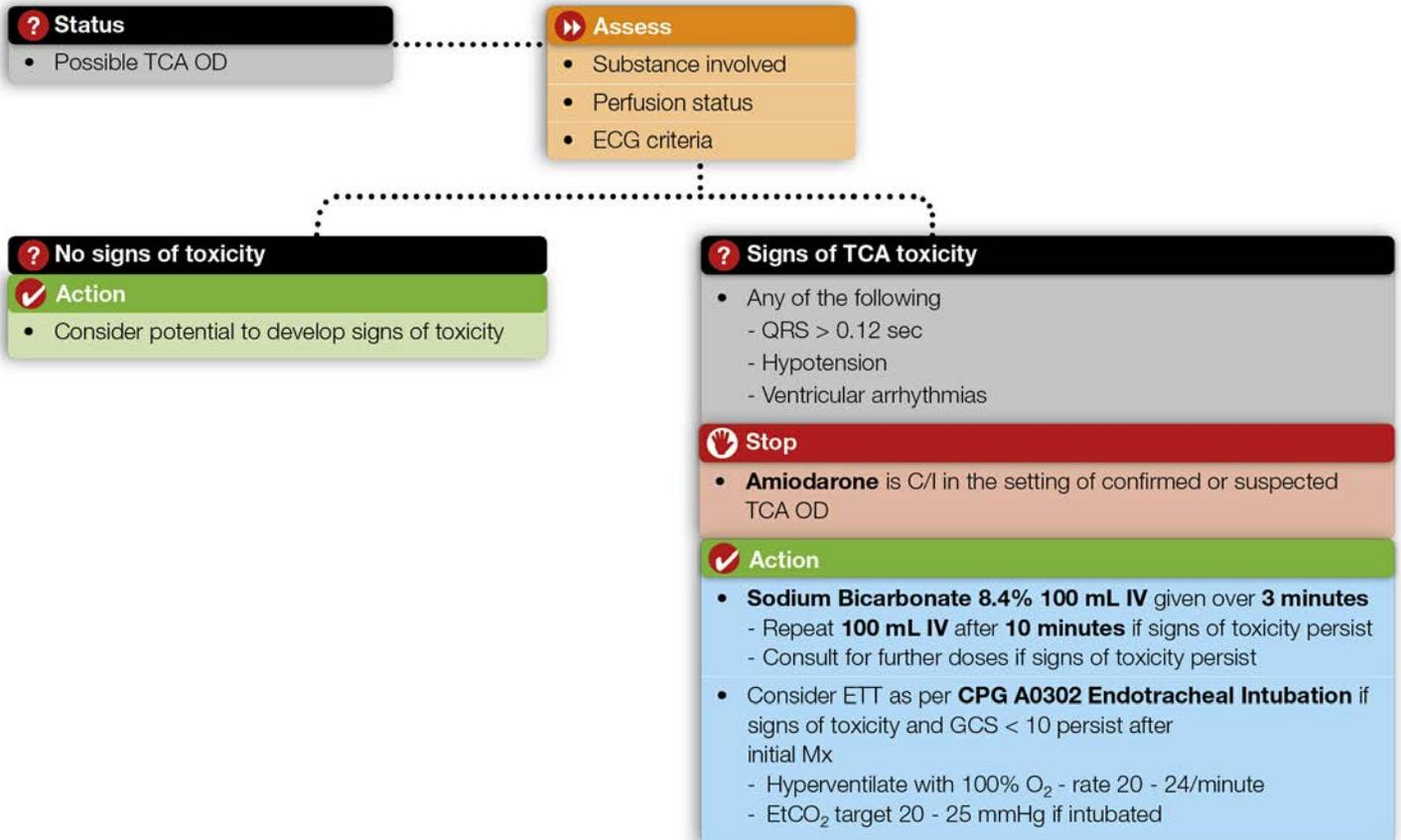
This could lead to aspiration, hyperthermia, rhabdomyolysis and APO.

TCAs may be prescribed to treat medical conditions other than depression (e.g. chronic pain).

Common tricyclic antidepressants

Generic name(s)	Brand name(s)
Amitriptyline (most commonly prescribed)	Endep Entrip
Clomipramine	Anafranil Placil
Dosulepin (dothiepin)	Dothep
Doxepin	Deptran Sinequan
Imipramine	Tofranil
Nortriptyline	Allegron Nortritabs

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Sept 2016 CPG A0707 Change Proposal - Tricyclic OD.pdf>

Care Objectives

- Reduction of patient agitation
- Management of clinical causes of agitation
- Maintain safe environment for patients, paramedics, family and bystanders
- Maintain patient dignity and empathetic communication

General Notes

Intended patient types

This CPG applies to any patient who presents with agitation, aggression, or violent behaviour.

Where clinically indicated, it is permissible to use this guideline to care for the following patient groups:

- Compulsory patients under the Mental Health Act 2014, and
- Patients in police custody under Section 351 of the Mental Health Act 2014

Assessment

The descriptors below outline the spectrum of behaviour which paramedics are likely to care for.

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. For example, a patient initially managed under **Mild** or **Moderate Agitation** may escalate to a higher level of risk than when initially assessed.

Cardiac and SpO₂ monitoring must be continuous in the sedated patient. Respiratory rate monitoring is also imperative and where available should be aided by the use of an ETCO₂ nasal sample set.

At a minimum, documented observation must be undertaken every 15 mins and include: VSS, GCS, sedation score, check for injury from mechanical restraints, check neurovascular status of limbs that are restrained.

Mild agitation

- Cooperative, not aggressive.
- Anxious, pacing, restless (can't sit still), excessive talking
- Able to safely take oral medication (self-administer)

Moderate agitation

- Loud outbursts, frequent non-purposeful movements
- Not aggressive or violent
- Risk expected to be controlled with Midazolam / analgesia alone

Severe agitation

- Uncooperative, combative, violent, immediate danger to patient and staff

- Patient fighting against overwhelming force (e.g. people holding them down)
- Lacks capacity
- The priority is to protect patients and staff

Psychostimulant affected patients

- Patients affected by methamphetamine may present with severe agitation and violence. Doses of **Midazolam** that would usually be effective in other scenarios may be ineffective. These patients may be managed as per the **Severe Agitation** section of this CPG using **Ketamine** if necessary.
- Ketamine is used only where necessary as it does not treat the underlying cause and may worsen any serotonin syndrome. Serotonin syndrome should be treated with benzodiazepines (midazolam) once controlled with ketamine to reduce motor tone and temperature (ALS consult).
- Cool the patient as per **CPG A0902 Hyperthermia**

Traumatic brain injury

- Agitation in traumatic or hypoxic brain injury **must** be managed with judicious analgesia.
- The hypotensive effects of midazolam can be detrimental to patient outcomes.
- In patients with mild to moderate acute traumatic brain injury (GCS 10 – 14), sedation can only be given after consultation with the AV Clinician.

Elderly / frail patients

- Elderly patients can present with delirium, which is an acute and reversible change in cognitive function and distinct from dementia. Consider and exclude clinical causes as per CPG.
- Elderly and frail patients are particularly sensitive to the effects of sedation. If it is safe to do so, the use of Olanzapine as the initial pharmacological agent is likely to be effective for this patient group. This may avoid or lessen the dose of midazolam required.
- Aim to use the lowest dose possible and carefully monitor for side effects.

Paediatric and adolescent patients

- **< 16 years old:** RCH (or MCH if the child usually attends that hospital) **must** be consulted prior to any sedation.
- **16 and 17 years old:** Consult with Clinician for most appropriate destination hospital.

Patient care

Safety

- Patient and paramedic safety is paramount at all times. Do not attempt any element of this CPG unless all necessary assistance is available.
- Paramedics should continue to utilise their Dynamic Risk Assessment skills throughout the case.
- Verbal de-escalation and communication with the patient is essential and should be maintained throughout all phases of care

- Prior to administering sedation and/or restraint, clear communication with all parties involved in restraining the patient is a key factor in reducing the risk of needle-stick or other injuries.

Physical restraint

- Restraint devices may be used without the use of sedation in circumstances where the patient will not sustain further harm by fighting against the restraints.
- Restraint devices should be removed and the patient repositioned if there is risk or harm occurring to the patient; e.g. asphyxia, aspiration.
- The indications for the use of restraints, type of restraint and the time of application and removal must be documented on the PCR.

Sedation

- Cutting clothing or administration of an IM injection through patient clothing is to be avoided where possible.
- *Rousable drowsiness* is defined as the patient being asleep but rousing if their name is called.
- Consider the use of Olanzapine to maintain a calm state where the agitated patient has responded to de-escalation yet has a propensity to re-escalate. NB. This does not apply to patients with no symptoms of anxiety or agitation who have a past history of agitation.
- A combination of sedative agents may be appropriate where the patient acuity changes. For example, the patient who has received midazolam may subsequently be administered olanzapine to achieve and maintain optimal outcomes.
- Use of the Sedation Assessment Tool will assist in ongoing monitoring, clinical handover and case documentation.
- Consideration of the SAT score may guide pharmacological approach as per table below.

SCORE	RESPONSIVENESS	SPEECH	Sedation agent
+3	Combative, violent out of control	Continual loud outbursts	Ketamine
+2	Very anxious and agitated	Loud outbursts	Midazolam
+1	Anxious / restless	Normal / talkative	Olanzapine
0	Awake and calm / cooperative	Speaks normally	-
-1	Asleep but rouses if name is called	Slurring or prominent slowing	-
-2	Responds to physical stimulation	Few recognizable words	-
-3	No response to stimulation	Nil	-

Post-sedation care

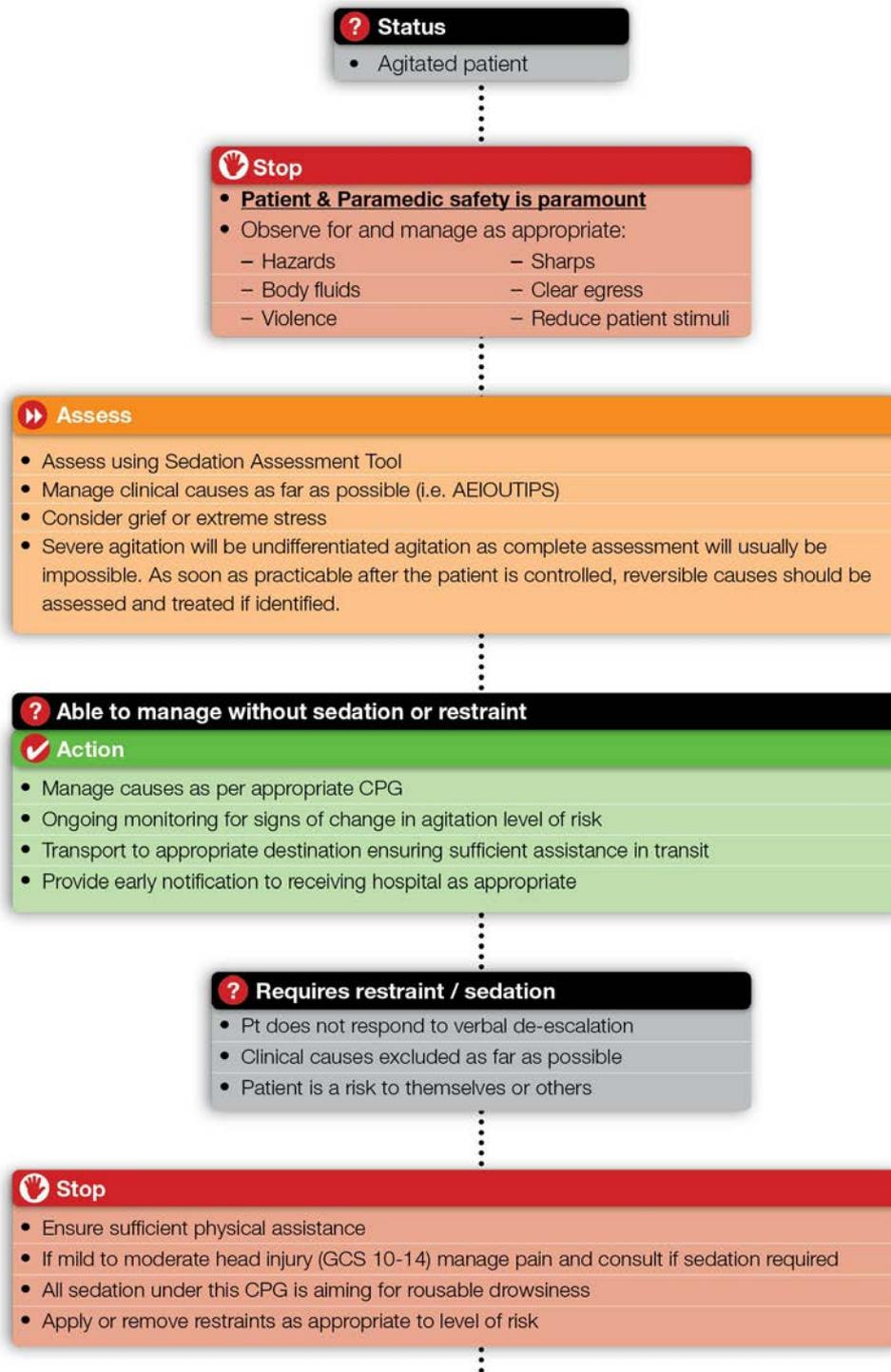
In all cases where sedation is administered, supportive care should be provided as required including:

- Airway management
- Supplemental O₂ as per **CPG A0001 Oxygen Therapy** (routine if sedated with **Ketamine**)
- Use of capnography where appropriate equipment is available. Please note that nasal sampling

capnography will assist to monitor respiratory rate, however the ETCO_2 readings may not be reliable.

- Perfusion management as per **CPG A0705 Inadequate Perfusion (Noncardiogenic / Non-hypovolaemic)**
- Temperature management as per **CPG A0901 Hypothermia** or **CPG A902 Hyperthermia**
- Reassessment and management of clinical causes of agitation
- Insert IV
- **Ketamine**: Management of hypersalivation. On most occasions suctioning will be sufficient. Where hypersalivation becomes difficult to manage or the airway is compromised, treatment may include administration of **Atropine** 600 mcg IV/IM (MICA)

Flowchart



? Mild agitation (SAT score +1)

✓ Action

If patient is cooperative and capable of safely taking an oral medication:

- **Olanzapine 10 mg ODT orally**
 - Administer lower dose (5mg ODT orally) for frail, elderly, weight <60kg, or significant effect from sedating drug / alcohol involvement
- Repeat dose after 20 minutes if patient remains mildly agitated

? Moderate agitation (SAT score +2)

✓ Action

- **Midazolam 5 – 10 mg IM**
 - Administer **2.5 – 5 mg IM** for elderly, frail, weight < 60 kg, SBP < 100 mmHg or significant effect from sedating drug/alcohol involvement
 - Repeat dose after 10 minutes if necessary, titrated to patient response
 - **Maximum total dose 20 mg.** Consult if patient remains agitated

Consider **Olanzapine 10 mg ODT** orally as per Mild Agitation if patient remains agitated but becomes co-operative.

- **Midazolam 2.5 – 5 mg IV**
 - Administer lower doses (**1 – 2 mg IV**) for elderly, frail, weight < 60 kg, SBP < 100 mmHg or significant effect from sedating drug/alcohol involvement
 - Repeat dose at 5 minute intervals if necessary, titrated to patient response
 - **Maximum total dose 20 mg.** Consult if patient remains agitated
 - IM injections may be indicated until IV access can be established

? Severe agitation (SAT score +3)

✓ Action

- Administer **Ketamine IM**:
 - < 60 kg **200 mg**
 - 60 – 90 kg **300 mg**
 - > 90 kg **400 mg**
- Consult for further ketamine if required
- If the patient is hyperthermic or has increased muscle tone, consult Clinician for **Midazolam (IV or IM)**
- If an IV is in situ, **Ketamine 50 – 100 mg IV**
- Once agitation is controlled and an IV in situ, maintain sedation with **Midazolam 2.5 – 5 mg IV** at **5 minute intervals** if necessary.
- If the patient is hyperthermic or has increased muscle tone, administer **Midazolam 2.5 – 5 mg IV.**
 - Temperature management as per **CPG A902 Hyperthermia**
 - **Maximum total dose of Midazolam (IM + IV) 20 mg**

? Transport patient to hospital

✓ Action

Pre-notify receiving hospital where the patient is:

- physically or mechanically restrained
- escorted by police
- agitated with a sedation assessment tool (SAT) score greater than zero
- sedated with a SAT score less than zero.

Related Resources

- [CPG Walkthrough - Agitation](#)
- [https://av-digital-cpg.web.app/assets/pdf/MAC/4.1.2 \(1\) Agitation CPG review March 2021 MAC final.pdf](https://av-digital-cpg.web.app/assets/pdf/MAC/4.1.2 (1) Agitation CPG review March 2021 MAC final.pdf)
- <https://av-digital-cpg.web.app/assets/pdf/MAC/Agenda item 4.1.2 MAC olanzapine 111019.pdf>
- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC CPG A0708 Management of Violent Patients Aug 2015.pdf>

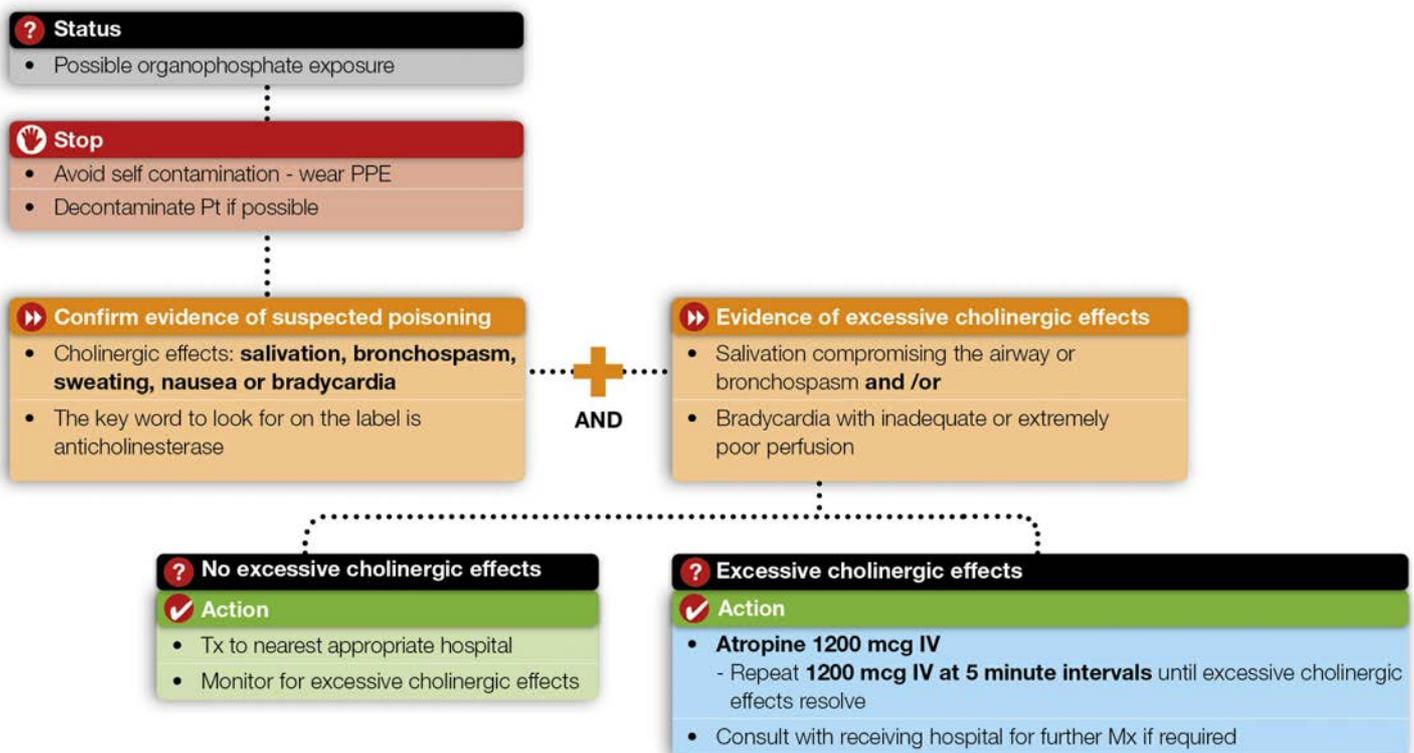
General Notes

- Notification to receiving hospital essential to allow for patient isolation and decontamination.
- The key word to look for on the label is anticholinesterase. There are a vast number of organophosphates which are used not only commercially but also domestically.
- Given potential contamination by a possible organophosphate, the container identifying trade and generic names should be identified and the Poisons Information Centre contacted for confirmation and advice (via Clinician or 13 11 26).
- In symptomatic cases, MICA Paramedics should consider calling for extra MICA support early as imprecise levels of **Atropine** may be quickly exhausted if scene times or transport times are prolonged.

General Care

- Where possible, remove contaminated clothing and wash skin thoroughly with soap and water.
- If possible minimise the number of staff exposed.
- Attempt to minimise transfers between vehicles in order to reduce risk of vehicle or equipment contamination and staff exposure.

Flowchart



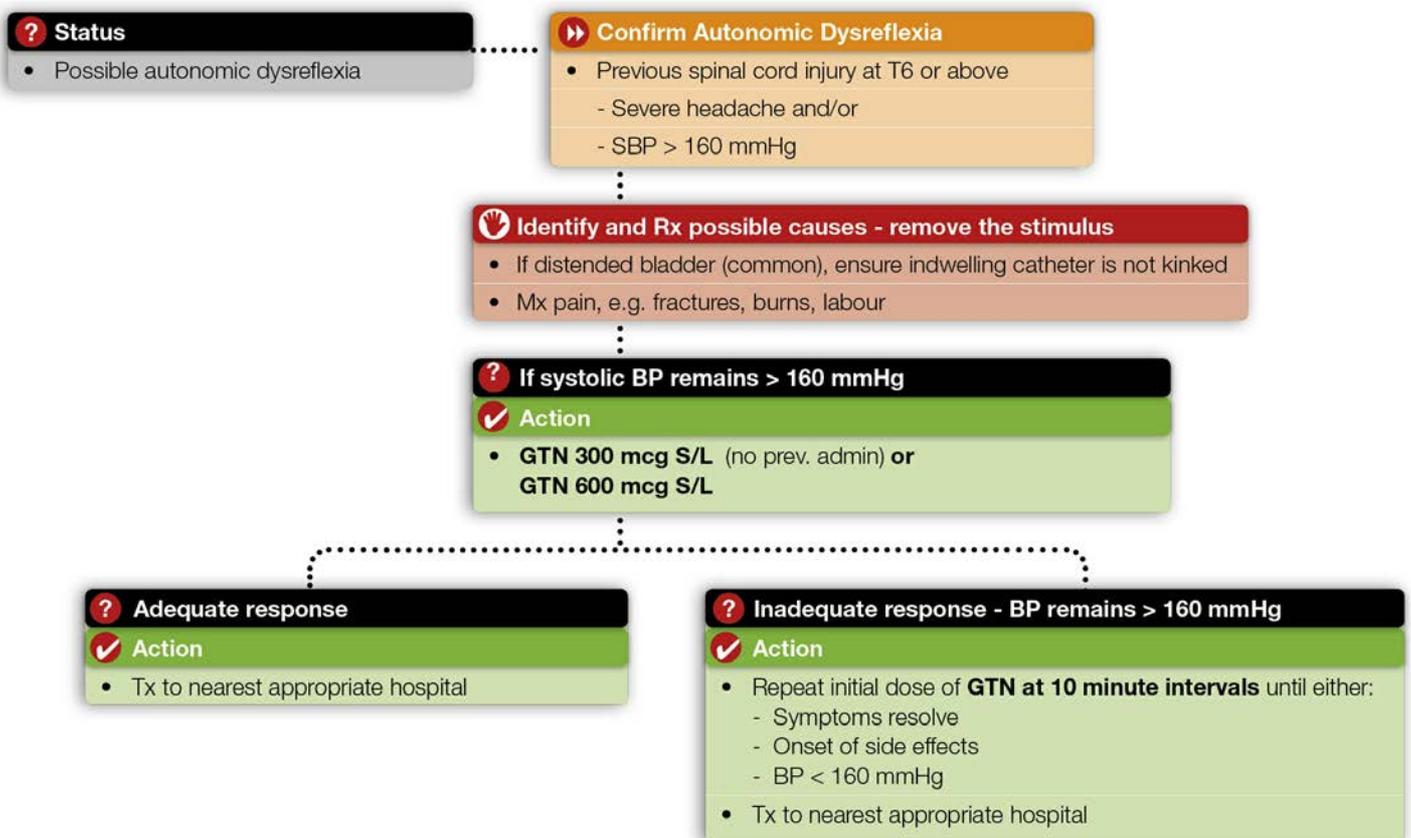
Related Resources

- [https://av-digital-cpg.web.app/assets/pdf/MAC/MAC CPG A0709 June 2015 Organophosphate Poisoning.pdf](https://av-digital-cpg.web.app/assets/pdf/MAC/MAC%20CPG%20A0709%20June%202015%20Organophosphate%20Poisoning.pdf)

General Notes

- Transport the patient even if the symptoms are relieved as this presentation meets the criteria of autonomic dysreflexia, a medical emergency that requires identification of probable cause and treatment in hospital to prevent cerebrovascular catastrophe.

Flowchart



Care Objectives

- Assess suspected Stroke / TIA cases using MASS
- Transport to appropriate destination (thrombolysis, ECR or neurosurgical stroke centre)
- Hospital pre-notification

General Notes

Intended patient group

- This guideline applies to all patients who have had neurological signs / symptoms (whether resolved or not) that may be a stroke or TIA.

Stroke

- Patients who still have signs / symptoms at point of assessment, even if they are improving, are suspected of having a stroke.
- O₂ therapy is reserved for patients with SpO₂ <92%, as per **CPG A0001 Oxygen Therapy**.

Stroke mimics

- Hypo/hyperglycaemia
- Seizures
- Migraine
- Sepsis
- Intoxication (drug / alcohol)
- Brain tumour
- Inner ear disorder (vertigo)
- Subdural haematoma (SDH)
- Syncope
- Electrolyte disturbance
- Multiple Sclerosis

Significant co-morbidities

Patients heavily dependent on others for activities of daily living (e.g. dementia or frailty - usually residents in a nursing home) are unlikely to receive thrombolysis in-hospital and should be transported Code 2 without notification.

Other comorbidities do not necessarily exclude the possibility of thrombolysis. If the patient is within the

treatment timeframe they should be treated with appropriate urgency and their medical history discussed during the hospital notification to aid in further clinical decision-making.

Transient Ischaemic Attack (TIA)

- TIA can only be diagnosed following investigation in hospital.
- Any patient suspected of having a TIA should be transported.

Intracranial Haemorrhage (ICH)

- Approximately 15-20% of stroke are intracranial haemorrhage and have the potential for rapid deterioration.
- Ischaemic stroke and ICH are not distinguishable clinically but ICH is more likely where there is/was:
 - Rapid deterioration in conscious state and GCS < 8
 - Complaint of severe headache
 - Nausea / vomiting
 - Bradycardia / hypertension

Transport of the suspected ICH patient

- **Awake** (following commands): Transport to nearest stroke hospital.
 - **Comatose** (not eye opening, not following commands): Transport to neurosurgical centre.
 - Metro: Neurosurgical centres include RMH, SVH, Austin, Alfred, or MMC
 - Rural: Consider HEMS, depending on distance to the regional stroke centre vs. time to HEMS arrival.
-
- Opioid analgesia should be used with caution due to the risk of deterioration in conscious state.
 - **Prochlorperazine** is unlikely to have a beneficial effect for ICH / SAH. It should only be given if the patient has nausea / vomiting and **ondansetron** cannot be given.

Symptom onset time

- The thrombolysis eligibility timeframe is potentially up to 12 hours from symptom onset.
- Symptom onset time is measured from the time the patient was last seen well.
- If the patient wakes with symptoms, this is considered to be the time they went to bed if they did not get up overnight.

Thrombolysis

- Most large metropolitan hospitals and rural hospitals participating in the Victorian Stroke Telemedicine program offer thrombolysis and stroke unit care. If unsure consult with the Clinician.
- On rare occasions (~1%) patients may develop orolingual angioedema post thrombolysis. This can be managed initially with nebulised **Adrenaline 5 mg in 5 mL**. If the patient deteriorates **IV**

Adrenaline can be given (ALS: Under consult only). IM adrenaline should be avoided post thrombolysis due to bleeding risk.

Endovascular Clot Retrieval (ECR)

- ECR is an effective treatment to remove large vessel clots up to 24 hours from symptom onset.
- ECR eligibility may be informed by the **ACT-FAST assessment tool**
- It is a time critical treatment that may require urgent secondary transport to an ECR capable hospital following initial CT scan and treatment.
- The mode of transport required for ECR transport will be coordinated with the hospitals, ARV and the Clinician. On occasion the urgency of transport will dictate that ALS Crews may transport patients with a higher degree of criticality than usual.

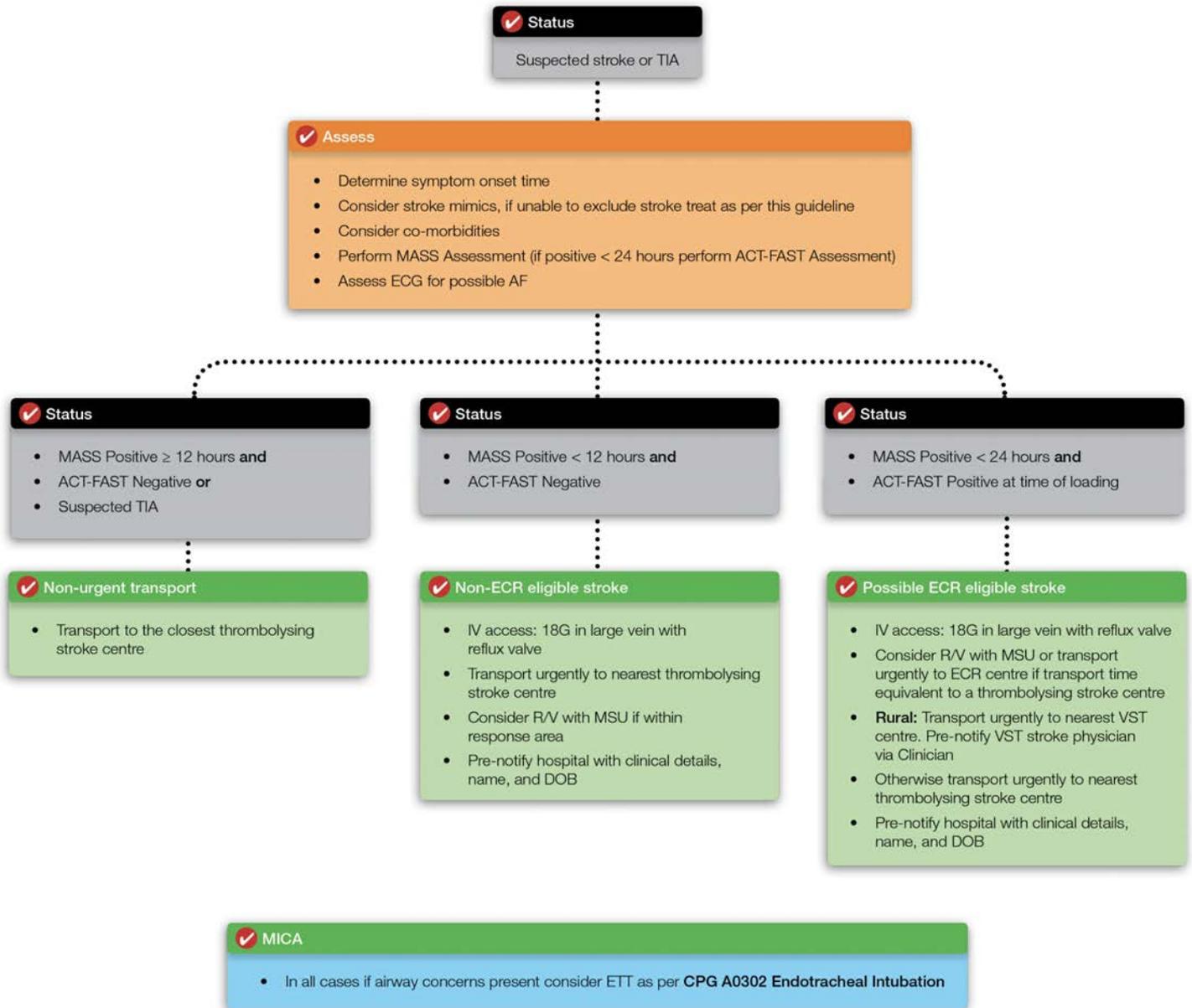
Endotracheal intubation

- Intubation should be considered where there is difficulty maintaining adequate airway, oxygenation and ventilation.
- Post intubation: Target BP 120 - 140 mmHg

Hospital pre-notification

- Pre-notification details allow the hospital to generate the CT request prior to ambulance arrival and reduces time to CT and any subsequent treatment.
- **ACT-FAST Positive:** Patients in the Western metropolitan area who would normally be transported to Werribee, Sunshine or Western (Footscray) ED should bypass these facilities and be transported directly to the RMH.

Flowchart



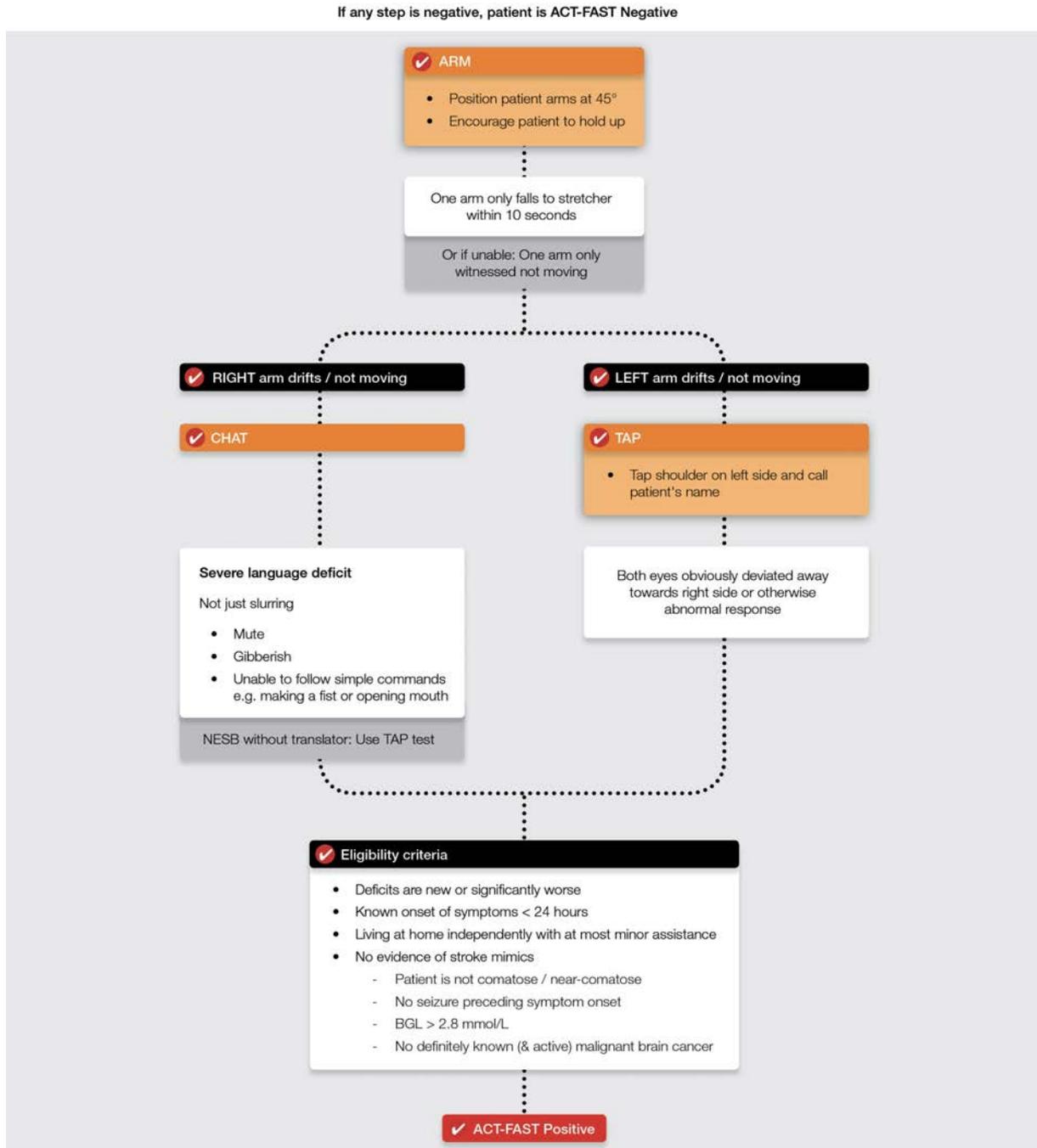
Flowchart – MASS Stroke Assessment

✓ 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

Flowchart – ACT-FAST Assessment for ECR eligibility



Related Resources

- [Stroke Foundation Guidelines](#)
- [Stroke Clinical Network \(SCV\)](#)
- <https://av-digital-cpg.web.app/assets/pdf/MAC/Agenda item 4.1.3 Update of CPG 0711 Stroke TIA.pdf>



Care Objectives

- The purpose of this CPG is to provide paramedics with guidance in managing patients who are currently registered with a community palliative care service and call an ambulance due to new or escalating symptoms. These symptoms are likely to be nausea/vomiting, pain, agitation/anxiety or dyspnoea.
- The intent of treatment is to provide relief from distressing symptoms, not the treatment of any underlying disease process. For example, SOB caused by pulmonary oedema should be treated with morphine, not GTN and diuretics.
- This CPG applies **ONLY** to patients with advanced, incurable disease who are no longer receiving active treatment, are currently registered with a community palliative care service and express a wish to stay at home.

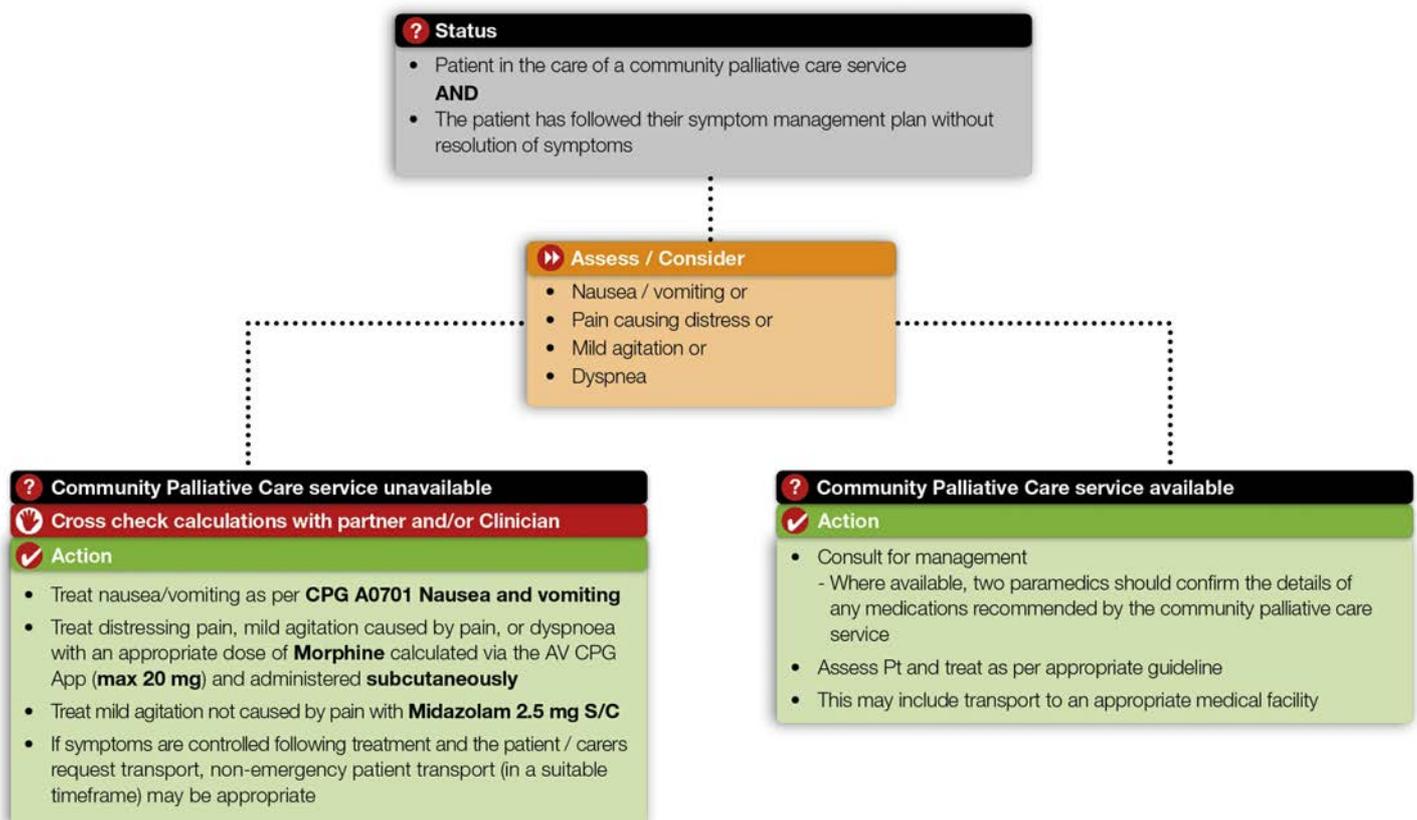
General Notes

- Agitation in the palliative care patient may be due to a number of causes including pain, hypoxia, hypotension, sepsis, urinary retention and electrolyte imbalance.
- The mainstay of treatment is morphine administered subcutaneously in a dose that is likely to keep the patient comfortable until the community palliative care service can attend.
- **Midazolam** may be administered where agitation is not associated with pain, however, **Morphine** and **Midazolam** should not be administered to the same patient unless under the direction of the community palliative care service due to the risk of respiratory depression.
- When a community palliative care service is unavailable to advise paramedics on management, the dose of subcutaneous **Morphine** to be administered is calculated by using the AV CPG App to convert each of the patient's regular opioid analgesics to a total equivalent daily dose of oral morphine. PRN medications are not included in this calculation.
- Where the total equivalent daily dose of oral morphine is < 50 mg, the patient should receive **Morphine 2.5 mg S/C as calculated by the AV CPG app** .
- Where the total equivalent daily dose of oral morphine is \geq 50 mg, 20 % of that dose will be calculated and converted to an appropriate subcutaneous dose by the AV CPG app.
- **It is not expected that paramedics perform any of these calculations manually. Where the AV CPG App is not available, paramedics should consult the Clinician for the appropriate dose.**
- Calculated doses of **Morphine > 10 mg** should be discussed with the Clinician. The maximum subcutaneous dose of **Morphine is 20 mg**. Patients who do not respond to this dose should be transported to hospital for further management. If paramedics have concerns, they should consult with the Clinician.
- If the patient is unable to have **Morphine**, an equivalent dose of **Fentanyl** should be administered. For example:
 - **Morphine 2.5 mg = Fentanyl 25 mcg**
 - **Morphine 20 mg = Fentanyl 200 mcg**
- Where the patient has not followed their symptom management plan, paramedics may encourage the patient / carer to administer any medications recommended as part of that plan, prior to management under this guideline. Paramedics can only administer the patient's own medications where the symptom management plan is clear and they are trained and experienced in the technique

of administration.

- Paramedics should not use in situ subcutaneous access devices unless they are familiar with them, or have guidance from someone who does (e.g. trained family member). Paediatric palliative care services will provide instruction over the phone on how to access their patient's devices.
- If a paediatric palliative care patient is attended, the Victorian Paediatric Palliative Care Program at the Royal Children's Hospital **MUST** be consulted regarding treatment and/or transport decisions. If the family presents paramedics with a symptom management plan, consultation must still occur before the plan is implemented.
- The on-call palliative care consultant is available 24 hours a day via the RCH switchboard on 9345 5522.
- For a patient in the care of a community palliative care service, there may be no benefit in measuring vital signs. However, if you are able to contact the palliative care service, they may ask you to measure vital signs to aid their assessment.
- It is important that the patient's regular treatment team are aware of the care delivered by AV Paramedics. Communicate directly with the community palliative care service if possible.
- Medications administered **MUST** be documented on the AV Health Information Sheet which should be left with the patient / carers to pass onto the palliative care team.

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/CWI/CWI OPS 174 Medication Administration by Subcutaneous Injection.pdf>

Care Objectives

- Identify and manage conditions that pose an immediate threat to the patient's life
- Minimise the time from injury to definitive care
- Hypothermia, acidosis and coagulopathy increase mortality in trauma
- Pain management is a cornerstone of trauma care

General Notes

Multiple trauma related CPGs will frequently need to be considered together in a single case. The following care objectives and notes should be considered in the context of the complex patient with multiple competing priorities.

General Care

- Manage life threatening injuries as an immediate priority (hemorrhage, airway, chest, pelvis and spinal trauma).
- In potential major trauma, transport should occur as soon as possible. The target scene time for non-trapped major trauma patients is less than 20 minutes. Paramedics are explicitly authorised to begin moving the patient towards the next level of care once the most life-saving procedures are completed.
- RSI should be considered only if the time taken to safely complete the procedure is significantly shorter than the time to definitive care. Basic airway support and transport may be lifesaving.
- IV access, analgesia/splinting, fluid administration, and patient warming should be considered concurrently with rapid transport to definitive care.
- A strong suspicion of spinal injury should exist for the unconscious patient or the awake patient complaining of spinal pain and/or neurological symptoms.
- If patients with suspected internal bleeding are likely to be trapped for a prolonged period, request the delivery of blood products to the scene.
- Hypothermia is associated with mortality in trauma. All available warming methods should be employed.
- Effective analgesia improves outcomes in trauma. Splinting and analgesia are more effective when employed together.
- Early Sit-Reps for additional resources (e.g. AAV and EMU) and other emergency services are critical for optimizing trauma workflow.
- Early hospital notification and transport to the highest level of trauma care saves lives.

Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/CWI/CWI OPS 119 Helmet Removal.pdf>
- <https://av-digital-cpg.web.app/assets/pdf/CWI/MAC CPG A0800 The Principles of Major Trauma Management.pdf>
- <https://av-digital-cpg.web.app/assets/pdf/CWI/MAC 6 April 2016 CPG A0801 - Tourniquets review.pdf>
- [Trauma Victoria - Major Trauma Guidelines and Education](#)

Care Objectives

- Identify and control major haemorrhage.
- Ensure vital organ perfusion while minimising the development of coagulopathy, acidosis and hypothermia.
- Rapid transport to a facility capable of definitive haemorrhage control.

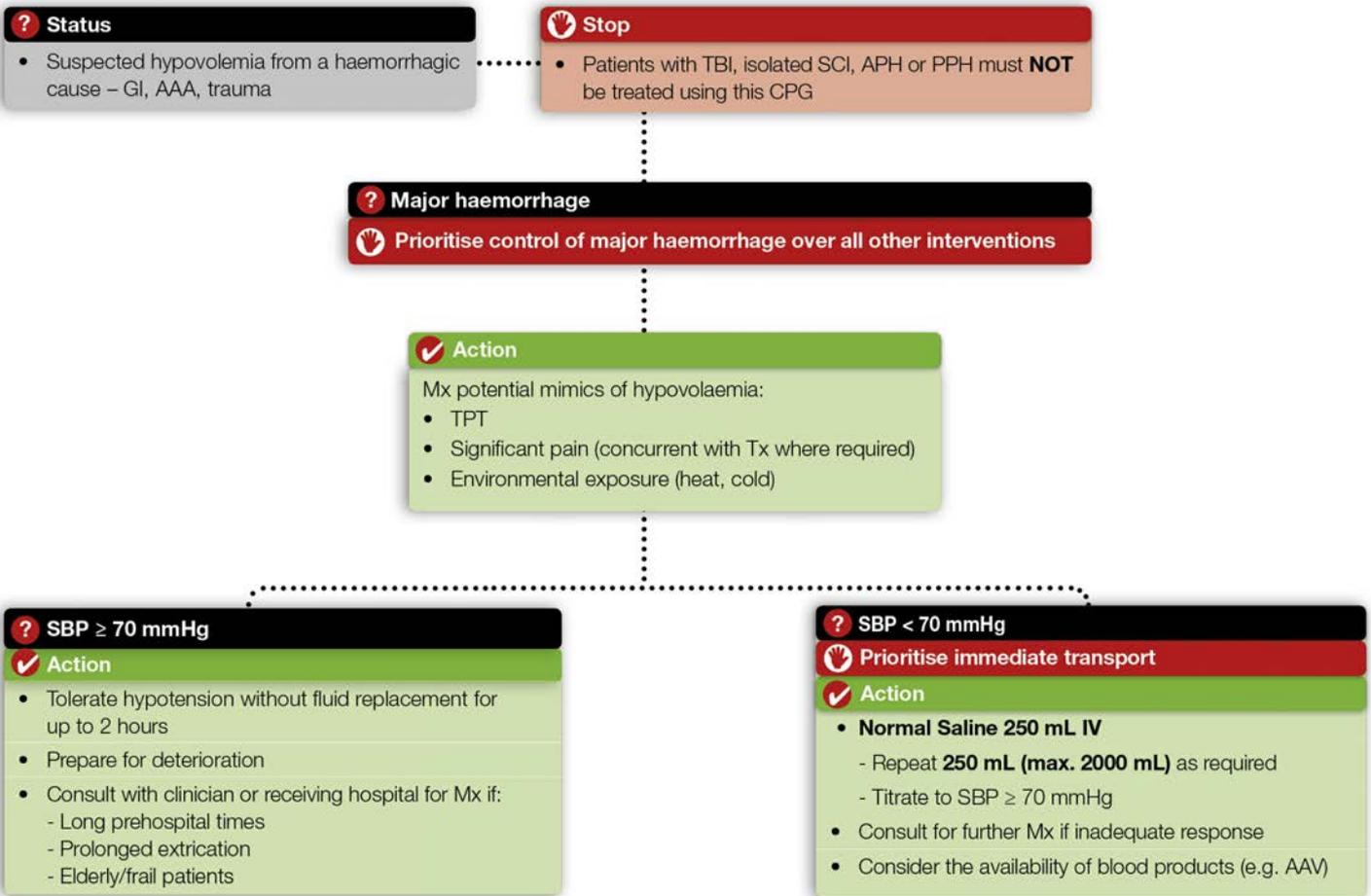
General Notes

- Minimising the volume of fluid administered may require accepting tachycardia and a degree of hypotension prior to definitive control of the haemorrhage.
- A BP can be difficult to ascertain accurately in critically ill patients. Patients with a BP < 70 mmHg will often present with absent radial pulses and decreased alertness. It may be appropriate to combine these assessments with the use of BP, especially where BP is thought to be inaccurate or cannot be taken.
- Where the patient is not alert but has a BP \geq 70 mmHg / radial pulse present, consider other causes of altered conscious state (e.g. TBI, ETOH, OD, hypoglycaemia, dementia).
- If an adequate BP cannot be achieved or there are other signs of unacceptably poor perfusion or deterioration, consult for further management. Options include further fluid, the use of pressors and/or the delivery of blood products.

General Care

- Blood products are the preferred resuscitation fluid and, where possible, should be considered in preference to normal saline (e.g. interhospital transfer, HEMS).
- Always consider tension pneumothorax, particularly in the patient with chest injury with IPPV or persistent hypotension despite fluid therapy.
- Where the patient condition and presentation allow, expedite transport with concurrent management of pain (e.g. penetrating trauma, amputation). Where possible, **DO NOT** delay transport for IV therapy in haemorrhagic hypovolaemia, especially penetrating trauma.
- **This guideline applies to** patients with suspected ruptured AAA, massive GIT haemorrhage, and pregnant trauma patients.
- **This guideline DOES NOT** apply to patients with TBI, isolated SCI or PPH. Manage as per the relevant CPG.
- For APH associated with major trauma, consult with PIPER. For APH not associated with major trauma, manage as per **CPG M0201 Antepartum Haemorrhage**

Flowchart



Related Resources

- [https://av-digital-cpg.web.app/assets/pdf/CWI/MAC CPG A0801 Hypovolaemia & CPG P0801 Hypovolaemia paediatric June 2018.pdf](https://av-digital-cpg.web.app/assets/pdf/CWI/MAC_CPG_A0801_Hypovolaemia_%26amp;_CPG_P0801_Hypovolaemia_paediatric_June_2018.pdf)

Care Objectives

- To identify and manage time critical chest injuries such as tension pneumothorax

General Notes

Flail segment / rib fractures

- Pain associated with rib fractures may lead to hypoventilation. In these instances, prioritise careful titration of analgesia.

TPT in the awake / spontaneously ventilating patient

- Patients with generic signs and symptoms of pneumothorax are not indicated for decompression. Paramedics should closely monitor the patient for deterioration.
- TPT is highly likely in the patient with generic symptoms of pneumothorax **AND** subsequent deterioration in respiratory status and/or conscious state. Decompression is indicated in these patients.
- Hypotension is a late sign in the spontaneously ventilating patient. MICA paramedics should not wait for a drop in BP prior to decompression.

TPT in the ventilated patient

- TPT in the ventilated patient is more likely to develop rapidly, with a sudden decrease in SpO₂ and BP.
- Chest injury patients receiving IPPV have a high risk of developing a TPT. Bilateral chest decompression is appropriate prior to managing decreased perfusion.
- Equal air entry is NOT an exclusion criterion for TPT.
- Cardiac arrest patients are at risk of developing chest injury during CPR.

General Care

Chest decompression

- Insertion site for cannula/intercostal catheter (SMART):
 - Second intercostal space
 - Mid - clavicular line (avoiding medial placement)
 - Above rib below (avoiding neurovascular bundle)
 - Right angles to chest
 - Towards body of vertebrae
- Insert an intercostal catheter, ARS device or long 14g cannula.
- If air escapes, or air and blood bubble through the cannula / intercostal catheter, or no air / blood detected, leave in situ and secure.
- If no air escapes but copious blood flows through the cannula / intercostal catheter then a major

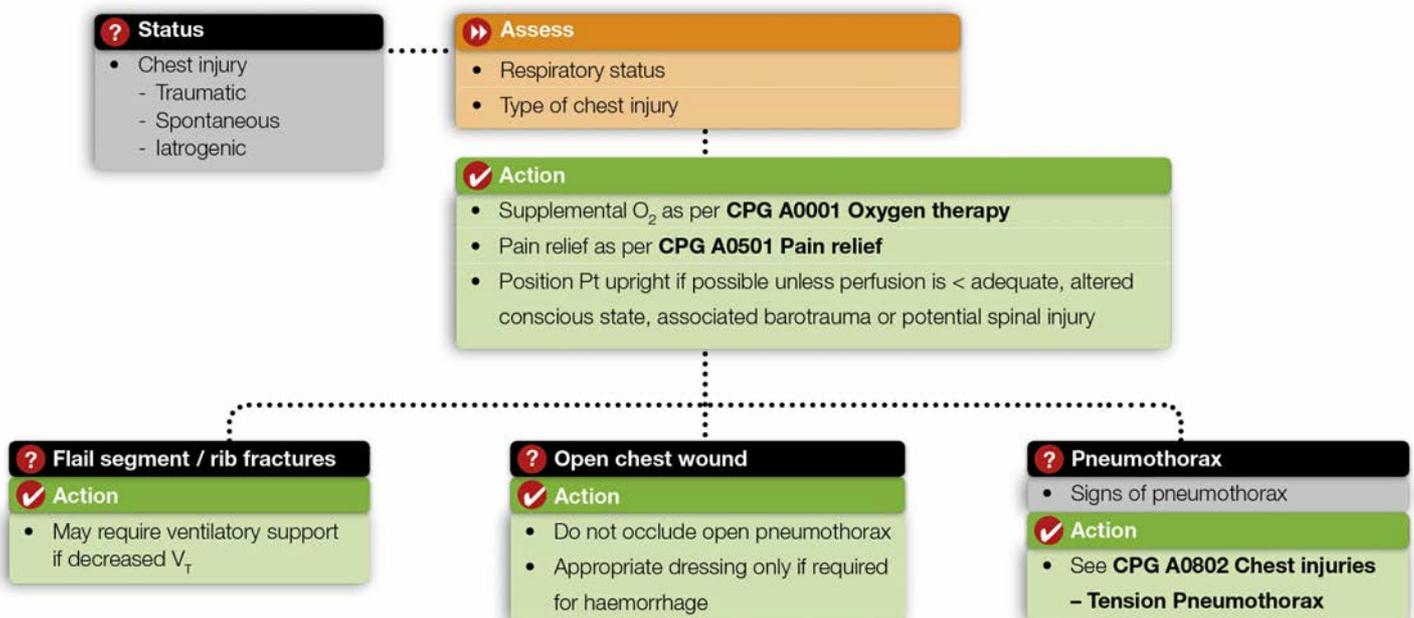
haemothorax is present. Remove, then cover the insertion site.

- If a 14g cannula is used initially, it should be replaced with an intercostal catheter (if available) as soon as practicable.
- Catheter troubleshooting:
 - Patient may re-tension as lung inflates if catheter kinks off
 - Catheter may also clot off. Flush with sterile **Normal Saline**

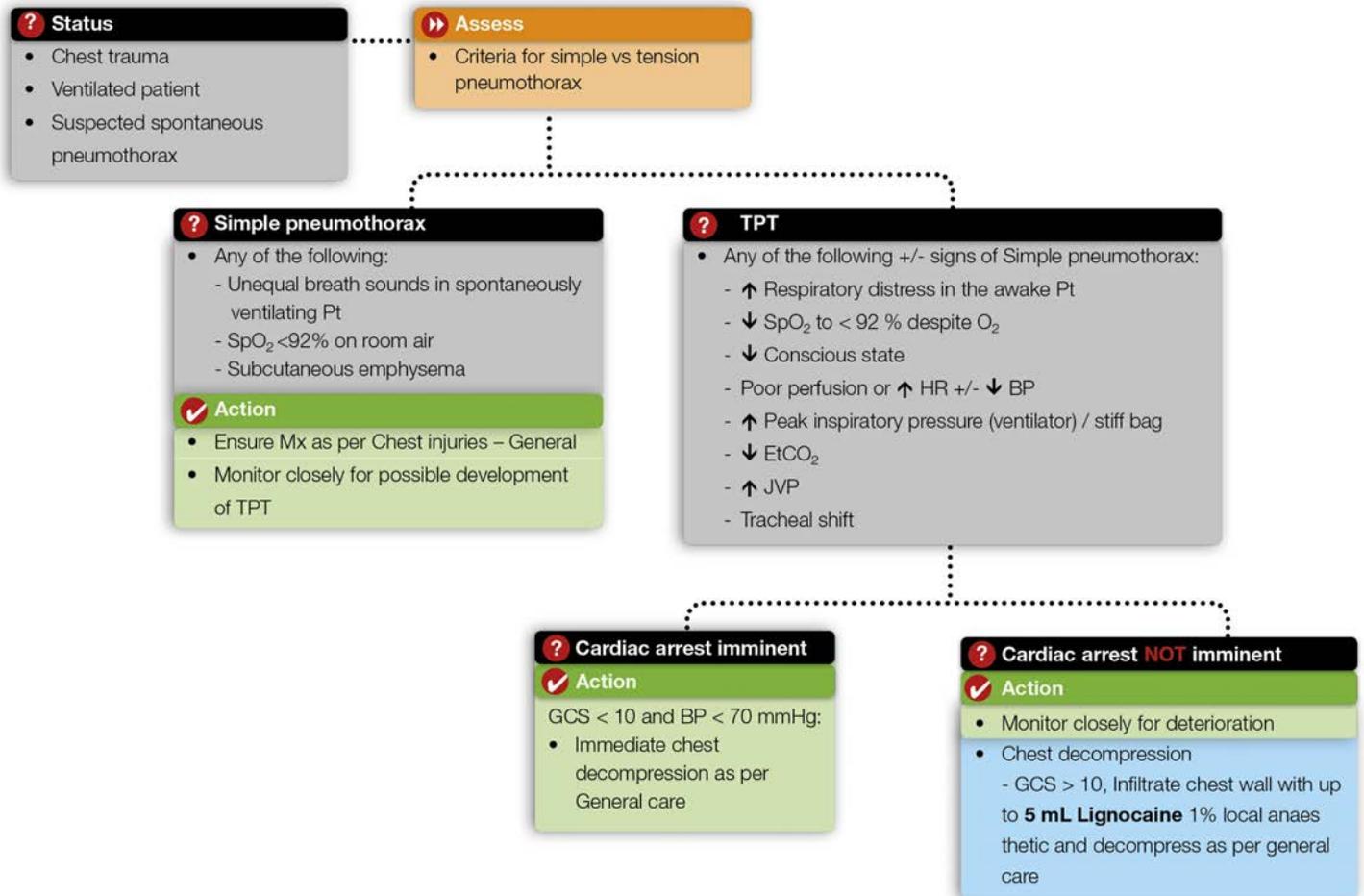
Local anaesthesia for GCS > 10

- Prepare Lignocaine 50 mg in 5 mL (1%) in a 10 mL syringe and attach a 23g or 21g needle.
- Locate insertion site for intercostal catheter, clean site and insert needle into pleural space. Inject up to 5 mL Lignocaine 1% into the tissues as needle is slowly withdrawn.
- Proceed with chest decompression.
- The maximum anaesthetic dose of Lignocaine 1% (to avoid the onset of side effects) is 4 mg / kg. This is unlikely to be reached in adult patients if the recommended dose is used.

Flowchart - General



Flowchart - Tension Pneumothorax



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/CWI/CWI OPS 073 Tension Pneumothorax with Arrow Pneumocath.pdf>
- [https://av-digital-cpg.web.app/assets/pdf/CWI/CWI OPS 169 Tension Pneumothorax decompression with the Air Release System \(ARS\) or IV cannula.pdf](https://av-digital-cpg.web.app/assets/pdf/CWI/CWI OPS 169 Tension Pneumothorax decompression with the Air Release System (ARS) or IV cannula.pdf)
- <https://av-digital-cpg.web.app/assets/pdf/CWI/MAC CPG A0802 Chest Injuries CPG.pdf>

Care Objectives

- To identify and appropriately triage potentially serious head injury.
- To optimize ventilation, oxygenation and cerebral perfusion pressure in order to prevent secondary brain injury.

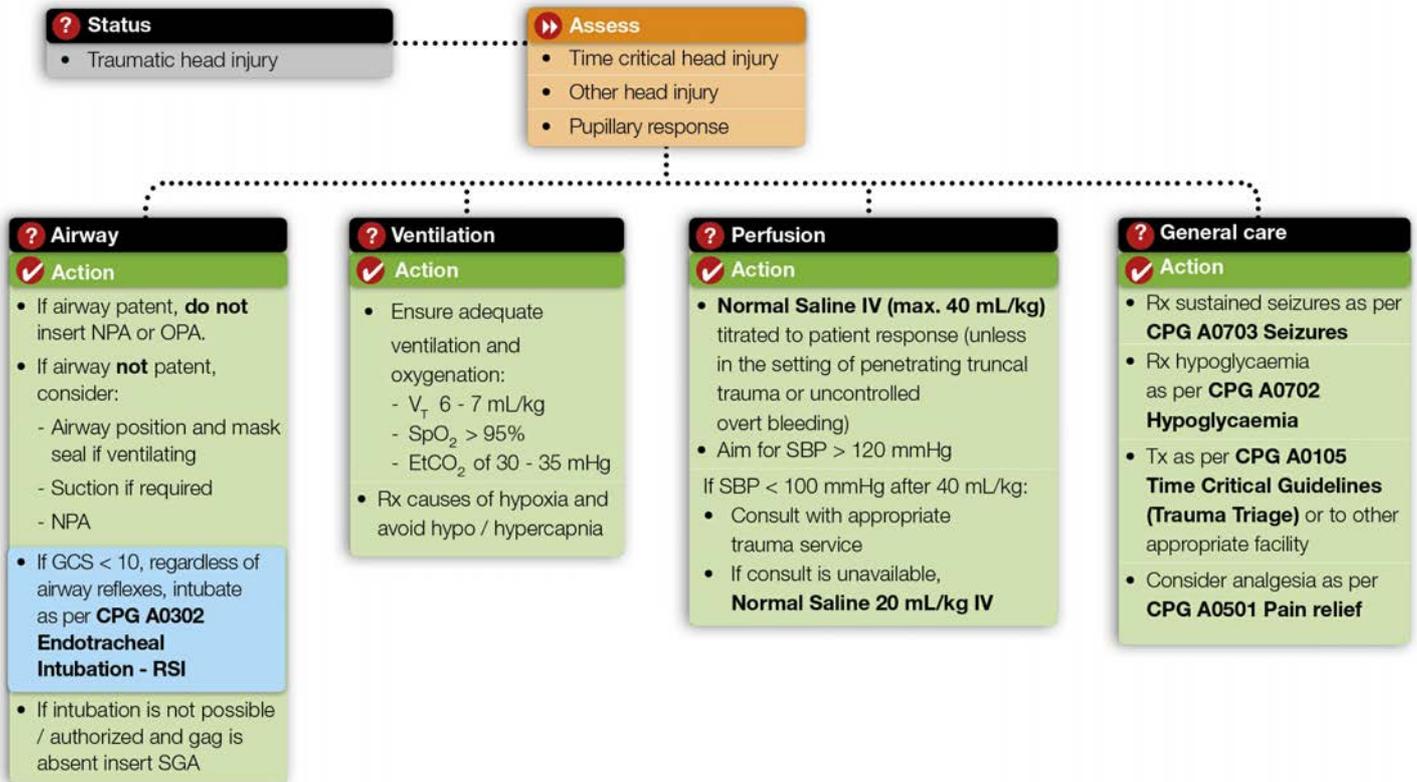
General Notes

- The Trauma Time Critical Guidelines require patients with serious blunt trauma to a single region to be triaged to the highest level of care. When assessing pattern of injury, the patient can be considered to have a serious blunt head injury with or without loss of consciousness / amnesia and GCS 13 - 15 with any of:
 - any loss of consciousness exceeding 5 minutes
 - skull fracture (depressed, open or base of skull)
 - vomiting more than once
 - neurological deficit
 - seizure
- Elderly patients with standing height falls who meet no other time critical criteria but are on anti-coagulant, antiplatelet agents or have bleeding disorders should not be underestimated. Transport to an appropriate level of care.
- Intoxicated patients with apparently minor MOIs (e.g. standing height fall) are at high risk of occult clinically significant head injury.

General Care

- Midazolam should not be used to control combativeness prior to RSI in head injury. Judicious opioid pain relief should be administered.
- In the rare circumstance where combativeness is preventing preoxygenation, then all other preparations for the RSI should be undertaken and a small (20 – 40 mg) bolus of **Ketamine** may be given to enable preoxygenation.
- Where the patient is severely agitated, manage with ketamine as per **CPG A0708 Agitation**
- Dress open skull fractures / wounds with an appropriate dressing.
- Consider spinal immobilisation as per **CPG A0804 Spinal injury**. If intubation is required, apply cervical collar after intubation. Attempt to minimise jugular vein compression.
- Attempt to maintain normal body temperature.
- If an adequate blood pressure cannot be achieved or there are other signs of unacceptably poor perfusion or deterioration, consult for further management. Options include further fluid or the use of pressors.

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/CWI/MAC CPG A0803 Traumatic head injury.pdf>

Care Objectives

- To identify patients with suspected SCI and transfer them to the appropriate facility.
- To protect and support the integrity of the spinal column where SCI is suspected or unstable vertebral injury cannot be excluded.
- To avoid unnecessary immobilisation by clinically excluding patients without injury to the spinal column.

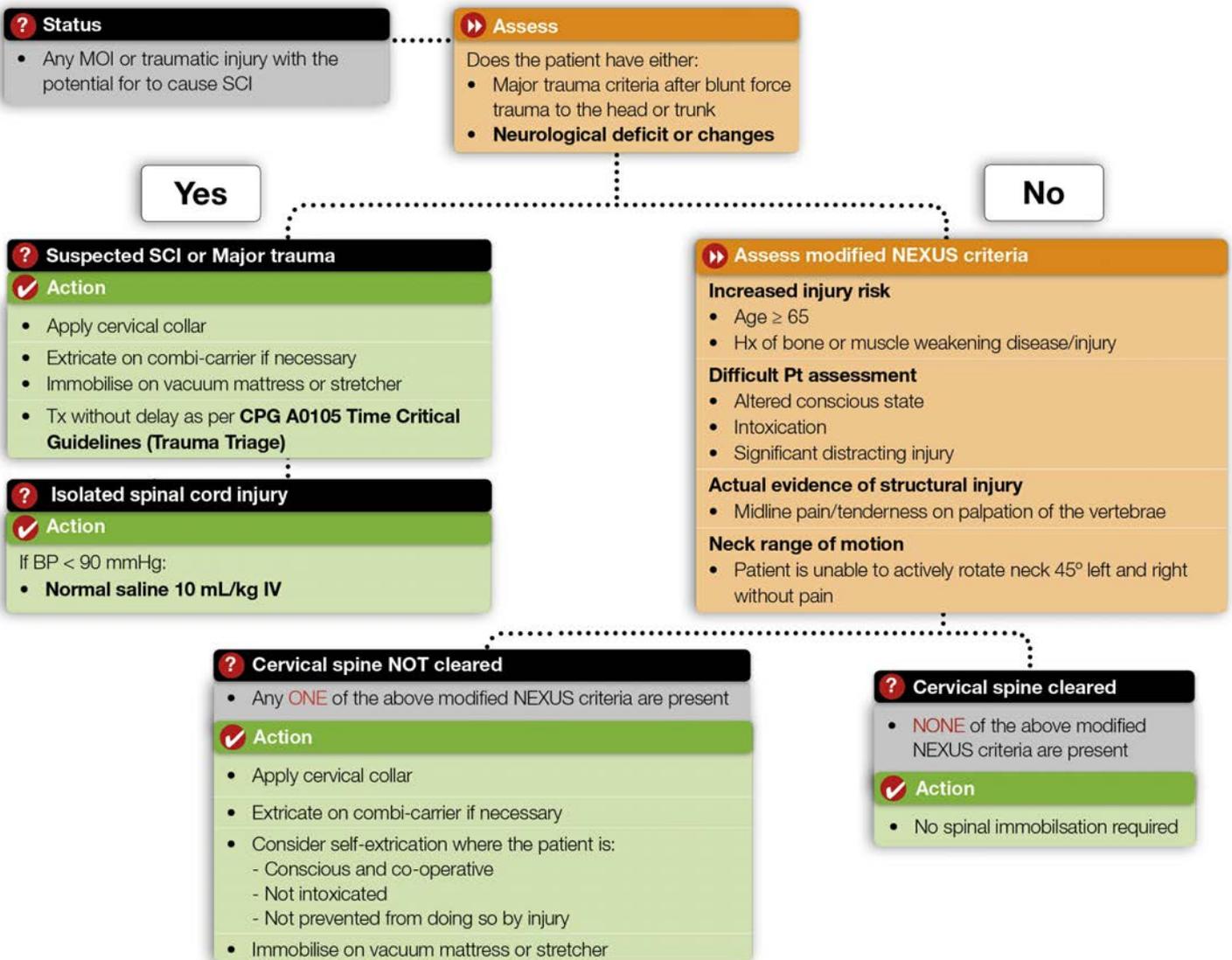
General Notes

- The intent of spinal immobilisation is to support the neutral alignment of the spinal column and reduce or distribute forces placed on it. A range of immobilisation techniques may be used to achieve this goal but are not a goal in themselves and should be modified where required by circumstance and comfort.
- Where a collar is not achieving the desired support and stability for any reason (e.g. the patient's anatomy, agitation) it may be adjusted, loosened or removed if there are no other options (e.g. calming the patient).
- The optimum position for spinal immobilisation is supine. However, where this is not possible (e.g. pain, vertebral disease, kyphosis, injuries prevent the position, CCF), support the patient in a position of comfort.
- The CombiCarrier extrication board should only be used as an extrication device. Patients should **NOT** be immobilized on the board for transport to hospital.
- **The head MUST NOT be independently restrained to the stretcher.**

General Care

- Concerning MOIs include those with the potential for hyper-flexion, hyper-extension, hyper-rotation or axial loading of the spinal column.
- A significant amount of force is required to damage healthy vertebrae. Patients sustaining any dangerous mechanism of injury such as a car rollover/ejection, pedestrian impact, or diving accident should be treated and assessed carefully.
- Older patients, those with vertebral disease or previous spinal abnormalities (ankylosing spondylitis, spinal stenosis, spinal fusion, previous c-spine injury & rheumatoid arthritis) may sustain unstable injuries to the cervical spine from injuries involving far less force (e.g. standing height fall) and should be treated with a high index of suspicion after trauma of any kind.
- Patients with penetrating trauma should not be routinely immobilized. Consider immobilisation where there is demonstrable neurological deficit.
- During extrication, all movements should be planned and co-ordinated as a team to minimise unnecessary handling of the patient and potential for manual handling injuries.
- Altered conscious state includes any presentation which may confound the results of a physical examination (e.g. GCS < 15 for any reason, concussion, dementia).
- Consider prophylactic antiemetic as per **CPG A0701 Nausea and Vomiting** in all awake spinally immobilised patients

Flowchart



Spinal Injury - Neurological examination

Neurological examination for the purpose of spinal clearance

Paramedics should assess the following criteria:

	YES	NO
Motor function - any weakness when asked to: <ul style="list-style-type: none"> • Arms: Push, pull and grasp • Legs: Push / plantar flex, pull / dorsiflex and leg raise 		
Sensory function - reduced or no sensation when applying light touch to the following: <ul style="list-style-type: none"> • Arms: Palms and back of hand • Legs: Lateral aspect of calcaneus • Suprasternal notch 		
Patient reports numbness, tingling, burning or any other altered sensation anywhere in the body.		

If ANY of the above criteria are present, the patient should be considered to have neurological deficit and CANNOT be spinally cleared.

- The left and right sides should be tested simultaneously in order to compare strength between sides of the body.
- Weakness or inability to perform the test due to pre-existing injury or anatomical considerations does not constitute a neurological deficit. In these cases, sensory and motor function should be assessed against the patient's normal ability.

Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/CWI/CWI OPS 100 Application of a Rigid Cervical Collar.pdf>
- CWI OPS 188 Soft Cervical Collar
- <https://av-digital-cpg.web.app/assets/pdf/CWI/MAC CPG A0804 Spinal Injuries.pdf>
- <https://av-digital-cpg.web.app/assets/pdf/CWI/MAC CPG A0804 Standardised neurological exam for the purpose of spinal clearance.pdf>
- <https://av-digital-cpg.web.app/assets/pdf/CWI/4.1.1 Soft Collar Review - MAC 131120.pdf>

Care Objectives

- To identify and manage potential airway burns as a priority
- To minimise the impact of injury by maintaining tissue and organ perfusion, minimising pain, appropriate burn wound cooling and minimising heat loss during transfer to hospital.

General Notes

- Signs and symptoms of airway burns include:
 - Evidence of burns to upper torso, neck and face
 - Facial and upper airway oedema
 - Sooty sputum
 - Burns that occurred in an enclosed space
 - Singed facial hair (nasal hair, eyebrows, eyelashes, beards)
 - Respiratory distress (dyspnoea +/- wheeze and associated tachycardia, stridor)
 - Hypoxia (restlessness, irritability, cyanosis, decreased GCS)
- Patients who receive intubation and paralysis are at increased risk of hypothermia. Once a long term paralytic is administered, temperature management becomes a more significant priority.
- Volume replacement is calculated for the burn injury only. Manage other injuries accordingly including the requirement for additional fluid.
- Electrical burns are at increased risk of acute kidney injury secondary to profound muscle damage and may require extra fluid.
- If small, isolated, superficial burn with unbroken skin, or sunburn, consider Treat and Refer pathway as per **TR0205 Treat and Refer - Minor Burns**

Transport Notes

- All burns patients who meet the time critical trauma criteria (> 20% TBSA or >10% TBSA if age ≤ 15 years, suspected airway burns, > 1000 volt electrical burns) should be transported either to the Alfred Hospital or RCH (aged 12-15 yrs) as a preference, if within 45 minutes transport time. If transport time > 45 minutes, transport to the nearest alternative highest level of trauma service.
- Any burns involving the face, hands, feet, genitalia, major joints, or circumferential burns of the chest or limbs are recommended for assessment by a major burns service. These patients may not require direct transport to the Alfred Hospital if distance is prohibitive, as it may be by secondary transfer.
- In all cases of prolonged transport times, consider alternative air transport.
- In all cases of significant burn injury – whether due to % TBSA or location of injury – consider consultation with ARV for further management, appropriate destination and hospital notification.

Burn cooling

- Burn cooling should ideally be undertaken for 20 minutes. Stop cooling if the patient begins shivering or has a temperature ≤ 35°C. Cooling provided prior to AV arrival should be included in the timeframe.
- Cool with gentle running water between 5 – 15°C where available. Ice and iced water is not desirable.

Dirty (e.g. dam) water should be avoided due to contamination and risk of infection.

- If running water is not available, cooling may be achieved by immersing the injury in still water, using a spray bottle or applying moist towels.
- Whilst being mindful of temperature management, chemical burns should be irrigated for as long as pain persists. Avoid washing chemicals onto unaffected areas, especially eyes.
- Remove burnt clothing or clothing containing chemicals or hot liquid when safe to do so. Do not remove any matter that is adhered to underlying tissue. Remove jewellery prior to swelling occurring.

Minimise heat loss

- Maintaining normothermia is vital. Assess temperature as soon as practicable. Protect the patient from heat loss where possible.

Elevate

- If clinically appropriate, elevation of the affected area during transport will minimise swelling and oedema, especially in circumferential burns.

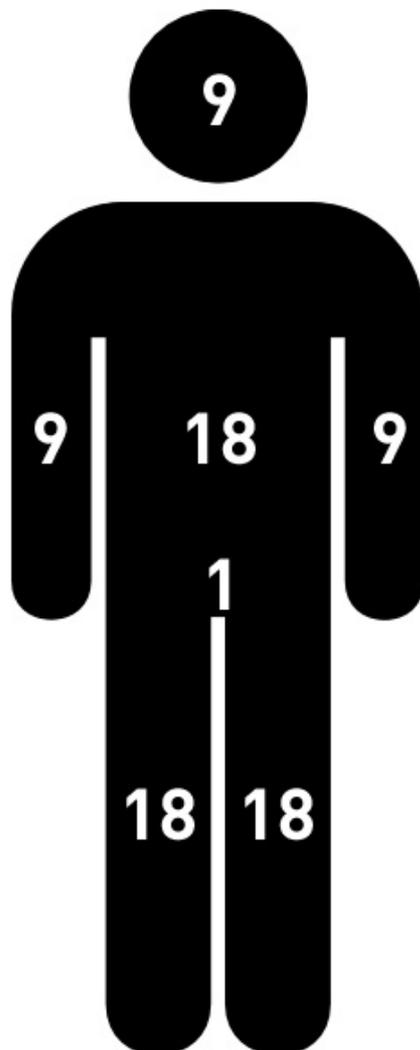
Dressing

- Cling wrap is an appropriate burns dressing and is preferred for all burns. It should be applied longitudinally to allow for swelling.

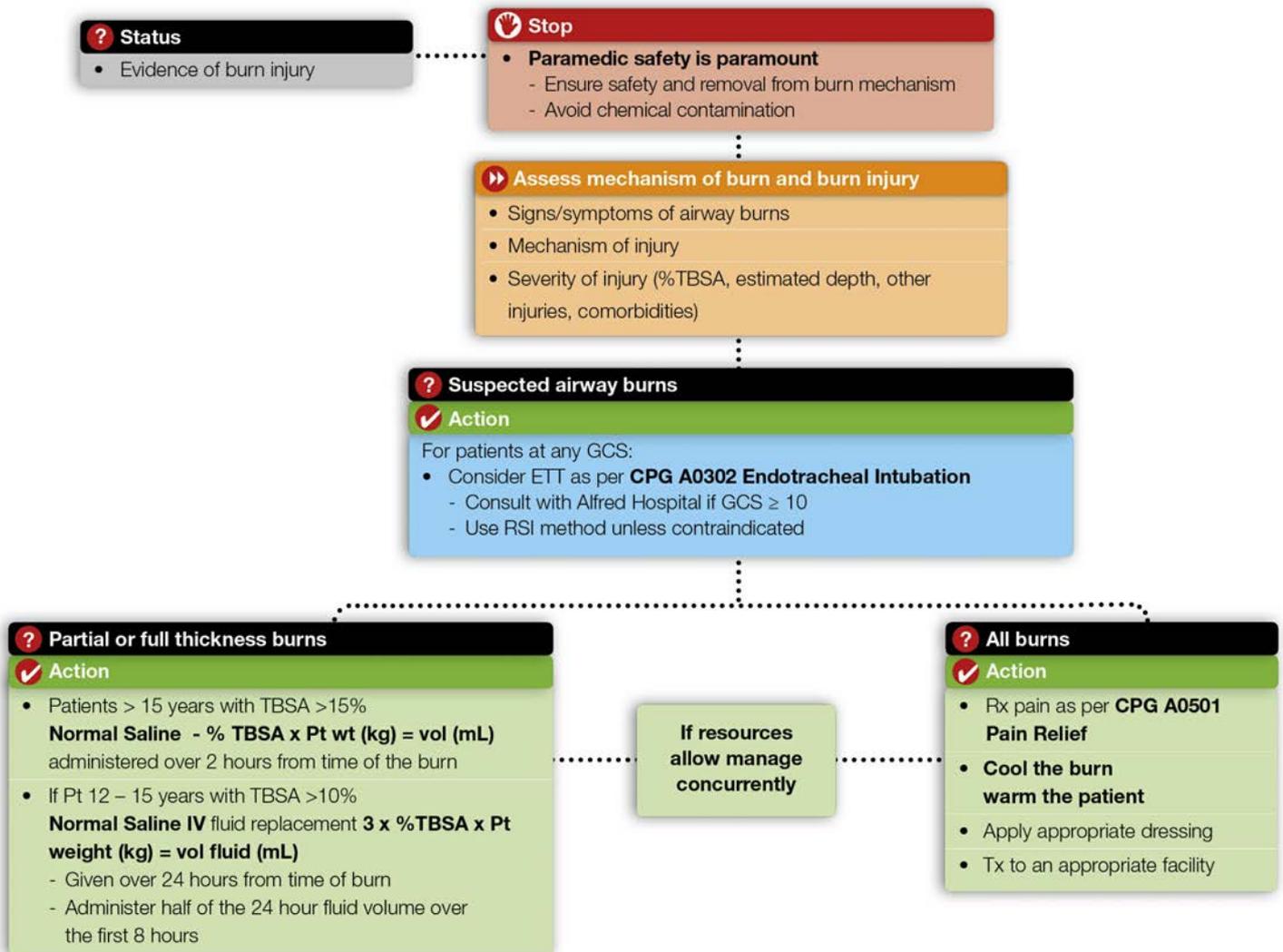
Wallace rule of nines

- Wallace rule of nines assists in estimating the % of total body surface area for burns patients. The breakdown is:
 - Head 9 %
 - Torso 18 % front (abdomen and chest) and 18 % back
 - Arm 9 % in total circumference (each)
 - Leg 18 % in total circumference (each)
 - Groin 1 %

10 years - Adult



Flowchart



Related Resources

- https://av-digital-cpg.web.app/assets/pdf/CWI/MAC_CPG_A0805_Burns_and_P0803_Burns_paediatric.pdf

Care Objectives

- The principles of good prehospital management of fracture/dislocation are:
 - Control external haemorrhage
 - Apply good splinting practices
 - Resolve neurological or vascular compromise where possible
 - Use judicious analgesia

General Notes

- Pelvic splints are a haemorrhage control device. If there is suspicion of a pelvic injury, a pelvic splint should be applied as a priority.
- If a patient has inadequate perfusion and/or an altered conscious state following a mechanism that may result in pelvic injury, a pelvic splint should be applied as a priority.
- If there is suspicion of both pelvic and leg injury, pelvic splinting and the CT-6 traction splint can be applied, but the pelvic splint is the priority and should be applied first.
- Patients with suspected pelvic injury should not be log-rolled as it may mobilise the pelvis and disrupt clots.

General Care

- Altered sensation, loss of a pulse or cold/dusky skin in a limb distal to a fracture or dislocation are indicators of neurological or vascular compromise, which constitutes a limb threatening injury and is time critical.
- Fractures with neurological or vascular compromise should be realigned as soon as possible. In general, dislocations with neurological or vascular compromise should be urgently transported if within 15 minutes transport time of a higher level of care. **Where travel times exceed 15 minutes, consult with receiving hospital and consider dislocation relocation at scene.**
- When considering relocating/reducing a fracture or dislocation, clinical judgement needs to be applied in relation to the risks associated with:
 - Analgising the patient
 - Likelihood of success of the procedure
- The general principles of reducing a fracture are:
 - Provide procedural analgesia as per **CPG A0501 Pain Relief**
 - Irrigate with 500 mL – 1 L of **N/Saline** prior to reduction if the fracture is compound.
 - Apply traction and gentle counter-traction in the line of the limb. This should reduce most fractures.
 - If required, further manipulation should be done whilst the limb is still under traction.
 - Splint the limb following reduction
- The general principles of relocating a dislocation are:
 - Provide procedural analgesia as per **CPG A0501 Pain Relief**
 - Apply sustained traction in the longitudinal direction away from the joint
 - Have an assistant providing counter-traction above the site of injury
- After reducing a fracture ongoing analgesia is likely to be required, as the pain will persist beyond the fracture being reduced and splinted. Opioids are indicated for most fractures.

Flowchart

? Status

- Patient with suspected fracture or dislocation

**Stop**

- Prioritise pelvic splinting if either:
 - Suspected pelvic fracture, or
 - Inadequate perfusion or altered conscious state, secondary to mechanism which may result in pelvic injury

**Assess**

- If the chest is injured and rib fractures are suspected

**Action**

- Treat as per **A0802 Chest Injuries**

Assess

- If a limb is injured, assess for neurological or vascular compromise distal to the injury

Action

- In the setting of a fracture with neurological or vascular compromise distal to the injury, treat Pt pain as per **CPG A0501 Pain Relief** and reduce the fracture as per General Care notes
- Apply appropriate splinting once fractures are reduced
- If a joint is dislocated with neurological or vascular compromise distal to the joint consider immediate transport with notification and consult with an MTS via the Clinician to receive advice around relocation
- Some dislocations (e.g. hip) can be extremely painful and will require aggressive analgesia which may include ketamine
- Reassess neurovascular status following any manipulation/splinting/sling application

Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/CWI/CWI OPS 156 Application of CT-6 Traction Splint.pdf>
- <https://av-digital-cpg.web.app/assets/pdf/CWI/CWI OPS 177 Application of Pelvic Splint.pdf>
- <https://av-digital-cpg.web.app/assets/pdf/CWI/MAC CPG A0806 Fracture Management.pdf>

Care Objectives

- Supine or lateral positioning
- High-flow oxygen
- IV rehydration
- Transport to a hyperbaric facility

General Notes

Intended patient group

- This CPG applies to patients who are experiencing possible symptoms of Decompression Illness (DCI) following a SCUBA dive.
- **Major Trauma:** In the setting of concurrent major trauma, the patient should be managed according to **CPG A0800 Principles of Major Trauma** with priority given to managing life threatening injuries before considering specific management as per this CPG

Decompression Illness (DCI)

Decompression Illness occurs when gas emboli form in blood and/or tissues following a rapid decrease in environmental pressure as can occur during SCUBA dive resurfacing.

This is a result of gases (mainly nitrogen) absorbed into the tissues on descent being released and forming bubbles in the bloodstream or pulmonary barotrauma.

Signs and symptoms

- Neurological changes (other than those listed under CAGE)
- Respiratory complaints
- Musculoskeletal pain
- Itching and/or blotchy rash

Cerebral Arterial Gas Embolism (CAGE)

In severe cases emboli may form in or travel to cerebral arterial circulation where they may cause temporary or permanent neurological dysfunction.

Signs and symptoms

- **Neurological:** GCS < 15 at any point, any seizure, any LOC (even if asymptomatic when assessed by AV)
- Onset of symptoms soon after surfacing (no specific timeframe, consider approximately half an hour)

Specific History

- Specific history is important for the receiving hospital and should be obtained at the scene where possible:

- Number of dives performed
- Surface interval between dives
- Maximum depth(s) and bottom time(s)
- Type of ascent (controlled / rapid)
- Decompression or safety stops
- Breathing gas mixture used
- Level of exertion during and after dive
- Which symptoms presented
- Any first aid provided and the patient's response

Management

Supine or lateral positioning

- Reduces the effect of gravity on the mobility of gas emboli

High-flow oxygen

- Oxygen must be delivered in the highest concentration possible to promote nitrogen off-gassing. This will likely be 15 LPM via non-rebreather mask or BVM

IV rehydration

- Dehydration occurs frequently in diving. Rehydration of patients complements hyperbaric management in hospital.
- Recompression reduces the size of inert gas emboli and increases the partial pressure of oxygen delivered to the patient.
- It is no longer considered necessary to withhold opioid analgesia if the patient is in pain. Treat as per **CPG A0501 Pain Relief**.
- Manage hypothermia as per **CPG A0901 Hypothermia**.

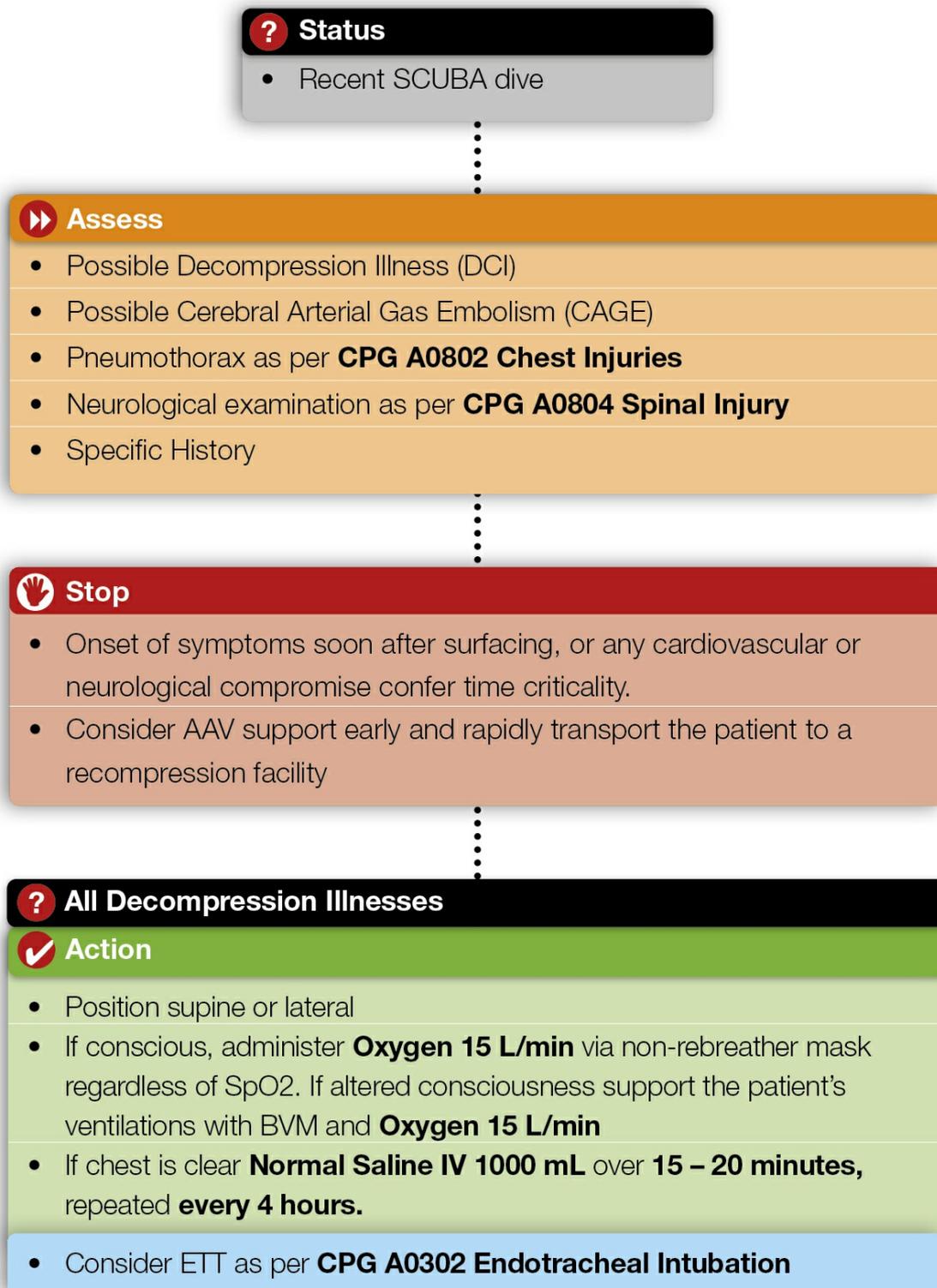
Non-recent dive (> 12 hours)

- Patients with a GCS of 15 who have been suffering symptoms for > 12 hours before calling can be kept on simple face mask, but still require transport to a recompression facility with their equipment.
- If cardiovascular or neurological symptoms are present, patient remains time-critical.

Transport

- **Dive computers:** It is essential that any dive computers and gauges be transported to the recompression facility
- **Destination:** The only public recompression facility in Victoria is at the Alfred Hospital. There is also a facility at the Royal Adelaide Hospital
- **Air transport:** Helicopter transport at < 300 m (approx. 900 feet) altitude or pressurised fixed wing aircraft are the preferred options
- **Consultation:** Early consultation with the on-call hyperbaric physician at The Alfred Hospital can assist with paramedic decision making and provide early notification of hospital based services. Paramedics should have a low threshold for contacting The Alfred Hospital to discuss patient management. This can be done via the Clinician.

Flowchart



Related Resources

- [https://av-digital-cpg.web.app/assets/pdf/MAC/Diving related emergencies MAC paper July 2019 V2 final.pdf](https://av-digital-cpg.web.app/assets/pdf/MAC/Diving%20related%20emergencies%20MAC%20paper%20July%202019%20V2%20final.pdf)

General Notes

- The purpose of this CPG is to provide Paramedics with guidance when managing an elderly or frail patient who has fallen but has no apparent injury.
- The cause of a fall can be broadly placed into one of three categories:
 - Environmental/mechanical – e.g. events related to uneven ground, poor lighting, ill-suited footwear
 - Known medical/pharmacological factor – e.g. postural hypotension, poor gait, confused patient or change of medication
 - Unanticipated event – e.g. AMI or seizure

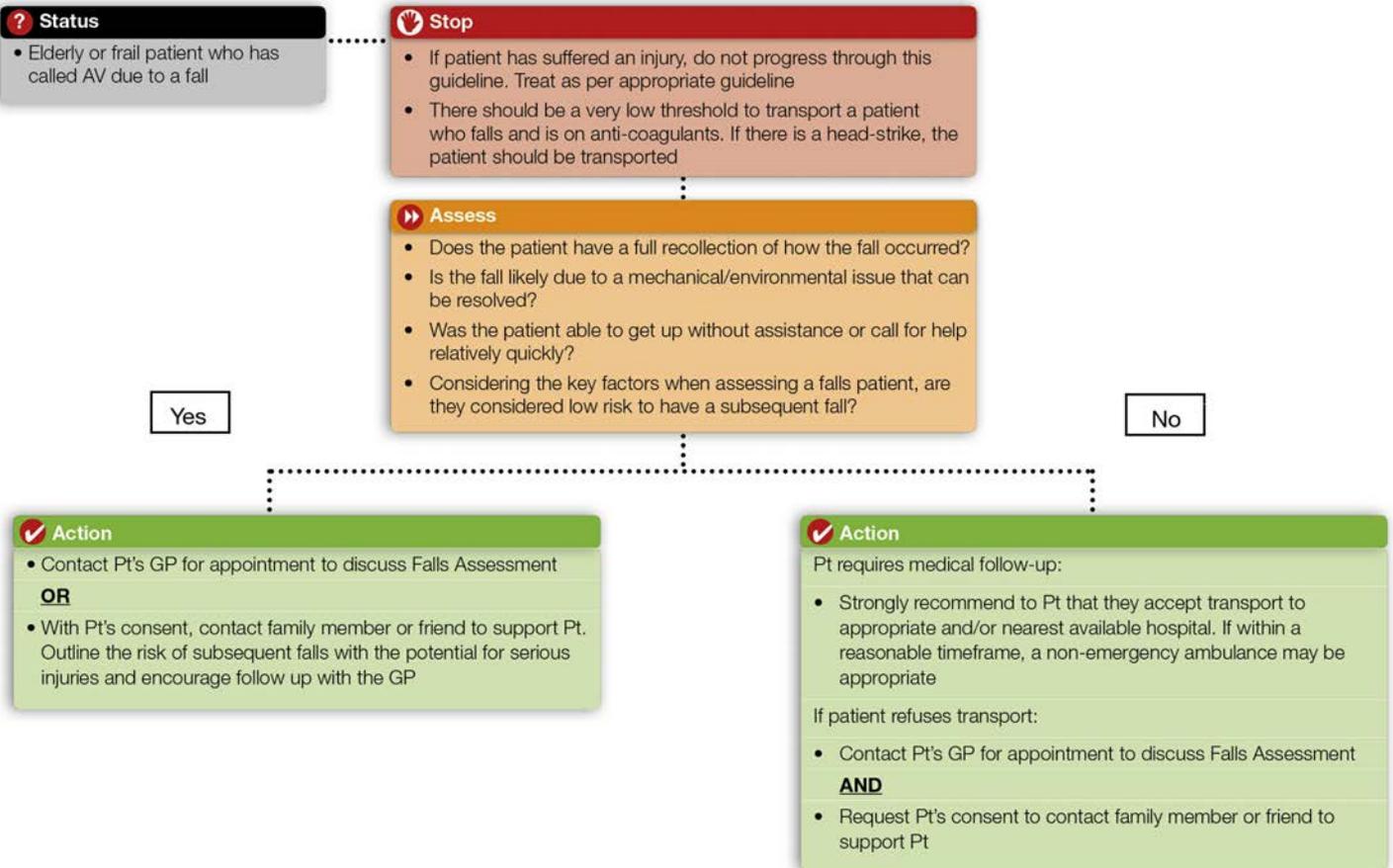
The first category is preventable. The second one may be preventable. The third category is not. Classifying the fall can aid in gauging the risk of whether a patient might fall again.

- Key factors when assessing the falls risk of a patient include:
 - Sensory impairment
 - Medications – recent changes to their medication regimen, multiple medications or specifically being on cardiovascular medications
 - Mobility issues or uses mobility aids
 - Altered cognitive state
 - Continence issues
 - Environment is unsafe – stairs, rugs, wires, poor footwear
 - A history of falls
 - Depression

General Care

- A fall is any event where a person comes to rest inadvertently on the ground, floor or other lower level.
- Elderly patients are usually considered > 65 years of age. Consideration should also be given to a patient < 65 years of age in relation to their frailty status, comorbidities or baseline level of functioning.
- Any fall that occurs whilst a patient is in AV care MUST be reported via Riskman.
- Patients who are at risk of falls should be referred for further assistance. As an initial point of contact a GP is appropriate. When possible, the GP should be contacted and spoken to directly by Paramedics.
- For patients who require medical follow-up, reasons to preferentially transport to hospital rather than connect with the GP include if the patient is socially isolated or if the patient is geographically remote.
- There is no specific timeframe that constitutes a safe or unsafe period, but patients who have fallen and spent a long time on the ground should be carefully assessed (aside from their injuries) for complications such as dehydration or pressure sores.

Flowchart



Related Resources

- https://av-digital-cpg.web.app/assets/pdf/CWI/MAC March 2017 CPG A0808 Elderly_non-injury_falls.pdf

Care Objectives

- To identify and appropriately manage hypothermic patients
- To minimise the risk of major trauma patients becoming hypothermic

General Notes

Intended patient group

- All adult patients

Classification

Mild	32 – 35°C
Moderate	28 – 32°C
Severe	< 28°C

Assessment

- Hypothermia is insidious and rarely occurs in isolation if the patient is part of a group.
- Elderly patients are a particular risk group for suffering hypothermia and this should be considered when assessing them, irrespective of the initial complaint.
- Potential major trauma patients should receive thermal management under this guideline, irrespective of their temperature.

Cardiac arrhythmias

- Associated with temperatures < 33°C.
- Gentle handling of the patient is essential to avoid stimulating lethal arrhythmias.
- Atrial arrhythmias, bradycardias or A-V blocks will generally resolve on rewarming. Antiarrhythmic medications or trans-thoracic pacing are usually not required unless decompensation has occurred.
- Defibrillation and cardioactive medications may not be effective at temperatures < 30°C. VF may resolve spontaneously upon rewarming.

Management

All patients

- The target temperature for the patient compartment of the ambulance for patients suffering or at risk of hypothermia is 24°C or higher.
- If a patient has wet clothes on they must be removed, the patient dried and then thermally protected. If a patient has dry clothes on, they should only be removed if required to assess and treat injuries.
- Where IV fluid is indicated it should be delivered via a fluid warmer if available.
- Bags of IV fluid are **not** to be warmed in a microwave and either administered to a patient, or used as

a hot water bottle.

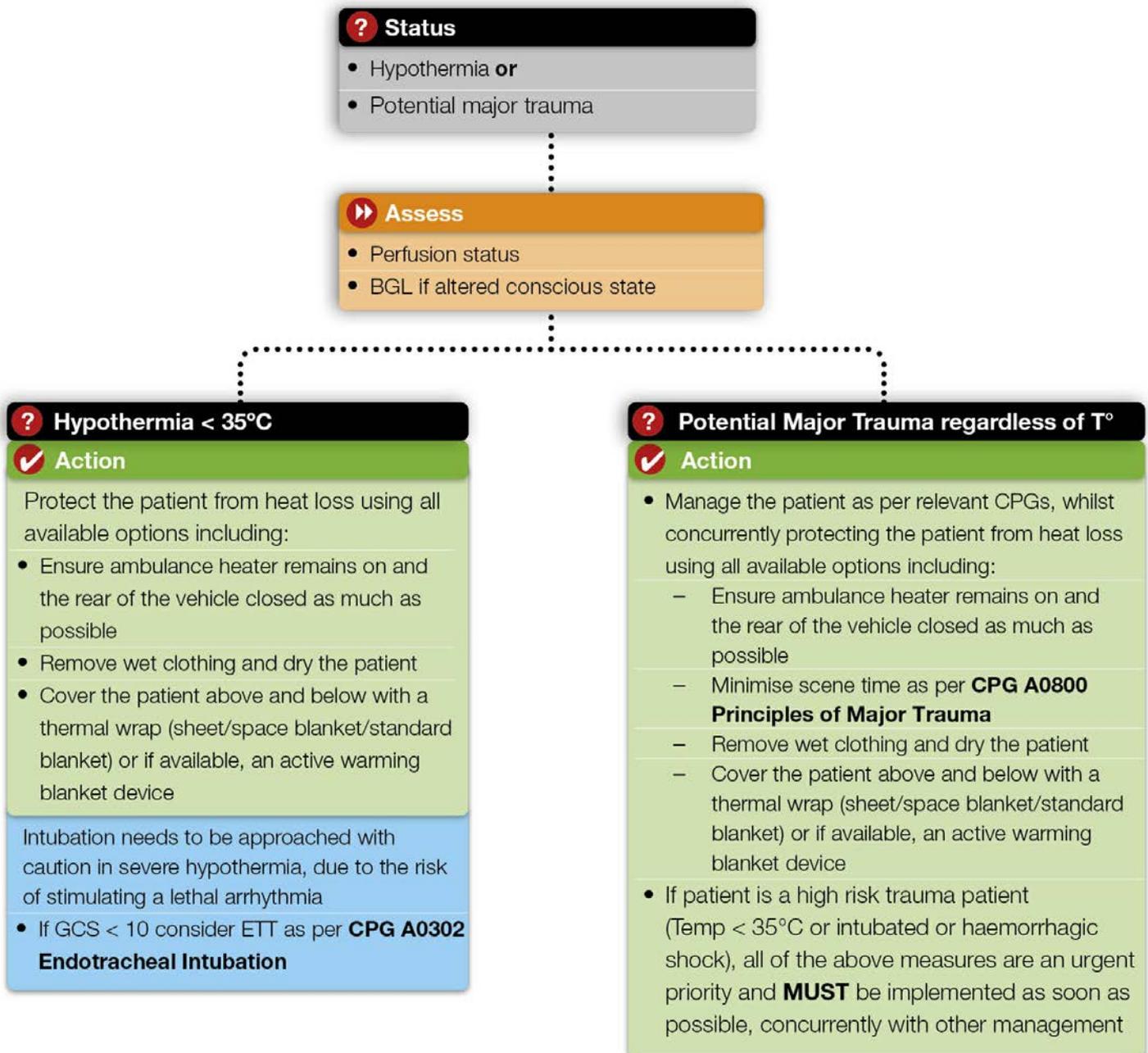
Cardiac arrest

- The onset and duration of medications is prolonged during hypothermia. In cardiac arrest if the patient has a temperature $< 30^{\circ}\text{C}$, the interval between doses of adrenaline or amiodarone is doubled as per **CPG A0201 Cardiac Arrest**.

Intubation

- Intubated hypothermic patients should have their temperature monitored with an oesophageal temperature probe where available.
- Intubated patients who are sedated and paralysed are at risk of becoming hypothermic and should have thermal management initiated once stabilised.

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC 29 March CPG Environment Emergency CPGs Hypothermia.pdf>

Care Objectives

- To identify and appropriately manage hyperthermic patients with an urgency relative to their presentation.
- The focus of treatment must be on aggressive cooling.

General Notes

Intended patient group

- The cause of heat illness may be:
 - Environmental
 - Exertional
 - Chemically mediated
- Heat stroke is generally defined as a temperature $> 40^{\circ}\text{C}$ with associated CNS dysfunction and is an urgent medical emergency.
- There may be some patients who have cross-over between environmental / exertional and toxin induced heat illness. Irrespective of whether the cause is clear, the focus of management is aggressive cooling.
- If a patient presents with signs / symptoms of heat stroke in a context where it is the likely diagnosis, and other causes of CNS dysfunction are ruled out, they should be actively and aggressively cooled. It is expected that the temperature will be $>38^{\circ}\text{C}$, but the exact number should not be the defining factor when deciding to treat or not.
- Exertional heat illness may affect patients in groups. If presented with a group suffering heat illness, consider requesting further resources such as ice and bottled water be brought to the scene to facilitate cooling and rehydration of multiple patients.

Management

Position

Gentle handling of the patient is essential. Position flat or lateral and avoid head-up positioning as far as possible to avoid hypotension, collapse and possible arrhythmias.

Cooling techniques

Strip / spray / fan

Air flow over the wet skin must be vigorously promoted. Passively blowing air conditioning is not adequate – aggressive fanning is required.

Oral fluids

If the patient is able, cold oral fluids are a suitable method of rehydration.

IV fluids

Cold IV fluid administration is to be titrated to adequate perfusion and consideration of temperature.

Consider a slower rate of fluid administration for the elderly or patients with impaired renal or cardiac function.

Ice bath / cold shower

In some sporting environments access to ice baths and/or open shower facilities may facilitate effective rapid cooling for exertional hyperthermia patients. Consider using these techniques where these facilities and resources are readily accessible while preparing for transport.

Some music festivals will also have ice baths on scene for toxin induced hyperthermia patients. In this circumstance it is possible that the patient will be intubated and placed in the bath prior to AV arrival. If definitive transport is going to be delayed (e.g. awaiting HEMS) consider leaving the patient in the ice bath until ready to move.

Muscle paralysis (RSI)

In toxin induced hyperthermia, standard cooling techniques in isolation are less likely to be effective as the intrinsic cause has not been fully addressed. In more severe cases, neuromuscular paralysis may assist and accordingly, RSI may be appropriate.

Target temperature

Aim for a target patient temperature < 40°C within 30 minutes of onset of symptoms if possible.

Intubated hyperthermic patients

Monitor temperature with an oesophageal temperature probe where available.

Risk Factors

Elderly / frail patients

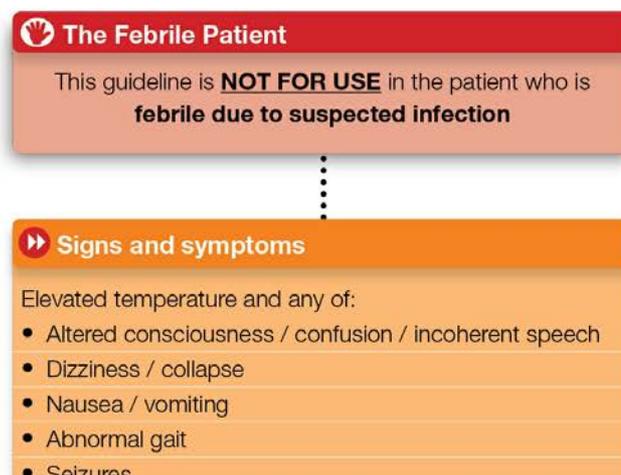
Frail patients are at increased risk of environmental hyperthermia, particularly during heat wave conditions. There should be a low threshold for transport, even if it is purely so they can be monitored in an air conditioned environment.

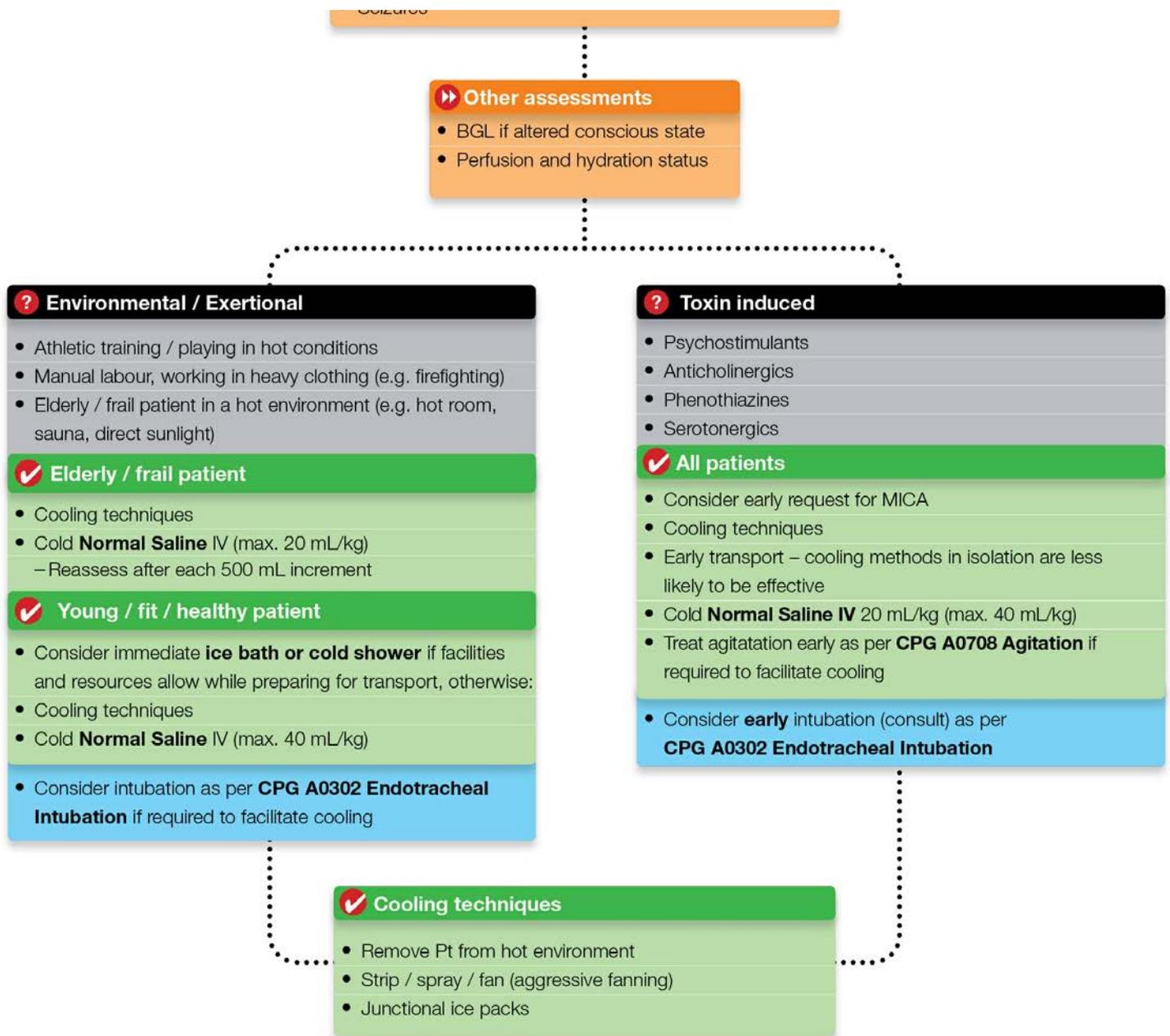
Age \geq 65 years is an independent factor which increases the risk of hospital / ICU admission and death if a patient presents with a heat illness.

Toxin induced hyperthermia

Maintain a lower threshold to manage agitation with early sedation to prevent further increases in temperature, as per **CPG A0707 Overdose: Sedative Agents/Psychostimulants**.

Flowchart





Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/Agenda item 4.1.2 Environment Emergency CPGs Hyperthermia.pdf>
- <https://av-digital-cpg.web.app/assets/pdf/MAC/Agenda item 4.1.3 Hyperthermia MAC July 2019 V3 final.pdf>

Care Objectives

- Patient history alone is enough to suspect envenomation
- Effective PBI if required – limit patient movement (bandage and splint)
- Transport patient urgently to appropriate destination – consider consulting with ARV/PIPER

General Notes

Intended patient group

- All adult and paediatric patients

Signs of systemic snake envenomation

- Eyelid dropping, diplopia, slurred speech, drooling, generalised muscle weakness (typical of tiger snake envenomation)
- Pain: generalised muscle pain, pain in lymph nodes draining the bite area, headache, abdominal pain (typical of tiger snake envenomation)
- Nausea or vomiting, sweating
- Respiratory distress (late sign)
- Loss of consciousness, paralysis
- Bleeding: bleeding from the bite site or elsewhere, bleeding from nose, gums, passing dark or red urine.

Pressure bandage with immobilisation (PBI)

- Pressure bandage application should be as tight as that for a sprained ankle
- Ensure bandaging does not cause loss of peripheral pulses.
- Use 15cm broad elasticated roller bandage

Blue ringed octopus

- Consider **prolonged respiratory resuscitation**. Due to paralysis patients will suffer respiratory arrest prior to cardiac arrest as a result of hypoxia. With appropriate ventilatory support the prognosis is good, even in cases of severe envenomation.

Tick bite

- May cause anaphylaxis early (manage as per **CPG A0704 / P0704 Anaphylaxis**) or a slow developing paralysis over days.
- Do not attempt to remove a tick if encountered. They require careful removal to ensure that the head does not remain embedded.

Management

- Contact ARV / PIPER via Clinician for management advice.
- In the case of a patient who is symptomatic after a suspected or confirmed snake bite, if transport time > 30 minutes to ED consult early with ARV to facilitate transport of the patient to an appropriate destination for anti-venom.
- Caring for the patients in the hours following envenomation (e.g. including inter-hospital transfer care) will include monitoring for signs of coagulopathy (bleeding from bite site or cannulae) and renal impairment. This may include measuring urine output where possible.

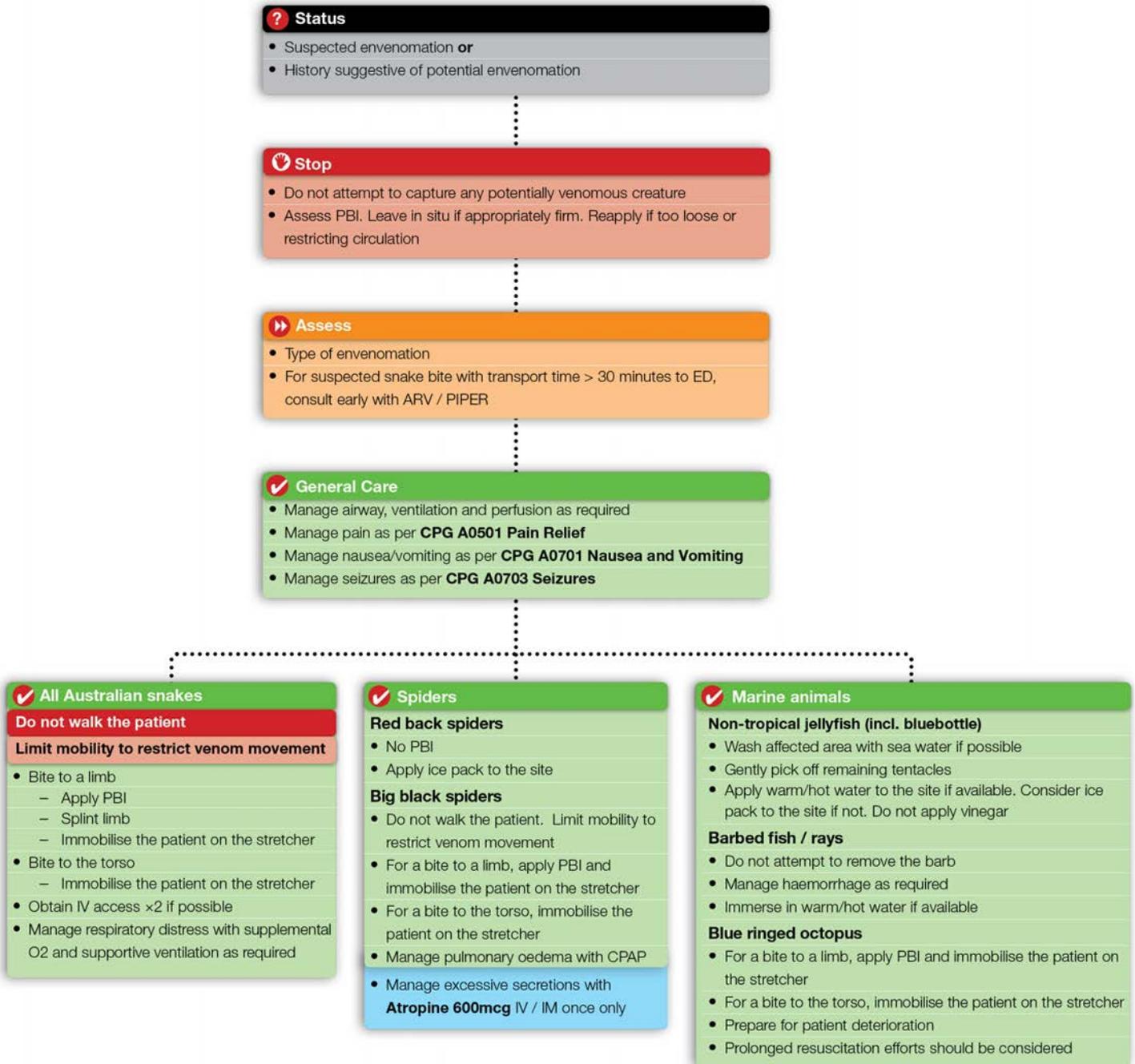
Paediatrics

- Envenomation should be considered when faced with a paediatric patient with sudden unexplained illness
- Children are at high risk due to venom / body weight ratios.

Antivenom

- Once approved by ARV / PIPER, you may be required to initiate snake antivenom. Follow administration advice from ARV / PIPER which may include the following:
 - Maintain first aid including PBI
 - Closely monitor vital signs
 - IV access x 2 is optimal. Connect IV fluid (TKVO or OFF) and prepare **IV Adrenaline** in case of anaphylaxis response to antivenom
 - Draw up the antivenom recommended by the toxicologist (via ARV / PIPER) and add it into a new bag of **Sodium Chloride 0.9% 500 mL**
 - Administer the full 500 mL via a separate IV giving set over 20-30 mins
 - There is a risk of anaphylaxis following antivenom administration. If detected, stop the infusion and provide treatment as per **CPG A0704 / P0704 Anaphylaxis**. Contact ARV / PIPER to discuss ongoing patient care

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/Agenda item 4.1.5 Envenomation.pdf>

Care Objectives

A paediatric patient is defined as any patient with an age < 12 years (i.e. up to and including 11 years), for the purpose of assessment and management under these guidelines.

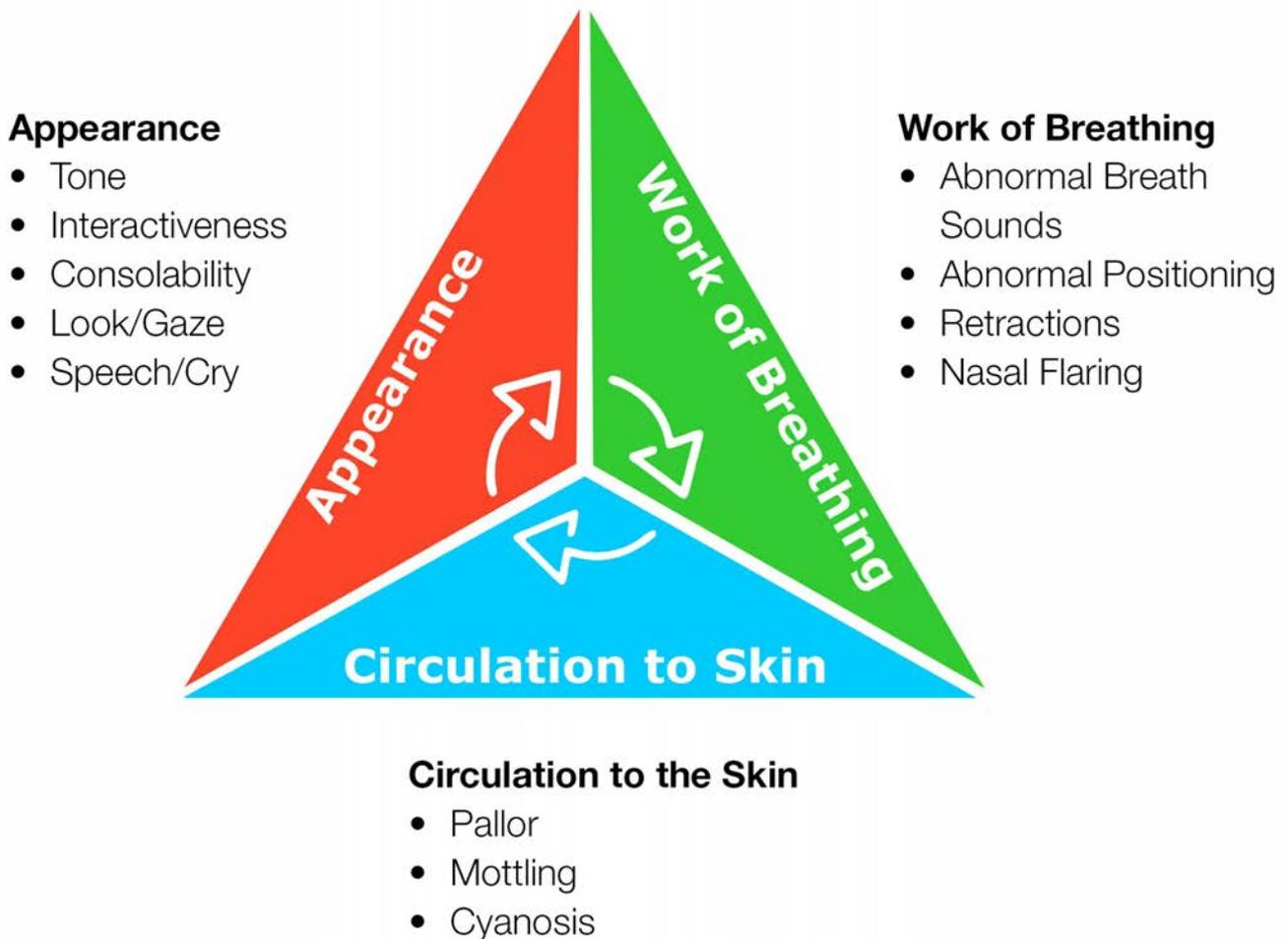
General Notes

- Paediatric drug doses are calculated by weight to adjust for anatomical and physiological changes in a developing child.
- For specific management of the newborn, refer to appropriate newborn guidelines.
- Caregiver level of concern is a valid symptom when assessing a child and it should not be discounted. Consider asking how the child is different from normal and whether the caregiver feels they are getting better or worse since calling AV.
- Assessment should consider the clinical trajectory of the child – at which point in their illness or injury are Paramedics encountering them? Are they likely to improve or deteriorate from this point?
- Children generally suffer cardiac arrest following a period of circulatory or respiratory insufficiency. If these conditions are recognised and treated promptly, cardiac arrest may be avoided.
- The RCH will accept any patient up to and including the age of 15 years and is the destination of choice for trauma and burns in this age range. If the patient has a relevant past history at RCH, they will accept patients up to and including the age of 18 years.
- If the management recommended in these guidelines is not successful or if further guidance is required, consultation with the RCH (or intended destination hospital) should be undertaken via the Clinician.
- Paediatric Infant Perinatal Emergency Retrieval (PIPER – formerly NETS, PETS and PERS) can also be accessed via the Clinician or on 1300 137 650 for clinical advice or support.
- Children presenting with abnormal vital signs must be transported to hospital.
- Rarely, paediatric patients may present with stroke, pain insufficiently managed by a palliative care program or agitation requiring sedation. The following adult CPGs contain information relevant to these patients and may be applied to paediatric patients following appropriate consultation:
 - **CPG A0708 Agitation**
 - **CPG A0711 Stroke / TIA**
 - **CPG A0712 Palliative Care**

Paediatric Assessment Triangle

- 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.
- Look at and listen to the child to rapidly estimate their level of criticality. This assessment should take no more than a few seconds.

PAEDIATRIC ASSESSMENT TRIANGLE



Criteria	Well child	Unwell child
Tone	Active, reaching, moving, strong grip	Still, floppy, quiet
Interactivity	Interested in the environment, looking, smiling	Not interested in their 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

Adapted from “Detect Junior: The Paediatric Approach”, Clinical Excellence Commission NSW, 2012

Related Resources

- [Paediatric Clinical Network \(SCV\)](#)
- [https://av-digital-cpg.web.app/assets/pdf/MAC/MAC CPG P0101 Paediatric Assessment May 2015.pdf](https://av-digital-cpg.web.app/assets/pdf/MAC/MAC%20CPG%20P0101%20Paediatric%20Assessment%20May%202015.pdf)
- [https://av-digital-cpg.web.app/assets/pdf/MAC/MAC June 2017 CPG P0101-1 Paediatric Values Re-alignment.pdf](https://av-digital-cpg.web.app/assets/pdf/MAC/MAC%20June%202017%20CPG%20P0101-1%20Paediatric%20Values%20Re-alignment.pdf)

Special Notes

Paediatric Definitions

Nomenclature	Age
Newborn	Birth to 24 hours
Small infant	Under 3 months
Large infant	3 - 12 months
Small child	1 - 4 years
Medium child	5 - 11 years

Paediatric Weight Calculation

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	6 kg
6 months	8 kg
1 year	10 kg
1 - 9 years	Age x 2 + 8 kg
10 - 11 years	Age x 3.3 kg

Normal Values

Normal blood volume

Newborn - 80 mL/kg

Infant and child - 70 mL/kg

Adequate perfusion

Age	HR	BP
Newborn (<24 hrs)	110 - 170 bpm	>60 mmHg
Small infant (<3 mth)	110 - 170 bpm	>60 mmHg
Large infant (3-12 mth)	105 - 165 bpm	>65 mmHg
Small child (1-4 yrs)	85 - 150 bpm	>70 mmHg
Medium child (5-11 yrs)	70 - 135 bpm	>80 mmHg

Skin - warm, pink, dry

Conscious state - alert and active

Abnormal Medical Values

Inadequate perfusion

Any deviation from normal perfusion values is a source of concern. Children presenting with abnormal vital signs must be transported to hospital.

Skin – cool, pale, clammy.

In the setting of an unwell child, cold hands/feet and mottled skin are an early sign that correlates with subsequent ICU admission. This should always be treated as a significant finding.

Conscious state – patient responding to voice, pain or unresponsive. May present as restless / agitated.

For Abnormal Trauma Values see **CPG P0105**.

The inadequate perfusion vital signs are based on hospital data for unwell children. They reflect the vital signs used by RCH to 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. Key reference:

http://www.rch.org.au/clinicalguide/guideline_index/Normal_Ranges_for_Physiological_Variables/

General Notes

- If patients are not producing tidal volumes necessary to allow auscultation, consider other aspects of the patient presentation. Indicators of increased work of breathing such as chest wall retraction and use of accessory muscles should raise the level of clinical concern. In general, there should be an inverse correlation between the degree of air entry and the work of breathing (\downarrow air entry = \uparrow WOB).
- Below 2 years of age, respiratory distress associated with a wheeze is unlikely to be asthma due to the still developing smooth muscle in the airways. Salbutamol may not be of benefit to these patients. Oxygen (unless driving a nebuliser) should only be applied if patient is hypoxaemic.
- The respiratory rates below are based on hospital data for unwell children. They reflect the vital signs used by RCH to 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 normal range towards respiratory distress should trigger attention prior to crossing the threshold.

Key reference:

http://www.rch.org.au/clinicalguide/guideline_index/Normal_Ranges_for_Physiological_Variables/

Normal Values

Normal respiratory rates

Age	RR
Newborn	25 - 60 breaths/minute
Small infant	25 - 60 breaths/minute
Large infant	25 - 55 breaths/minute
Small child	20 - 40 breaths/minute
Medium child	16 - 34 breaths/minute

Abnormal Medical Values

Respiratory distress

Any deviation from normal respiratory values is a source of concern. Children presenting with abnormal vital signs must be transported to hospital.

Signs of respiratory distress include:

- tachypnoea
- chest wall retraction
- use of accessory muscles
- tracheal tugging
- abdominal protrusion.

For Abnormal Trauma Values see **CPG P0105**.

AVPU (Alert, Voice, Pain, Unresponsive)

- AVPU is the preferred tool for assessing conscious state in children where adapting the GCS can be problematic. It is widely used and is consistent with current practice at RCH.
- AVPU is quick and simple to apply and is appropriate to determine conscious state whilst an initial assessment is conducted and treatment is being established. A formal GCS should be undertaken in more complex patient presentations.
- A child cannot have a conscious state assessment done while asleep. They must be woken first. If the child wakes and remains awake and alert, record this as an "A" for AVPU. If the child wakes but remains drowsy and appears inattentive, record this as a "V".

Pt response:

When assessed, is the Pt:

A = alert

V = responds to voice

P = responds to pain

U = unresponsive

Glasgow Coma Scale

Child ≤ 4 years	Child > 4 years
Eye opening	Eye opening
Spontaneous – 4 To voice – 3 To pain – 2 None – 1	Spontaneous – 4 To voice – 3 To pain – 2 None – 1
Verbal response	Verbal response
Appropriate words/social smile – 5 Cries but consolable – 4 Persistently irritable – 3 Moans to pain – 2 None – 1	Orientated – 5 Confused – 4 Inappropriate words – 3 Incomprehensible sounds – 2 None – 1
Motor response	Motor response
Spontaneous – 6 Localises to pain – 5 Withdraws from pain – 4 Abnormal flexion to pain – 3 Abnormal extension to pain – 2 None – 1	Obeys command – 6 Localises to pain – 5 Withdraws from pain – 4 Abnormal flexion to pain – 3 Abnormal extension to pain – 2 None – 1

General Notes

- Emergency care literature and AV data indicates that children are less likely to receive analgesia than adult patients or receive less analgesia comparatively. There are many complex reasons why this happens both in and out of hospital. One of the factors that can improve analgesia for children is pain assessment. There is evidence that having a formal assessment of pain leads to improved awareness of treating pain and an appropriate increased use of analgesics. If a child presents with an illness or injury that may be associated with pain, formal assessment should be conducted and documented.
- Paediatric pain assessment should be tailored to the developmental level of the child. Pain may be communicated by words or sounds, expressions or behaviour such as crying, grimacing or guarding a body part. Irrespective of age, pain should not be documented as “unable to rate” without some comment on signs, symptoms and behaviour to indicate that an assessment has been completed.
- Distraction therapy is a useful adjunct for analgesia with children. Many methods may assist including use of toys or improvised toys (car keys for example), distraction with a pen-torch or use of a caregiver device such as a phone or tablet.
- If pain relief needs to be delivered with a method that may involve discomfort for the child (IV or IM), consider use of an ice-pack for 30-60 seconds on the site first.
- Include the caregiver in the assessment and management of pain. They may be able to identify behaviours that indicate that their child is in pain e.g. a normally talkative child that is quiet. This will also provide important, meaningful involvement for the caregiver.
- There are many paediatric pain scales with no specific evidence as to which one is best. Irrespective of which one is preferred, it is important that one is chosen and that the same pain scale is used throughout the episode of care for consistency of reporting to guide care.
- Establishing a good rapport, building trust and being aware of non verbal cues are important elements of pain assessment in paediatric patients. Children will communicate their pain in different ways and to varying degrees at different developmental stages, even after they are able to communicate verbally. For example children around 5 years of age may describe all pain as a "tummy ache" irrespective of where the pain is in their body and adolescents may be unwilling to accurately describe their pain if they are concerned about exposing specific areas of their body.
- For paediatric patients in pain, Fentanyl IN is well established as a safe and effective analgesic. It is the preferred option of RCH in most cases.

FLACC Scale

The FLACC Scale	0 points	1 point	2 points
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant frown, clenched jaw, quivering chin
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting back and forth, tense	Arched, rigid or jerking
Cry	No cry (awake or asleep)	Moans or whimpers, occasional complaints	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging, or being spoken to, distractible	Difficult to console or comfort

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Faces pain scale



When talking to the child say either "hurt" or "pain", whichever seems right for a particular child.

"**These faces show how much something can hurt. This face** [point to face on far left] **shows no pain. The faces show more and more pain** [point to each from left to right] **up to this one** [point to face on far right] - it shows very much pain. Point to the face that shows how much you hurt [right now]."

Score the chosen face 0, 2, 4, 6, 8, or 10, counting left to right, so "0" = "no pain" and "10" = "very much pain". Do not use words like "happy" or "sad". This scale is intended to measure how children feel inside, not how their face looks.

Reference: Hicks CL, et al. The Faces Pain Scale - Revised: Toward a common metric in pediatric pain measurement. Pain 2001; 93:173-183.

Verbal Numerical Scale

This scale asks the patient to rate their pain from “no pain” (0) to “worst pain possible” (10) and is suitable for use in children over six years of age who have an understanding of the concepts of rank and order. Avoid prompting the patient with examples using numbers. Some patients are unable to use this scale with only verbal instructions but may be able to look at a number scale and point to the number that describes the intensity of their pain.

Paediatric Chart

Paediatric Chart

Age		0	3 Mth	6 Mth	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	33	36	kg
Resps	Normal lower limit	25	25	25	20	20	20	20	16	16	16	16	16	16	16	/minute
Resps	Normal upper limit	60	60	55	40	40	40	40	34	34	34	34	34	34	34	/minute
Pulse	Normal lower limit	110	110	105	85	85	85	85	70	70	70	70	70	70	70	/minute
Pulse	Normal upper limit	170	170	165	150	150	150	150	135	135	135	135	135	135	135	/minute
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

Resuscitation drugs

Resuscitation drugs

Age	0	3 Mth	6 Mth	1	2	3	4	5	6	7	8	9	10	11	Yrs	Guideline	
Weight	3.5	6	8	10	12	14	16	18	20	22	24	26	33	36	kg		
Adrenaline 1:1,000 neb.	For all ages add 5 mL to nebuliser															Upr airway oedema	
Adrenaline 1:1,000 10 mcg/kg	0.1*	0.1*	0.1*	0.1*	0.12	0.14	0.16	0.18	0.2	0.22	0.24	0.26	0.33	0.36	mL	ALS anaphylaxis, asthma	
1 mg/1 mL (1 mg = 1 mL)	100	100	100	100	120	140	160	180	200	220	240	260	330	360	mcg		
	1 mL syringe																
Adrenaline 1:1,000 10 mcg/kg	use 1:10,000			0.1	0.12	0.14	0.16	0.18	0.2	0.22	0.24	0.26	0.33	0.36	mL	MICA anaphylaxis, asthma	
1 mg/1 mL (1 mL = 1 mg)	35	60	80	100	120	140	160	180	200	220	240	260	330	360	mcg		
	1 mL syringe																
Adrenaline 1:10,000 10 mcg/kg	0.35	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	3.3	3.6	mL	MICA anaphylaxis, cardiac arrest, asthma	
1 mg/10 mL (1 mL = 100 mcg)	35	60	80	100	120	140	160	180	200	220	240	260	330	360	mcg		
	1 mL syringe				10 mL syringe												
Sodium Bicarbonate 8.4% 2 mL/kg	7	12	16	20	24	28	32	36	40	44	48	52	66	72	mL	Cardiac arrest (TCA OD or hyperkalaemia), TCA OD	
	50 mL Minijet syringe																
Amiodarone 5 mg/kg	1.75	3	4	5	6	7	8	9	10	Different dilution suggested for > 6 yr.					mL	VF/VT arrest	
100 mg/10 mL (See across for dilution info) (1 mL = 10 mg)	17.5	30	40	50	60	70	80	90	100						mg		
	Dilution info: Add 2 mL (100 mg) Amiodarone (from 150 mg in 3 mL ampoule) to 8 mL Dextrose in a 10 mL syringe																
Amiodarone 5 mg/kg	Different dilution suggested for ≤ 6 yr.									2.2	2.4	2.6	3.3	3.6	mL	VF/VT arrest	
150 mg/3 mL (1 mL = 50 mg)										110	120	130	165	180	mg		
	10 mL syringe																
Syringe Scales	1 mL/0.01 mL increments				2.5 mL/0.1 mL increments					10 mL/0.2 mL increments increments					50 mL/1 mL		

*0.1 mL has been made a minimum vol to reduce dosage error. The minimum vol is sometimes different to the prescribed dose and should be recorded/handed over as the dose delivered. An example of the error that occurs in a vol less than 0.1 mL is as follows: required dose vol of 0.07 mL, 0.7 mL is prepared and the Pt incorrectly receives 10 x required dose.

Ceftriaxone and Dextrose

Ceftriaxone and Dextrose

Age	0	3 Mth	6 Mth	1	2	3	4	5	6	7	8	9	10	11	Yrs	Guideline	
Weight	3.5	6	8	10	12	14	16	18	20	22	24	26	33	36	kg		
Ceftriaxone (IM) 50 mg/kg 1 g diluted with 3.5 mL 1% Lignocaine (1 mL = 250 mg)	0.7	1.2	1.6	2	2.4	2.8	3.2	3.6	4	4	4	4	4	4	mL	Meningococcal septicaemia	
	175	300	400	500	600	700	800	900	1000	1000	1000	1000	1000	1000	mg		
	1 mL syringe	2.5 mL syringe				10 mL syringe											
Ceftriaxone (IV) 50 mg/kg 1 g diluted with 9.5 mL Water for Injection (1 mL = 100 mg)	1.75	3	4	5	6	7	8	9	10	10	10	10	10	10	mL	Meningococcal septicaemia	
	175	300	400	500	600	700	800	900	1000	1000	1000	1000	1000	1000	mg		
	10 mL syringe																
Dextrose 10%	3 mL/kg	10	18	24	30	36	42	48	54	60	66	72	78	99	108	mL	Hypoglycaemia
	2 mL/kg	7	12	16	20	24	28	32	36	40	44	48	52	66	72	mL	
Use a 50 mL syringe or infusion depending on volume to be delivered																	

Drug dose errors can occur when calculations are required. All appropriate checking procedures should be followed including, where available 2 Paramedics independently confirming the required dose and vol and/or checking against approved AV reference material prior to administration.

Fentanyl, Midazolam, Morphine and Naloxone

Fentanyl, Midazolam, Morphine and Naloxone

Age	0	3 Mth	6 Mth	1	2	3	4	5	6	7	8	9	10	11	Yrs	Guideline
Weight	3.5	6	8	10	12	14	16	18	20	22	24	26	33	36	kg	
Fentanyl (IV) 2 mcg/kg 100 mcg/10 mL (1 mL = 10 mcg)	0.7	1.2	1.6	2	2.4	2.8	3.2	3.6	4	4.4	4.8	5.2	6.6	7.2	mL	Emergency sedation
	7	12	16	20	24	28	32	36	40	44	48	52	66	72	mcg	
	Add 2 mL (100 mcg) Fentanyl (from 100 mcg in 2 mL ampoule) to 8 mL Normal Saline in a 10 mL syringe															
Midazolam (IV) 0.1 mg/kg 15 mg/15 mL (1 mL = 1 mg)	0.35	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	3.3	3.6	mL	Post - ETT sedation
	0.35	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	3.3	3.6	mg	
	Add 3 mL (15 mg) Midazolam (from 15 mg in 3 mL ampoule) to 12 mL Normal Saline in a 20 mL syringe															
Ketamine (IV) 0.25 mg/kg 200 mg/20 mL (1 mL = 10 mg)	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.8	0.9	mL	Extreme traumatic pain
	1	1	2	2	3	3	4	4	5	5	6	6	8	9	mg	
	Add 2 mL (200 mg) Ketamine to 18 mL Normal Saline in 20 mL syringe															
Morphine (IM) 0.1 mg/kg 10 mg/1 mL (1 mL = 10 mg)	0.035	0.06	0.08	0.1	0.12	0.14	0.16	0.18	0.2	0.22	0.24	0.26	0.33	0.36	mL	Pain relief
	0.35	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	3.3	3.6	mg	
	1 mL syringe															
CAUTION IM Morphine dose should never exceed 0.5mL																
Naloxone (IM) 10 mcg/kg 400 mcg/1 mL (1 mL = 400 mcg)	n/a	0.15	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.6	0.65	0.825	0.9	mL	Opioid overdose
	n/a	60	80	100	120	140	160	180	200	220	240	260	330	360	mcg	
	1 mL syringe															

Drug dose errors can occur when calculations are required. All appropriate checking procedures should be followed including, where available 2 Paramedics independently confirming the required dose and vol and/or checking against approved AV reference material prior to administration.

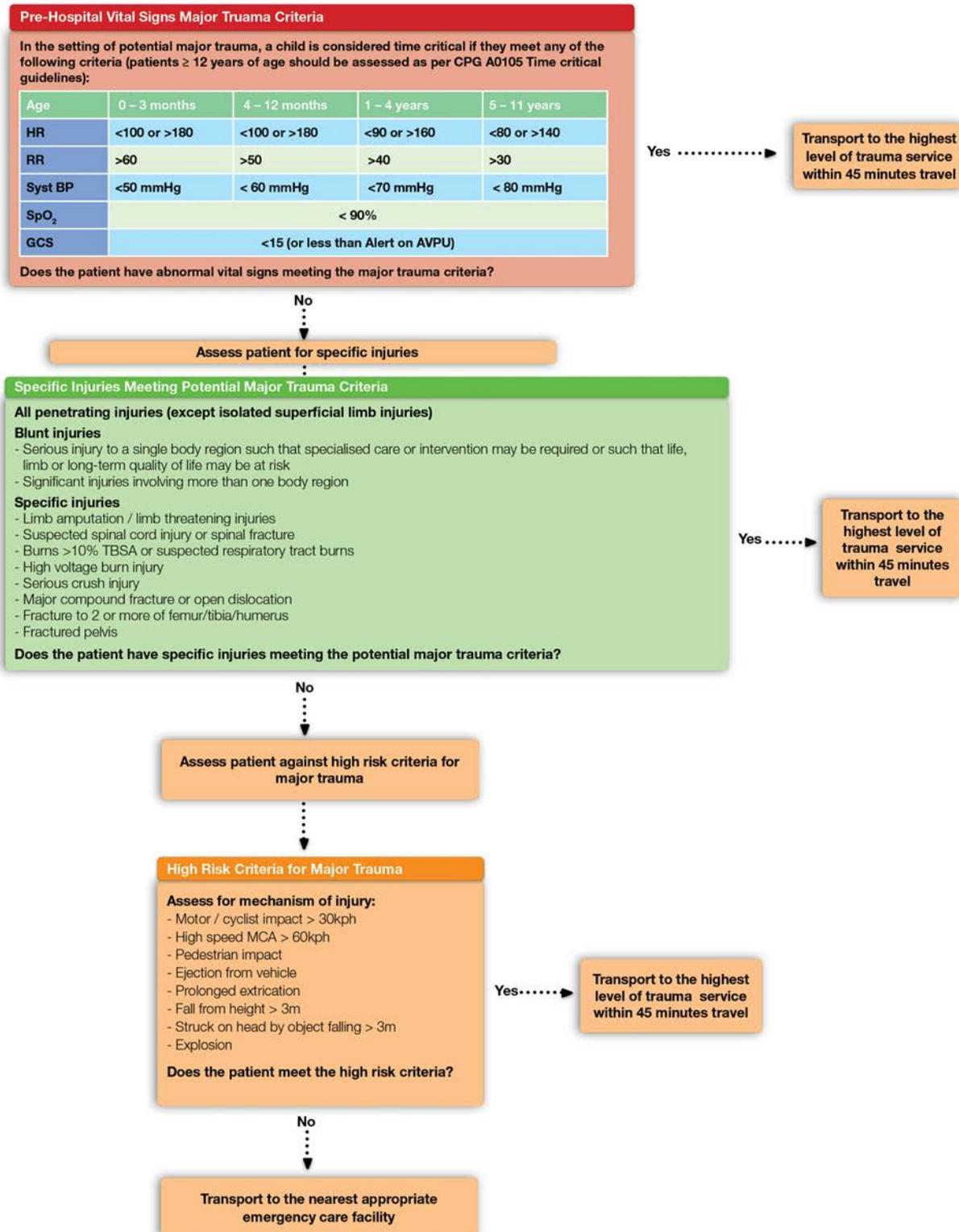
Normal Saline and Dexamethasone

Normal Saline and Dexamethasone

Age	0	3 Mth	6 Mth	1	2	3	4	5	6	7	8	9	10	11	Yrs	Guideline
Weight	3.5	6	8	10	12	14	16	18	20	22	24	26	33	36	kg	
Normal Saline 20 ml/kg	70	120	160	200	240	280	320	360	400	440	480	520	660	720	mL	Hypovolaemia, asthma, cardiac arrest, anaphylaxis
Use a 50 mL syringe or infusion depending on volume to be delivered																
Dexamethasone 600 mcg/kg 8 mg in 2 mL (1 mL = 4 mg)	0.52	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3	3	3	3	3	3	mL	Asthma (MICA), croup (ALS)
	2.1	3.6	4.8	6	7.2	8.4	9.6	10.8	12	12	12	12	12	12	mg	
	1 mL syringe		2.5 mL syringe				5 mL syringe									

Drug dose errors can occur when calculations are required. All appropriate checking procedures should be followed including, where available 2 Paramedics independently confirming the required dose and vol and/or checking against approved AV reference material prior to administration.

Flowchart



Care Objectives

- To accurately assess patient safety risk
- To transport patients who are at risk of deterioration or adverse outcome

General Notes

Intended patient group

- All paediatric patients (age < 12 years)

Patient Safety Risk

- The Patient Safety Risks are a selection of general risk factors that should be considered as part of the Diagnostic Phase for all patients. No specific combination of risks mandates transport, but any patient judged to be at risk of deterioration or adverse outcome should be transported to hospital.
- The presence of significant risk of any kind should outweigh an apparently benign diagnosis in determining the care plan.

Diagnostic uncertainty

- Diagnostic uncertainty is a significant source of risk. The recognition of significant risk (i.e. where a diagnosis is uncertain or the patient otherwise presents an unacceptable level of risk independent of their diagnosis) should prompt a change in the care plan. This will frequently include transport to hospital.
- Few paramedics develop an experience base which provides them with expertise in assessing and managing paediatric patients. This should result in a low threshold for either transport or seeking expert advice to assist decision-making.
- Parental concern is a valid reason for a child to be seen by a medical practitioner and should not be discounted.

Clinical course / deterioration

- Many patients will present without any obvious concerning findings at the time of assessment but may go on to deteriorate in a predictable way. In addition to the patient's condition at the time of assessment, paramedics must consider the likely or possible clinical course and where the patient currently sits on that trajectory. An appropriate care plan may include transporting patients who do not have concerning findings at the time of assessment but who still present a reasonable risk of deterioration.

Bias and human factors

- Biases can influence assessment and decision making. No individual is immune to bias, but recognising and acknowledging that a bias is present can help to mitigate the impact on subsequent decisions.
- Patients with mental health problems, substance dependence and Aboriginal and Torres Strait Islanders are at particular risk of the unconscious bias of health care professionals.

Clinical Flags

- **Red Flags** mandate transport. Where paramedics believe transport is not required, they must contact the AV Clinician.
- The Red Flags are not an exhaustive list. Where patients present with abnormal vital signs that do not meet Red Flag criteria, staff are encouraged to maintain a high index of suspicion for serious illness. Similarly, there are other specific conditions that will require transport not listed here.
- If a patient does not meet any Red Flags, but staff have a non-specific concern (“gut instinct”) about their health or welfare, the patient should be transported to ED.
- The Red Flags do not indicate a need for MICA, however, any patient with deranged vital signs is at risk of deterioration. Escalation of care, including MICA, should be considered.
- Some patients will meet the abnormal vital sign criteria at initial presentation but will respond well to treatment, such as heroin overdose or hypoglycaemia. It is reasonable to treat these patients and reassess, with transport or non-transport decisions being based on subsequent sets of vital signs. If patients do not respond to treatment as expected, transport is required.
- **Yellow Flags** do not mandate transport. However, patients with one or more yellow flags must be advised to attend hospital or GP within two hours via their own transport arrangements. If this is not possible for any reason, the other options to escalate care should be explored (e.g. Patient Transport or transport via emergency ambulance).

Patient Safety Risk

Patients at risk of deterioration or adverse outcome if not transported must be taken to hospital by ambulance. Transport by other means may be appropriate in some circumstances.

Consider risk of **diagnostic error**:

- Diagnostic uncertainty
- Bias and human factors
- Age, comorbidities and baseline functioning
- Communication difficulties (e.g. non-verbal, NESB, intellectual disability, developmental delay)
- Current drug or alcohol intoxication
- History of mental health problems
- Aboriginal or Torres Strait Islander
- Multiple comorbidities / complex medical history / ≥ 5 medications
- Rare medical condition
- Highly emotive scene

Consider risk of **deterioration**:

- Expected clinical course / trajectory
- Borderline vital signs
- Failure to respond to community based treatment as expected

Consider **social / environmental risk**:

- Risks to the safety of the patient
- Poor health literacy
- Adequate shelter and warmth

Consider **access to care**:

- The supply of required medications
- Ability to access necessary health services or further help if required

Red Flags

Patients meeting any of the following criteria must be transported to hospital by ambulance*. Consider notification.

- Abnormal vital sign

Age	HR bpm	RR breath / min	SBP mmHg
Newborn (< 24 hours)	< 110 or > 170	< 25 or > 60	< 60
Small infant (< 3 months)	< 110 or > 170	< 25 or > 60	< 60
Large infant (3 – 12 months)	< 105 or > 165	< 25 or > 55	< 65
Small child (1 – 4 years)	< 85 or > 150	< 20 or > 40	< 70
Medium Child (5 – 11 years)	< 70 or > 135	< 16 or > 34	< 80

N.B. In the setting of trauma consider **CPG P0105 Time Critical Guidelines (Trauma Triage)**

- **GCS** < 15 or not alert (as per AVPU)
- **SpO₂** < 96 %
- Unexplained pain (including behavioural cues in non-verbal aged paediatrics e.g. inconsolable, agitated)
- Second presentation within 48 hours to AV or a Medical Practitioner for related complaint

Specific Conditions:

- Febrile > 38°C in small infant (< 3 months old)
- Stridor
- First presentation seizure
- Anaphylaxis (including resolved or possible anaphylaxis or the post-adrenaline patient)
- Unable to walk (when usually able to walk)
- Post-tonsillectomy bleeding (of any amount) up to 14 days post-operation
- Testicular pain
- Ingestion/inhalation of toxic substance
- Inhalation of foreign body
- Non-blanching rash

*** Where the patient/carer/guardian refuses transport or paramedics believe transport is not warranted, the AV Clinician MUST be contacted.**

Yellow Flags

Patients meeting any of the following criteria must be advised to attend hospital or GP within two hours via own transport arrangements.

- Ongoing parental concern
- Ingestion of a dangerous foreign body - asymptomatic/normal VSS (including button batteries and magnets)
- Surgical procedure within past 14 days

AND patient's carer must:

- Have capability to transport patient to hospital/GP
- Be read Referral Advice Script

Referral Advice Script

"Our assessment indicates that your child does not currently require transport to hospital in an emergency ambulance.

However, your child needs to be reviewed by a medical doctor within the next two hours, and we would recommend that you transport them to your GP or the emergency department in your own vehicle.

If you are unable to do so on your own we will assist you."

This script does not remove the need to seek valid consent including a full explanation of the clinical findings, possible diagnosis, limitations of assessment, and any risks associated with a care pathway.

No flag criteria met

Where the patient does not meet any Red or Yellow Flags and is assessed as being suitable for non-transport, encourage family/carer to see GP for follow-up within 48 hours.

Care Objectives

- **Effective airway control** and **adequate ventilation with oxygen** is the cornerstone of paediatric resuscitation

General Notes

- This guideline should be applied to patients < 12 years of age who are unresponsive, not breathing normally and:
 - Pulseless; or
 - HR < 60 bpm (infants); or
 - HR < 40 bpm (children)
- Manage newborn patients (< 24 hrs old) as per **CPG N0201 Newborn Resuscitation**
- For patients \geq 12 years manage as per **CPG A0201 Cardiac Arrest (Adult)**
- Cardiac arrest in children and infants is commonly caused by hypoxia, hence the intent of this guideline is to provide airway and ventilatory support as a priority. Respiratory arrest followed by bradycardic cardiac arrest may be corrected with ventilation prior to commencing chest compressions.
- **VF / Pulseless VT** is rare in paediatric cases.
- Fluid administration in shockable rhythms may be detrimental and should be limited to medication flush and TKVO only
- During cardiac arrest, rhythm analyses are required every two minutes. Carotid pulse checks are only required for a potentially perfusing rhythm i.e. the presence of QRS complexes which would be expected to be accompanied by a rise in EtCO₂
- When **ETT** is attempted, it should not interrupt compressions
- **EtCO₂**
 - Can be used as a surrogate marker of cardiac output during cardiac arrest.
 - May be falsely low in very young infants due to low tidal volumes
 - A gradual fall may suggest CPR fatigue

Airway positioning

- Padding under shoulders may be required to correct flexion in small children while supine due to their comparatively larger occiput
- Use neck and head extension with caution in children < 8 years of age

High-Performance CPR

- **Prioritise airway and ventilation**
- **Perform high-quality CPR:**
 - Rate: 100 - 120 compressions per minute
 - Depth: 1/3 chest depth, allow for full recoil
 - Ventilation duration: 1 second per ventilation
 - 2 minute rotations of compressor
- **Minimise interruptions to chest compressions**
 - Focus on team performance and communication
 - Charge defibrillator during compressions
 - On-screen rhythm analysis
 - Hover hands over chest and resume compressions immediately after defibrillation or disarm
- **Utilise Team Leader and checklist**

General Notes

Compression technique

- **Infant:**
 - Two rescuers: Two-thumb technique preferred. The hands encircle the chest and thumbs compress the sternum. Take care not to restrict chest expansion during recoil or ventilation.
 - Single rescuer: Two-finger technique preferred in order to minimise transition time between compressions and ventilations.
- **Small Child:** One-hand technique (otherwise similar to that for adults)
- **Medium Child:** Two-handed technique (as for adults)

Ratios of compressions to ventilations

- **No ETT/SGA**
 - 15 compressions : 2 ventilations
 - 30 compressions : 2 ventilations (single rescuer)
 - Pause for ventilations
- **ETT/SGA insitu**
 - 10 ventilations per minute
 - No pause for ventilations
- NB. Evidence suggests compression rates often differ from recommendations. Consider using metronome if available.

Intraosseous (IO) cannulation

- Proceed directly to IO access if IV access cannot be achieved within 60 seconds

Hypothermic cardiac arrest < 30°C

- The primary goal is to prevent further heat loss prior to ROSC or transport - significant improvement in temperature from prehospital intervention is unlikely
- Double the interval for **Adrenaline** and **Amiodarone** doses
- Greater than 3 shocks is unlikely to be successful while patient remains severely hypothermic - consider AAV for transport. Where these resources are not available, continue DCCS as per standard cardiac arrest

PEA reversible causes

- Tension pneumothorax
- Upper airway obstruction
- Exsanguination
- Asthma
- Anaphylaxis
- Hypoxia

Tension pneumothorax

- Where tension pneumothorax is considered to be the cause of cardiac arrest, in either medical or traumatic arrest, decompress chest bilaterally as per **CPG P0802 Chest Injuries**
- Chest decompression should not be routine in medical cardiac arrest

TCA overdose or hyperkalaemia

- Administer **Sodium bicarbonate 8.4% 2 mL/kg IV/IO**
- Sodium bicarbonate should not be routinely administered outside of this setting

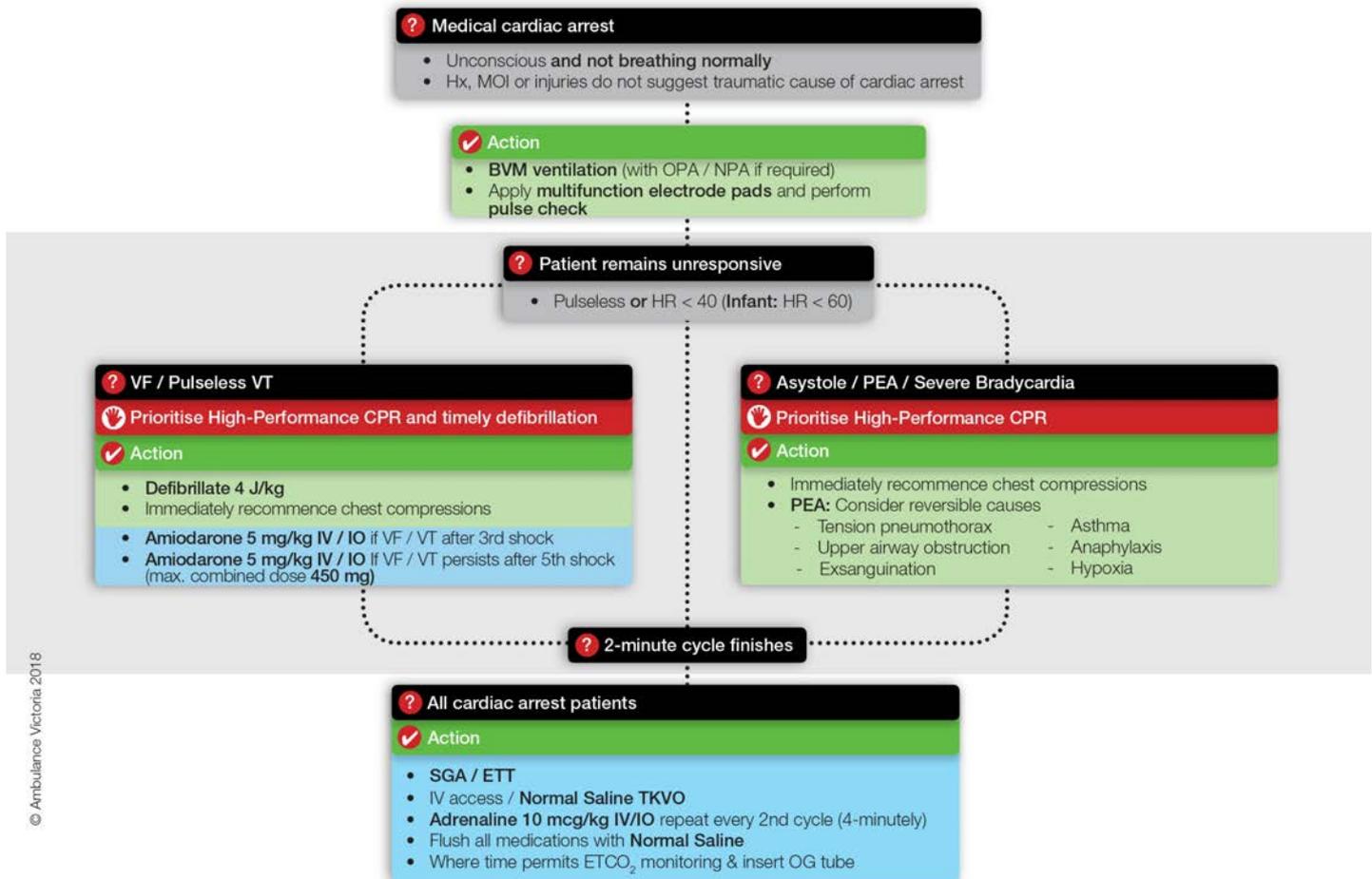
Hypovolaemia / anaphylaxis / asthma

- In PEA arrest where hypovolaemia, anaphylaxis or asthma is suspected or the patient has a rhythm that may be fluid responsive, administer **Normal Saline 20 mL/kg IV/IO**

Hypoglycaemia

- Hypoglycaemia in cardiac arrest is rare. However, BGL should be measured and hypoglycaemia treated as per **CPG P0702 Hypoglycaemia**
- All other management to be prioritised above BGL measurement

Flowchart



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Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC March 2017 CPG P0201 Paediatric cardiac arrest.pdf>

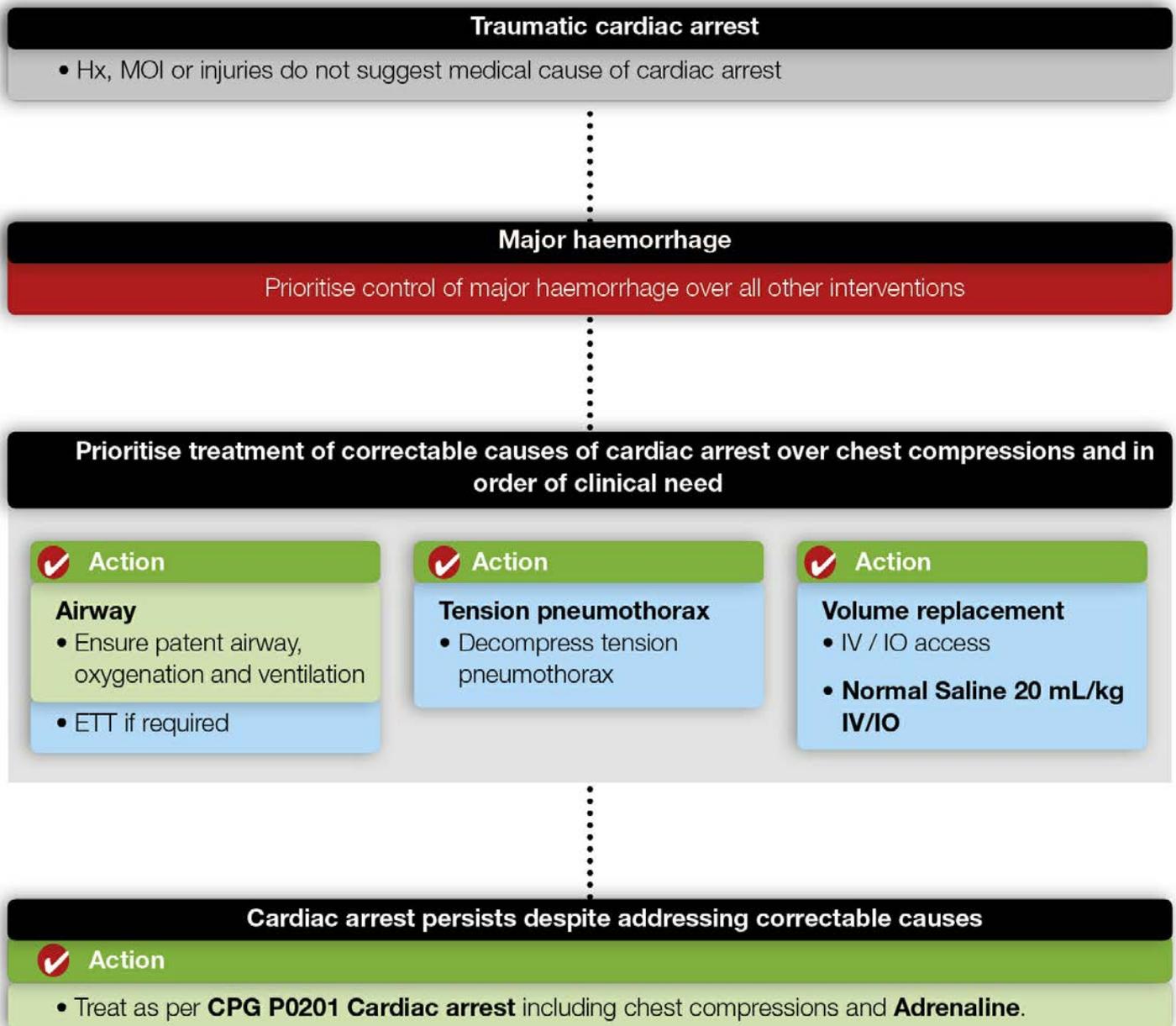
Care Objectives

- **Major haemorrhage control** over all other interventions
- Management of **correctable causes** in order of clinical need:
 - Oxygenation / ventilation
 - Exclusion of tension pneumothorax by insertion of bilateral intercostal catheters
 - Administration of Normal Saline 20mL/kg IV/IO
- Standard cardiac arrest management including rhythm check following the trauma priorities

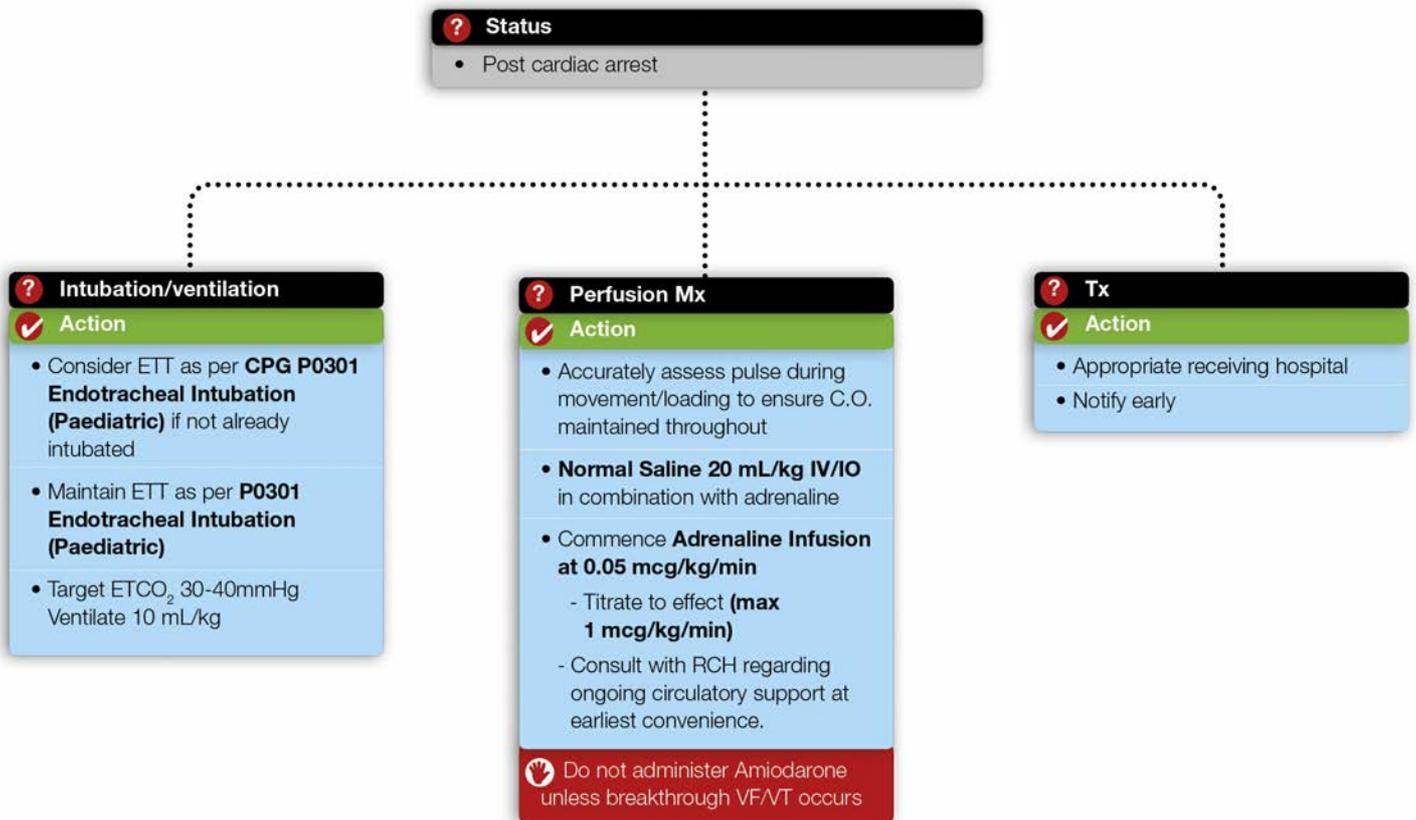
General Care

- Consider medical cause in cases where the Hx, MOI or injuries are inconsistent with traumatic cardiac arrest, or patient is in VF / VT. If any doubt exists as to the cause of arrest, treat as per Medical Cardiac Arrest
- Control of major haemorrhage can be achieved with tourniquets, haemostatic dressings and/or direct pressure
- Undifferentiated blunt trauma: A pelvic splint should be applied after other interventions. Where pelvic fracture is clearly contributing to cardiac arrest, a pelvic splint may be applied earlier

Flowchart



Flowchart



Care Objectives

- Ensure safe and effective ventilation throughout entire episode of care

General Notes

Intended patient group

- Patients < 12 years of age.
- Patients < 5 years of age: intubation during cardiac arrest should be deferred until ROSC unless the airway cannot be adequately managed with a BVM or SGA alone. Prioritise management with a BVM or SGA until ROSC is achieved.

Tube selection

- Children under 3.0 kg or premature babies should be intubated with a size 2.5 mm or 3.0 mm uncuffed ETT as per **CPG N0201 Newborn Resuscitation**.
- A cuffed ETT should not be used for children if a manometer is not available to ensure appropriate cuff pressure at inflation. The cuff should be inflated to a pressure of 20 – 30 cmH₂O.

Risk-benefit analysis

- A dynamic risk-benefit analysis is required for every prehospital intubation and should include evaluation of any precautions alongside the clinical context. Prehospital intubation may cause patient harm.
- Minimising scene times should be prioritised over the decision to perform prehospital intubation.
- Physiological derangement refractory to or requiring significant resuscitation, such as hypotension, hypoxia and/or metabolic acidosis may be exacerbated by intubation and precipitate cardiac arrest.
- In rural and regional areas IFS may be undertaken or withheld by single-responder MICA Paramedics following consideration of risk-benefit analysis.

Capnography

- The recording of pre and post-intubation capnography is necessary to accurately describe the therapeutic effect of ETT placement. Post-intubation capnography is essential for confirmation of tracheal placement **and must be noted by all paramedics** at scene. If there is **any** doubt about tracheal placement the ETT **must be immediately removed**.
- If electronic capnography fails, immediately confirm using colorimetric capnometry whilst troubleshooting occurs.

Unassisted intubation

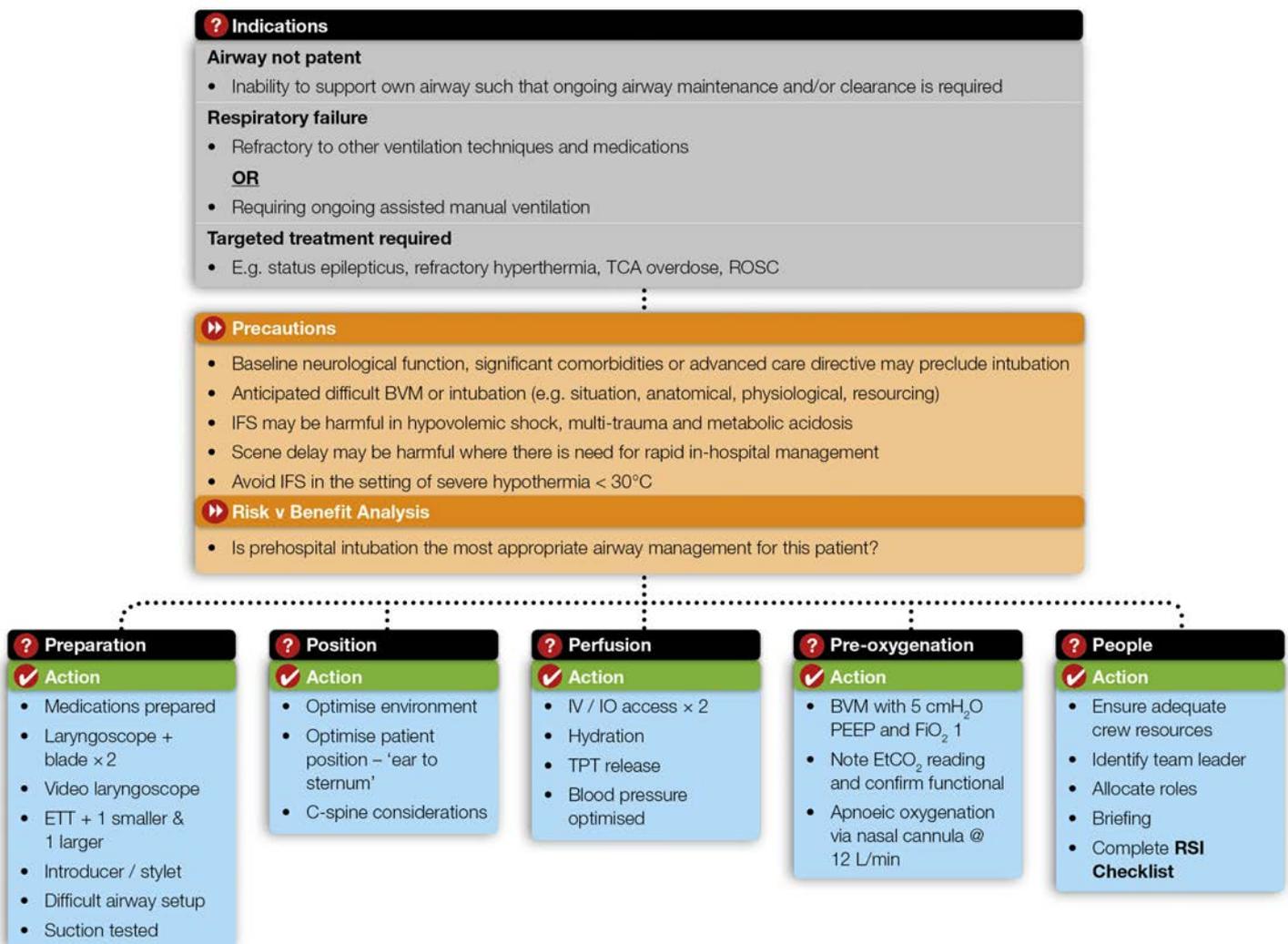
- Unassisted intubation is permitted in patients with a GCS of 3 where there are no airway reflexes present, excluding TBI/NTBI.
- Unassisted intubation is permitted in the setting of pre- and peri-arrest multi-trauma with TBI and no airway reflexes, however transport unintubated is preferred.

- In this cohort, gentle laryngoscopy should be undertaken during intubation attempts and suction prepared. ETI should be abandoned if airway reflexes interfere with laryngoscopy or intubation.
- Unassisted intubation is not a shortcut. Prepare and anticipate the need for rapid post ETT sedation.

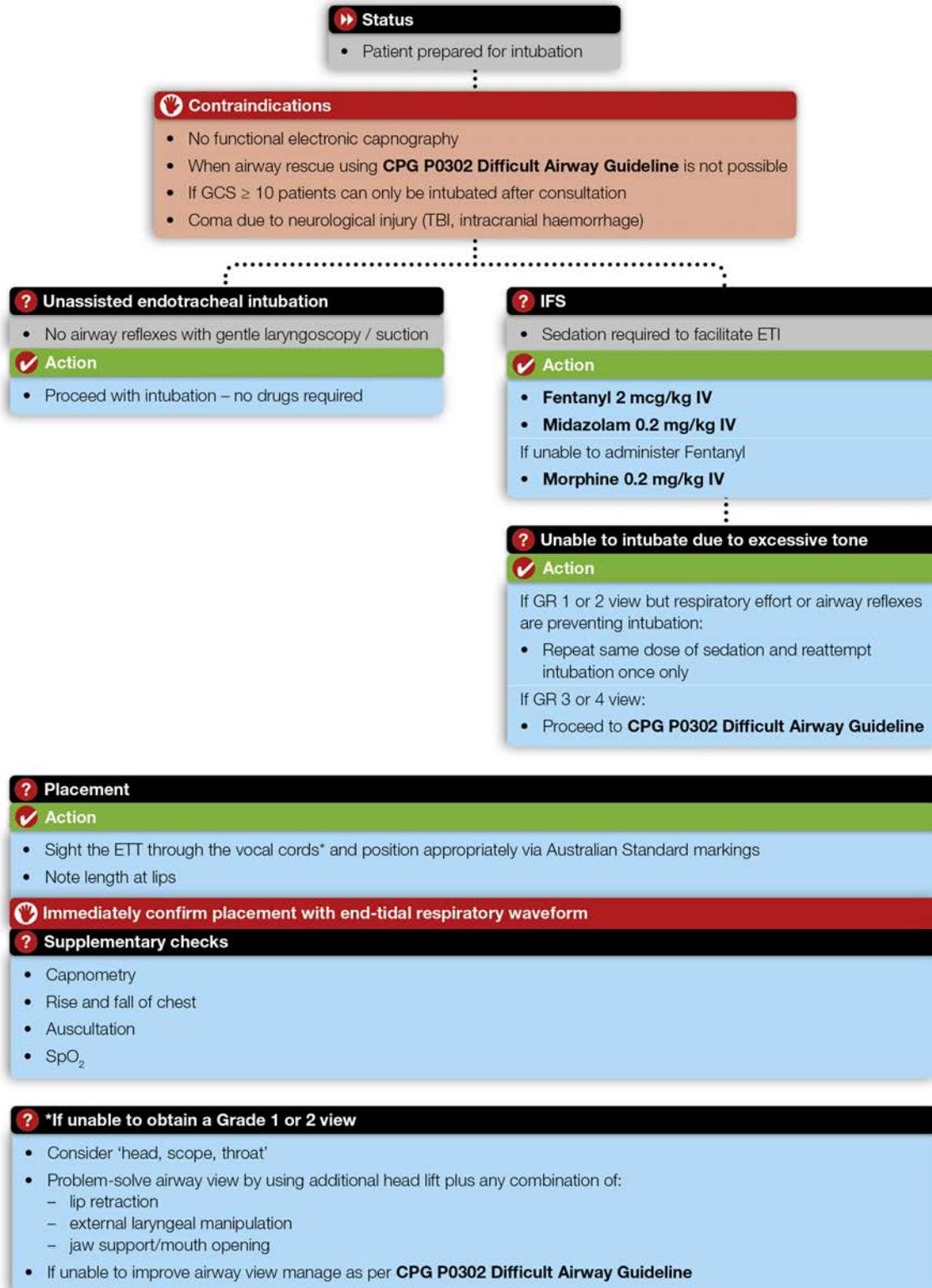
Preparing and support

- When you attend a critical paediatric case, consider contacting the following experts to assist or advise:
 - AV Clinician
 - PIPER
 - Receiving hospital
- Managing a critically unwell paediatric case can be distressing. It is recommended that you make contact with AVs peer support services.

Flowchart - Indications and Preparation



Flowchart - Procedure



Related Resources

- [https://av-digital-cpg.web.app/assets/pdf/MAC/Endotracheal intubation \(paeds and AAV\) FINAL.pdf](https://av-digital-cpg.web.app/assets/pdf/MAC/Endotracheal%20intubation%20(paeds%20and%20AAV)%20FINAL.pdf)

General Notes

Guideline Principles

- This guideline applies to all patients (< 12 years of age) undergoing medication assisted intubation. However, the principles may also be applied to unassisted intubation.
- RSI and cricothyroidotomy in paediatric patients are only authorised for MFPs.

Oxygenation

- A strategy for effective oxygenation and ventilation should be identified prior, during and post intubation.
- A critical desaturation threshold should be identified by the team. For the adequately oxygenated patient this may be defined as < 90%. In difficult to oxygenate patients this will be lower, but a critical threshold should still be verbalized.
- Rescue airway strategies should be used at any time during the procedure to correct critical desaturation

Crew Resource Management

- Paediatric intubation, particularly those facilitated by medication, is a team-based procedure. Team roles, anticipated challenges and airway plan must be verbalized prior to commencement.
- Difficulties encountered during the procedure must be verbalised to the team to ensure a shared awareness and collaborative effort towards correction.

Plan A: OPTIMISED First intubation attempt

- First pass intubation is the goal of this guideline.
- The strategy of 'Head-Scope-Throat' is a rapid analysis of intubation difficulties and appropriate equipment selection. 'Head-Scope-Throat' should be performed when difficulties are encountered and/or between first and second attempt.
- Equipment selection is based on paramedic preference and clinical context (i.e. anatomy, airway complications). However it is recommended that Plan A should include the use of a bougie.

Plan B: ALTERNATIVE second intubation attempt

- A second intubation attempt must involve an alternative strategy that corrects identified issues.
- Alternative strategies should include the bougie and/or video laryngoscope (size appropriate) if not previously utilized.

Plan C: Rescue Airway Strategy

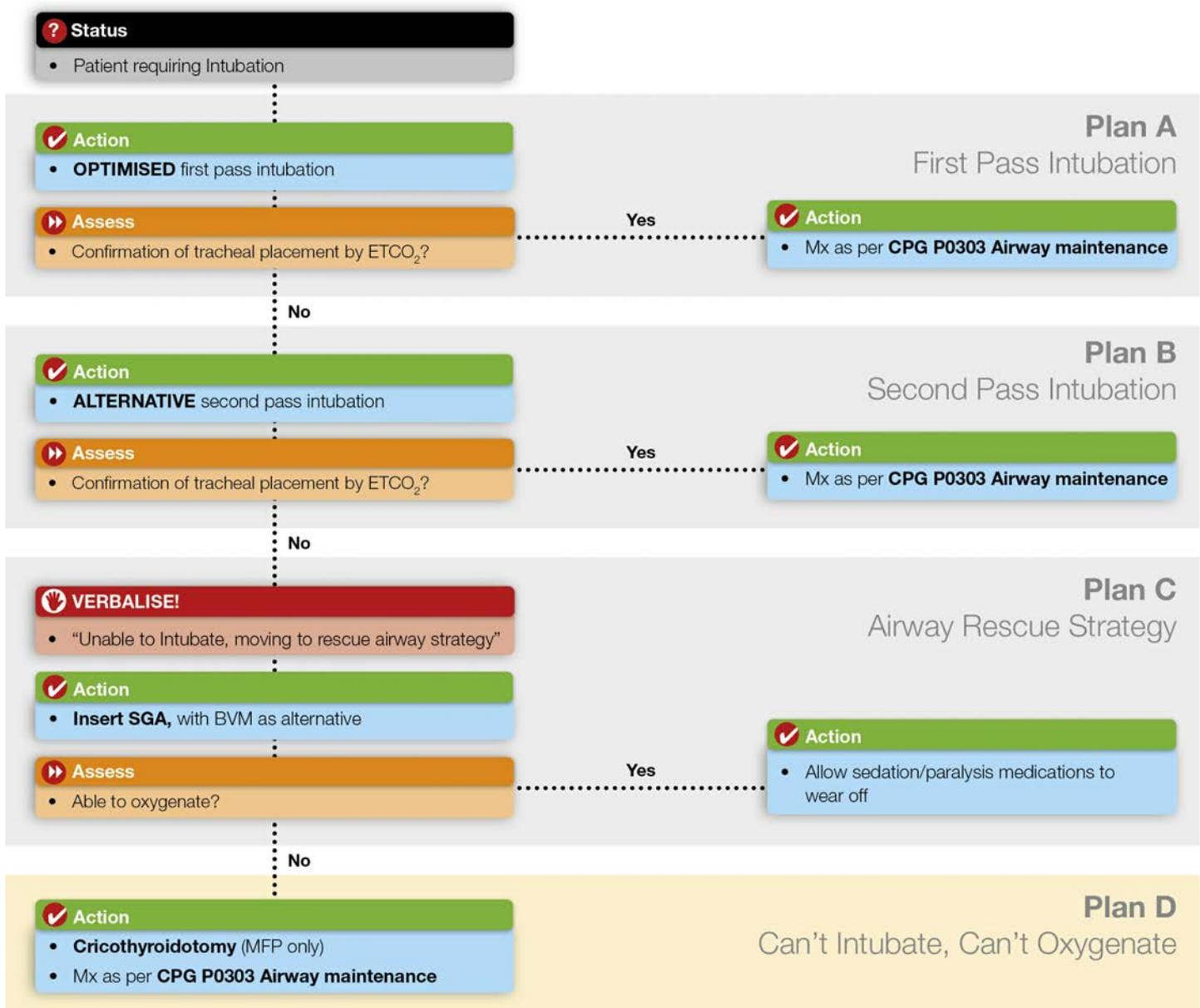
- If intubation is unsuccessful following two attempts, rescue airway strategies must be implemented with the key objective of achieving adequate oxygenation.
- The preferred airway rescue strategy is the SGA. However there may be clinical circumstances where reverting to two-handed BVM combined with basic airway adjuncts is appropriate.
- Sedation/paralysis should not be administered for the purpose of maintaining an SGA. This applies to

all MICA qualifications.

Plan D: Can't Intubate Can't Oxygenate (MFP only)

- A can't intubate, can't oxygenate (CICO) situation is a life-threatening emergency that requires cricothyroidotomy.
- While rare, in critical desaturation where the patient is deemed to be at immediate risk of arrest, moving directly to Plan D may be appropriate.
- Cricothyroidotomy is a primary airway method when intubation is deemed impossible, and other airway techniques (i.e. SGA and BVM) are not feasible or ineffective.

Flowchart



Care Objectives

- Optimise sedation +/- paralysis
- Optimise ventilation parameters using lung protective strategies

General notes

- Cervical collars should be placed on all intubated children over the age of 4 years where practicable.
- Insert bite block.
- Suction ETT and oropharynx
- Gastric decompression is especially important in paediatric patients. Children's stomachs are easily inflated, insertion of an OG or NG tube may decrease splinting of the diaphragm and improve ventilation.
- To reduce the risk to tube dislodgement, consider disconnecting ETT circuit during transfer if clinically appropriate.
- Re-confirm tracheal placement following each movement.
- If electronic capnography fails, immediately confirm using colorimetric capnometry whilst troubleshooting occurs.
- Position patient in a 30° head-up semi-recumbent position if clinically appropriate
- Check cuff pressure and ensure 20 – 30 cmH₂O.
- Maintain normothermia.

Ventilation

- Settings:
 - Ventilate using 100% O₂
 - Tidal Volume of 5 - 10 mL/ kg
- Maintain:
 - SpO₂ > 95%
 - EtCO₂ at 30 - 35 mmHg
- EtCO₂ target may vary in the following patient cohorts:
 - **Asthma** - higher EtCO₂ may be appropriate permitted
 - **TCA OD** - maintain 20 - 25 mmHg
 - **DKA** - EtCO₂ should be maintained at the level detected immediately pre-intubation, with a maximum of 25 mmHg.

Sedation

- Patients should be routinely given a loading dose of sedation prior to commencement of the infusion to ensure a therapeutic level is rapidly reached.
- Consider separate Morphine and Midazolam infusions for specific presentations (e.g. pain-producing pathology or injuries, status epilepticus, etc.).
- Signs of inadequate sedation include cough, gag or patient movement, HR and BP trending up together, lacrimation, diaphoresis, and hypersalivation.

Paralysis

- Post-intubation paralysis requires consultation with the receiving hospital or RCH.
- All patients who are paralysed require ongoing sedation.

Infusions

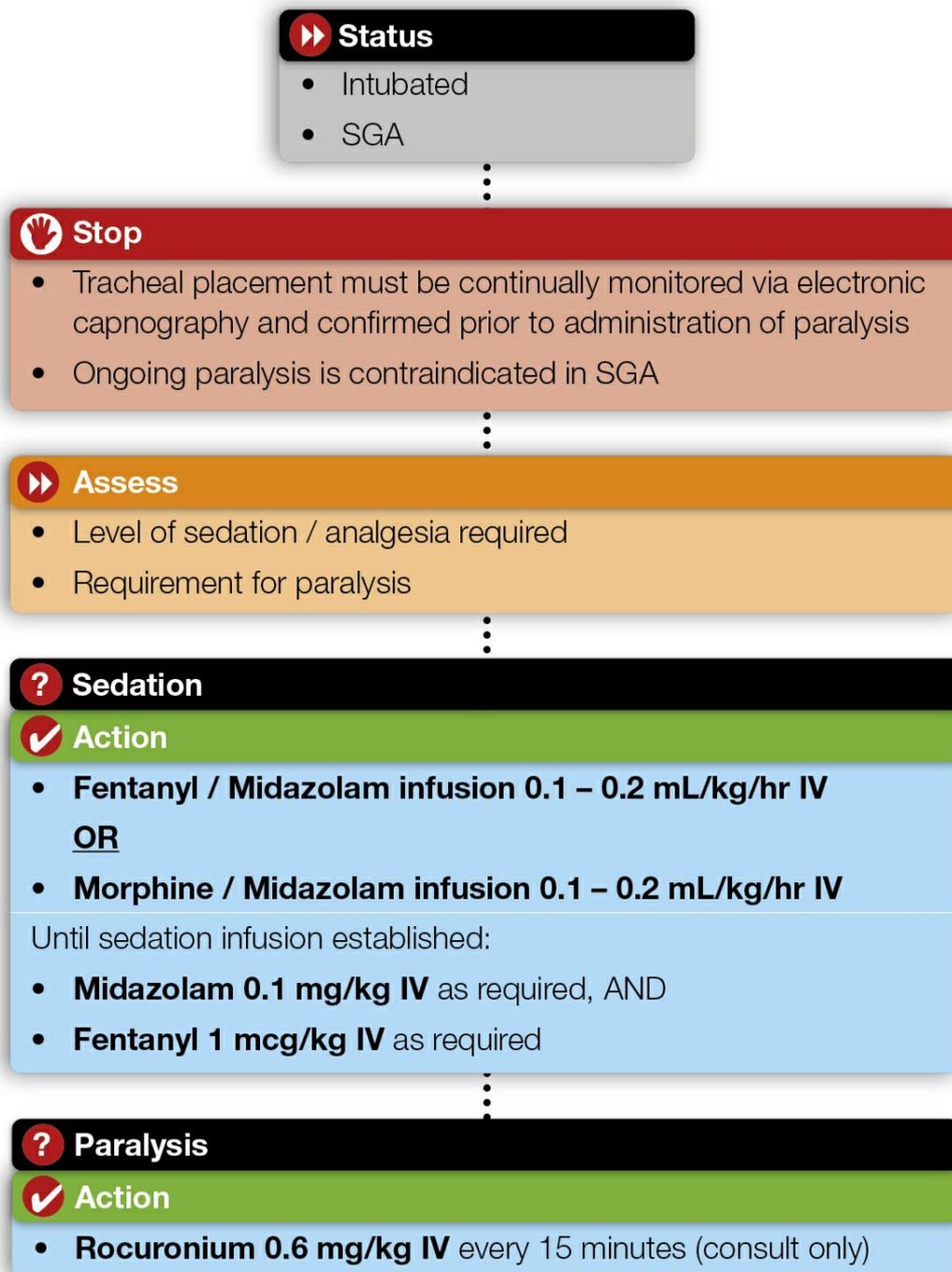
Fentanyl + Midazolam Infusion (preferred)

- **Fentanyl 300 mcg + Midazolam 15 mg in 15 mL D5W or Normal Saline**
 - 1 mL = 20 mcg Fentanyl + 1 mg Midazolam
 - 0.1 mL = 2 mcg Fentanyl + 0.1 mg Midazolam

Morphine + Midazolam Infusion (Paediatric)

- **Morphine 15 mg + Midazolam 15 mg in 15 mL D5W or Normal Saline**
 - 1 mL = 1 mg each drug
 - 0.1 mL = 0.1 mg each drug
 - - 1 mL/hr = 1 mg/hr

Flowchart



Care Objectives

- To reduce the suffering associated with the experience of pain to a degree that the patient is comfortable.

General Notes

Quality Analgesia

- The adequacy of analgesia should be discussed, where possible, with the patient and balanced against medication side effects. The patient reporting comfort is the most important indicator of adequate analgesia. Distressed appearance, physiological signs of pain and verbal numerical rating may contribute to determining the adequacy of analgesia.
- An inability to report or rate pain (e.g. age, intellectual disability, non-English speaking) should not preclude analgesia. Where discomfort is evident in the setting of possible pain producing stimuli, strongly consider options for analgesia.
- **Fentanyl IN** is well established as a safe and effective analgesic, even in severe pain. Paramedics are encouraged to consult for further doses if the maximum dose has been reached but the patient remains in pain. It is the preferred option of RCH in most cases for ALS and MICA paramedics.
- Using the Mucosal Atomizer Device (MAD), all doses include an additional 0.1 mL to account for atomiser dead space
- Where Fentanyl IN is insufficient in severe pain consider IV Ketamine +/- IV opioids rather than IV opioids alone.
- Consider administering paracetamol in addition to opioids for moderate pain where the oral route is not contraindicated (e.g. possible emergency surgery or procedural sedation).
- The analgesic effect of morphine IM is slow and variable. In rare cases, consider **Morphine 0.1 mg/kg IM** (single dose only) as a last resort **ONLY** where unable to administer fentanyl IN and the IV route is unavailable. Unless the patient is heavier than their age-calculated weight, the maximum dose should not exceed 5 mg.
- Opioids/ketamine should be titrated to pain or side effects. In younger patients (1 – 2 years) adequate analgesia may be attained with a single dose of **Fentanyl IN**. If significant respiratory depression occurs due to opioid administration, manage as per **CPG P0707 Overdose**.

Procedural analgesia

- Procedural pain refers to any situation in which a patient requires supplemental analgesia for short periods of time. Methoxyflurane should not be used as a sole analgesic.

Ketamine

- Ketamine may be administered without an opioid where a patient is opioid tolerant or allergic to opioids.
- Emergence reactions, hallucinations or other behavioural disturbances associated with Ketamine are less common in low doses which are used for pain management. These reactions are transient and can be minimised by administering IV doses slowly and by providing reassurance. Consult with RCH if further management options are required.

- Hypersalivation is a known side effect of ketamine. On most occasions suctioning will be sufficient. Where hypersalivation becomes difficult to manage or the airway is compromised, consult RCH for management options which may include administration of **Atropine** (MICA only)

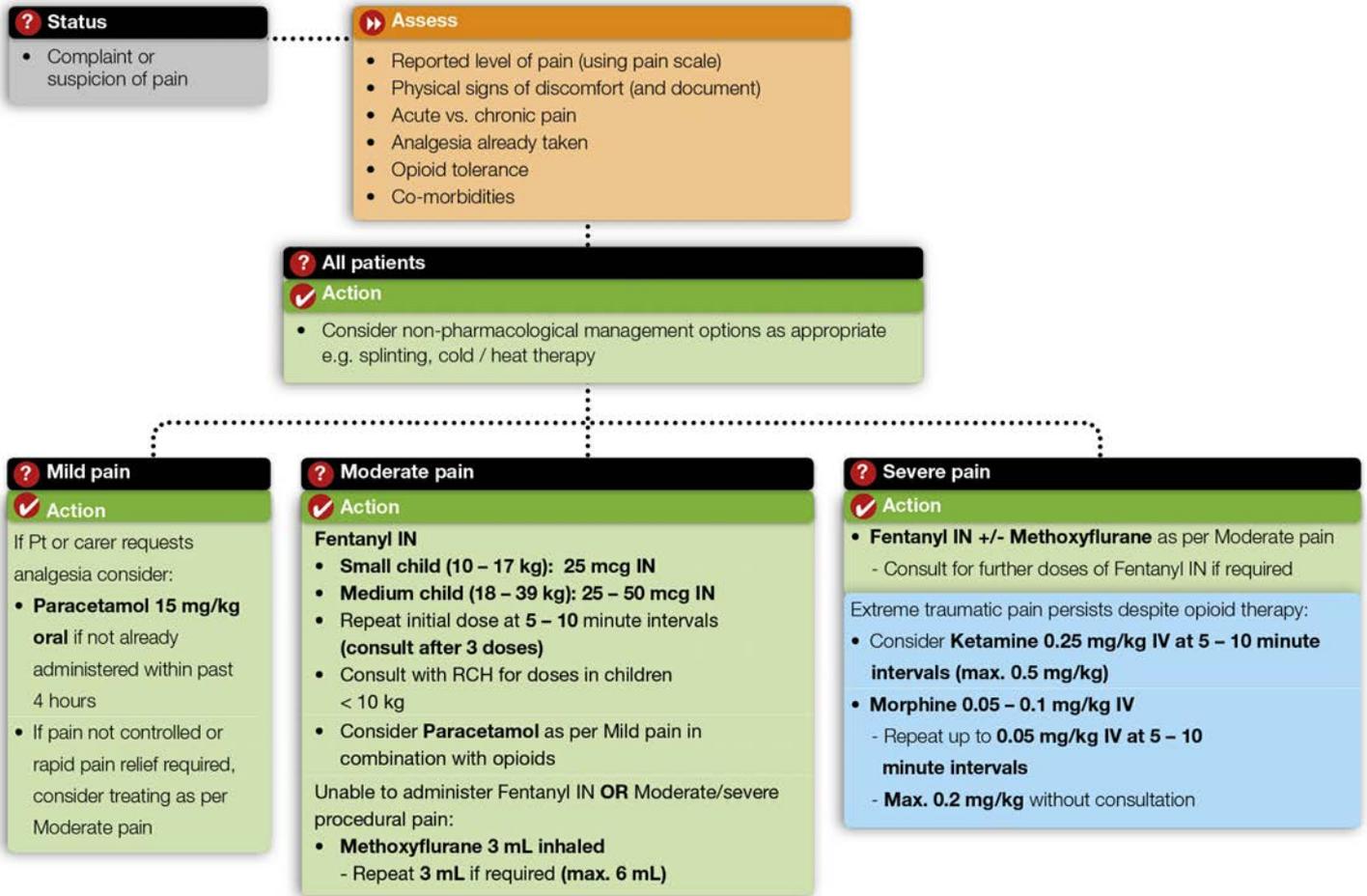
Paediatric paracetamol dose table

Paracetamol 15 mg/kg dose (based on 120 mg in 5mL liquid) CONFIRM DOSE WITH LABEL ON BOTTLE

Age (years)	Weight (kg)	Dose (mg)	Volume (nearest mL)
3 month	6	90	4
6 month	8	120	5
1 year	10	150	6
2	12	180	8
3	14	210	9
4	16	240	10
5	18	270	11
6	20	300	13
7	22	330	14
8	24	360	15
9	26	390	16
10	33	495	21
11	36	540	23

NB. Children aged 10 - 11 can have a single 500mg tablet as an alternative to the liquid preparation depending on the patient preference.

Flowchart



Related Resources

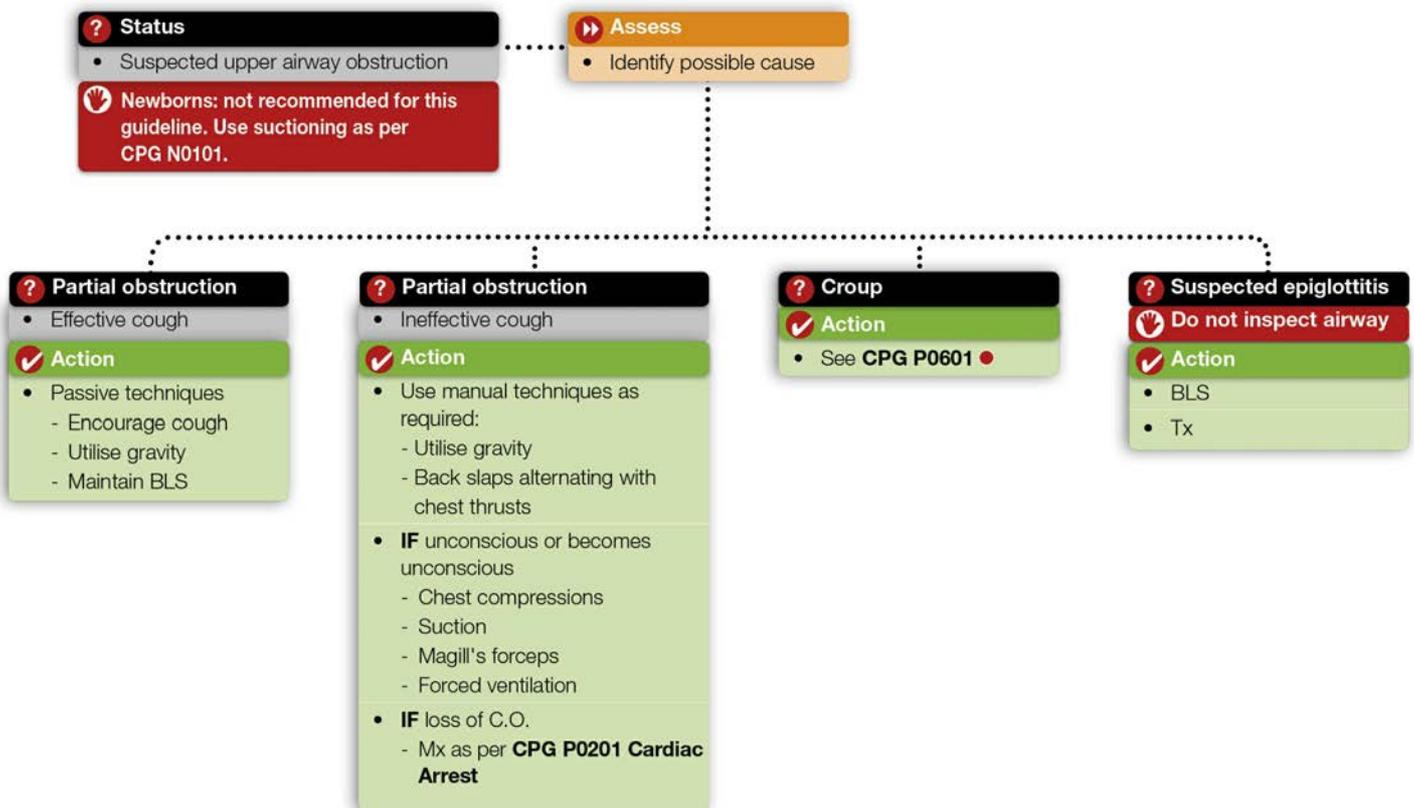
- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC CPG A0501 Pain Relief and CPG P0501 Pain Relief Paediatric June 2018.pdf>

General Notes

Patients with suspected epiglottitis can be difficult to identify, however should be considered time critical.

- In the patient presenting with stridor and increased work of breathing, drooling and an absence of cough are suggestive of epiglottitis (a cough and absence of drooling are more likely to indicate croup).
- Other reliable indicators of epiglottitis include a low pitched expiratory stridor (often snoring) and the patient preferring to sit in a 'tripod' or 'sniffing' position.
- Do not inspect the airway in patients with suspected epiglottitis due to the risk of precipitating respiratory arrest.

Flowchart

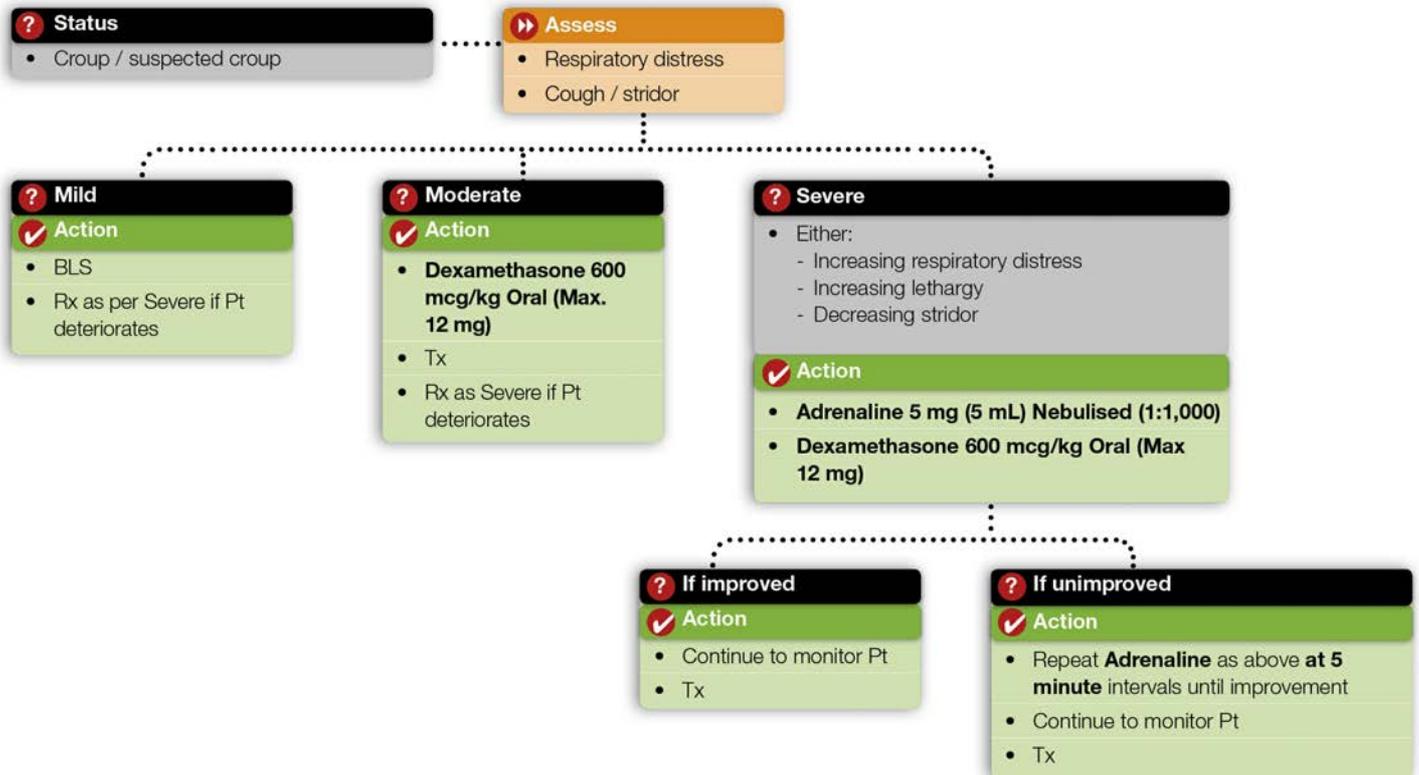


General Notes

- Decreased cough / stridor and increasing lethargy may be a sign of patient condition deteriorating and needs to be assessed carefully.
- Nebulised **Adrenaline** for croup is indicated for children presenting with signs of hypoxia or those whose condition is deteriorating.

RCH croup severity table			
	Mild	Moderate	Severe
Behaviour	Normal	Some/ intermittent irritability	Increasing irritability and/ or lethargy
Stridor	Barking cough. Stridor only when active or upset.	Some stridor at rest	Stridor present at rest
Respiratory Rate	Normal	Increased resp. rate Tracheal tug Nasal flaring	Marked increase or decrease in RR Tracheal Tug Nasal flaring
Accessory Muscle Use	None or minimal	Moderate chest wall retraction	Marked chest wall retraction
Oxygen	No oxygen requirement	No oxygen requirement	Hypoxaemia (late sign)

Flowchart: Croup



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC April 2016 CPG A0601 P0602 Steroid use in AV.pdf>

General Notes

- Asthmatic patients are dynamic and can show initial improvement with treatment then deteriorate rapidly.
- Consider MICA support but do not delay transport waiting for back up.
- Despite hypoxaemia being a late sign of deterioration, pulse oximetry should be used throughout patient contact.
- An improvement in SpO₂ may not be a sign of improvement in clinical condition.
- Nebuliser masks require a minimum volume of fluid to operate correctly. For doses of nebulised **Salbutamol** less than a single nebule, draw up appropriate volume of drug and dilute with normal saline to a minimum of 5 mL.
- Caution should be used when administering nebulised **Salbutamol** to children as it can cause profound lactic acidosis. Nebulised **Salbutamol** should be reserved for severely ill children.
- Children under 2 years of age should not be treated with nebulised **Salbutamol** as it is unlikely to provide benefit.
- When using pMDI use child's own mask and spacer where available.
- If an IV cannot immediately be inserted in the critically unwell child, obtaining IO access must not be delayed.
- Preparation of **Adrenaline** infusion (syringe pump): **Adrenaline 300 mcg** added to make **50 mL** with **5% Dextrose** or **Normal Saline**.
 - 1 mL = 6 mcg
 - 1 mL/hr = 0.1 mcg/min
- At low flow rates in younger children an infusion may not be as effective as providing boluses. Clinical judgement should be applied as to the most effective route of administration.
- A pMDI is the preferred route of administration for Salbutamol in patients with mild or moderate respiratory distress. If a pMDI is not available, nebulise Salbutamol as per Severe respiratory distress.

Severity

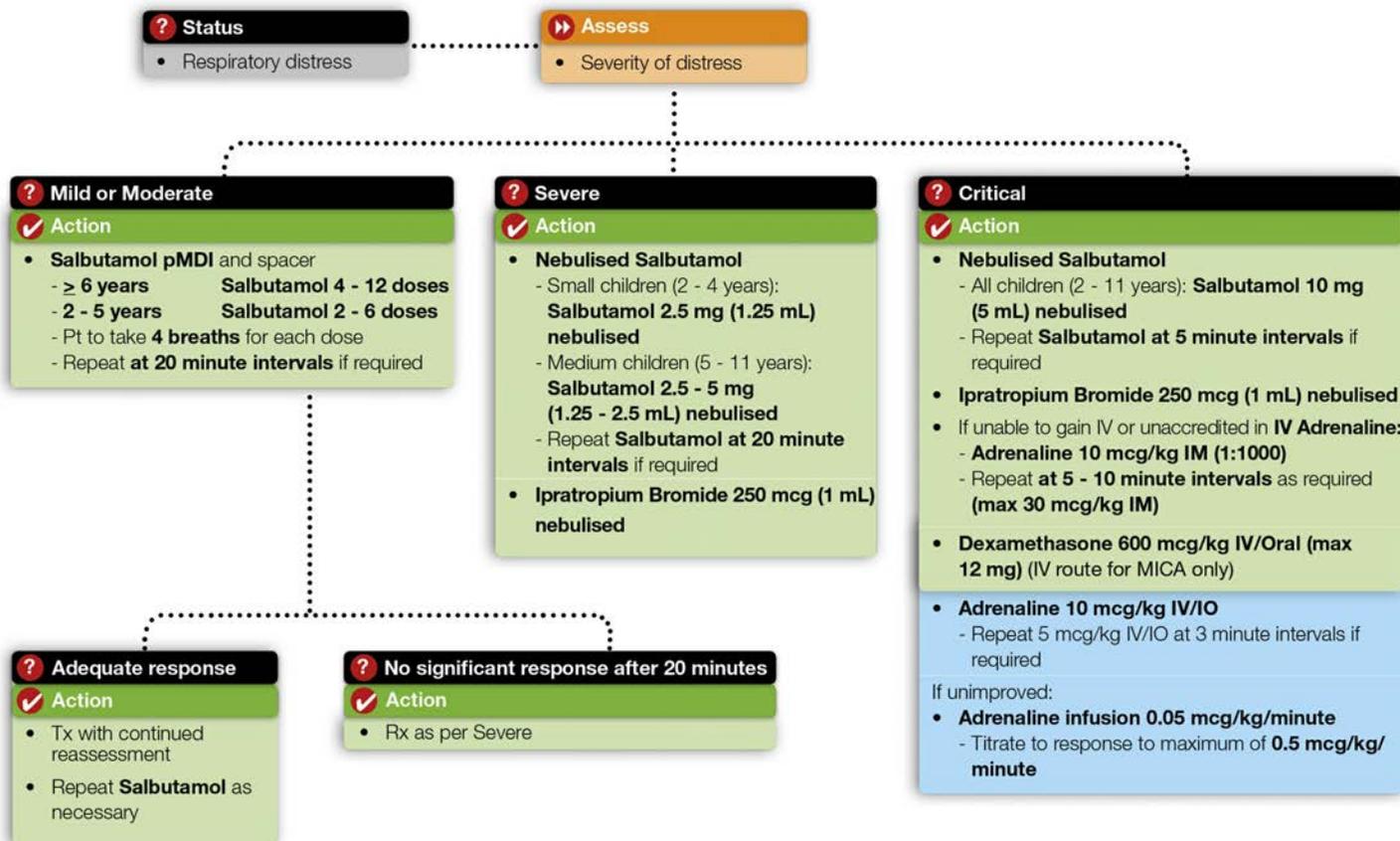
- Assess severity as follows. Vital signs can vary significantly depending on the age of the child.

Mild/Moderate: Normal conscious state, some increased work of breathing, tachycardia, speaking in phrases/ sentences.

Severe: Agitated/distressed, markedly increased work of breathing, including accessory muscle use/retraction, tachycardia, speaking in words.

Critical: Altered conscious state, maximal work of breathing, marked tachycardia, unable to talk.

Flowchart



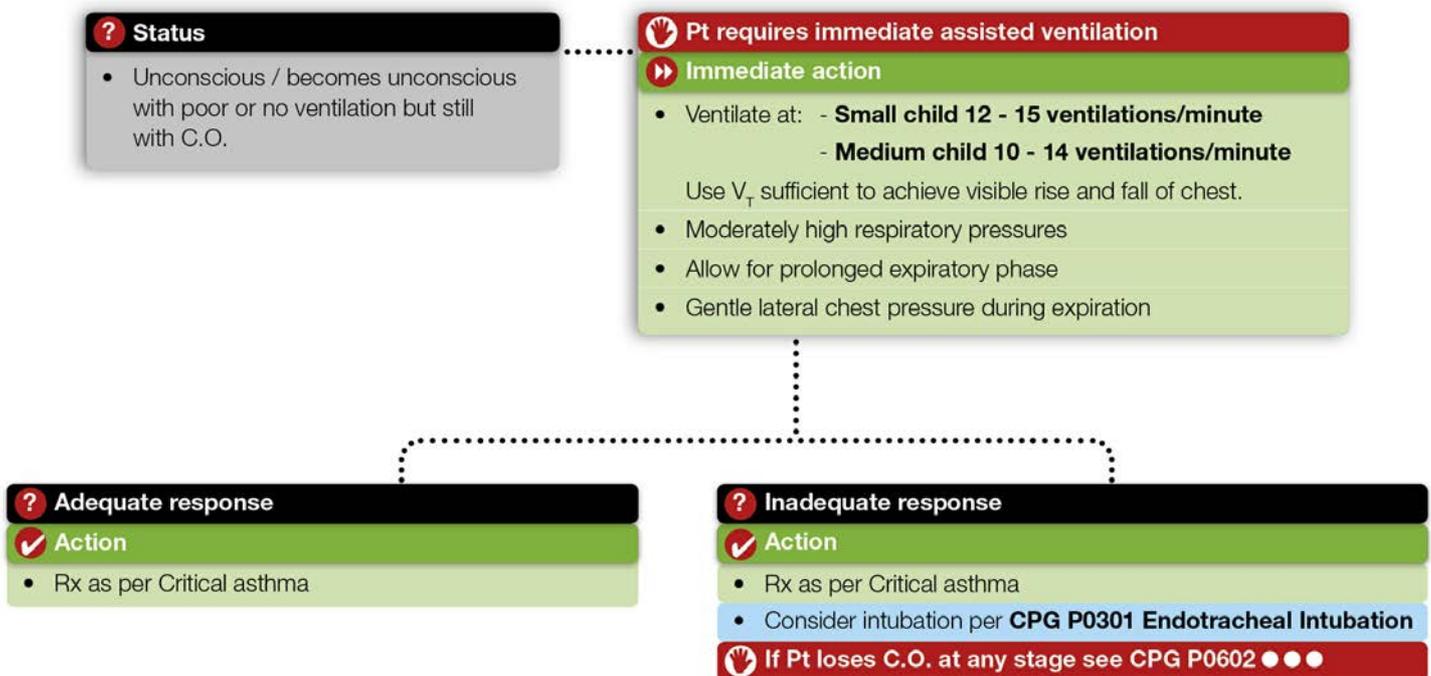
Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC CPG P0602 Paediatric Asthma Aug 2015.pdf>

General Notes

- High EtCO₂ levels should be anticipated in the intubated asthmatic patient. An EtCO₂ level of 120 mmHg in this setting is considered safe and when managing ventilation the Paramedic should be conscious of the effect of gas trapping when attempting to reduce EtCO₂.
- Extreme care must be taken with assisted ventilation as gas trapping and barotrauma occurs easily in asthmatic patients with already high airway pressures. Give early consideration to bilateral chest decompression in the manually ventilated asthma patient.
- If a mechanical ventilator is not available it can be difficult to assess tidal volume during manual ventilation. In this setting all paediatric patients should be ventilated with sufficient pressure and volume to achieve visible rise and fall of the chest.

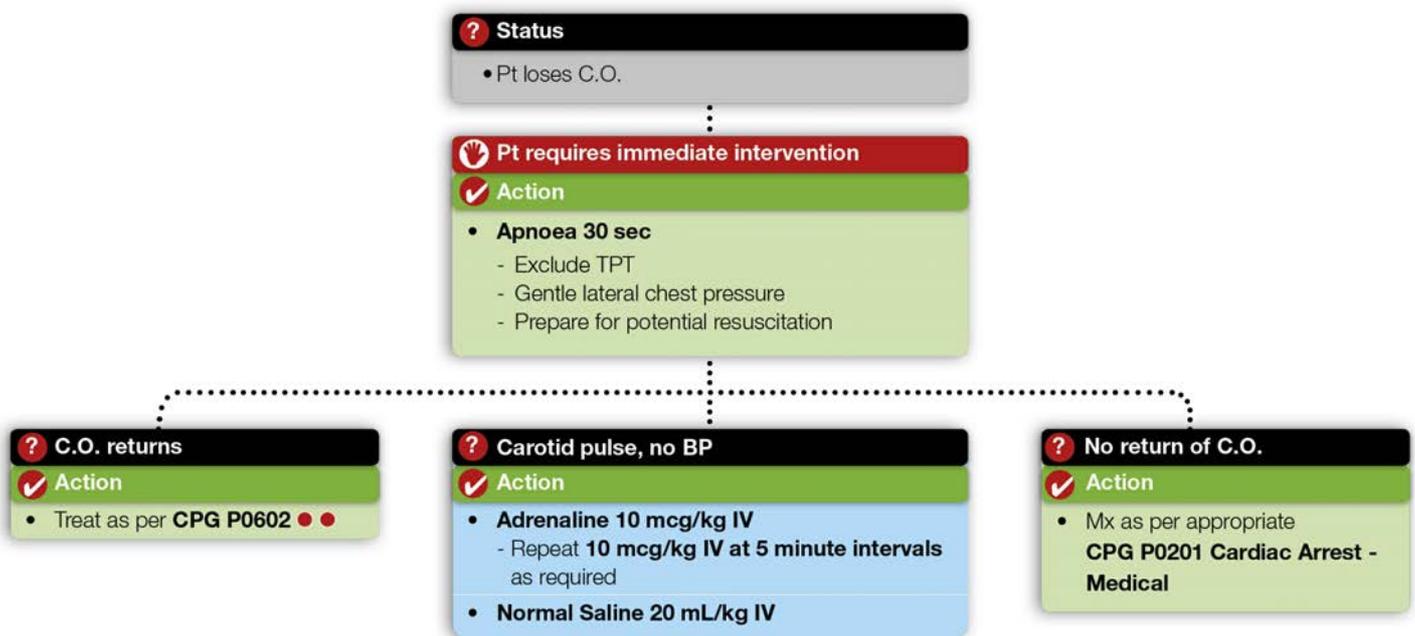
Flowchart



General Notes

- Consider potential for TPT and manage as per **CPG P0802 Chest Injuries (Paediatric)**.
- Due to high intrathoracic pressure as a result of gas trapping, venous return is impaired and C.O. may be lost. Apnoea allows the gas trapping to decrease.
- The patient receiving APPV is at higher risk of this occurring and should be monitored closely.

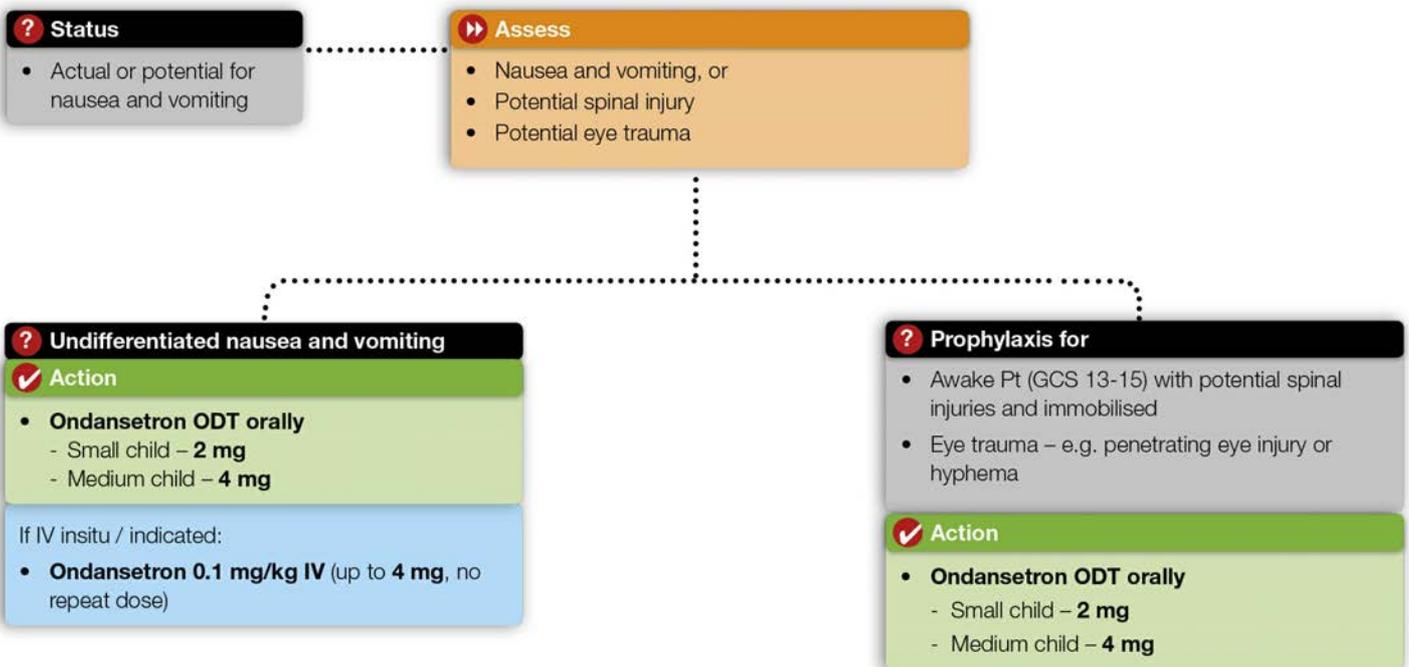
Flowchart



Special Notes

- The main focus in paediatric nausea and vomiting is oral rehydration.
- If nausea and vomiting is being tolerated, basic care and transport is the only required treatment.
- Intravenous fluid replacement is intended for the patient in shock.
- Undifferentiated nausea and vomiting may include but is not limited to:
 - secondary to opioid analgesia
 - secondary to cytotoxic drugs or radiotherapy
 - severe gastroenteritis

Flowchart



Care Objectives

- Normalisation of blood glucose level

General Notes

Intended patient group

- All paediatric patients

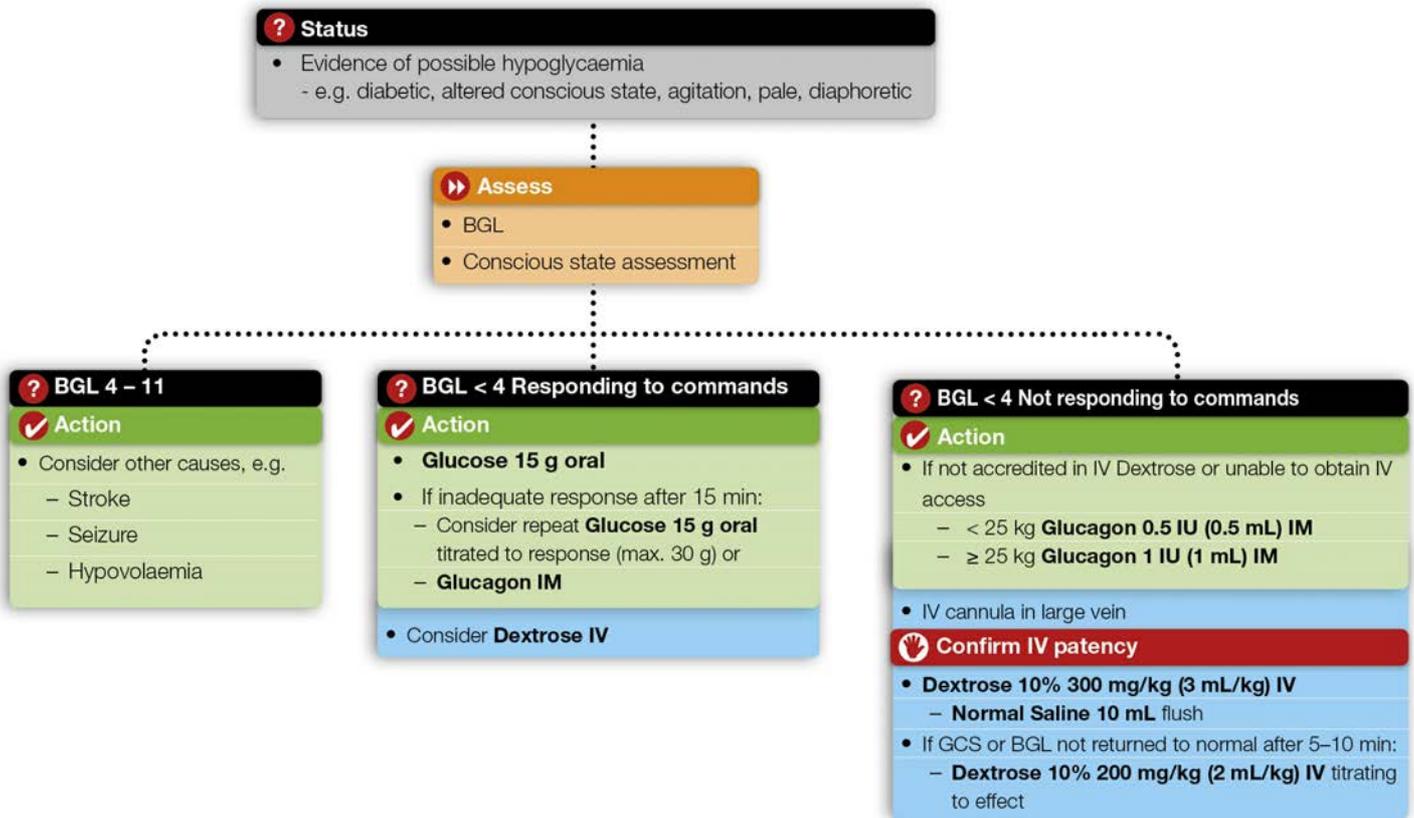
Management

- Patient may be aggressive during management.
- Ensure IV is patent before administering Dextrose. Extravasation of Dextrose can cause tissue necrosis.
- All IVs should be well flushed before and after Dextrose administration (minimum **10 mL Normal Saline**).
- The median time to restoration of normal conscious state after the administration of Dextrose IV can vary from 5 to 15 minutes. A slow response exceeding 15 minutes can also occur occasionally. When considering additional doses of Dextrose IV, it is appropriate to reassess both conscious state and BGL.
- If BGL has returned to normal but the Pt remains altered conscious, consider concomitant illness (e.g. sepsis, head injury, trauma) and transport without undue delay.
- Further doses of Dextrose 10% IV may be required in some severe hypoglycaemic episodes. Consider consultation if BGL remains less than 4 mmol/L despite **Dextrose 10% IV 500 mg/kg** and unable to administer oral carbohydrates.
- Consult early for Dextrose 10% IV in the setting of an insulin overdose even if BGL > 4 mmol/L and/or patient obeying commands.
- If next meal is more than 20 minutes away, encourage patient to eat a long acting carbohydrate (e.g. sandwich, fruit, glass of milk) to sustain BGL until next meal.
- **If adequate response, maintain initial management and transport.**
- Maintain general care of unconscious patient and ensure adequate airway and ventilation.

Refusal of transport

- If the patient or legal guardian refuses transport, repeat the advice for transport. If patient still refuses transport, document the refusal and leave patient with a responsible guardian. Advise the guardian of actions to take if symptoms recur and of the need to make early contact with LMO for follow up.

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC CPG A0702 Hypoglycaemia & A0713 Hyperglycaemia.pdf>

Care Objectives

- Adequate fluid replacement where indicated

General Notes

Intended patient group

- All paediatric patients

Diabetic ketoacidosis (DKA)

- Any patient with
 - a pre-existing history of diabetes
 - BGL > 11 mmol/L, and
 - clinical features of DKA (e.g. confusion, signs of dehydration, Kussmaul's breathing) should be transported to hospital for further investigation.
- Approximately one half of diabetic ketoacidosis (DKA) cases will present with low to moderate hyperglycaemia (11-29 mmol/L).
- Occasionally, DKA will occur in paediatric patients without previously diagnosed diabetes. Paramedics should be vigilant to assess BGL in paediatric patients with signs or symptoms of hyperglycaemia **or unexplained illness**.
- Kussmaul's breathing can often be confused for hyperventilation related to anxiety. Any patient with a BGL > 11mmol/L, clinical signs of dehydration and hyperventilation requires further investigation in hospital.
- Clinical features alone may not be sufficient to differentiate between DKA and a Hyperosmolar Hyperglycaemic State (HHS).

Hyperosmolar Hyperglycaemic State (HHS)

- Patients with HHS are
 - typically older
 - have higher BGL readings (> 30mmol/L)
 - and usually do not present with clinical features of DKA (e.g. Kussmaul's breathing).
- **HHS is unlikely in paediatric patients.**

Management

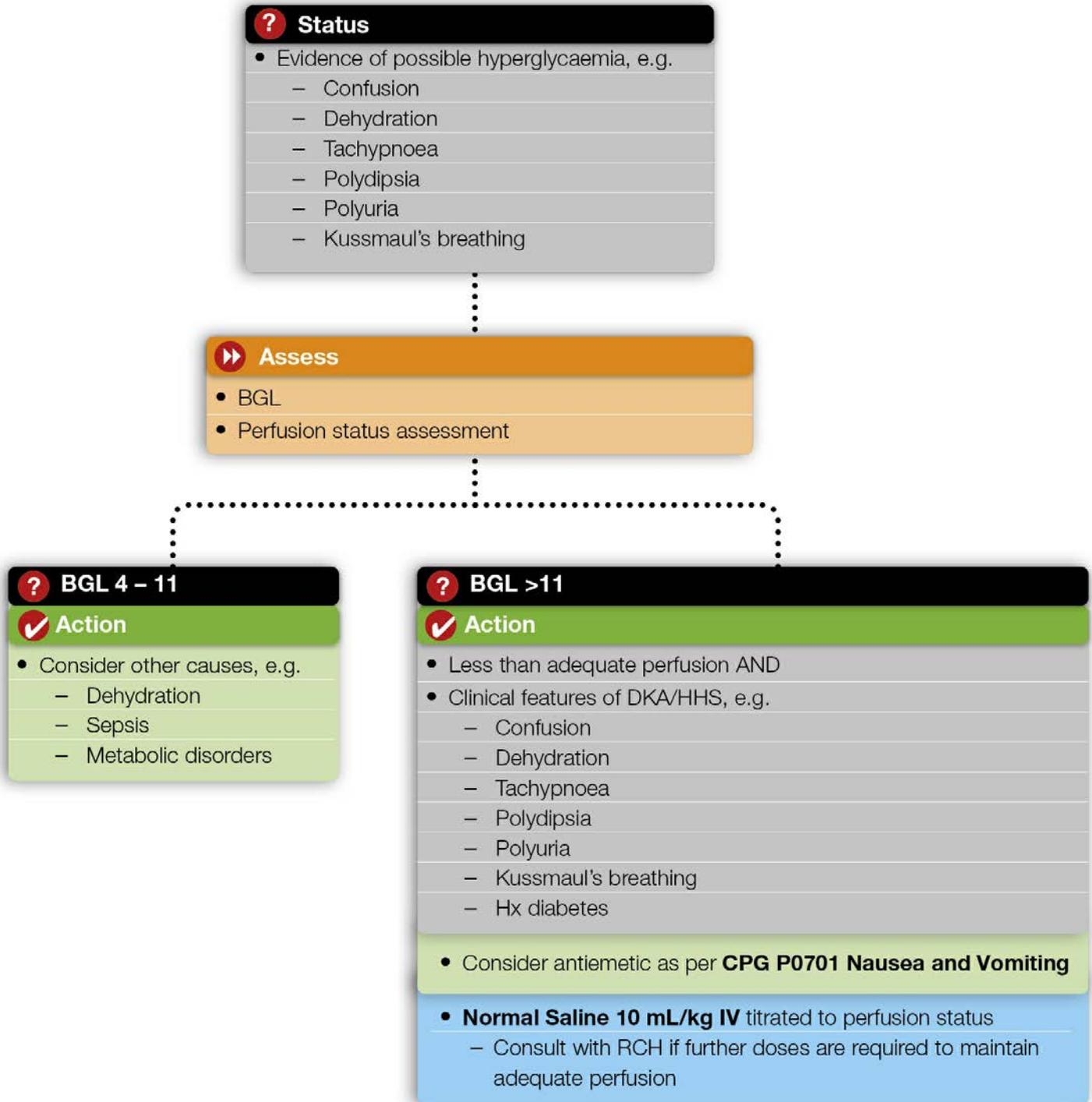
- There is no value in differentiating between hyperglycaemic crises in the prehospital setting. Adequate fluid replacement in patients with less than adequate perfusion should be aim of care in symptomatic patients.
- Paediatric patients with DKA/HHS who are adequately perfused do not require bolus doses of Normal Saline in the prehospital setting.
- Patients should not be encouraged to self-administer additional doses of insulin prior to transport to

hospital.

Intubation

- Removing the patient's ability to achieve compensatory respiratory alkalosis (i.e. Kussmaul's respirations) can lead to poorer outcomes in DKA patients. As such, endotracheal intubation should be avoided except in cases where the patient is severely obtunded.

Flowchart



General Notes

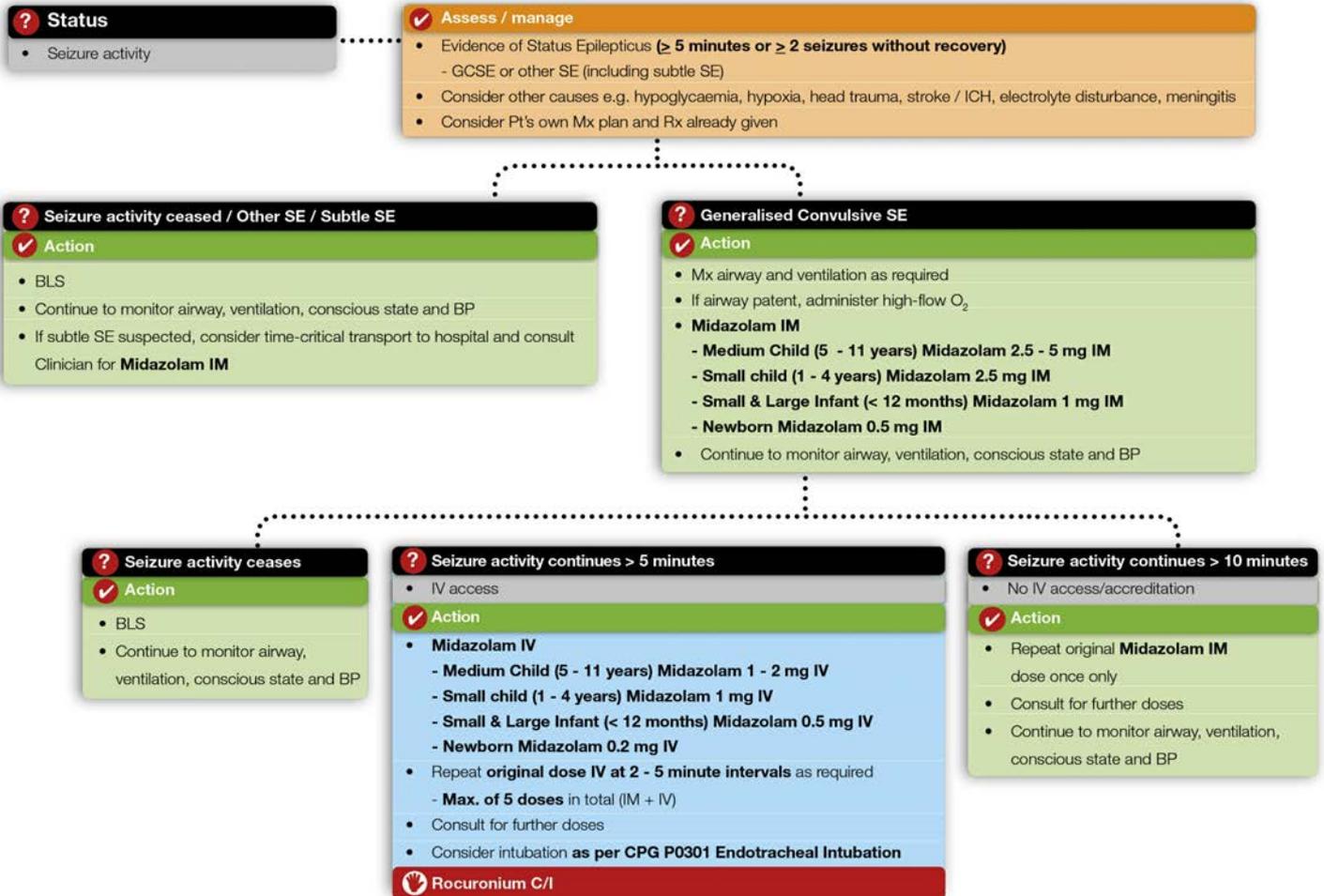
- For the purposes of this CPG, Status Epilepticus (SE) refers to either ≥ 5 minutes of continuous seizure activity OR multiple seizures without full recovery of consciousness (i.e. back to baseline) between seizures.
- Generalised Convulsive Status Epilepticus (GCSE) is characterised by generalised tonic-clonic movements of the extremities with altered conscious state.
- Subtle SE may develop from prolonged or uncontrolled GCSE and is characterised by coma and ongoing electrographical seizure activity with or without subtle convulsive movements (e.g. rhythmic muscle twitches or tonic eye deviation). Subtle SE is difficult to diagnose in the pre-hospital environment but should be considered in patients who are witnessed to have generalised tonic-clonic convulsions initially and present with ongoing coma with no improvement in conscious state (with or without subtle convulsive movements).
- For seizures other than GCSE, Midazolam may only be administered following consultation via the Clinician.
- Some patients may be prescribed buccal / intranasal midazolam or rectal diazepam to manage seizures.
- If a single seizure has spontaneously terminated continue with initial management and transport.
- If patient has a past history of seizures and refuses transport, they may be left in the care of a responsible third party. Advise the person of the actions to take for immediate continuing care if symptoms recur, and the importance of early contact with their primary care physician for follow up.

Midazolam Dosage Chart

Midazolam Dosage Chart

Age	Newborn	Infant <1	Small Child 1 - 4	Medium Child 5 - 11	Yrs
Weight	< 5	5 - 9	10 - 17	18 - 39	kg
Midazolam (IM) 5 mg/1 mL (0.2 mL = 1 mg)	0.1	0.2	0.5	0.5 - 1	mL
	0.5	1	2.5	2.5 - 5	mg
1 mL syringe					
Midazolam (IV) 15 mg/15 mL (1 mL = 1 mg)	0.2	0.5	1	1 - 2	mL
	0.2	0.5	1	1 - 2	mg
Add 3 mL (15mg) Midazolam (from 15 mg in 3 mL ampoule) to 12 mL Normal Saline in a 20 mL syringe					

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC CPG A0703 P0703 June 2015 Seizure CPG.pdf>

Care Objectives

- Adrenaline (IM) with minimal delay
- Airway and perfusion support
- Hospital-based observation (usually 4 hours) at a minimum

General Notes

Intended patient group

- All patients < 12 years old

Definition

- Severe, potentially life-threatening systemic hypersensitivity reaction.¹

Pathophysiology and presentation

Overview

- Anaphylaxis can exist with any combination of the signs and symptoms below, but may also be limited to a single body system (e.g. isolated hypotension or isolated respiratory distress in the setting of exposure to an antigen that has caused anaphylaxis in the patient previously).
- Rapid onset (usually within 30 minutes but may be up to 4 hours)
- Anaphylaxis can be difficult to identify. Cutaneous features are common though not mandatory. Irrespective of known allergen exposure, if 2 systemic manifestations are observed then anaphylaxis should be accepted.

Respiratory

- Respiratory distress, shortness of breath, wheeze, cough, stridor
 - Due to inflammatory bronchoconstriction or upper airway oedema

Abdominal

- Pain / cramping
- Nausea / vomiting / diarrhoea
 - Particularly to insect bites and systemically administered allergens (e.g. IV medications)

Skin

- Hives, welts, itching, flushing, angioedema (e.g. lips, tongue)

- Due to vasodilation and vascular hyperpermeability

Cardiovascular

- Hypotension
 - Due to vasodilation and vascular hyperpermeability

Common allergens

Exposure to an allergen may be known or unknown.

- **Insect stings:** Bees, wasps, jumping jack ants
- **Food:** Peanuts/treenuts, egg, fish/shellfish, dairy products, soy, sesame seeds, wheat
- **Medications:** Antibiotics, anaesthetic drugs, contrast media
- **Exercise-induced:** Typically affecting young adults (rare)
- **Idiopathic anaphylaxis:** No external trigger (rare)

Further information

Anaphylaxis and asthma

- Asthma, food allergy and high risk of anaphylaxis frequently occur together, often in adolescence. Bronchospasm is a common presenting symptom in this group, raising the likelihood of mistaking anaphylaxis for asthma. A history of asthma increases the risk of fatal anaphylaxis.²
- Maintain a high index of suspicion for anaphylaxis in patients with a history of asthma or food allergy.

Other causes of angioedema

- Several types of non-allergic angioedema exist including hereditary angioedema (HAE) and its more broad categorisation: bradykinin-mediated angioedema.
- These may present with similar symptoms to anaphylaxis including abdominal signs and symptoms and laryngeal swelling however will not respond to anaphylaxis management.
- Where HAE or bradykinin-mediated angioedema is identified **AND** the patient has their own medication to manage this, follow the patient's treatment plan and use the patient's own medication.
- Otherwise strongly consider standard anaphylaxis management if indicated.

Food Protein Induced Enterocolitis (FPIES)

- FPIES is a non-immunoglobulin E mediated paediatric allergy that usually presents with nausea and vomiting, and in severe cases may present with collapse, confusion or altered consciousness. These patients should not be treated with adrenaline under this guideline. If the patient has a positive diagnosis of FPIES and a care plan, treat symptomatically (e.g. ondansetron, IV fluid) and transport to

hospital. Consider consultation with paediatric receiving hospital regarding steroid administration.

Risk factors for refractory anaphylaxis or deterioration

The presence of the following risk factors may increase the risk of deterioration or symptoms refractory to initial adrenaline. Consider escalation of care (e.g. MICA):

- Expected clinical course (e.g. history of refractory anaphylaxis / ICU admission / multiple adrenaline doses)
- Hypotensive
- Medication as precipitating cause (e.g. antibiotics, IV contrast medium)
- Respiratory symptoms / respiratory distress
- History of asthma or multiple co-morbidities/medications

OR

- No response to initial dose of IM Adrenaline

Adrenaline

- Adrenaline is the primary treatment agent for anaphylaxis.
- **Administration site:** anterolateral mid-thigh.
- Deaths from anaphylaxis are far more likely to be associated with delay in management rather than inadvertent administration of Adrenaline.
- Patients with known anaphylaxis may carry their own Adrenaline autoinjector. If the patient responds well to their own autoinjector dose, further Adrenaline may not be required. Closely monitor for deterioration and transport to hospital.
- Patients should carry their Adrenaline auto-injector with them to hospital.
- **Adrenaline infusion:**
 - Where the initial two doses of IM Adrenaline have not been effective. IM Adrenaline every 5 minutes is appropriate if MICA is not available or while the infusion is being prepared.
 - An infusion is the preferred method of administering IV adrenaline.
 - At low flow rates in younger children an infusion may not be as effective as providing boluses. Clinical judgement should be applied regarding the most effective route of administration.
- **IV Adrenaline bolus:**
 - Only administer if extremely poor perfusion or cardiac arrest is imminent.
 - IV Adrenaline should be subsequent to IM Adrenaline in all cases with an initial IM therapy option selected for every anaphylaxis patient regardless of presentation.
- **Adrenaline toxicity:** Where the patient develops nausea, vomiting, shaking, tachycardia or arrhythmias but has **some improvement in symptoms and a normal or elevated BP**, consider the possibility of adrenaline toxicity rather than worsening anaphylaxis. Consider whether further doses of adrenaline are appropriate.

Additional therapies

- Adrenaline remains the absolute priority.
- *Additional therapies* may be administered concurrently or in order of clinical need but **must not** delay continued Adrenaline administration.

Bronchospasm

- Where bronchospasm persist despite the administration of adrenaline, administer salbutamol, ipratropium bromide and dexamethasone. These medications should never be the first line treatment for bronchospasm associated with anaphylaxis.

Circulation - Hypotension

- Where hypotension persists despite initial Adrenaline therapy, large volumes of fluid may be extravasating. IV fluid therapy is indicated to support vasopressor administration.

Management plans

- Many patients presenting with anaphylaxis will be under the care of a medical specialist and have a prescribed anaphylaxis action plan. Where possible, paramedics should consider the action plan and align the care in accordance to specialist recommendations.

Transport

- All patients with suspected or potential anaphylaxis must be advised that they should be transported to hospital regardless of the severity of their presentation or response to management.
- Hospital-based observation is required for a minimum of **four hours** in case of a biphasic reaction, where symptoms return after an initial resolution. This occurs in approximately 20% of cases.

Medication preparation

Adrenaline infusion

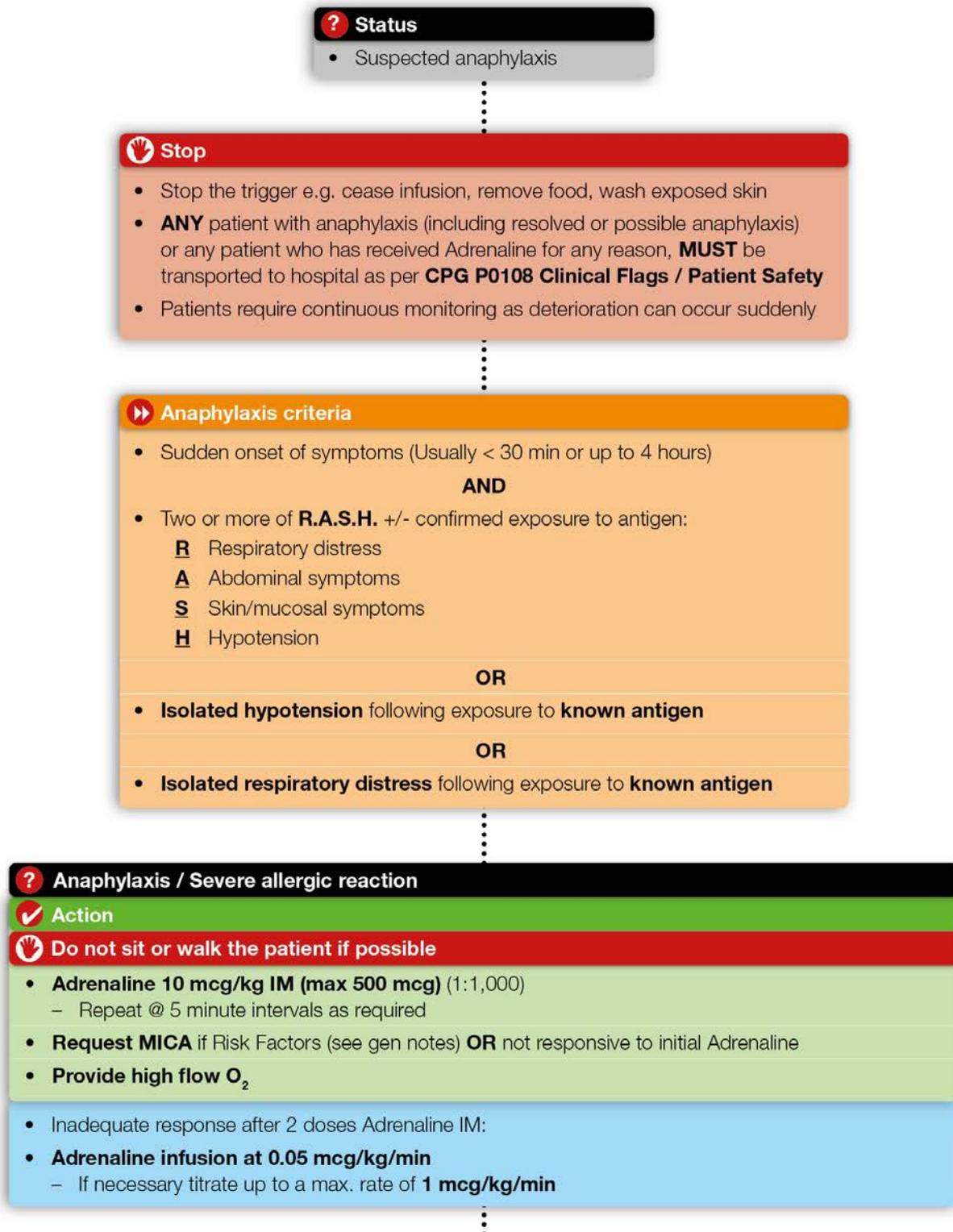
(Via syringe pump)

- Dilute **Adrenaline 300 mcg** to 50 mL with **5% Dextrose** or **Normal Saline** (in a 50 mL syringe)
- 1 mL = 6 mcg
- 1 mL/hr = 0.1 mcg/min

At low flow rates in younger children an infusion may not be as effective as providing boluses.

Clinical judgement should be applied regarding the most effective route of administration.

Flowchart



✓ **Additional therapies** (in order of clinical need)

✋ **Prioritise repeat Adrenaline doses**

Airway oedema / stridor:

- **Adrenaline 5 mg nebulised**
 - Consult RCH via the Clinician for repeat dose if required
 - Notify receiving hospital

Bronchospasm:

- **Salbutamol Nebulised or pMDI**
 - Repeat at 20-minute intervals if required

	Neb (mg)	pMDI (doses)
6 – 11 yrs	2.5 – 5 mg	4 – 12
2 – 5 yrs	2.5 mg	2 – 6

- **Ipratropium Bromide Nebulised or pMDI**

	Neb (mcg)	pMDI (doses)
6 – 11 yrs	250 mcg	8
2 – 5 yrs	250 mcg	4

- **Dexamethasone 600 mcg / kg IV / oral (Max 12 mg)** (IV route MICA only)

Cardiovascular – Hypotension despite initial adrenaline:

- Consider fluid as per **CPG P0801 Hypovolaemia**

? **Extremely poor perfusion OR impending cardiac arrest**

✓ **Action**

- **Adrenaline 10 mcg/kg IV/IO**
 - **Repeat 10 mcg/kg IV/IO at 1 minute intervals** until adequate perfusion or side effects occur

Related Resources

References

1. Safer Care Victoria. Anaphylaxis clinical care standard. 2019 Feb. Available from: <https://www.bettersafecare.vic.gov.au/resources/clinical-guidance/emergency-care/anaphylaxis-adults>
2. Australasian Society for Clinical Immunology and Allergy. Acute management of anaphylaxis. 2019. Available from: <https://www.allergy.org.au/hp/papers/acute-management-of-anaphylaxis-guidelines>
3. Australasian Society for Clinical Immunology and Allergy. Food Protein-Induced Enterocolitis Syndrome (FPIES) Available from: https://www.allergy.org.au/images/pcc/ASCIA_PCC_FPIES_2019.pdf

General Notes

- A typical purpuric rash may be subtle in some cases and present as a single 'spot' only.
- The presence of rapid onset symptoms of sepsis +/- rash may be a sign of meningococcal septicaemia.
- Meningococcal is transmitted by close personal exposure to airway secretions / droplets.
- Ensure face mask protection especially during intubation / suctioning.
- Ensure medical follow up for staff post exposure.
- Consider consultation where diagnosis is uncertain.

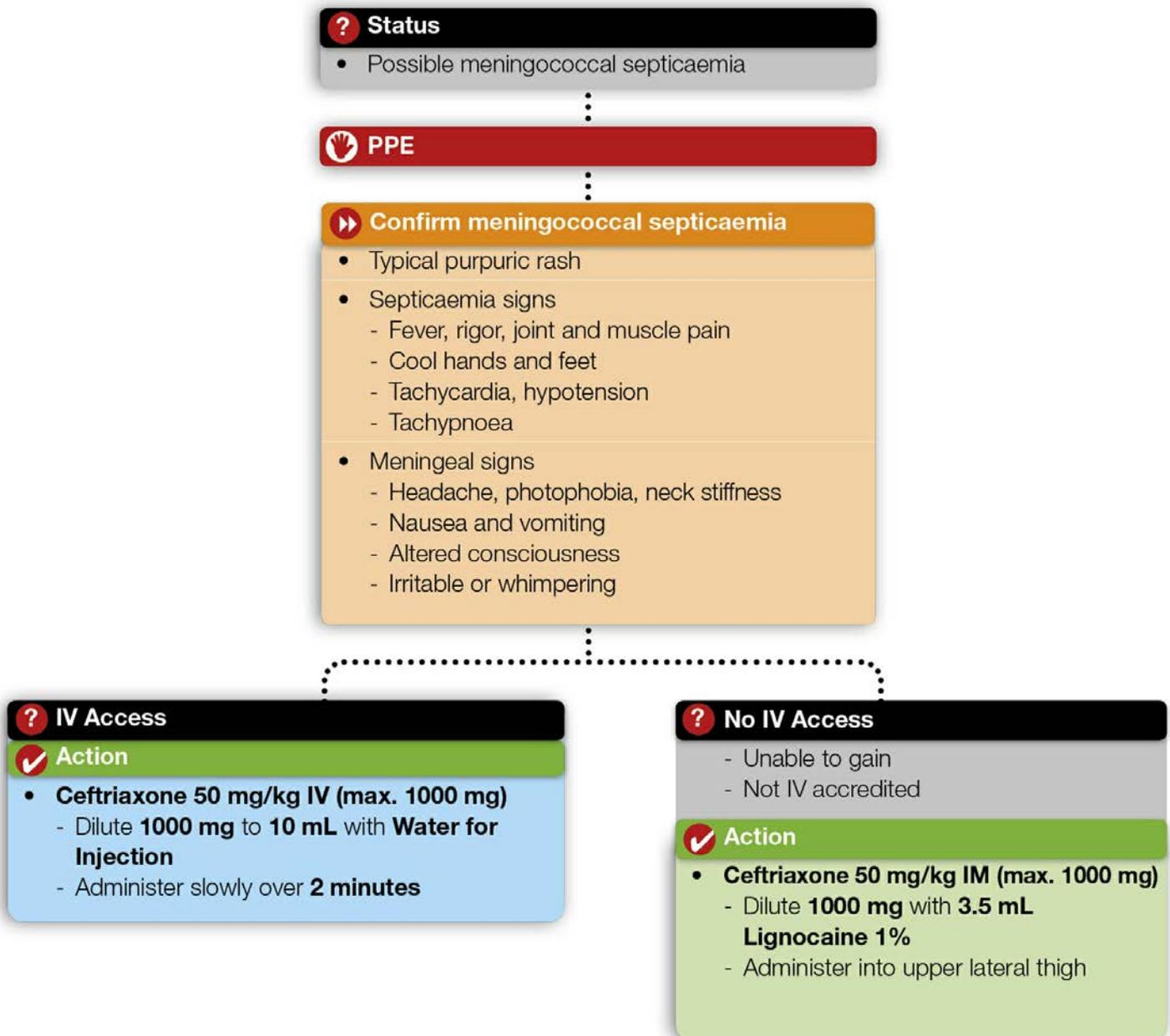
Ceftriaxone preparation

- Dilute Ceftriaxone 1 g with 9.5 mL of Water for Injection and administer 50 mg/kg IV over approximately 2 minutes (NB 1 mL = 100 mg).
- If unable to obtain IV access, or not accredited in IV cannulation, dilute Ceftriaxone 1 g with 3.5 mL 1% Lignocaine HCL and administer 50 mg/kg IM into the upper lateral thigh (NB 1 mL = 250 mg).

Paediatric Chart

Paediatric Chart															
Age	0	3 Mth	6Mth	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	33	36	kg
Ceftriaxone (IM) 50 mg/kg 1 g diluted with 3.5 mL 1% Lignocaine (1 mL = 250 mg)	0.7	1.2	1.6	2	2.4	2.8	3.2	3.6	4	4	4	4	4	4	mL
	175	300	400	500	600	700	800	900	1000	1000	1000	1000	1000	1000	mg
	1 mL syringe		2.5 mL syringe			10 mL syringe									
Ceftriaxone (IV) 50 mg/kg 1 g diluted with 9.5 mL Water for Injection (1 mL = 100 mg)	1.75	3	4	5	6	7	8	9	10	10	10	10	10	10	mL
	175	300	400	500	600	700	800	900	1000	1000	1000	1000	1000	1000	mg
	10 mL syringe														

Flowchart



General Notes

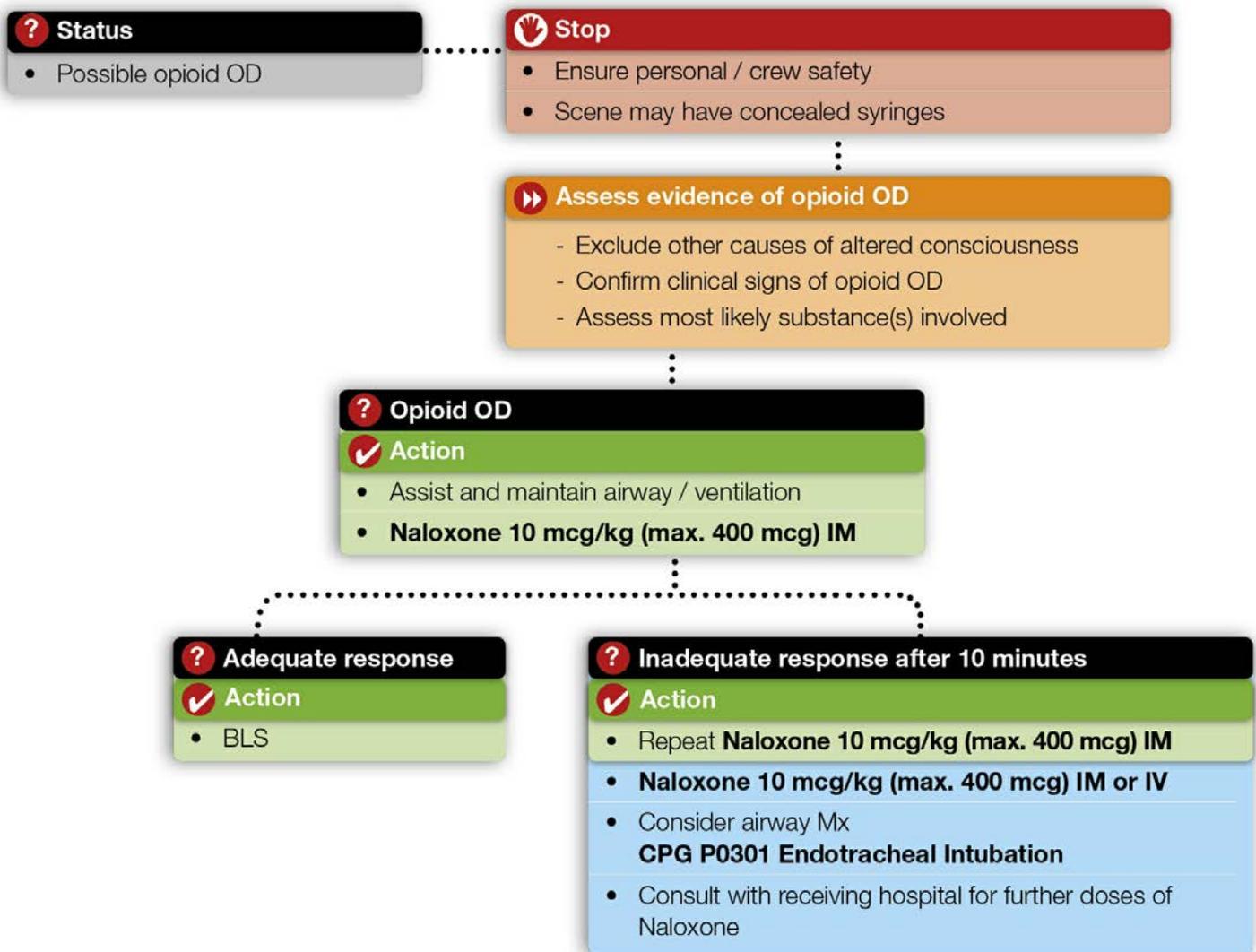
- Provide supportive care (in all cases)
 - Provide appropriate airway management and ventilatory support.
 - If patient is in an altered conscious state, assess BGL and if necessary manage as per **CPG P0702 Hypoglycaemia (Paediatric)**.
 - If patient is inadequately perfused, manage as per **CPG P0801 Hypovolaemia (Paediatric)** in cases other than TCA OD.
 - Assess patient temperature and manage as per **CPG P0901 Hypothermia / Cold exposure (Paediatric)**, or **CPG P0902 Environmental Hyperthermia / Heat Stress (Paediatric)**.
- Confirm clinical evidence of substance use or exposure
 - Identify which substance/s are involved and collect evidence if possible.
 - Identify by which route the substance/s have been taken (e.g. ingestion).
 - Establish the time the substance/s were taken.
 - Establish the amount of substance/s taken.
 - What were the substance/s mixed with when taken (e.g. alcohol, water)?
 - What treatment has been initiated prior to ambulance arrival (e.g. induced vomiting)?
- If patient claims to have taken an overdose of a potentially life-threatening substance then they must be transported to hospital. Police assistance should be sought to facilitate this as required.

When dealing with cases of overdose, if Paramedics are unfamiliar with a substance or unsure of the effects it may have, then consultation with Poisons Information should take place. Poisons Information can be contacted via the Clinician, or on [13 11 26](tel:131126).

General Notes

- Opioids may be in the form of IV preparations such as Heroin or Morphine and oral preparations such as Codeine, Endone, MS Contin. Some of these drugs also come as suppositories and topical patches.
- Not all opioid overdoses are from IV administration of the drug.
- If inadequate response after 10 minutes patient is likely to require transport without delay.
 - Maintain general care of the unconscious patient including airway management and supported ventilations if required.
 - Consider other causes e.g. head injury, hypoglycaemia or polypharmacy overdose.
 - Beware of patient becoming aggressive.

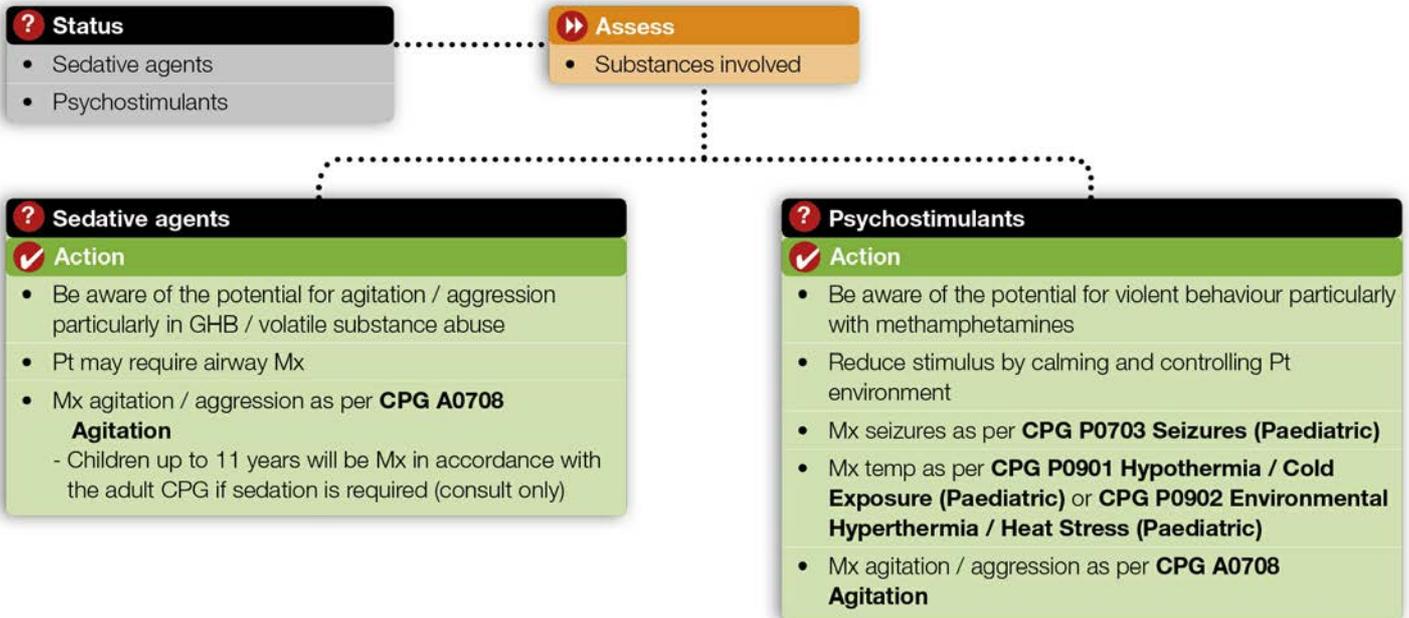
Flowchart



Special Notes

- For patients who refuse transport, repeat the advice for transport using friend / relative assistance. If patient still refuses transport advise the patient and responsible third person of follow up options, counselling services and actions to take for immediate continuing care if symptoms recur.
- For young persons, Paramedics should strongly encourage them to make contact with a responsible adult.
- Paramedics should contact Police if in their professional opinion the patient appears to be a victim of or at increased risk of:
 - Family violence (e.g. from a parent, guardian or care giver).
 - Sexual exploitation or abuse.
 - Or if:
 - The supply of drugs appears to be from a parent / guardian / caregiver.
 - There is other evidence of child abuse / maltreatment or evidence of serious untreated injuries.
- If patient claims to have taken an overdose of a potentially life-threatening substance then they must be transported to hospital. Police assistance should be sought to facilitate this as required.
- Documentation of refusal and actions taken must be recorded on the PCR.
- If the Police are contacted, they will notify the Department of Human Services (DHS) Child Protection if they believe the young person is in need of protection.
- If a young person makes it known they are involved with DHS Child Protection and they give permission, an attempt should be made on their behalf to contact the young person's Child Protection practitioner, Region or Child Protection After Hours Service (24 hours on 131 278) to advise of the ambulance attendance and treatment. The intent is to make arrangements for ongoing care for this patient. Such contact is best made through the Clinician in the operations / communications centre.

Flowchart



General Notes

Signs and symptoms of TCA toxicity

- Mild to moderate OD
 - Drowsiness, confusion
 - Tachycardia
 - Slurred speech
 - Hyperreflexia
 - Ataxia
 - Mild hypertension
 - Dry mucus membranes
 - Respiratory depression
- Severe toxicity (within 6 hours ingestion)
 - Coma
 - Respiratory depression / hypoventilation
 - Conduction delays
 - PVCs
 - SVT
 - VT
 - Hypotension
 - Seizures
 - ECG changes

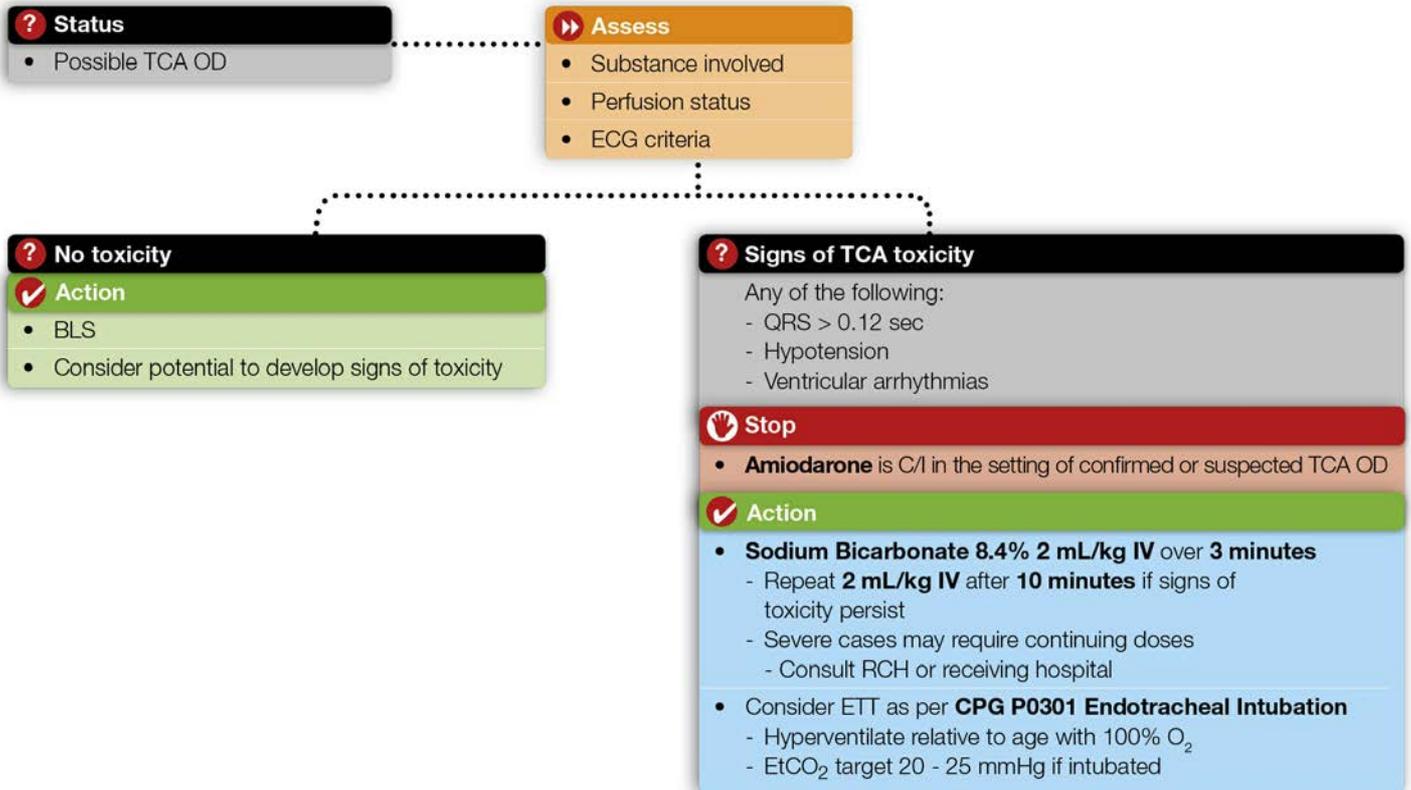
This could lead to aspiration, hyperthermia, rhabdomyolysis and APO.

ECG Changes

ECG changes include prolonged PR, QRS and QT intervals associated with an increased risk of seizures if QRS > 0.10 seconds and ventricular arrhythmias if QRS > 0.16 seconds.

TCAs may be prescribed to treat medical conditions other than depression (e.g. chronic pain).

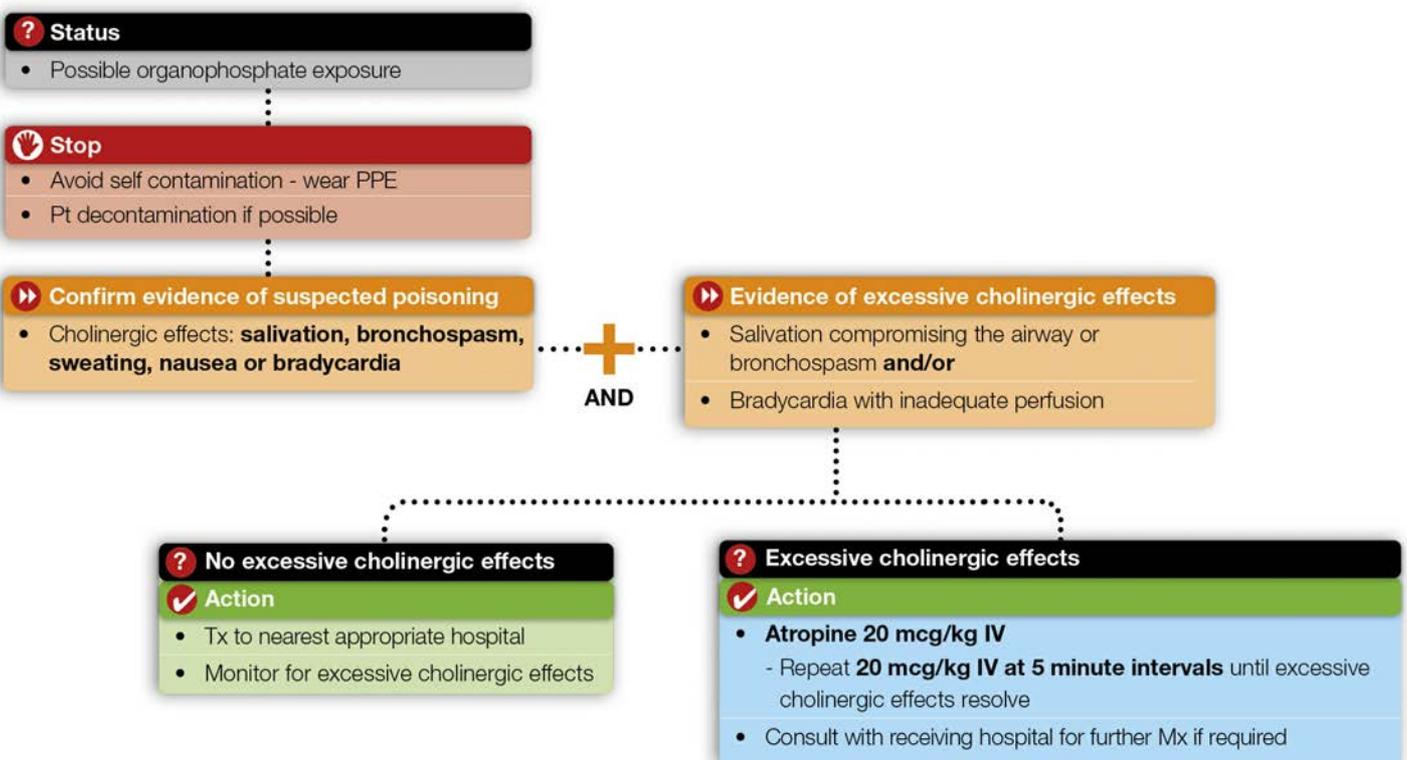
Flowchart



General Notes

- Notify the receiving hospital as patient isolation is essential.
- The key word to look for on the label is anticholinesterase. There are a vast number of organophosphates which are used not only commercially but also domestically.
- If a potential contamination by a possible organophosphate has occurred, the container identifying trade and generic names should be located and the Poisons Information Centre contacted for confirmation and advice via the Clinician, or on 13 11 26.
- In symptomatic cases, MICA Paramedics should consider calling for extra MICA support early as imprecise levels of Atropine may be quickly exhausted if scene times or transport times are prolonged.
- Where possible, remove contaminated clothing and wash skin thoroughly with soap and water.
- Minimise the number of staff exposed.
- Attempt to minimise transfers between vehicles in order to reduce risk of vehicle or equipment contamination and staff exposure.

Flowchart



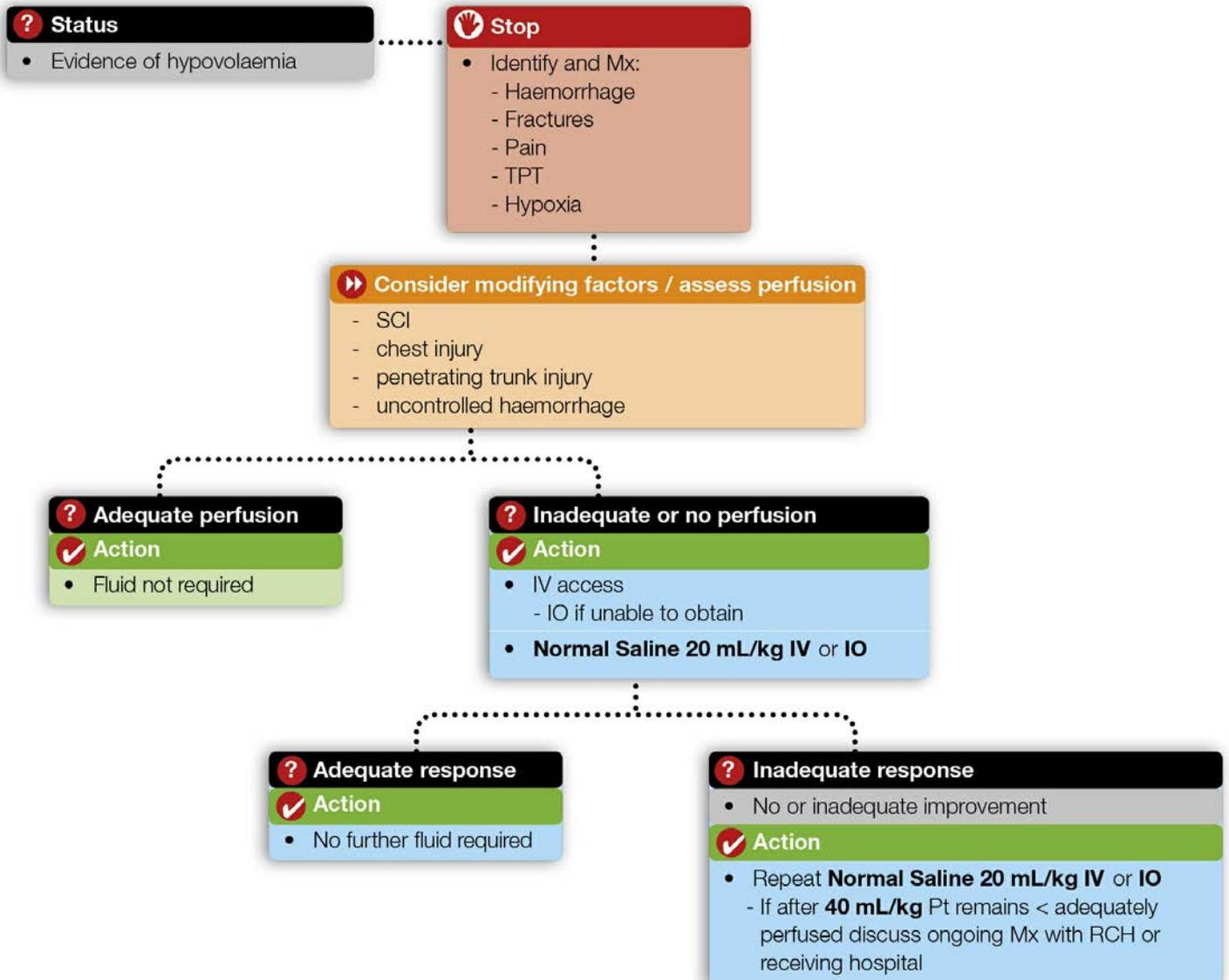
General Notes

- Modifying factors must be considered and managed prior to aggressive fluid therapy.
- Always consider the possibility of TPT in the patient with persistent hypotension unresponsive to fluid therapy, in the setting of a chest injury.
- Excessive fluid should not be given if SCI is an isolated injury.
- If IV access is unable to be obtained and the patient is obtunded, insert IO.
- Provide pain relief as per **CPG P0501 Pain Relief (Paediatric)**.

Modifying factors

- Patients with isolated neurogenic shock can be given up to **5 mL/kg Normal Saline IV** bolus to correct hypotension.
- Chest injury - Consider TPT and manage as per **CPG P0802 Chest Injury (Paediatric)**.
- Penetrating trunk injury or uncontrolled haemorrhage
 - **accept palpable carotid pulse and transport immediately. Consider IV access en route to hospital.**

Flowchart



Care Objectives

- To identify and manage time critical chest injuries such as tension pneumothorax

General Notes

Flail segment / rib fractures

- Pain associated with rib fractures may lead to hypoventilation. In these instances, prioritise careful titration of analgesia.

TPT in the awake / spontaneously ventilating patient

- Patients with generic signs and symptoms of pneumothorax are not indicated for decompression. Paramedics should closely monitor the patient for deterioration.
- TPT is highly likely in the patient with generic symptoms of pneumothorax **AND** subsequent deterioration in respiratory status and/or conscious state. Decompression is indicated in these patients.
- Hypotension is a late sign in the spontaneously ventilating patient. MICA paramedics should not wait for a drop in BP prior to decompression.

TPT in the ventilated patient

- TPT in the ventilated patient is more likely to develop rapidly, with a sudden decrease in SpO₂ and BP.
- Chest injury patients receiving IPPV have a high risk of developing a TPT. Bilateral chest decompression is appropriate prior to managing decreased perfusion.
- Equal air entry is NOT an exclusion criterion for TPT.
- Cardiac arrest patients are at risk of developing chest injury during CPR.

Chest decompression

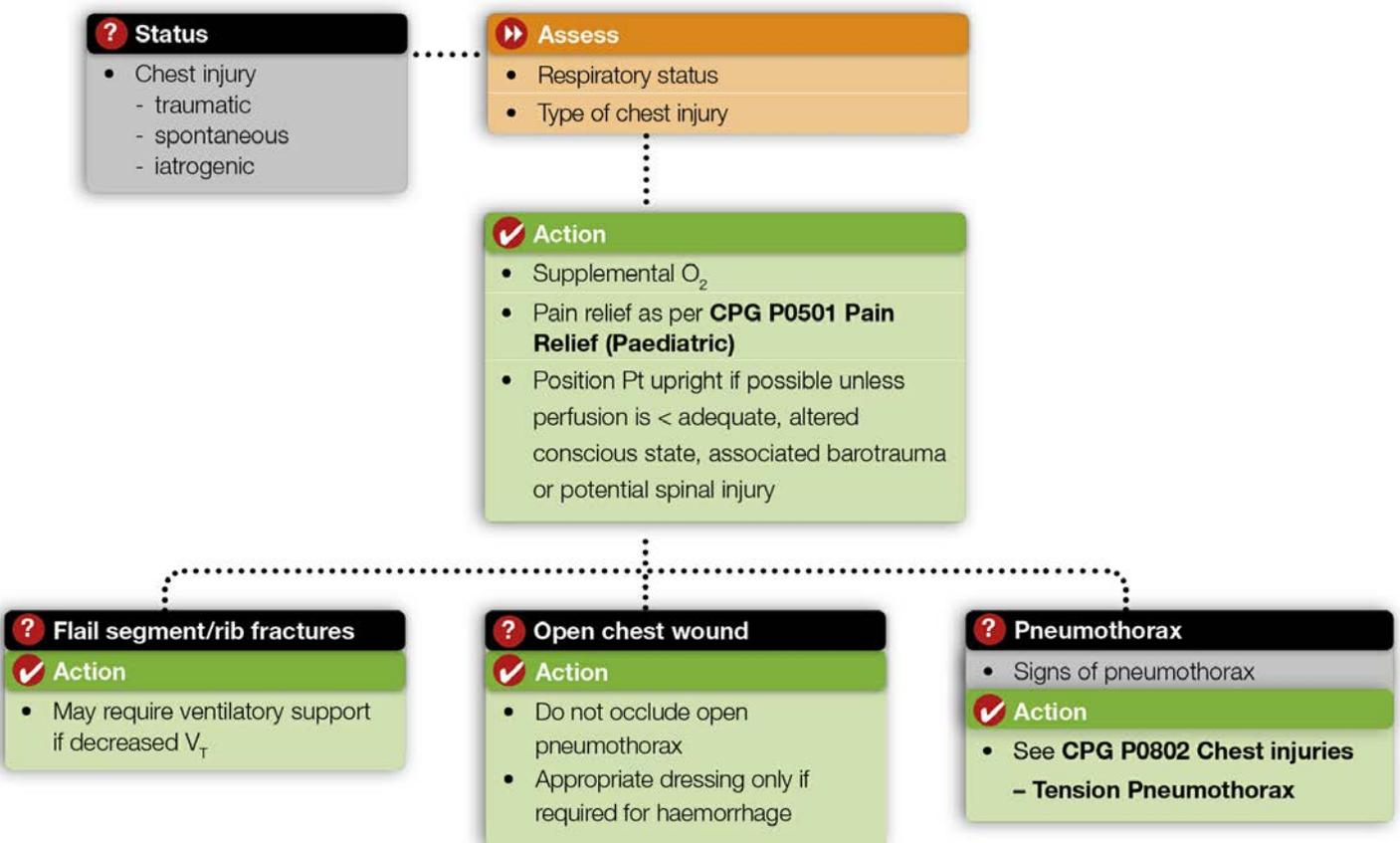
- Insertion site for cannula/intercostal catheter (SMART):
 - **S**econd intercostal space
 - **M**id - clavicular line (avoiding medial placement)
 - **A**bove rib below (avoiding neurovascular bundle)
 - **R**ight angles to chest
 - **T**owards body of vertebrae
- Insert a 14g or 16g cannula depending on patient size.
- If air escapes, or air and blood bubble through the cannula, or no air / blood detected, leave in situ and secure.
- If no air escapes but copious blood flows through the cannula then a major haemothorax is present. Remove the cannula and cover the insertion site.
- Catheter troubleshooting:

- Patient may re-tension as lung inflates if catheter kinks off
- Catheter may also clot off. Flush with sterile **Normal Saline**

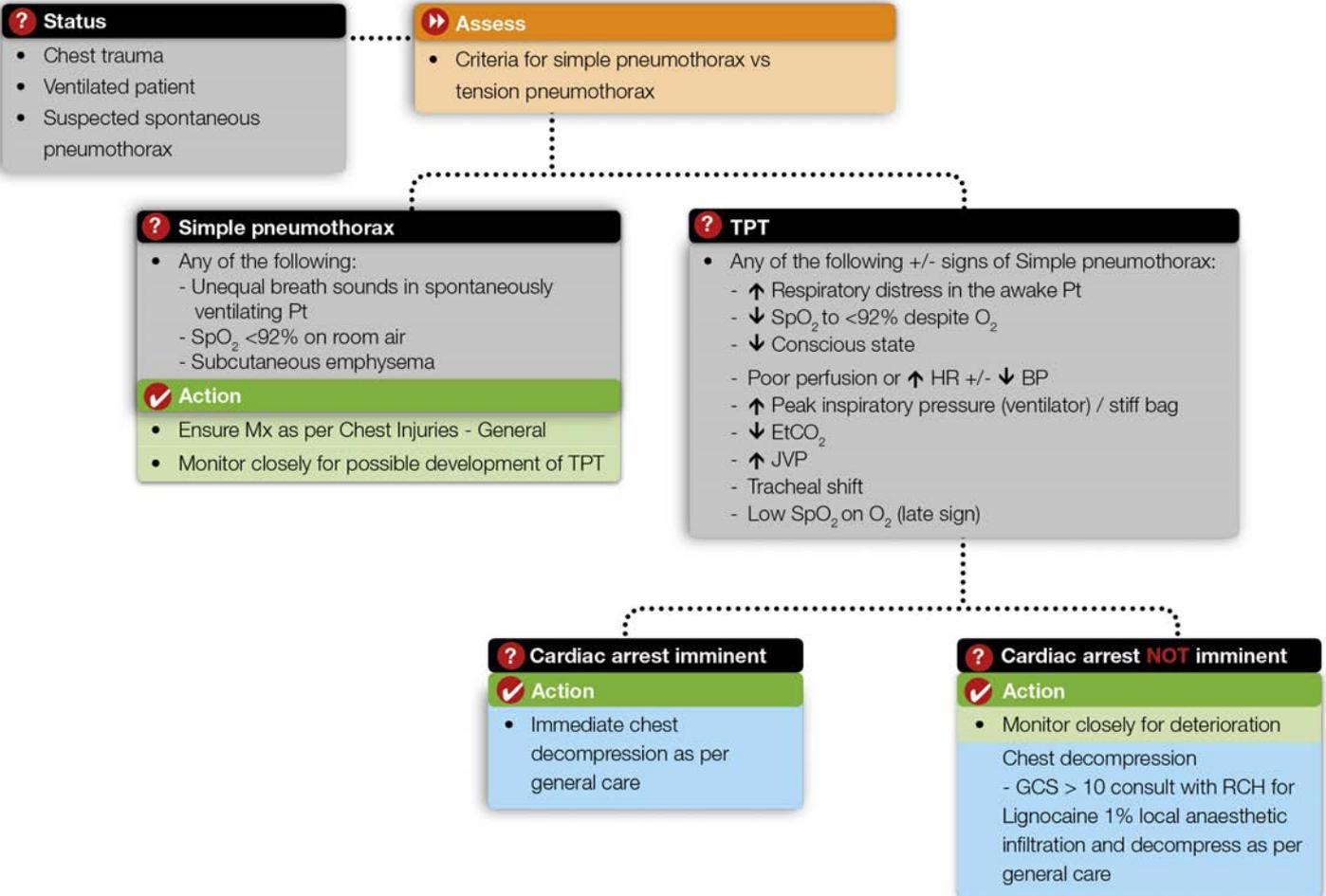
Local anaesthesia for GCS > 10

- Consult with RCH if local anaesthetic is required for chest decompression in the conscious paediatric patient.

Flowchart: Chest Injuries - General



Flowchart: Chest Injuries - Tension Pneumothorax



Care Objectives

- To identify and manage potential airway burns as a priority
- To minimise the impact of injury by maintaining tissue and organ perfusion, minimising pain, appropriate burn wound cooling and minimising heat loss during transfer to hospital.

General Notes

- Signs and symptoms of airway burns include:
 - Evidence of burns to upper torso, neck and face
 - Facial and upper airway oedema
 - Sooty sputum
 - Burns that occurred in an enclosed space
 - Singed facial hair (nasal hair, eyebrows, eyelashes, beards)
 - Respiratory distress (dyspnoea +/- wheeze and associated tachycardia, stridor)
 - Hypoxia (restlessness, irritability, cyanosis, decreased GCS)
- Patients who receive intubation and paralysis are at increased risk of hypothermia. Once a long term paralytic is administered, temperature management becomes a more significant priority.
- Volume replacement is calculated for the burn injury only. Manage other injuries accordingly including the requirement for additional fluid.
- Electrical burns are at increased risk of acute kidney injury secondary to profound muscle damage and may require extra fluid.
- PIPER can be contacted via the Clinician or on 1300 137 650. They should be notified in all cases of suspected airway burns or if TBSA > 10% and the patient is not being transported directly to RCH.

Burn Cooling

- Burn cooling should ideally be undertaken for 20 minutes. Stop cooling if the patient begins shivering or has a temperature $\leq 35^{\circ}\text{C}$. Cooling provided prior to AV arrival should be included in the timeframe.
- Cool with gentle running water between 5 – 15°C where available. Ice and iced water is not desirable. Dirty (e.g. dam) water should be avoided due to contamination and risk of infection.
- If running water is not available, cooling may be achieved by immersing the injury in still water, using a spray bottle or applying moist towels.
- Whilst being mindful of temperature management, chemical burns should be irrigated for as long as pain persists. Avoid washing chemicals onto unaffected areas, especially eyes.
- Remove burnt clothing or clothing containing chemicals or hot liquid when safe to do so. Do not remove any matter that is adhered to underlying tissue. Remove jewellery prior to swelling occurring.

Minimise heat loss

- Maintaining normothermia is vital. Assess temperature as soon as practicable. Protect the patient from heat loss where possible.

Elevate

- If clinically appropriate, elevation of the affected area during transport will minimise swelling and oedema, especially in circumferential burns.

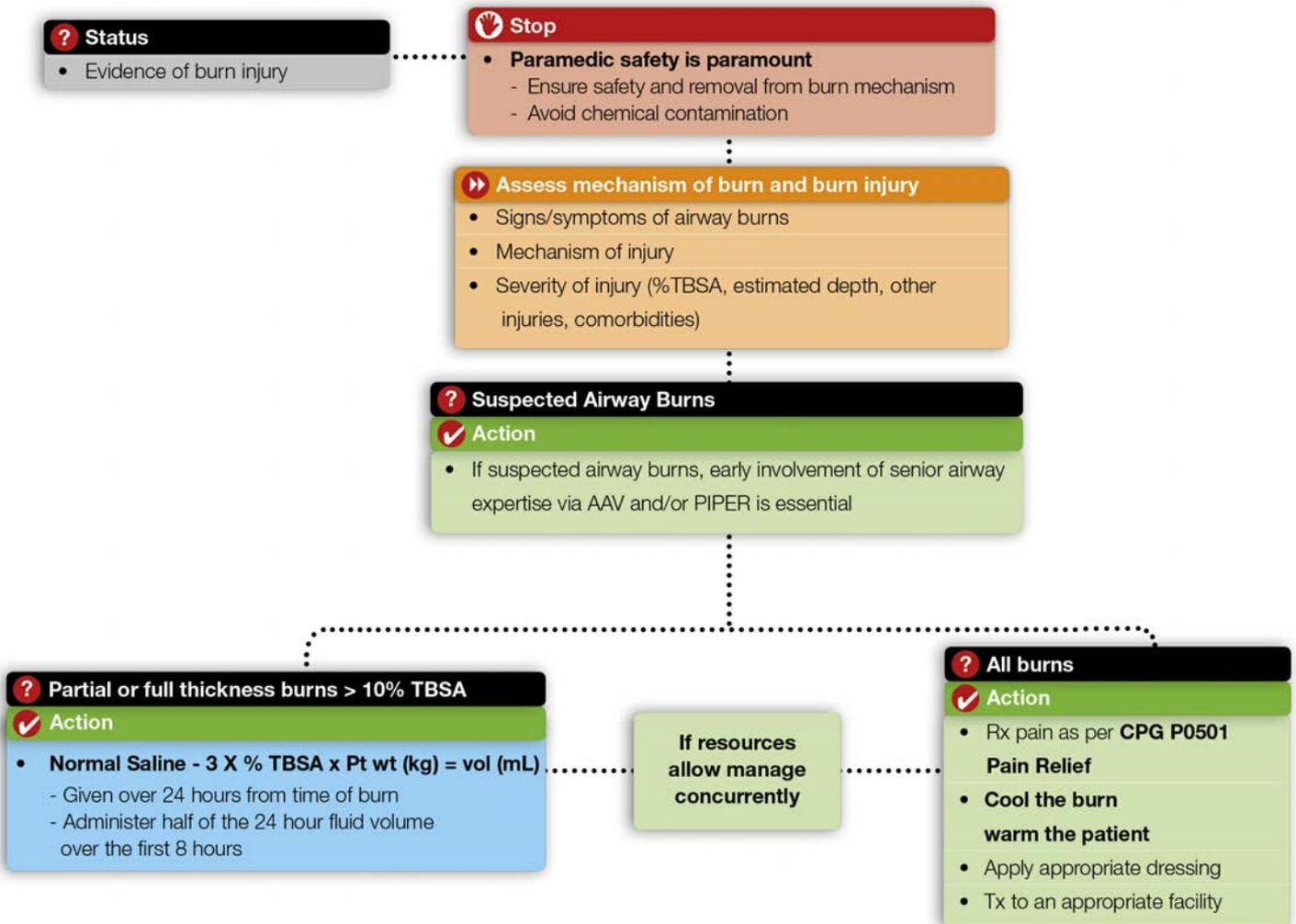
Dressing

- Cling wrap is an appropriate burns dressing and is preferred for all burns. It should be applied longitudinally to allow for swelling.

Transport

- All burns patients who meet the time critical trauma criteria (> 10% TBSA, suspected airway burns, > 1000 volt electrical burns) should be transported to the Royal Children's Hospital as a preference, if within 45 minutes transport time. If transport time > 45 minutes, transport to the nearest alternative highest level of trauma service.
- Any burns involving the face, hands, feet, genitalia, major joints, or circumferential burns of the chest or limbs are recommended for assessment by a major burns service. These patients may not require direct transport to the Royal Children's Hospital if distance is prohibitive, as it may be via telemedicine or secondary transfer.
- In all cases of prolonged transport times, consider alternative air transport.
- In all cases of significant burn injury – whether due to % TBSA or location of injury – consider consultation with PIPER for further management, appropriate destination and hospital notification.

Flowchart

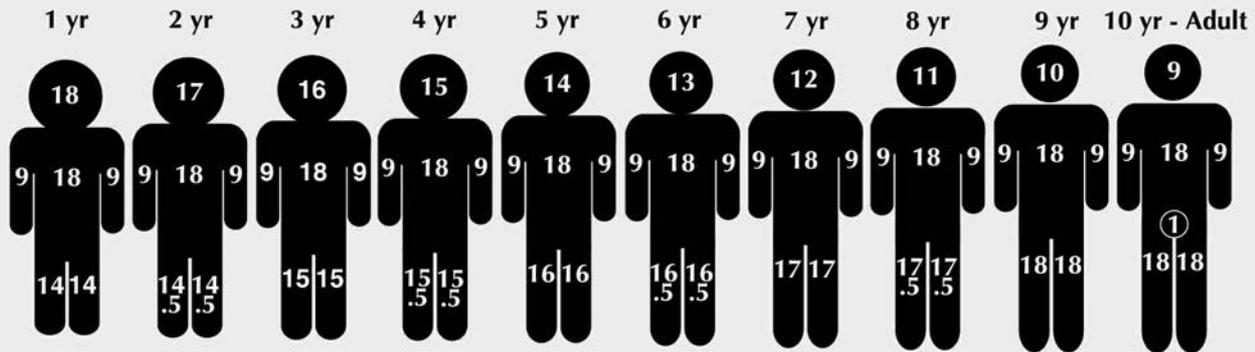


Paediatric - Adult Burns Assessment Ruler

Special Notes

Paediatric-Adult Burns Assessment Ruler

Expressed as a % of Total Body Surface Area



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

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Care Objectives

- To identify and appropriately manage hypothermic patients
- To minimise the risk of major trauma patients becoming hypothermic

General Notes

Intended patient group

- All paediatric patients

Classification

Mild	32 – 35°C
Moderate	28 – 32°C
Severe	< 28°C

Assessment

- Hypothermia is insidious and rarely occurs in isolation if the patient is part of a group.
- Frail patients are at increased risk group for suffering hypothermia and this should be considered when assessing them, irrespective of the initial complaint.
- Potential major trauma patients should receive thermal management under this guideline, irrespective of their temperature.

Cardiac arrhythmias

- Associated with temperatures < 33°C.
- Gentle handling of the patient is essential to avoid stimulating lethal arrhythmias.
- Atrial arrhythmias, bradycardias or A-V blocks will generally resolve on rewarming and this should be the focus of treatment. If the patient has a profound bradycardia and an altered conscious state despite all attempts at rewarming being made, consult for further management.
- Defibrillation and cardioactive medications may not be effective at temperatures < 30°C. VF may resolve spontaneously upon rewarming.

Management

All patients

- The target temperature for the patient compartment of the ambulance for patients suffering or at risk of hypothermia is 24°C or higher.
- If a patient has wet clothes on they must be removed, the patient dried and then thermally protected. If a patient has dry clothes on, they should only be removed if required to assess and treat injuries.
- Where IV fluid is indicated it should be delivered via a fluid warmer if available.

- Bags of IV fluid are **not** to be warmed in a microwave and either administered to a patient, or used as a hot water bottle.

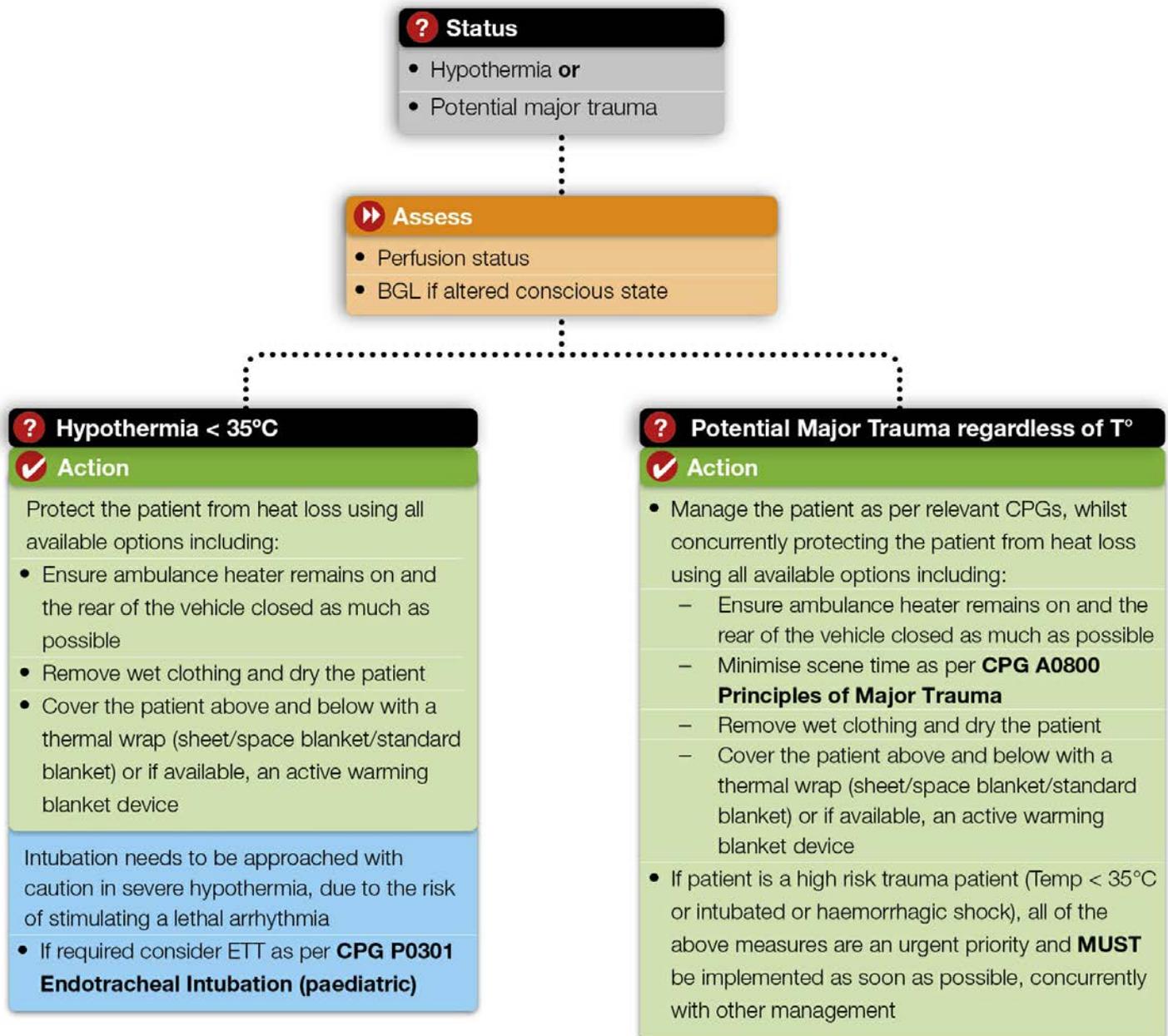
Cardiac arrest

- The onset and duration of medications is prolonged during hypothermia. In cardiac arrest if the patient has a temperature $< 30^{\circ}\text{C}$, the interval between doses of adrenaline or amiodarone is doubled as per **CPG P0201 Cardiac Arrest**.

Intubation

- Intubated hypothermic patients should have their temperature monitored with an oesophageal temperature probe where available.
- Intubated patients who are sedated and paralysed are at risk of becoming hypothermic and should have thermal management initiated once stabilised.

Flowchart



Care Objectives

- To identify and appropriately manage hyperthermic patients with an urgency relative to their presentation.
- The focus of treatment must be on aggressive cooling.

General Notes

Intended patient group

- The cause of heat illness may be:
 - Environmental
 - Exertional
 - Chemically mediated
- Heat stroke is generally defined as a temperature $> 40^{\circ}\text{C}$ with associated CNS dysfunction and is an urgent medical emergency.
- There may be some patients who have cross-over between environmental / exertional and toxin induced heat illness. Irrespective of whether the cause is clear, the focus of management is aggressive cooling.
- If a patient presents with signs / symptoms of heat stroke in a context where it is the likely diagnosis, and other causes of CNS dysfunction are ruled out, they should be actively and aggressively cooled. It is expected that the temperature will be $>38^{\circ}\text{C}$, but the exact number should not be the defining factor when deciding to treat or not.
- Exertional heat illness may affect patients in groups. If presented with a group suffering heat illness, consider requesting further resources such as ice and bottled water be brought to the scene to facilitate cooling and rehydration of multiple patients.

Management

Position

Gentle handling of the patient is essential. Position flat or lateral and avoid head-up positioning as far as possible to avoid hypotension, collapse and possible arrhythmias.

Cooling techniques

Strip / spray / fan

Air flow over the wet skin must be vigorously promoted. Passively blowing air conditioning is not adequate – aggressive fanning is required.

Oral fluids

If the patient is able, cold oral fluids are a suitable method of rehydration.

IV fluids

Cold IV fluid administration is to be titrated to adequate perfusion and consideration of temperature.

Consider a slower rate of fluid administration for the elderly or patients with impaired renal or cardiac function.

Ice bath / cold shower

In some sporting environments access to ice baths and/or open shower facilities may facilitate effective rapid cooling for exertional hyperthermia patients. Consider using these techniques where these facilities and resources are readily accessible while preparing for transport.

Some events will also have ice baths on scene for toxin induced hyperthermia patients. In this circumstance it is possible that the patient will be intubated and placed in the bath prior to AV arrival. If definitive transport is going to be delayed (e.g. awaiting HEMS) consider leaving the patient in the ice bath until ready to move.

Target temperature

Aim for a target patient temperature < 40°C within 30 minutes of onset of symptoms if possible.

Intubated hyperthermic patients

Monitor temperature with an oesophageal temperature probe where available.

Risk Factors

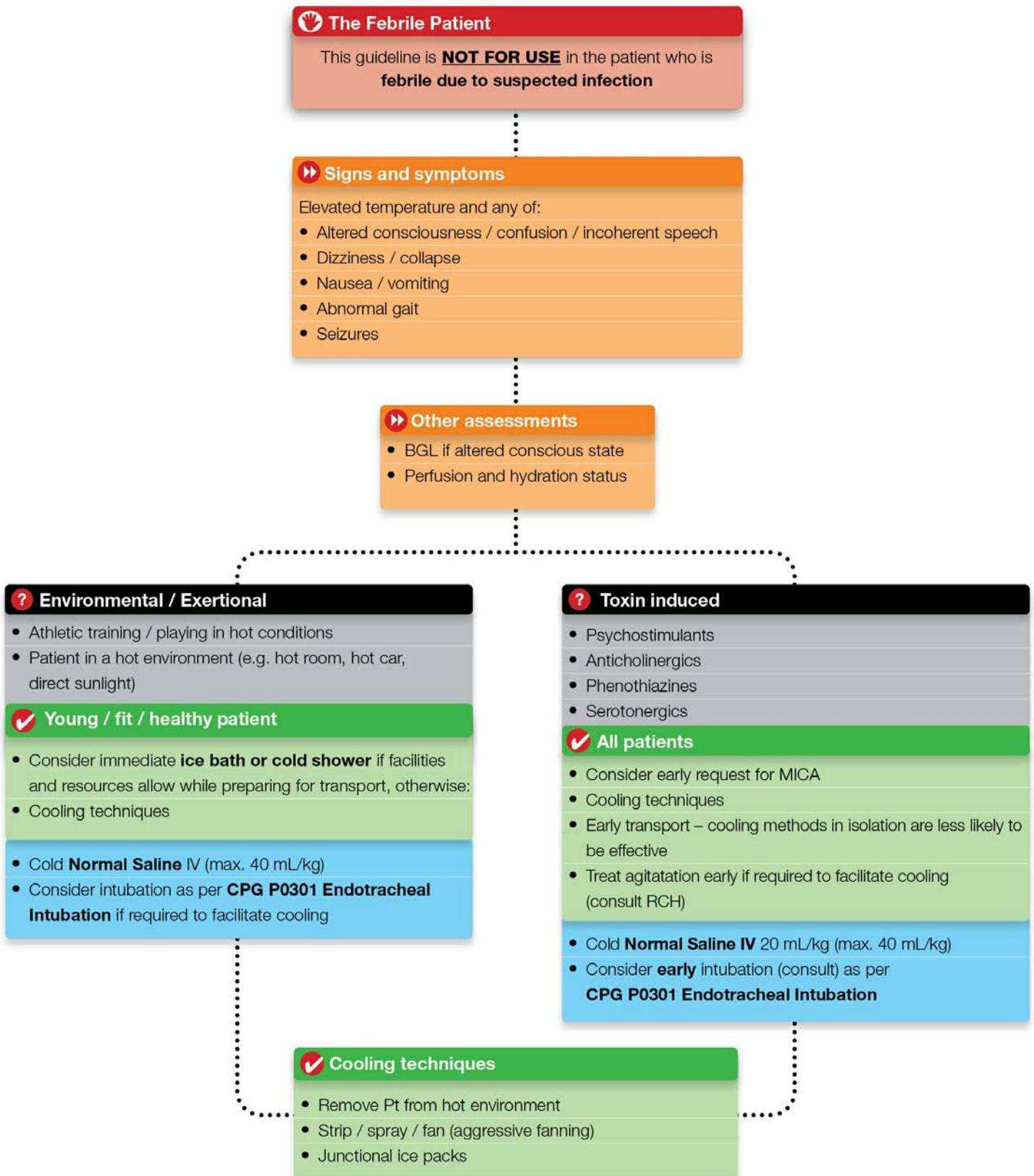
Very young patients

Very young patients are at increased risk of environmental hyperthermia, particularly during heat wave conditions. There should be a low threshold for transport, even if it is purely so they can be monitored in an air conditioned environment.

Toxin induced hyperthermia

Maintain a lower threshold to manage agitation with early sedation to prevent further increases in temperature, as per **CPG P0707 Overdose: Sedative Agents/Psychostimulants**.

Flowchart



Definitions

Term:	37 - 42 weeks gestation
Preterm:	24 – < 37 weeks gestation
Show:	Vaginal discharge of mucous and blood
Spontaneous rupture of membranes:	Gush of normally clear or pink coloured fluid. Can occur from prior to onset of labour until baby is born.
Meconium stained amniotic fluid:	Greenish / brown stained amniotic fluid
First stage labour:	Onset of regular painful contractions to full cervical dilatation (i.e. contractions every 2 - 20 minutes, 20 - 60 seconds duration)
Second stage labour:	Full cervical dilatation to birth of baby (typical duration Primipara 1 - 2 hours, Multipara 15 - 45 minutes)
Imminent birth presentation:	Active pushing / grunting Rectal pressure – urge to use bowels or bladder Anal pouting / bulging perineum Strong unstoppable urge to push Presenting part (baby's head) on view - crowning Mothers statement – “I am going to have the baby”
Precipitate birth:	Unusually rapid labour (less than 4 hours) with extremely quick birth. The rapid change in pressure from intrauterine life may cause cerebral irritation.

Role of paramedics at a home birth

There are home birth programs that have been set up in conjunction with hospitals and under the guidance of the Victorian Department of Health. The midwives in these programs are endorsed by their hospital and will be equipped and have a range of medications to manage common obstetric emergencies and will have two midwives present. In the case of Ambulance Victoria attending the home of a woman in one of these home birth programs (as opposed to an independent home birth), the Ambulance Victoria paramedic will work with the health service midwives to ensure safe and effective care. In the case of an obstetric emergency, the paramedics will usually assist the attending midwives. If the reason for the emergency call is not related specifically to the birth (for example cardiac arrest), the Ambulance Victoria paramedic will take the clinical lead with the home birth midwives assisting. If the home birth is not part of an obstetric hospital staffed and supported program, paramedics are expected to take the clinical lead in all cases, with assistance from any trained staff present at their discretion. If disagreement between parties at scene cannot be resolved, consult with PIPER.

Assessment

Focussed history

In addition to routine history/examination

Previous pregnancies

- Any / number of previous pregnancies?
- Prior caesarean sections / interventions?
- Complications / problems with previous pregnancies?
- Length of previous labours?

Current pregnancy

- How many weeks pregnant are you?
- Are you expecting a singleton or multiple pregnancy?
- Have your membranes ruptured? What was the colour of the amniotic fluid?
- Are you having contractions? Assess frequency and duration.
- Do you have an urge to push?
- Have you felt fetal movements? More / less or same as normal?
- Hospital interventions (if any)?
- Do you anticipate any problems / complications (baby / mother)?
- Have you had any antenatal care?
- Any current complaints?
 - vaginal bleeding / PV loss
 - high BP
 - pain
 - trauma
 - any other issues

Physiological Parameters

Cardiovascular

BP	Minimal change – initial decrease in 1st and 2nd trimesters, normal in 3rd trimester SBP > 170 mmHg and DBP > 110 mmHg is significant
HR	↑ by 15 – 20 bpm (Normal pregnancy HR 80 – 110 bpm)
Cardiac output	↑ by 30 – 40% (Normal volume 6 – 7 L/minute during pregnancy)
ECG	Non specific ST changes, Q waves – (leads III and AVF) atrial and ventricular ectopics
SVR	↓ due to progesterone and blood volume

Respiratory

Respiratory rate	↑ by 15% (2 – 3 breaths/minute) 14 - 19 breaths/minute at term
O ₂ demand	↑ by 15 - 20%
Minute ventilation	↑ by 25 – 50% 11 - 19 L/minute at term
Tidal volume	↑ by 25 – 40%
Arterial pH	↑ to 7.40 – 7.45
PaO ₂	↑ by 10 mmHg 104 - 108 mmHg at term
PaC ₂	↓ 27 – 32 mmHg

Haematological

Blood volume (mL)	↑ 30 – 50% vol 5,500 mL at term
Haemoglobin (g/dL)	↓ 10 – 14 Red cell mass ↑ by 20 – 30% but is less than blood volume increase
Haemoglobin (g/L)	↓ 100 – 140
Haematocrit (%)	↓ 32 – 42 (physiological anaemia)
Plasma volume (mL)	↑ 30 – 50%

Basic Care

As per Clinical Approach CPG A0101 with the following modifications:

Position: (If patient > 20 weeks pregnant)

- Allow the woman to assume a safe position of comfort. If supine, a left lateral tilt can help to reduce aorta-caval compression and subsequent hypotension.
- A 30° tilt can be achieved by placing a wedge (using blankets or pillows if required) under the patient's right hip. This can significantly improve BP.
- If patient requires spinal immobilisation, then she should be packaged and tilted as an entire unit with a 15° tilt.

Supplemental O₂: To maintain SpO₂ > 94%

IV access and fluid therapy:

- Early IV access required in emergencies.
- Consider high compensatory ability in pregnancy. The mother may lose up to 30 – 35% (2 L) circulating blood volume before showing signs of shock / hypotension.
- Fetus may be compromised even when the mother appears stable.

Stabilisation:

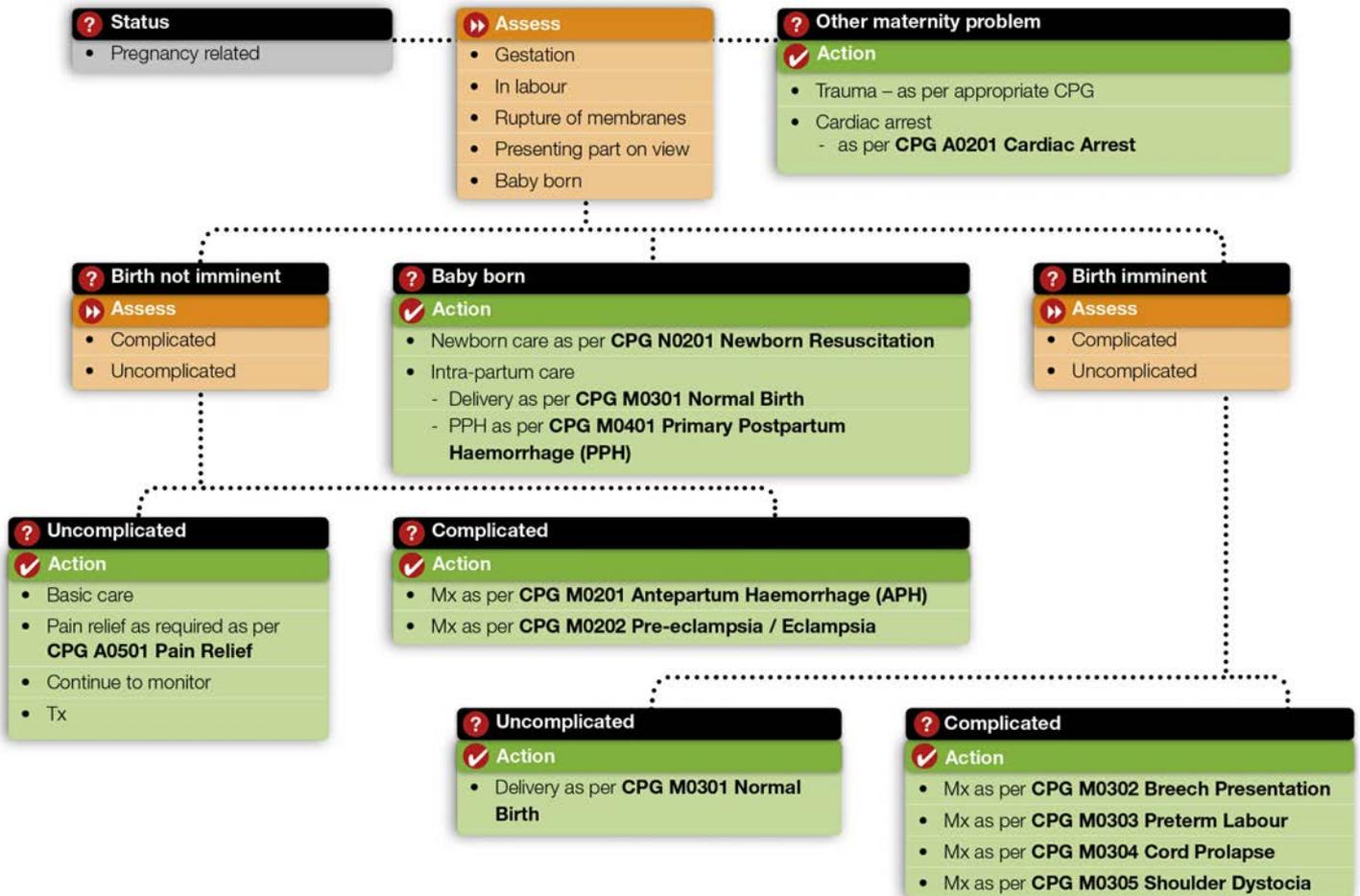
- Assessment and resuscitation of the mother must take priority as ultimately the welfare of the fetus is optimised by providing the best available care to the mother.
- If there is any doubt as to the application of any maternity CPG, consult with PIPER

Triage:

- Fetal morbidity and mortality can occur with seemingly minor blunt trauma.
- All injured pregnant women should have an obstetric assessment due to the risk of placental abruption.
- Even minor injuries may be associated with complications such as feto-maternal haemorrhage.

Contact Paediatric Infant Perinatal Emergency Retrieval (PIPER) 24/7 via Clinician or on 1300 137 650.

Flowchart



Related Resources

- [Maternity Clinical Network \(SCV\)](#)
- [https://av-digital-cpg.web.app/assets/pdf/MAC/4.1.1 CPG Change Proposal - Maternity CPG.pdf](https://av-digital-cpg.web.app/assets/pdf/MAC/4.1.1%20CPG%20Change%20Proposal%20-%20Maternity%20CPG.pdf)

General Notes

- If birth is imminent transport to the closest hospital with a maternity service.

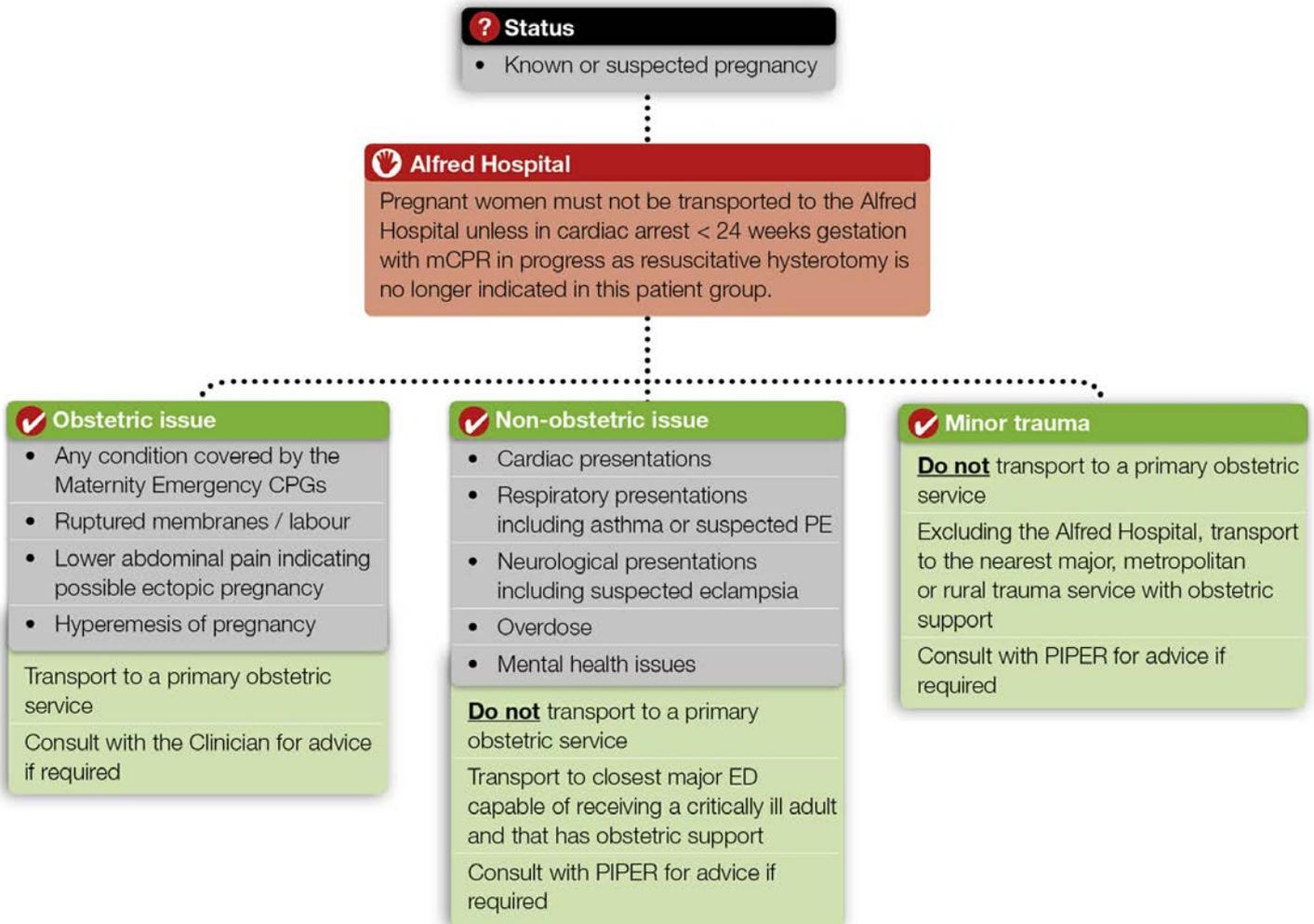
Metropolitan

- When transporting a baby born outside hospital or a woman in labour, if >36 weeks gestation and an uncomplicated labour is anticipated, transport to the maternity unit the patient is booked into. If the patient is not booked into a maternity unit, transport to the closest unit. Notify receiving facility.
- If between 32 – 36 weeks gestation, consult with PIPER for destination advice.
- If <32 weeks gestation transport the patient to the closest of the Royal Women's Hospital, Mercy Hospital for Women Heidelberg or Monash Medical Centre Clayton, as the patient will need NICU facilities.

Rural

- All pregnant women with complications of pregnancy/labour should be transported to the closest regional base hospital.

Flowchart



Assessment and cultural considerations

- Female Genital Mutilation/Cutting includes all procedures that involve partial or total removal of the external female genitalia, or other injury to the female genitals, for non-medical reasons.
- It is most commonly practiced in approximately 30 countries in Africa, the Middle East and Asia. Paramedics may encounter a patient who has migrated to Australia having undergone the procedure previously.
- It is usually performed on girls between infancy and age 15. Some patients will have had it performed on them and be unaware that it was done. It is important for the psychological health of the patient to be sensitive when asking about FGM/C.
- It is important not to react with shock if FGM/C is noted during assessment. The patient should not be left feeling ashamed. When asking about the medical history, the preferred terminology is female genital cutting or circumcision, as patients do not see themselves as mutilated.
- There are four types of FGM/C ranging from part or all of the clitoris being removed, through to stitching or cauterizing the labia, closing off most of the vaginal opening.

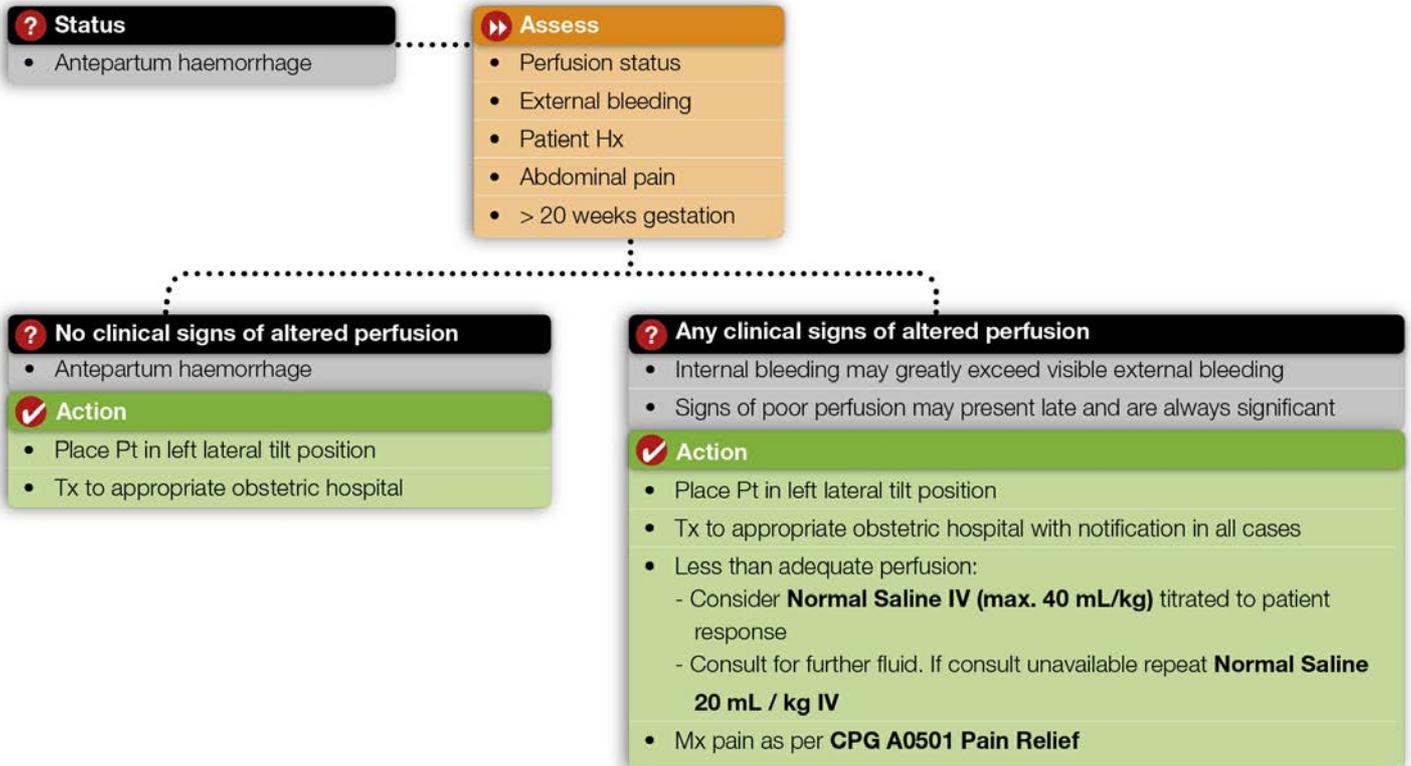
General Care

- FGM/C can lead to significant complications during childbirth, including prolonged second stage of labour, increased risk of tears/lacerations and associated haemorrhage, increased need for episiotomy and increased need for a caesarean section.
- If a patient is geographically close to hospital and can be loaded into the ambulance, rapid transport with notification is the best option. If a patient is not geographically close to hospital or cannot be loaded due to advanced labour, PIPER will advise on management options.
- FGM/C cases may be confronting in some circumstances. Staff are encouraged to contact Peer Support on [1800 626 377](tel:1800626377).
- If a woman presents in labour and has had FGM/C, contact PIPER as soon as possible via the Clinician or on [1300 137 650](tel:1300137650) for support and advice.

Related Resources

- [https://av-digital-cpg.web.app/assets/pdf/MAC/MAC May 2019 CPG M0101-3 Female genital mutilation cutting.pdf](https://av-digital-cpg.web.app/assets/pdf/MAC/MAC%20May%202019%20CPG%20M0101-3%20Female%20genital%20mutilation%20cutting.pdf)

Flowchart



Special Notes

- Pre-eclampsia and eclampsia are time critical emergencies requiring early recognition, intervention and prompt transport to reduce perinatal and maternal mortality.
- Signs and symptoms of pre-eclampsia include:
 - headache
 - cerebral irritability/agitation
 - visual disturbances (flashing lights, shimmering)
 - nausea and / or vomiting
 - heartburn / epigastric or abdominal pain
 - hyper-reflexia
 - An elevation of 20 mmHg above normal blood pressure may be sufficient to indicate pre-eclampsia if other signs or symptoms are present.
- Uterine pain and / or PV bleeding may signify abruption.
- The most common cause of seizures in pregnancy is pre-existing epilepsy. New onset seizures in the latter half of pregnancy are most commonly eclampsia.
- Seizures may occur during or post birth, usually within 48 hours of birth.
- There are no reliable clinical indicators to predict eclampsia. Eclamptic seizures usually do not last longer than 90 seconds and are self-limiting.
- The only definitive treatment is birth of the baby.
- Provide early hospital notification.

Paediatric Infant Perinatal Emergency Retrieval (PIPER) for advice via Clinician or on 1300 137 650

Inter hospital transfer

- Management of this condition may involve pharmacological control of hypertension, neurological instability and the prevention of seizures. This may include:

Nifedipine

- Initial hospital dose is 10 mg oral, repeated after 30 minutes if inadequate response.

MICA only IHT drugs

Loading doses and infusions should be established prior to transport. IV Magnesium Sulphate

- Indicated for severe pre-eclampsia and for seizure prophylaxis. Infusion via a dedicated line and controlled infusion device with ECG monitoring in situ. A usual loading dose is 4 mg IV over 10 – 15 minutes or via IM with maintenance infusion usually at 1 g/hr (4 mmol/ hr) until at least 24 hours post delivery or last seizure.

IV Labetolol

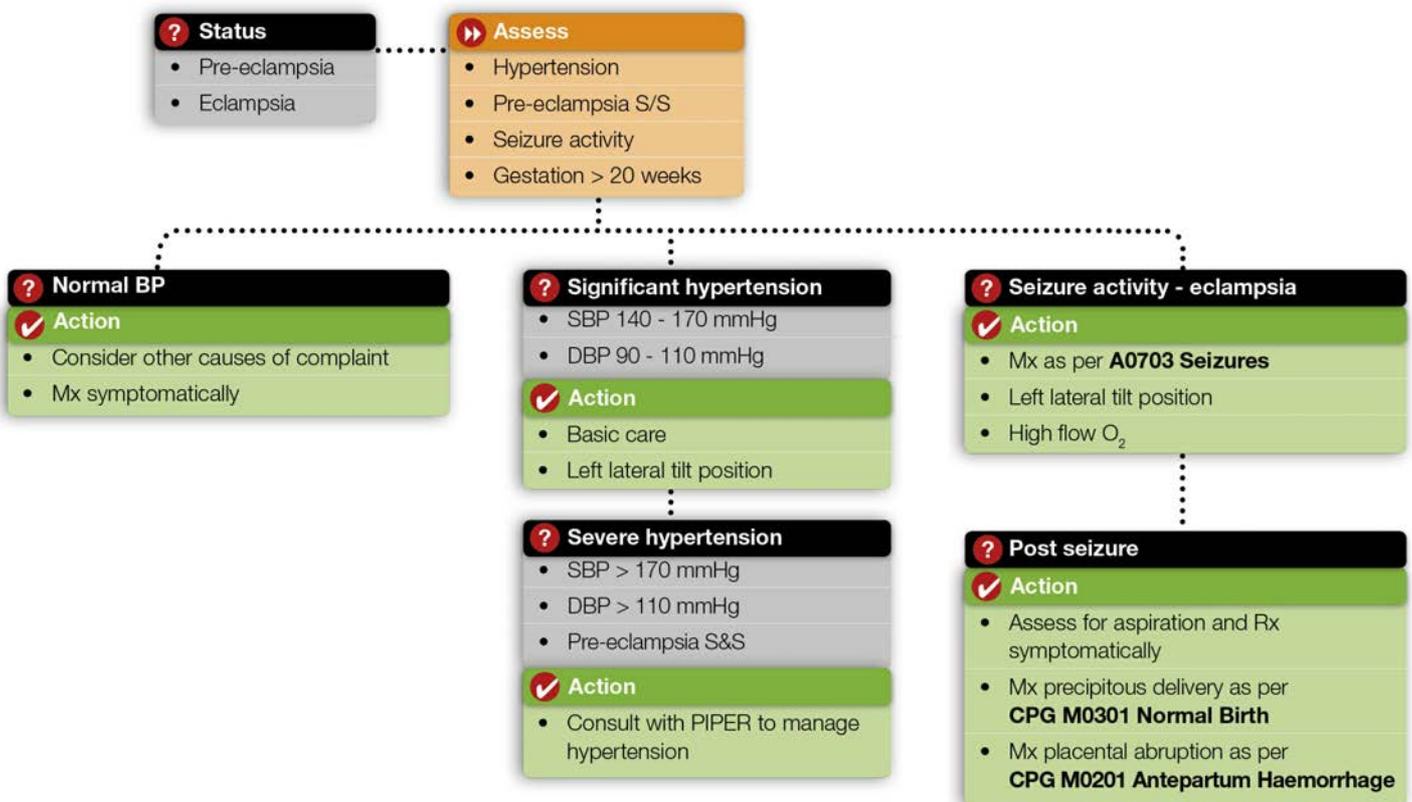
- Initial IV bolus of 20 mg given slowly over 2 minutes. This can be repeated every 10 minutes until optimal BP is achieved or max. dose of 300 mg delivered. Alternatively a 20 – 160 mg/hr infusion can follow the initial bolus titrated to achieve optimal BP.

IV Hydralazine

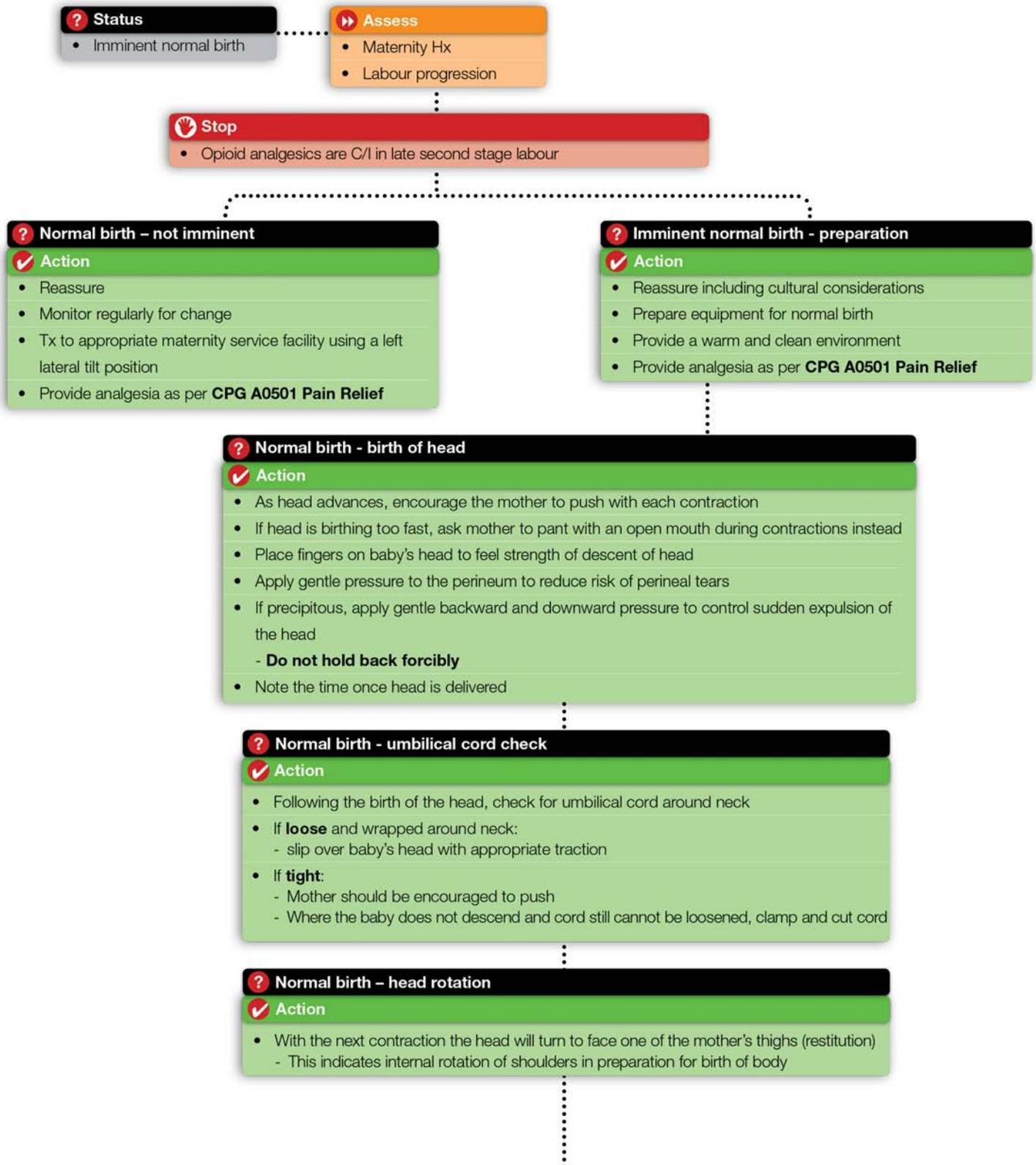
- Initial IV bolus (usually 5 – 10 mg) over 5 – 10 minutes. This can be repeated two more times at 30 minute intervals. Maintenance infusion run at 5 mg/hr. Adjust rate to maintain BP between 140 - 160 / 90 - 100 mmHg. The BP should not fall below 140/80 mmHg as the placental circulation will have adapted to a higher BP.

The severity of the disease will dictate the escort's scope of practice – MICA, AAV MICA, midwife / obstetrician escort, ARV.

Flowchart



Flowchart



? Normal birth – birth of the shoulders and body

✓ Action

- May be passive or guided birth
- Hold baby's head between hands and if required apply gentle downwards pressure to deliver the anterior (top) shoulder
- Once the baby's anterior shoulder is visible, if necessary to assist birth, apply gentle upward pressure to birth posterior shoulder – the body will follow quickly
- Support the baby
- Note time of birth
- Place baby skin to skin with mother on her chest to maintain warmth unless baby is not vigorous / requires resuscitation
- Mx the vigorous newborn as per **CPG N0101 Newborn Baby**
- Mx the non vigorous newborn as per **CPG N0201 Newborn Resuscitation**
- If the body fails to deliver in < 60 sec after the head Mx as per **CPG M0305 Shoulder Dystocia**
- Following delivery of baby, gently palpate abdomen to ensure second baby is not present

? Normal birth – clamping and cutting the cord

✓ Action

- There is no immediate urgency to cut the cord. Wait for the cord to stop pulsating, which commonly takes one to two minutes. Allow birthing partner to cut the cord if they wish. Ideally, cord cutting should be undertaken prior to extrication.
- To cut the cord, apply first clamp 10cm from the baby and the second clamp a further 5cm from the first, then cut between the two clamps.
- For uncomplicated births, a parental birthing preference where mother and baby are transported to hospital still attached is permissible e.g. lotus births

? Normal birth – birthing placenta (third stage)

- Delivery of baby to placenta

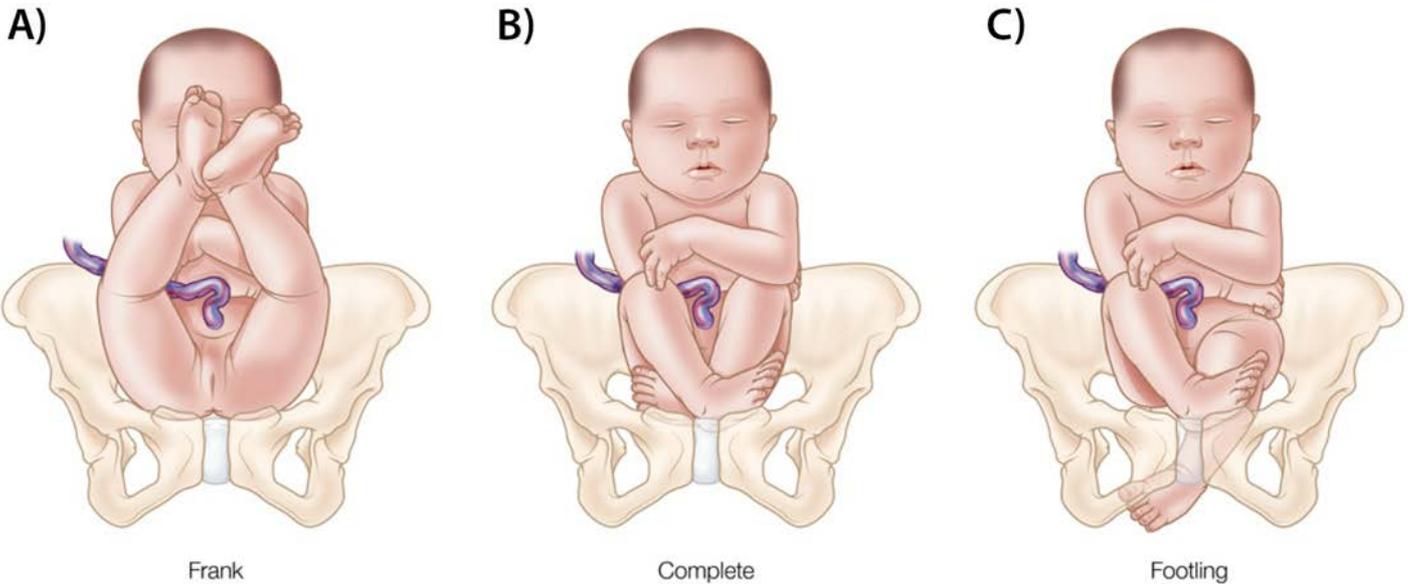
✓ Action

Passive (expectant) Mx

- Allow placental separation to occur spontaneously without intervention
- This may take from 15 minutes up to 1 hour
- Position mother sitting or squatting to allow gravity to assist expulsion
- Breast feeding may assist separation or expulsion
- **Do not pull on cord – wait for signs of separation**
 - lengthening of cord
 - uterus becomes rounded, firmer, smaller
 - trickle or gush of blood from vagina
 - cramping / contractions return
- Placenta and membranes are birthed by maternal effort. Ask mother to give a little push
- Use two hands to support and remove placenta using a twisting 'see saw' motion to ease membranes slowly out of the vagina
- Note time of delivery of placenta
- Place placenta and blood clots into a container and transfer
- Inspect placenta and membranes for completeness
- Inspect that fundus is firm, contracted and central
- Continue to monitor fundus though do not massage once firm
- If fundus is not firm or blood loss > 500 mL Mx as per **CPG M0401 Primary Postpartum Haemorrhage (PPH)**

Special Notes

Types of Breech Presentation



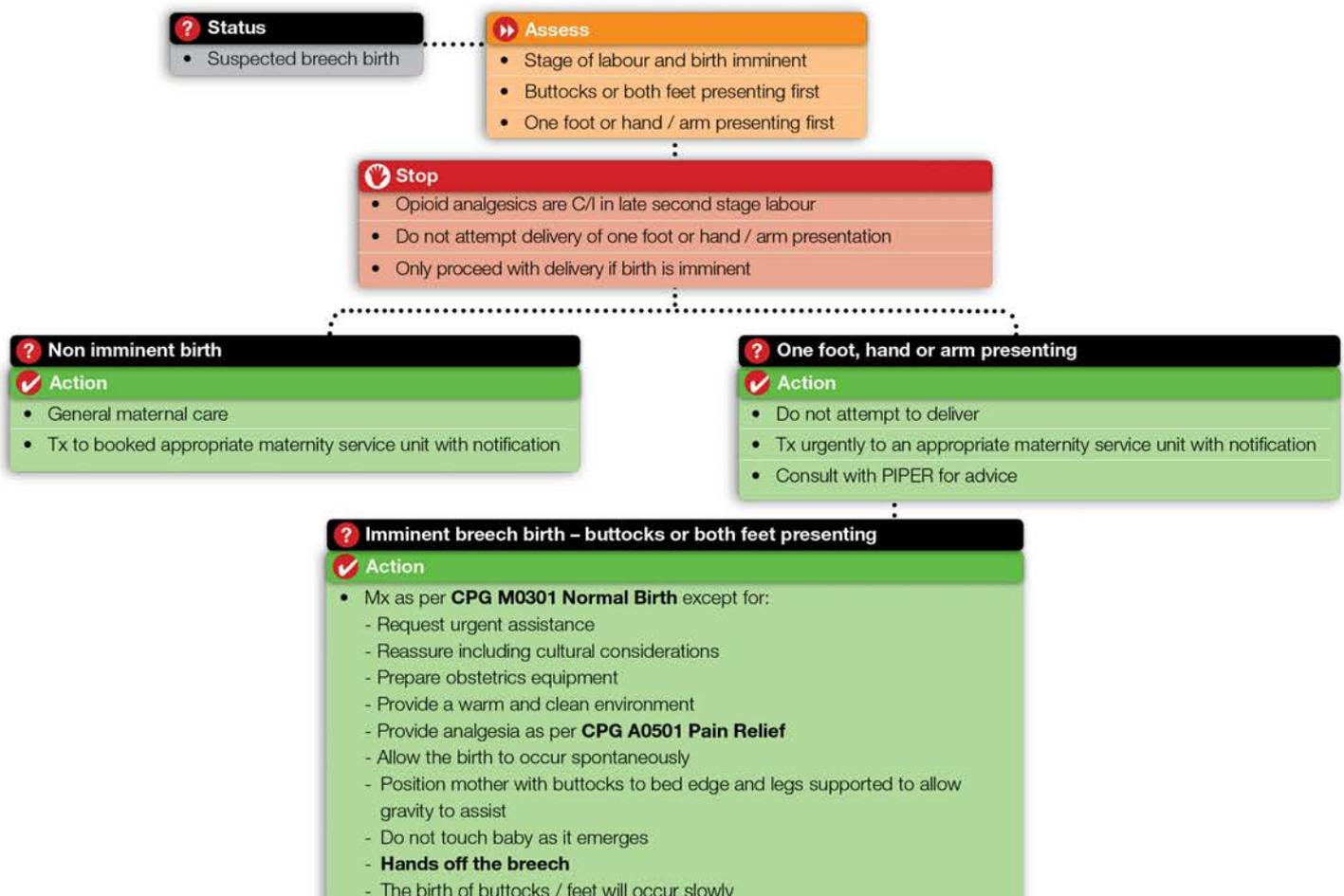
- A. Breech with extended legs (frank breech) – buttocks present first with flexed hips and legs extended on the abdomen.
Most common = $\frac{1}{2}$ of all breech presentations.
- B. Breech with flexed legs (complete breech) – buttocks present first with flexed hips and flexed knees.
- C. Footling – one or both feet present as neither hips nor knees are fully flexed. Feet are palpated lower than the buttocks.
- It is normal for meconium to be passed as the baby's buttocks are squeezed.
 - Cord prolapse is more common with breech presentation.
 - If a known breech and birth is not imminent, transport to a booked obstetric unit with capacity for surgical intervention. Provide early hospital notification.
 - In the setting of precipitous delivery with back not uppermost, consider positioning mother kneeling on all fours to allow restitution.

General Care

During all breech labour

- Keep mother informed of progress. Encourage mother to push hard with contractions.
- Position mother with buttocks to bed edge with legs supported (lithotomy position) if on a stretcher or bed. Standing or squatting may be preferred by the mother and is more anatomically and physiologically sound though not suited to transport or imminent birth.
- A hands off approach encourages the baby to maintain a position of flexion, which simplifies birth.
- Only touch to gently support. If too much stimulus is provided the baby will extend flexed head.
- Main force of birth is maternal effort. Do not attempt to pull baby out. The key is to allow the birth to occur spontaneously with minimal handling of the newborn.
- Most additional manoeuvres are only required in the event of delay.
- Prevent hypothermia by maintaining a warm environment. Use available resources e.g. warm towels or bubble wrap to wrap the baby if the body is exposed for an extended period. Cool air may stimulate breathing which is not desirable if the head remains unborn.

Flowchart



⋮

? Buttocks first presentation – back uppermost – delivery of body/legs

- ✓ Action**
- This is the most common presentation
 - **Do not attempt to pull the baby out**
 - Encourage mother to push hard with contractions
 - Feet and legs should spring free
 - Await further descent
 - Keep body warm by wrapping in a towel or bubble wrap if needed
 - The body will further descend to the clavicles and arms should swing free
 - Let baby hang until the nape of neck is visible
 - The baby should face downward
 - Assist birth of the head using modified **Mauriceau Smellie Veit Manoeuvre**

⋮

? Buttocks first presentation – back uppermost – delivery of head
Modified Mauriceau Smellie Veit Manoeuvre

- ✓ Action**
- Place the index and ring finger of non dominant hand on the baby's shoulders and middle finger on the occiput to assist with flexion of the head
 - Place dominant hand under the baby to support the body, with ring and index fingers on the baby's cheekbones
 - Slowly lift the baby straight up in a circle onto the mother's abdomen, allowing the head to birth slowly
 - An assistant can aid flexion of head by applying direct pressure behind the pubic bone
- ⋮

Flowchart continued

? Buttocks first presentation – back not uppermost

✓ Action

- The baby's back needs to remain uppermost
- If legs delivered and back is not uppermost
 - Gently hold the baby by placing thumbs on bony sacrum with fingers around thighs.
 - **Do not squeeze the abdomen**
 - Rotate / turn baby uppermost between contractions taking care of baby's spine
 - Take great care to **never pull the baby**



? Buttocks first presentation – legs don't birth spontaneously

✓ Action

- If extended legs (frank breech)
 - slip one hand along the leg of the baby lying anteriorly
 - place a finger behind the baby's knee and deliver it by flexion and abduction



? Buttocks first presentation – arms don't birth spontaneously

Lovsett's Manoeuvre

✓ Action

- Hold baby by the sacrum
- Turn baby 90 degrees so that one shoulder is in the antero-posterior diameter
- Insert a finger into the brachial plexus and sweep the arm down over the baby's chest
- Turn baby 180 degrees so that the opposite shoulder is in the antero-posterior diameter
- Repeat the finger manoeuvre
- Turn the baby 90 degrees again so that the back is uppermost
- Await further descent
- **Do not pull or apply traction**

Contact PIPER via Clinician or on 1300 137 650 for advice

Special Notes

- There is a high possibility of abnormal presentation.
- Tocolytics are drugs intended to suppress premature labour. They are contraindicated in the setting of massive maternal haemorrhage (APH) and pregnancy induced hypertension (pre-eclampsia / eclampsia).
- Consider transporting patient semi-prone with hips elevated over folded towels in order to take pressure off amniotic sac.

Inter hospital transfer

- Some women may be receiving tocolytics to suppress preterm labour. This may include pharmacotherapy including:

Nifedipine

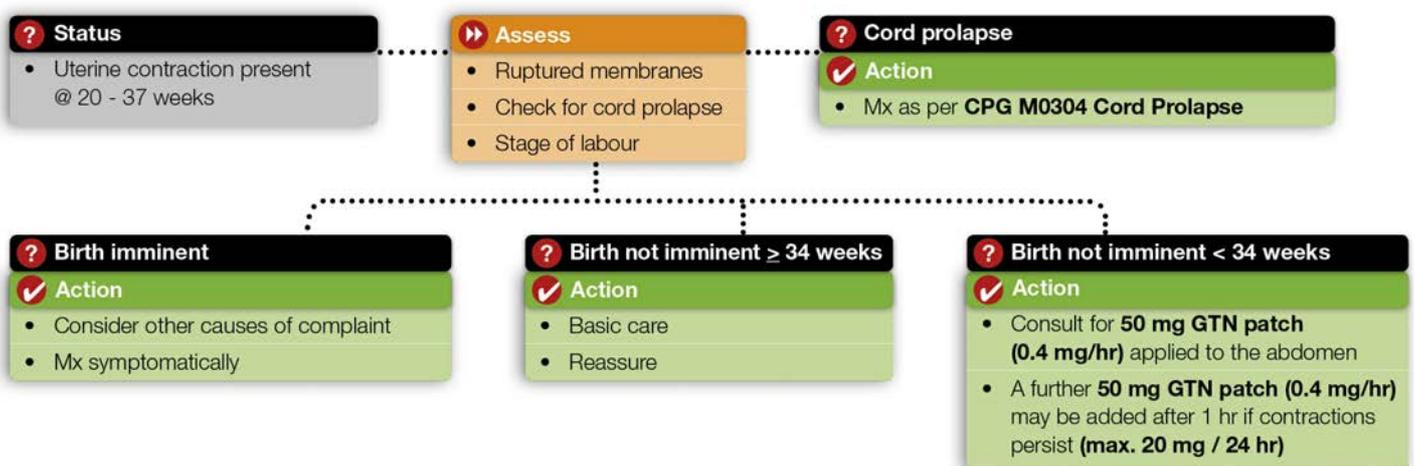
- The drug of choice. Initial dose of up to 20 mg orally given by hospital. Monitor for adverse reaction prior to transport. Can repeat if contractions persist after 30 minutes. Ongoing monitoring of blood pressure and pulse is required.

GTN Patch 50 mg (0.4 mg/hour) transdermal

- Placed on abdomen. A further 50 mg (0.4 mg/hour) patch may be added after 1 hour if contractions persist (maximum dose 100 mg in 24 hours). Paramedics may commence this therapy after appropriate consultation.
- A 50 mg Transiderm patch delivers 10 mg per 24 hours at 0.4 mg/hour. Obstetric services may quote 10 mg patch instead of 50 mg as actual dose being delivered.

Contact PIPER via Clinician or on 1300 137 650 for advice

Flowchart

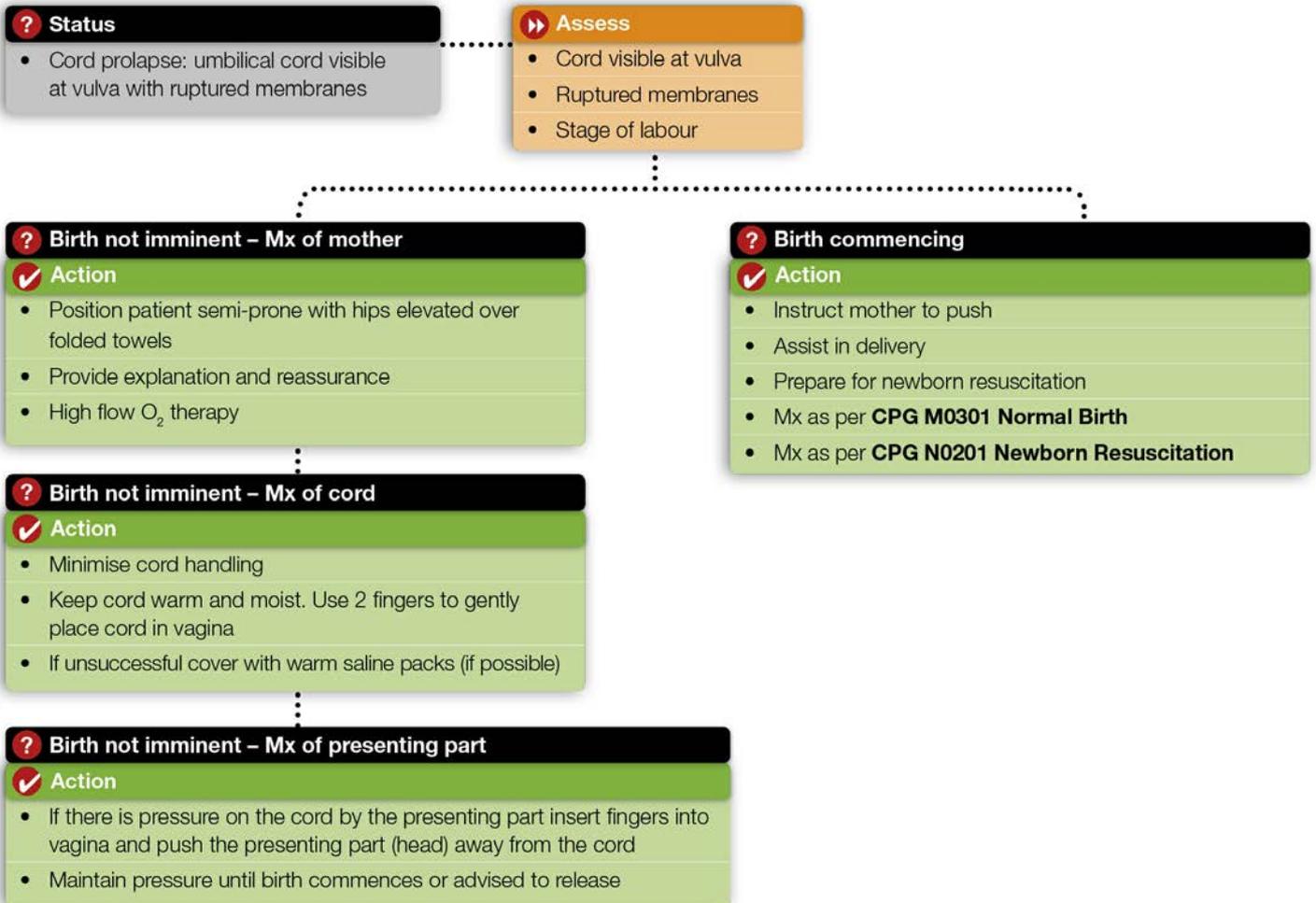


Special Notes

- This is a time critical emergency – early diagnosis, immediate intervention and prompt transport to an appropriate facility are effective in reducing the perinatal mortality rate.
- Notify the receiving hospital early.
- In most instances caesarean section is the preferred method of birth, however if birth is imminent encourage mother to push – this ONLY applies when the presenting part is distending the perineum and the mother is pushing uncontrollably. Prepare for resuscitation of the newborn as per **CPG N0201 Newborn Resuscitation**.
- Cord prolapse is usually associated with an unstable lie or malpresentation.
- Cord handling should be kept to a minimum as this can lead to vasospasm or contraction of umbilical vessels.
- Key history is important: time membranes ruptured, how long has the cord been visible, due date, fetal movement felt, onset of labour, contractions present, fetal presentation if known, PV bleeding.

Contact PIPER via Clinician or on 1300 137 650 for advice

Flowchart

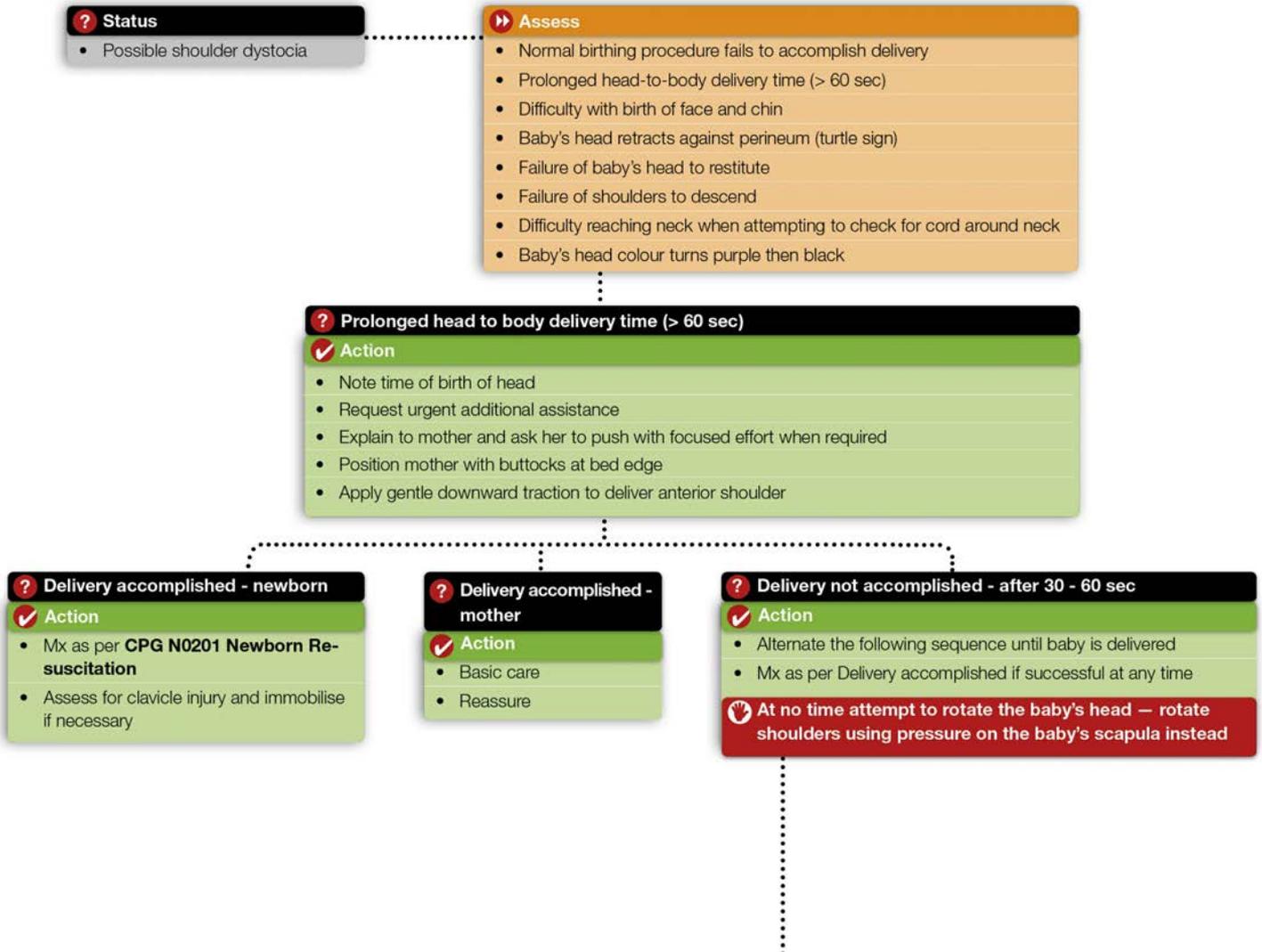


Special Notes

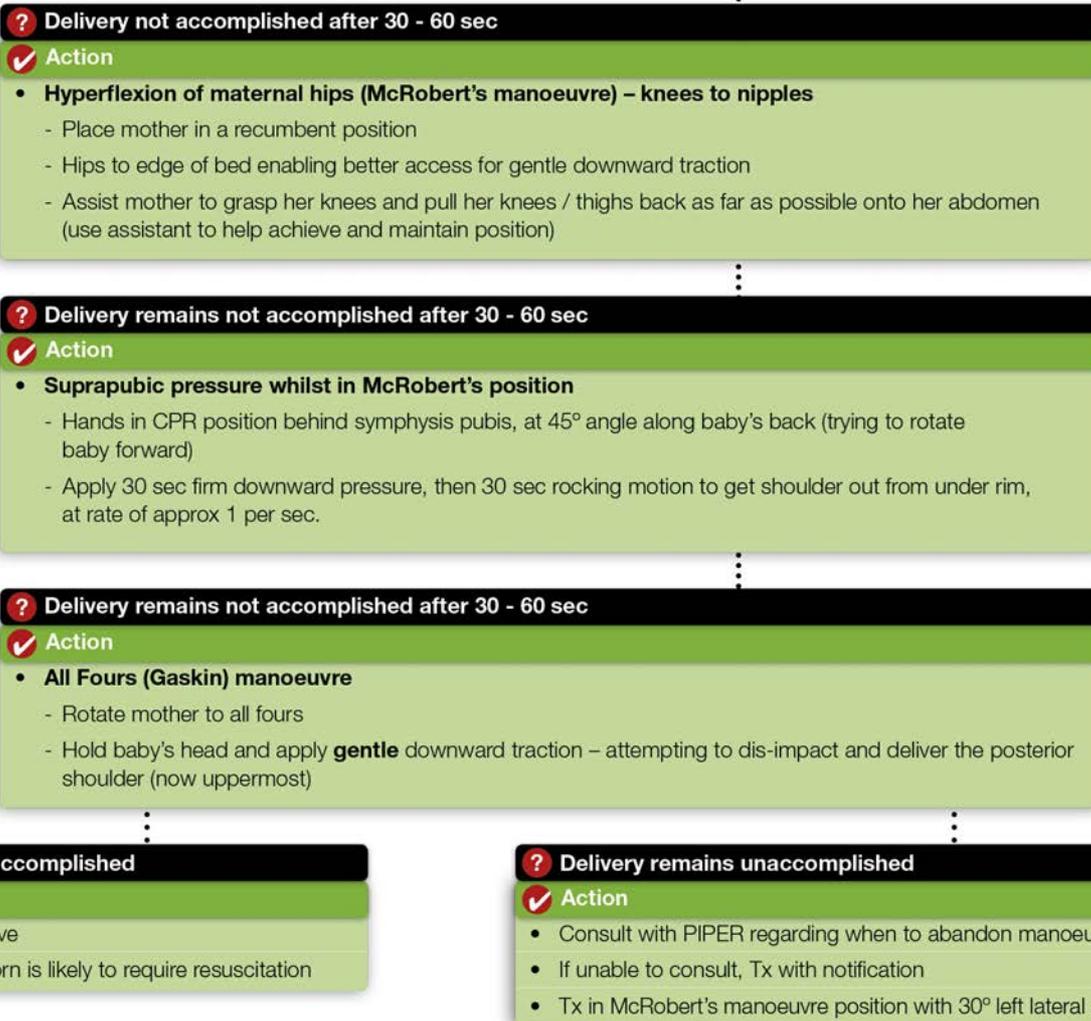
- This is a time critical situation. There is 5 - 7 minutes to deliver the baby due to compression of the cord against the pelvic rim.
- Explain the situation to the mother to gain maximum co-operation.
- It is important to note times of birth of head, timing of manoeuvres and delivery of body.
- The newborn is likely to be compromised in this setting and require resuscitation.
- During procedures, be prepared for a sudden release of resistance and be prepared to take hold of the baby.
- The process of releasing the baby may cause injury, particularly clavicle fracture. Manage any such injury appropriately including arm immobilisation.
- If these manoeuvres are not successful, consult with PIPER regarding when to abandon attempts to deliver and initiate transport.

Contact PIPER via Clinician or on 1300 137 650 for advice

Flowchart



Flowchart continued



Special Notes

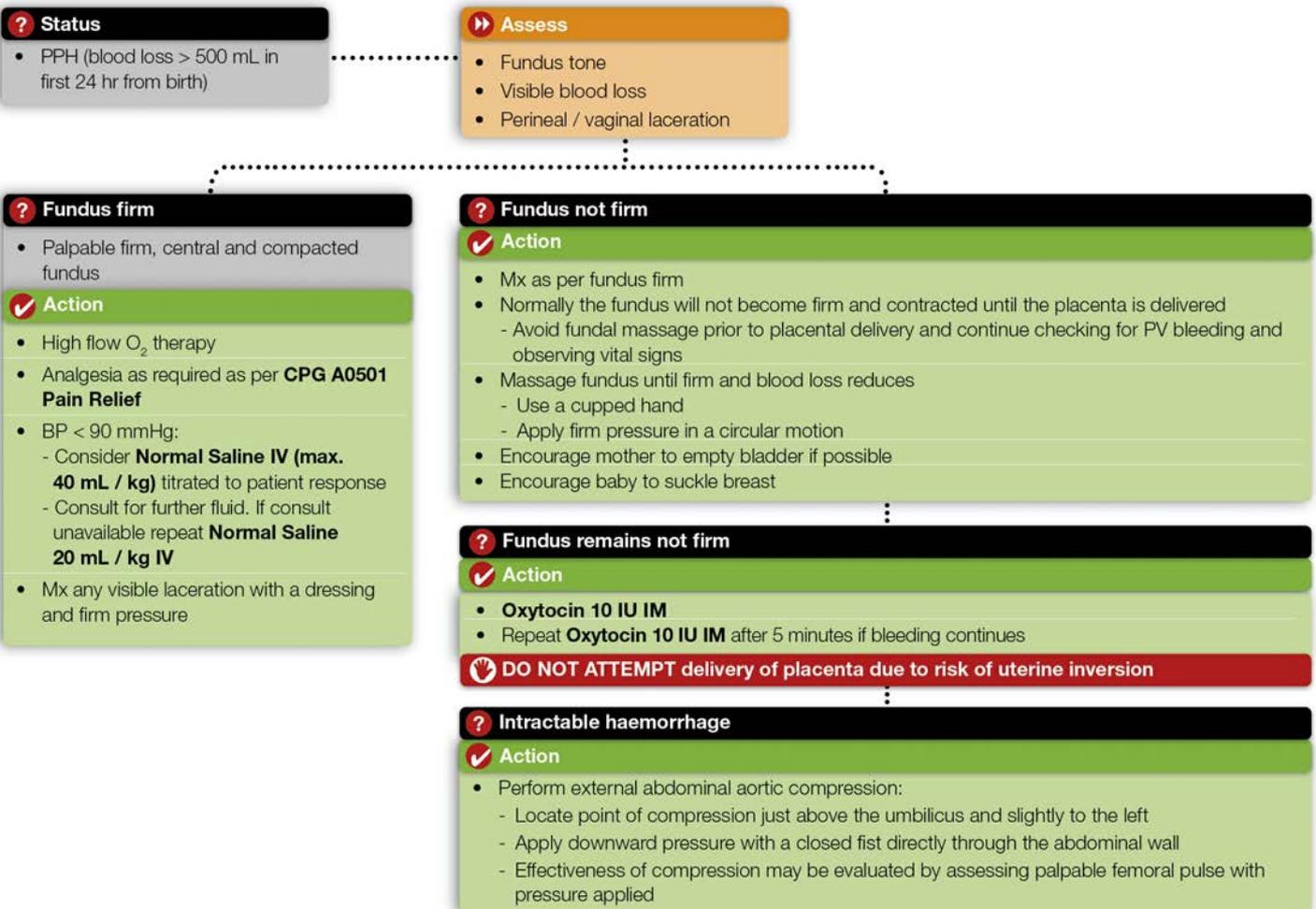
- Massaging a fundus that is firm, central and contracted may interfere with normal placental post birth separation and worsen bleeding. Fundal massage should only be applied when the fundus is not firm.
- Causes of PPPH include the 'four Ts':
 - Tone (uterine atony)
 - Trauma (to genital structures)
 - Tissue (retention of placenta or membranes)
 - Thrombin (coagulopathy)

The most common cause of PPPH is uterine atony.

- **An empty and contracted uterus does not bleed.**
- Higher risk patients include multiple pregnancy, more than four pregnancies, past history of PPPH, history of APH, large baby.
- Normally the fundus will not become firm and contracted until the placenta is delivered. Avoid fundal massage prior to placental delivery and continue checking for PV bleeding and observing vital signs.
- Where severe bleeding occurs at 24 hrs to 6 weeks post birth (secondary PPPH), consult with receiving hospital regarding the administration of **Oxytocin**

Contact Paediatric Infant Perinatal Emergency Retrieval (PIPER) via Clinician or on 1300 137 650 for advice

Flowchart



Related Resources

- [https://av-digital-cpg.web.app/assets/pdf/MAC/4.1.1 \(2\) Oxytocin MAC March 2021.pdf](https://av-digital-cpg.web.app/assets/pdf/MAC/4.1.1 (2) Oxytocin MAC March 2021.pdf)

Miscarriage is a common but distressing complication of pregnancy that refers to the unexpected loss of a pregnancy prior to 20 weeks gestation. An infant delivered without signs of life at ≥ 20 weeks gestation (or > 400 grams where gestation is unclear) is legally regarded as a stillborn. Regardless of signs of life, patients may be managed under this guideline < 23 weeks gestation. Infants delivered ≥ 23 weeks gestation, or where the gestation is unclear but there is a reasonable likelihood that it may be ≥ 23 weeks, should be managed per CPG N0201 – Newborn resuscitation. It is a legal requirement in Victoria that any infant born at ≥ 20 weeks gestation, or showing signs of life regardless of gestation, be registered by completing a Birth Registration Statement (BRS). A hospital, medical facility or midwife can issue a BRS. There is no requirement that stillbirths or miscarriages be reported to the coroner or police unless the loss of pregnancy has occurred due to violence or injury.

Women experiencing potential miscarriage typically may present with:

- Abdominal or pelvic pain/cramping. Pain may radiate to the lower back, buttocks or genitals.
- Vaginal bleeding may be present and can range from spotting to life threatening haemorrhage. Depending on gestation and the nature of the miscarriage, the patient may pass the products of conception.

There is no diagnostic procedure or specific management of miscarriage in the pre-hospital environment. Management should focus on emotional support of the mother and treatment of symptoms such as pain and nausea. Paramedics should always keep a high index of suspicion for life threatening complications, such as major haemorrhage or ectopic pregnancy.

Not all vaginal bleeding or antepartum haemorrhages that occur during pregnancy result in the loss of the foetus. Avoid definite statements or promises that provide false hope or a clear diagnosis. However, paramedics should be honest with the patient about the possibility of miscarriage. Offering some sense of what comes next is reasonable. Where the outcome is unclear, an ultrasound and blood tests are possible but it is likely that the ED may not be able to provide a definite answer in regards to the viability of the pregnancy.

Patients may pass products of conception which can range in nature from blood clots to a recognisable foetus. In the event of preterm labour late in the second trimester, delivery may proceed spontaneously. The foetus may initially make small movements or gasp. While an infant delivered at greater than 20 weeks gestation must be registered as a birth from a legal perspective, there is no prospect for successful resuscitation prior to 23 weeks gestation. It is reasonable for paramedics to withhold resuscitation and this decision should be explained to the mother in a sensitive way.

Regardless of appearance or gestation, the foetus may be important to the mother. Do not dispose of them. Treat them with respect in accordance with the mother's wishes. If necessary, clamp and cut the umbilical cord. Paramedics should wrap and transport them with the mother as products of conception are generally sent to pathology for further examination. The mother or other family may wish to hold the infant, especially if it has shown signs of life and a resuscitation attempt is withheld. This should be encouraged where appropriate as parents often feel comforted by the fact that the infant was held during the dying process. Where the mother does not wish to, it may be appropriate for other family members or the attending crew to hold the infant. Referring to the pregnancy as a baby, or using the babies name if it has one, is generally preferable. Avoid the use of medical terminology such as spontaneous abortion or products of conception.

Many women experience a strong sense of loss, sadness, anger, disbelief, disappointment, sense of isolation and often guilt. It is normal to experience a range of feelings. Paramedics should acknowledge the impact of the miscarriage with compassion and understanding. Minimising the loss of the pregnancy with statements such as, "you're young, you can try again", can significantly worsen the patient's experience.

It is appropriate to treat pain, nausea and hypovolaemia per the relevant guidelines in the patient experiencing potential miscarriage. Misoprostol should not be used to treat bleeding in the setting of miscarriage (i.e. < 20 weeks gestation).

Care Objectives

- Establish and maintain effective respiration
- Prevent hypothermia
- Transport to appropriate facility

General Notes

Definitions

Newborn: Refers to the first minutes to hours post birth. Newborn resuscitation principles can be applied up to 24 hours post birth due to respiratory and cardiovascular changes during this time.

Viability: Resuscitation should be withheld for infants born < 23 weeks' gestation regardless of signs of life. Consult with PIPER for advice if there is any uncertainty.

Preterm infant: < 37 weeks' gestation.

Heart rate is the most important indicator of effective ventilation. It should be used to guide the need for, and effectiveness of, resuscitation.

Drying and covering the newborn in addition to skin-to-skin contact with the mother is important to prevent hypothermia. This can be done while initially assessing breathing and tone.

Where the newborn is ≥ 37 weeks' gestation and experienced no complications at birth, transport to an appropriate maternity service. Where the newborn is preterm and/or required resuscitation, transport to a higher level of care is appropriate in consultation with PIPER.

Paediatric Infant Perinatal Emergency Retrieval (PIPER)

Advice and assistance in newborn management

Contact via the clinician or 1300 137 650

Normal Values

Weight (avg full term)	3.5 kg	
Normal blood volume	80 mL/kg	
Heart rate	110 – 170	
Respiratory rate	25 – 60	
Temperature	36.5 – 37.5	
BGL	2.6 – 3.2 mmol/L	
Appearance	Dusky and peripherally cyanosed in the first few minutes. Blue-ish / purple hands and feet are normal in the first 24 hours after birth. Supplemental oxygen is generally not required where the newborn is breathing effectively and the HR is > 100. Good muscle tone (flexing arms and legs). Spontaneous regular breathing.	
Targeted SpO₂ (mins post birth) Pulse oximeters should always be placed on the right wrist (pre-ductal).	1 min	60 – 70%
	3 mins	70 – 90%
	5 mins	80 – 90%
	7-10 mins	> 90 %

Initial management

- Paramedics should treat as per CPG N0201 Newborn resuscitation where the newborn does not rapidly develop effective respirations and good muscle tone after drying and stimulating; deteriorates at any stage or is unable to maintain a HR >100 bpm.
- Where the newborn is vigorous, dry the newborn and place the newborn naked, skin-to-skin on the mother's chest. Dry the head. Cover both mother and newborn with warm blankets/towels. Newborns lose heat via the large surface area of their head and by evaporation from their wet bodies.
- Where resuscitation is required, the newborn should be placed on a warm, flat surface. A woollen hat or the corner of a blanket may be placed over the top of the head. Ensure the environment is appropriately warm. Bubble wrap may be placed over the newborn's body to maintain warmth.

Preterm infants

- Preterm infants may experience greater difficulty in establishing and maintaining effective respiration due to incomplete maturity of the lungs.
- Very premature newborns < 32 weeks' gestation are particularly at risk of hypothermia.
- If the infant is < 32 weeks' gestation, or has an estimated birth weight < 1500 grams, place the newborn into a polyethylene (Glad™ zip lock) bag. The newborn's head should protrude from a hole cut into the top of the bag. The head should be dried and covered with a hat or blanket as above. Zip-lock the bag below the newborn's feet.
- If paramedics are present at the birth, this should occur immediately without drying the newborn while the infant is still wet and warm. If paramedics arrive after the birth, the newborn should be dried

first as the newborn will be hypothermic.

Suction

- Routine suction is not required in vigorous newborns, even if the infant was born through meconium stained amniotic fluid. Newborns generally clear their own airways very effectively. Excessive suctioning may delay onset of respiration and induce bradycardia. Suction is only indicated when airway obstruction is suspected.

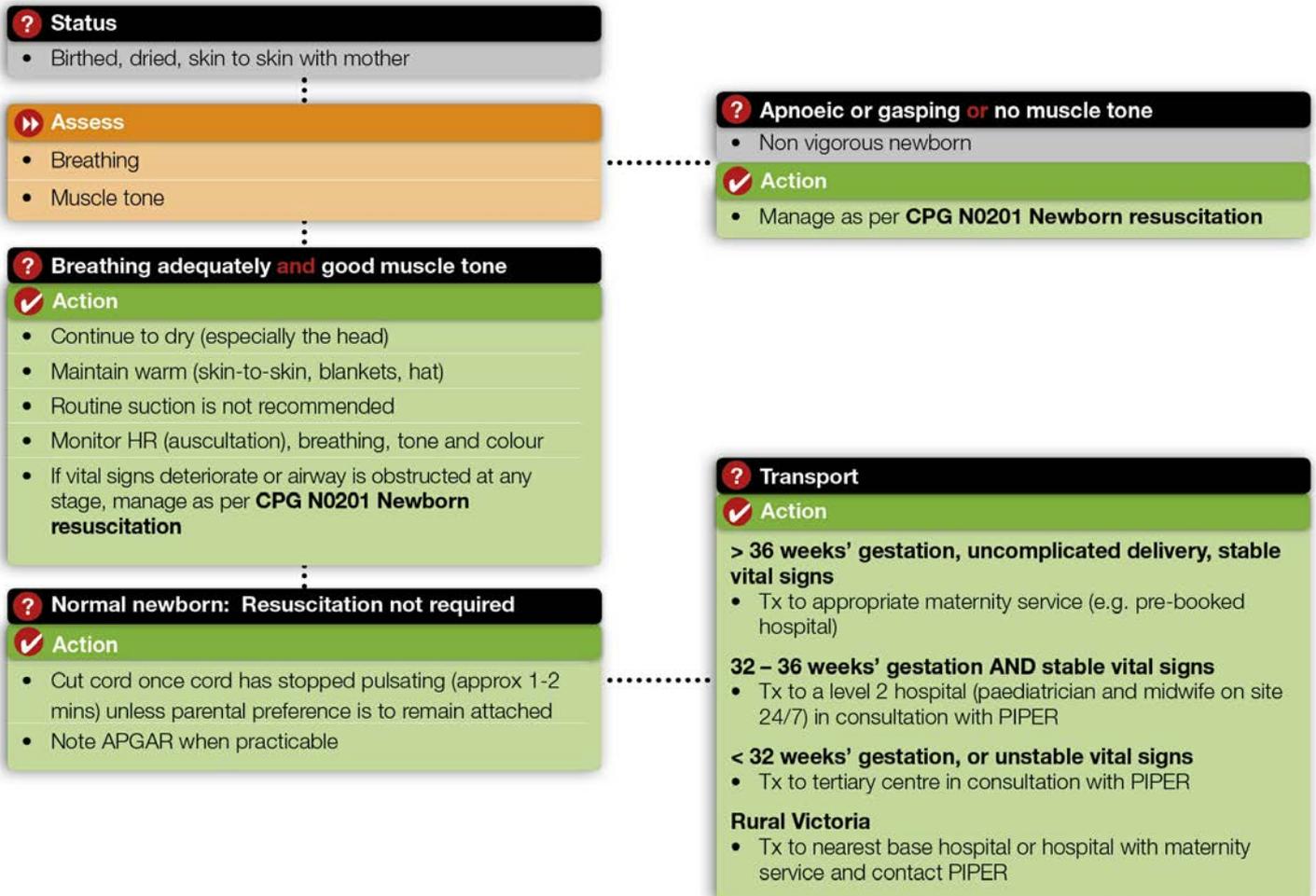
Cutting the cord

- Vigorous newborn: Cutting the cord in the vigorous newborn is not urgent. Wait until the cord has stopped pulsating (approximately 1-2 minutes) unless parental preference is to remain attached (e.g. Lotus birth)
- Non vigorous newborn: Paramedics should prioritise resuscitation (e.g. IPPV). Cutting the cord earlier may be required to facilitate resuscitation if access to the newborn is compromised by the intact cord.

Tertiary Centres

- Monash Children's Hospital (MCH), Mercy Hospital for Women (MHW), Royal Women's Hospital, Parkville (RWH) and Royal Children's Hospital (RCH).
- Paramedics should consult with PIPER where transfer time to a tertiary centre is prolonged. Transfer to a closer hospital followed by retrieval by PIPER may be appropriate.

Flowchart



APGAR

APGAR scores should not be used as a guide for resuscitation. The time intervals used for resuscitation are contained elsewhere within this CPG.

The APGAR should be conducted at 1 minute and 5 minutes post birth, then repeated at 5 minute intervals until APGAR score > 7.

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

7 - 10 Satisfactory

4 - 6 Respiratory depression, may require ventilation

0 - 3 Requires ongoing resuscitation

Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC March 2017 CPG N0101 Newborn patient and resus.pdf>

Care Objectives

Effective ventilation is the key to newborn resuscitation

The majority of newborns requiring resuscitation are apnoeic and bradycardic due to ineffective ventilation. Prioritise establishing and maintaining effective ventilation at each stage of resuscitation. Improvement in heart rate (> 100 bpm) is the best indicator of effective ventilation.

General Notes

- Ventilation should be initiated within the first 60 seconds of management in the non-vigorous newborn.
- Initial ventilation should occur without supplemental oxygen, at a rate of 40 – 60 per minute and with enough pressure to see chest rise.
- Where appropriate equipment is available, apply PEEP (5 cmH₂O) whenever positive pressure ventilation is being provided.
- Where the heart rate remains 60 – 100 bpm after 30 seconds of effective ventilation on room air, paramedics should ensure adequate mask seal, and airway position and increase ventilation pressure. Where heart rate remains < 100, 100% oxygen (5L/min) should be provided.
- Once heart rate is > 100 bpm and target saturations are being met, oxygen should be weaned to avoid hyperoxaemia.
- Where the heart rate is < 60 bpm despite at least 30 seconds of effective ventilation, CPR with 100% oxygen is required.

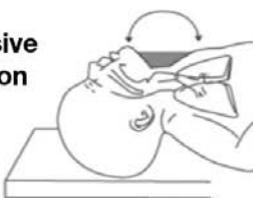
Indications for withholding resuscitation

- Resuscitative efforts should be withheld in infants < 23 weeks' gestation as there is no possibility of successful resuscitation. Where there is any doubt as to the gestation of the newborn, paramedics should attempt resuscitation and consult with PIPER.
- While resuscitative efforts may not be required, it is a legal requirement in Victoria that any infant born at ≥ 20 weeks' gestation or ≥ 400 g birth weight **OR** showing signs of life regardless of gestation, be registered by a hospital, medical facility or midwife. There is no requirement that miscarriages < 20 weeks' gestation be reported to the coroner or police unless the loss of pregnancy has occurred due to violence or injury.

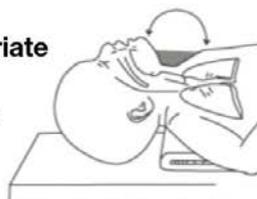
Airway

- The head and neck should be placed in the neutral position. Avoid both neck flexion and excessive head extension. This will likely require placing a folded towel or blanket underneath the shoulders.

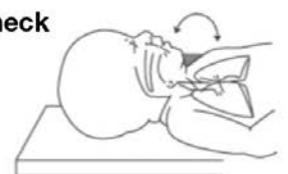
Avoid excessive head extension



Appropriate neutral position



Avoid neck flexion



Suction

- Suction is only required where the airway is obstructed. The mouth should be suctioned first, followed by the nose. The newborn is a nasal breather and may gasp and inhale pharyngeal fluid if the nose is cleared first.
- Suction should be gentle, brief (5 - 6 seconds) and no deeper than the oropharynx (measured from the tragus to the corner of the mouth) to avoid laryngospasm and bradycardia.
- A size 10 or 12 FG catheter with approximately < 100 mmHg (< 13 kPa, 133 cm H₂O or approximately 1 quarter of recommended adult pressure) of suction should be applied. Only apply suction as the catheter is being withdrawn.
- If the newborn is intubated, consider tracheal suction only if a lower airway obstruction (e.g. meconium or blood) is suspected.

Advanced airway

- OPAs are not recommended for routine use as they may cause airway obstruction and vagally mediated bradycardia. A size 0 may be useful where airway abnormalities or the newborn's tongue impede effective ventilation.
- Colorimetric EtCO₂ detectors should be used for all newborns requiring intubation. Continuous waveform EtCO₂ monitors may provide inaccurate readings due to small tidal volumes (5 - 10 mL/kg).

	ETT size (mm)	Lip length (wt in kg + 6 cm)	ETT suction catheter	NG tube	Laryngoscope blade	i-Gel	Suction catheter (negative pressure)
< 1 kg or < 28 wks 'extremely preterm'	2.5	6 – 7 cm	6 FG	6 FG	00 straight miller blade	None	10 – 12 FG (-100 mmHg)
1-3 kg or 28 – 34 wks 'moderately preterm'	3	7 – 9 cm	6 FG	8 FG	0 or 1 straight Miller blade	None	
> 3 kg or ≥ 35 wks 'term or near term'	3.5	9 – 10 cm	6 FG	8 FG	0 or 1 straight Miller blade	Size 1.0 for >2 kg	

Heart rate and ECG monitoring

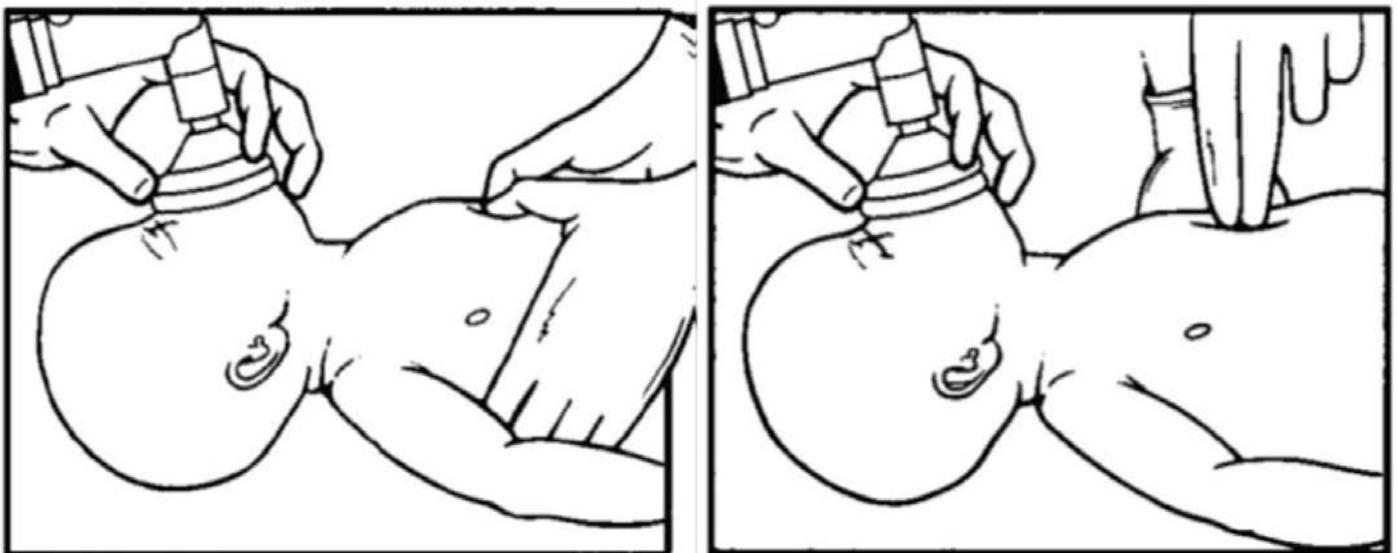
- Heart rate is routinely measured by auscultation in the vigorous newborn. In the non-vigorous newborn, requiring resuscitation, ECG electrodes should be placed to guide resuscitation. Measuring heart rate by auscultation is preferred in extremely preterm newborns (< 28 weeks) as the electrodes may damage their skin.
- Shockable rhythms are extremely rare in newborns. Should these rhythms be observed, apply multifunction electrode pads and defibrillate in manual mode using 4 J/kg at 2 minute intervals.

Pulse oximetry

- Attach to the right hand or right wrist (pre-ductal). See **CPG N0101 The newborn baby** for normal values post birth. SpO₂ significantly lower than these values may guide the use of supplemental oxygen.
- Obtaining a reliable SpO₂ trace in newborns can be problematic. Consider SpO₂ strength of waveform and overall patient condition in determining the reliability of SpO₂ reading.

CPR

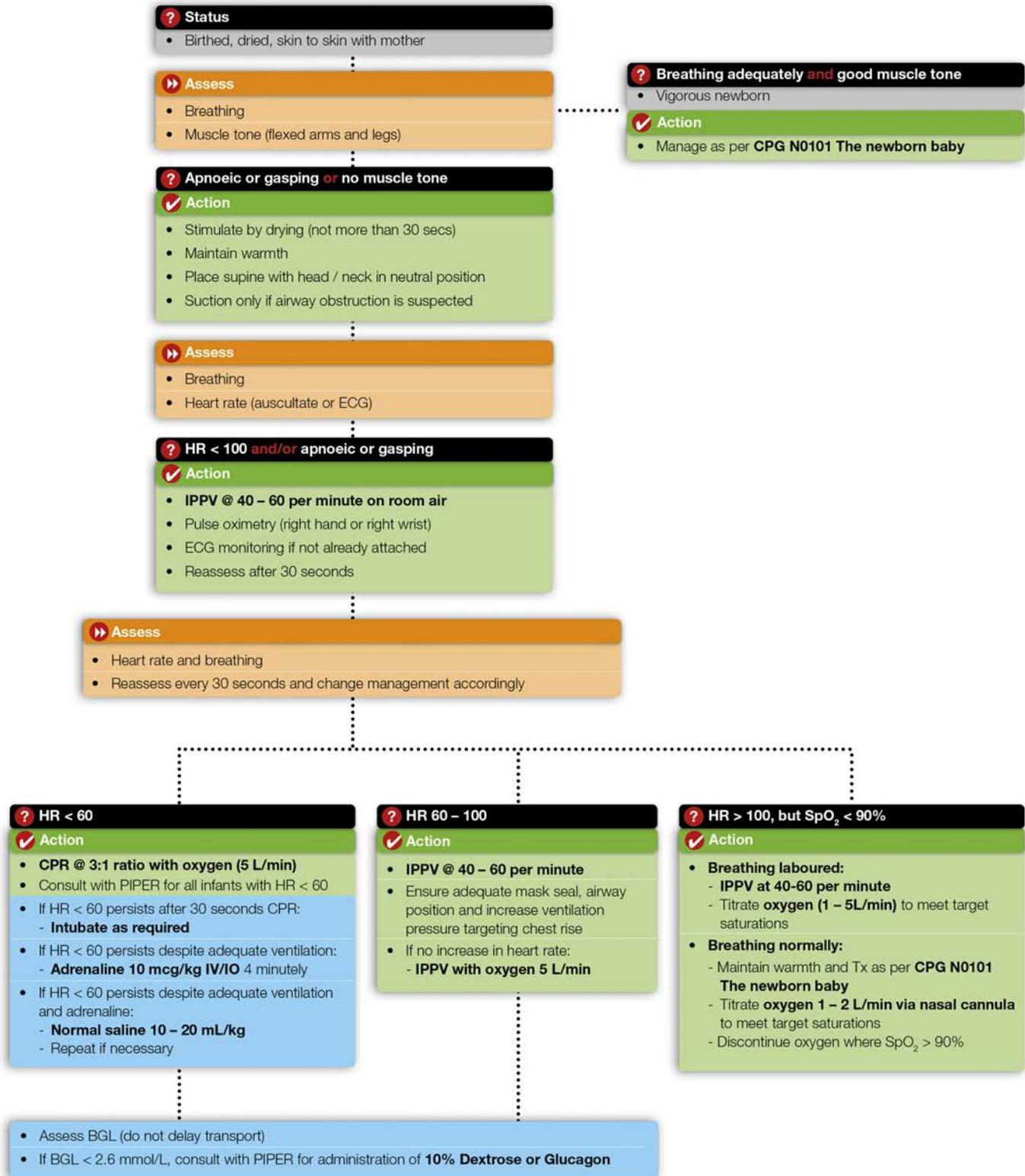
- 3:1 compression to ventilation ratio.
- Achieve 90 compressions and 30 ventilations per minute with a 0.5 second pause for ventilation (120 events per minute).
- Compression depth should be approximately 1/3 the depth of the chest.
- The two thumb, hand encircling technique (below left) is preferred. The two-finger technique (below right) may be performed if access to the tibia for IO insertion is required.



Single rescuer

- In single rescuer scenarios, the focus should be on providing effective positive pressure ventilation until back-up arrives. Attempting to perform ECC and PPV at 3:1 as a single operator is unlikely to be effective in restoring heart rate.

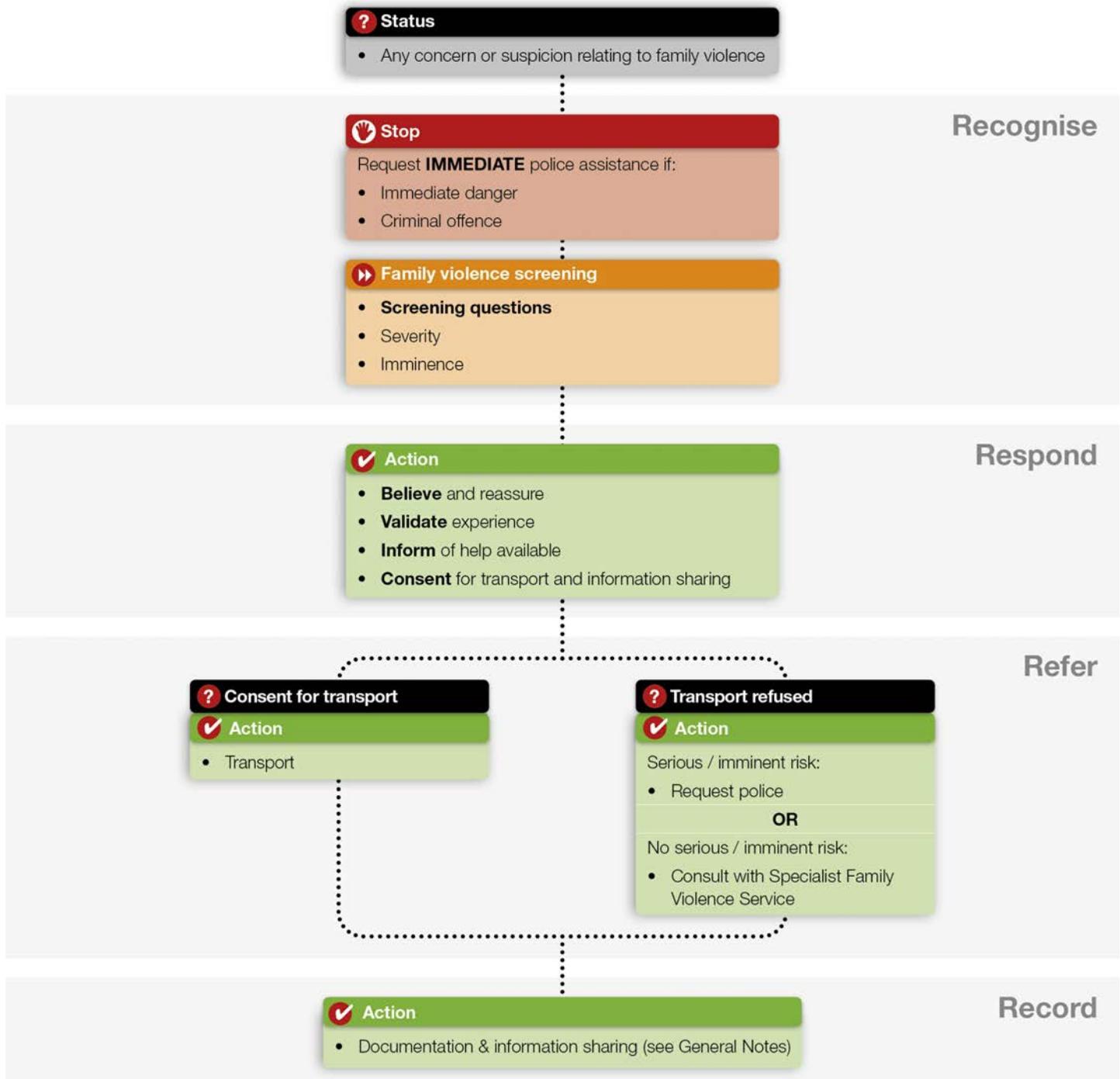
Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC March 2017 CPG N0101 Newborn patient and resus.pdf>

Flowchart



General Notes

- Definition:** Family violence is behaviour that is physically, sexually, emotionally, psychologically or economically abusive, threatening or coercive. It includes any behaviour that controls or dominates a family member and causes them to fear for their own or another person's safety or wellbeing. It also includes exposing a child to these behaviours. Family violence is complex and multifactorial. It

extends beyond physical or sexual abuse and may include psychological, emotional or economic abuse or neglect in any combination.

Recognise

Presentations across the community

- Family violence occurs across all ages, genders and other socioeconomic groups. It is typically gendered in nature with a female victim survivor and male perpetrator. However, it is important to recognise the potential for a range of presentations, risks and barriers to care that may occur in [some groups](#).
- Respectful, safe and sensitive engagement is required while communicating with victim-survivors of family violence.

Signs, indicators and risk factors

- It is essential to have an awareness of the [signs of family violence](#) and associated risk factors as they inform the suspicion that family violence may be present.
- An initial suspicion or recognition of the potential for family violence may be prompted by a wide variety of factors. If there is any indication or suspicion of family violence, paramedics should perform *Family Violence Screening*.
- Not all victims will openly report family violence, so it is important to respond to other factors identified in your assessment.
- **Paramedics should maintain a low threshold for screening patients for family violence.**
- Considering the risk factors for family violence will help inform your assessment and the degree of urgency of services and care required.

Serious risk factors

Increased risk of the victim being killed or almost killed.

- Physical assault while pregnant or following new birth
- Planning to leave or recent separation
- Controlling behaviours
- Access to weapons
- Use of weapon in most recent event
- Has ever tried to strangle the victim
- Has ever threatened to kill the victim
- Has ever harmed or threatened to harm or kill pets or other animals
- Has every threatened or tried to self-harm or commit suicide (perpetrator)
- Stalking of victim
- Sexual assault of victim

- Obsessive/jealous behaviour toward victim
- Unemployed/disengaged from education (perpetrator)
- Drug and/or alcohol abuse/misuse (perpetrator)

A detailed list of **other risk factors, paediatric risk factors and protective factors** are available.

Other risk factors

- Self-assessed level of risk
- Imminence (situations that increase the risk in a short time e.g. court proceedings, release from prison)
- Financial abuse/difficulties
- Has ever harmed or threatened to harm victim or family members
- Previous or current breach of court orders/intervention orders
- History of family violence
- History of violent behaviour (not family violence)
- Mental illness/depression
- Isolation (of victim from family, friends, social networks and community)
- Physical harm
- Emotional abuse
- Property damage

Paediatric risk factors

Caused by perpetrator behaviours

- Exposure to family violence
- Sexualised behaviour towards a child by the perpetrator
- Child intervention in violence
- Behaviour indicating non return of child
- Undermining the child-parent relationship
- Professional and statutory interventions

Specific to child's circumstances

- History of professional involvement and/or statutory intervention
- Change in behaviour not explained by other causes
- Child is a victim of other forms of harm (harassment, grooming, assault)

Protective factors

Help to reduce or mitigate risk but do not remove it entirely

<p>Systems intervention</p>	<ul style="list-style-type: none"> • Perpetrator is incarcerated or prevented from contact • Victim-survivor is on the Victims Register for notification of pending release of perpetrator from incarceration • Court dates relating to family law, family violence or other matters involving perpetrator or victim survivor • Intervention order is in place and being adhered to • Perpetrator is actively linked to a support program.
<p>Practical/ environmental</p>	<ul style="list-style-type: none"> • Safe housing • Financial security (access to money or employment) • Health (including mental health) • Immigration status • Food security • Transport • Communication safety (including via phone, online etc) • Ability to access community • Connection to advocacy / professional / therapeutic services • Positive and friendly care environment (particularly for children and young people).
<p>Strengths-based (Identity / Relationships / Community)</p>	<ul style="list-style-type: none"> • Social networks (family, friends, informal social networks) • Healthy relationships • Connection/sense of belonging to community • Culture and identity • Agency of victim survivor

- An individual's personal skills and emotional resilience.

Immediate risk

- Request immediate police attendance in the following circumstances:
 - Immediate danger where there is an immediate threat to paramedic or patient safety (e.g. active violence, agitation, weapons on scene)
 - A crime has been committed

Family violence screening

- Screening is intended to provide a rapid indication of:
 - The potential presence of family violence and associated high risk factors
 - Severity / escalation of risk factors
 - Imminence of risk
- **Do not pressure or force disclosure.** A person's decision not to disclose must be respected, unless there are legal duties of care (e.g. to report crimes, or child safety concerns).
- Further explanation of the purpose of each screening questions and the meaning associated with different answers can be found [HERE](#).

Family Violence Screening questions

If there is any indication or suspicion of family violence, ask the following questions:

1. Has anyone in your family done something that made you or your children feel unsafe or afraid?
Identify potential for family violence.
2. Have they controlled your daily activities (e.g. who you see, where you go), or put you down?
Identify obsessive, controlling or jealous behaviour.
3. Have they threatened to hurt you in any way?
Identify threats to harm or kill, including sexual assault.
4. Have they physically hurt you in any way?
Identify history of harm, particularly if it includes strangling, weapons or sexual assault.
5. Do you have any immediate concerns about the safety of your children or someone else in your family?
Identify imminence the risks identified in Q 1-4.
6. Do you feel safe to leave here today?
Identify imminence.
7. Would you engage with a trusted person or police if you felt unsafe or in danger?
Identify imminence and severity. Absence of this protective factors increase risk.

If the answer is yes to any one of the screening questions (or no to questions 6 or 7), family violence is

identified.

Perpetrators

- **Do not directly engage perpetrators** about family violence as it may increase the risk of harm to victim-survivors and AV staff at the scene.
- **Do not question potential victim-survivors in the presence of a potential perpetrator.** Doing so may increase the risk to victim-survivors, including children. Conduct any screening and risk assessment discreetly when it is safe to do so.

Respond

Family violence identified

- **Believe:** Reassure the person that you believe them. State clearly that the violence is not their fault, and that all people have a right to be and feel safe.
- **Validate:** Acknowledge any challenges and difficulties they have spoken of and validate their efforts to protect themselves and their family members.
- **Inform:** Let them know that there are different services and options for people who experience family violence and that you would like to help them access those services.
- **Consent:** Seek the patient's consent for transport to hospital or consultation with a Specialist Family Violence Service. This will include consent to share information relating to the case with other relevant services and professionals.

Family violence **NOT** identified

- Paramedics **must** respect the responses.
- The person might not be ready or not feel comfortable to talk to you about the family violence they are experiencing, or they may not be experiencing family violence.
- Thank the person for answering the questions and inform them about the help that is available.

Refer

Transport

- If family violence is identified, the patient requires risk assessment, risk management / safety planning and referral to a family violence service. This can be achieved by:
 - Transporting the patient to an emergency department (preferred), or
 - Police attendance or consultation with a Specialist Family Violence Service (details below) at scene (if the patient refuses transport).
- If a child is transported and paramedics have concerns / suspicions of family violence and/or child safety concerns, these must be reported as per **CPG P1001 Child Safety**.

Transport refused

- **Serious / imminent risks:**
 - Situations where the scene is safe at the time of assessing the patient but there is an unacceptable risk of harm in the coming hours or days (e.g. several serious risk factors are present and perpetrator returning home in three hours).
 - Requires clinical judgement. The presence of Serious Risk factors can inform this decision. If in doubt, assume there is serious / imminent risk.
 - Request immediate police attendance stating '*Family Violence*'
- **No serious or imminent risks:**
 - Seek the patient's consent and consult with a Specialist Family Violence Service.
 - Paramedics must ensure that any referral information is passed on in a safe manner.
 - If the patient does not consent to further assistance, paramedics must respect this decision. Inform the person of the help that is available and advise them to seek assistance if circumstances change.

Specialist Family Violence Service Consultation

- Contact Orange Door in the first instance. If Orange door is not available (e.g. public holiday), contact Safe Steps.
- Explain who you are and that you're calling for assistance with risk assessment, safety planning and referral.

Orange Door

Open in seven areas across Victoria. Each location provides access to women's and children's family violence services, child and family services, Aboriginal services and men's family violence services, and is open from 9am to 5pm Monday to Friday (closed public holidays).

Barwon	1800 312 820
Central Highlands	1800 219 819
Inner Gippsland	1800 319 354
Loddon	1800 512 359
Mallee	1800 290 943
North Eastern Melbourne	1800 319 355
Bayside Peninsula	1800 319 353

Safe Steps (available 24/7)

[1800 015 188](tel:1800015188)

Consent for Information sharing

- Information that is relevant to assessing or managing risk of family violence may be shared by paramedics with other professionals or services who are prescribed Information Sharing Entities under the Family Violence Information Sharing Scheme. These include police, healthcare professionals (including emergency department staff during handover), Family Violence Services, and many other professionals and organisations.
- Consent is required to share information relevant to family violence with these services with the following exceptions:
 - **Perpetrator:** Consent **is not** required from an alleged perpetrator when sharing information.
 - **Child victim-survivor** (< 18 years of age): Consent **is not** required from any person to share their information when assessing or managing risk for a child victim-survivor. *Where safe, appropriate and reasonable, you should obtain the views of the child and/or other family members at risk of violence (including a parent who is not a perpetrator) prior to sharing their information.*
 - **Serious or imminent threat:** Consent **is not** required if there is a belief that sharing confidential information is necessary to lessen or prevent a serious threat to an individual's life, health, safety or welfare or the information relates to assessing or managing risk to a child victim-survivor.

Record

- Documentation requirements are included in:
 - [PRO/QPE/009 Patient care documentation standard](#)
 - [PRO/OPS/273 Family violence](#)
 - [PRO/OPS/261 Child Safety](#)
- PCRs are a legal record of the care episode and as such may form the basis of:
 - Information sharing with partner agencies, and/or
 - Evidence in legal proceedings
- In all cases, staff must record all relevant objective clinical and observational data on a PCR specific to each affected individual. This includes a separate PCR for children who are present during actual or suspected family violence events where the presenting patient is another individual (e.g. a relative).
- Documentation may include the following:
 - Information that informed your assessment of current or future risk (e.g. perpetrator behaviour, risk factors, individual circumstances related to wellbeing).
 - Documentation of the verbal consent sought from the adult victim survivor (or where appropriate, any views sought from a child victim survivor) to share information.
 - Others present at the scene including family and other services (e.g. police).
 - If secondary consultation / referral was undertaken, document the name of the service, the content of the call, outcomes and name of the person consulted.

- If handing over to another healthcare professional (e.g. in ED) document the information reported to that person.
- Any information or advice provided to the patient in relation to safety planning or referral options.

References

1. Australian Institute of Health and Wellbeing. Family, domestic and sexual violence in Australia; 2018. Available from: <https://www.aihw.gov.au/reports/domestic-violence/family-domestic-sexual-violence-in-australia-2018/summary>

Further resources

- Family Violence CPG [Walkthrough Video](#)
- [Victorian Government MARAM resources](#)
- [Victoria Government Family Violence Information Sharing Guidelines](#)
- [Victorian Government Child Information Sharing Scheme](#)
- [Safeguarding Care intranet page](#)
- [https://av-digital-cpg.web.app/assets/pdf/MAC/Family violence - MAC paper - March 2021.pdf](https://av-digital-cpg.web.app/assets/pdf/MAC/Family%20violence%20-%20MAC%20paper%20-%20March%202021.pdf)

General Notes

Intended patient group

- A “child” covered under the relevant legislations is defined as babies, children and young people up to and including **17 years of age**. Unborn babies are not legally defined as children, but are still covered under this legislation.

Overview

Ambulance Victoria (AV) is a Child Safe organisation and is committed to meeting the Victorian Government’s Child Safe Standards and our legal duty of care to children. All Operational staff have a responsibility to ensure their personal behaviour and actions align with our Child Safety Procedure (PRO/OPS/261) and Child Safety Code of Conduct.

This information is designed to assist Operational staff to ‘Assess, support, and report’ cases involving child abuse, sexual offences against children, or child safety concerns.

- Child safety concerns may involve physical abuse, sexual abuse, sexual offences against children, emotional abuse, psychological abuse, cultural abuse, and neglect. Such abuse or neglect may have occurred, or may be likely to occur in the future.
- Child safety risk factors may include family violence, parent/caregiver alcohol and drug abuse, mental health problems, cognitive impairment, homelessness, illness, failure to provide for care, poor parenting skills or support and/or social isolation. These risk factors frequently co-exist.
- Children witnessing other family members experiencing violence is a legitimate child safety concern.
- Violence and abuse can have damaging cumulative physical and mental health effects that can last for many years after abuse has ended. These include depression, suicidality, alcohol and drug abuse, post-traumatic stress disorder, eating and sleeping disorders, anxiety disorders and injuries.

The role of paramedics

- Operational staff may see victims of abuse during the early stages of their victimisation, before other professionals such as child protection, justice or health services staff. We can play a role in reducing the impacts of abuse and abuse-associated health problems by identifying those at risk early; offering skilled and compassionate support; and reporting to relevant services to support children who may need care and protection.
- Where there is a belief that child abuse exists or a child’s safety is at risk Operational staff **must** report and handover to either Police or Child Protection Services (depending on the urgency of the case), or the AV Integrity Officer who can report the case to Child Protection Services on your behalf. In cases where a child is transported, all relevant details must also be handed over to a health professional who is a mandated reporter (e.g. a doctor or nurse), as per the Child Safety Procedure. The health service handover should include mention of the plan to report the case to Child Protection Services via the AV integrity officer.
- Record all relevant objective clinical data and observations on a PCR specific to the child.
- Paramedic safety is paramount. A dynamic risk assessment, including any dangers, should form part of any clinical approach. Ensure personal and scene safety and request Police attendance if required.

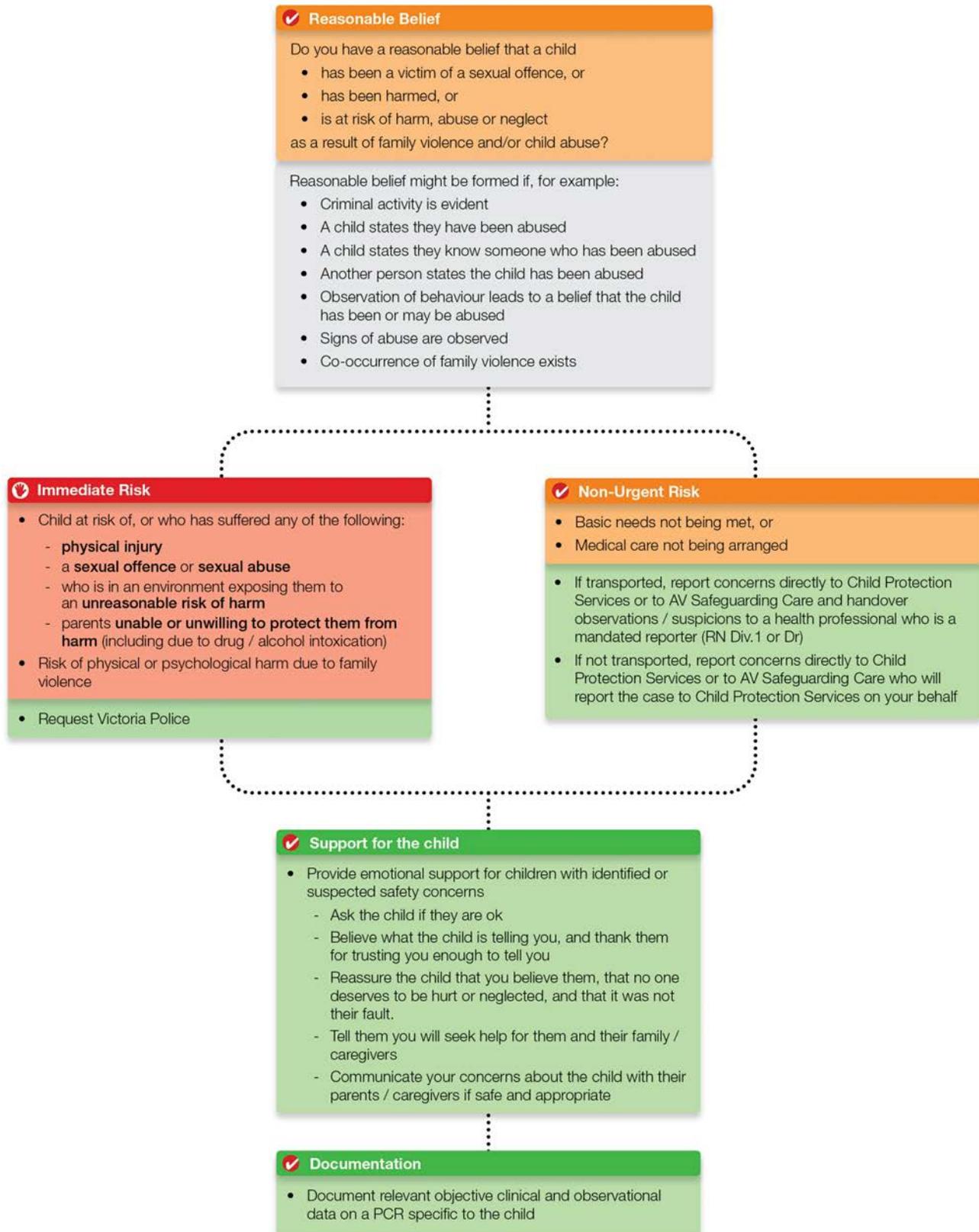
Unacceptable conduct

- AV staff who witness or reasonably suspect unacceptable conduct by their colleagues must promptly report their concern to the Professional Conduct Unit (PCU) and Police for suspected criminal child abuse. This is a mandatory report.
- Unacceptable conduct may occur within work or private settings, and includes sexual offences, sexual misconduct or physical violence against, with or in the presence of a child; any behaviour that causes significant emotional or psychological harm to a child; and/or significant neglect of a child.

Staff welfare

Child safety procedures may raise personal issues or concerns for staff, including secondary trauma related to observations in community response. Staff are encouraged to proactively seek support from Peer Support or the VACU psychologist via [1800 MANERS \(1800 626 377\)](tel:1800626377).

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/Agenda item 4.1.4 Child Safety.pdf>

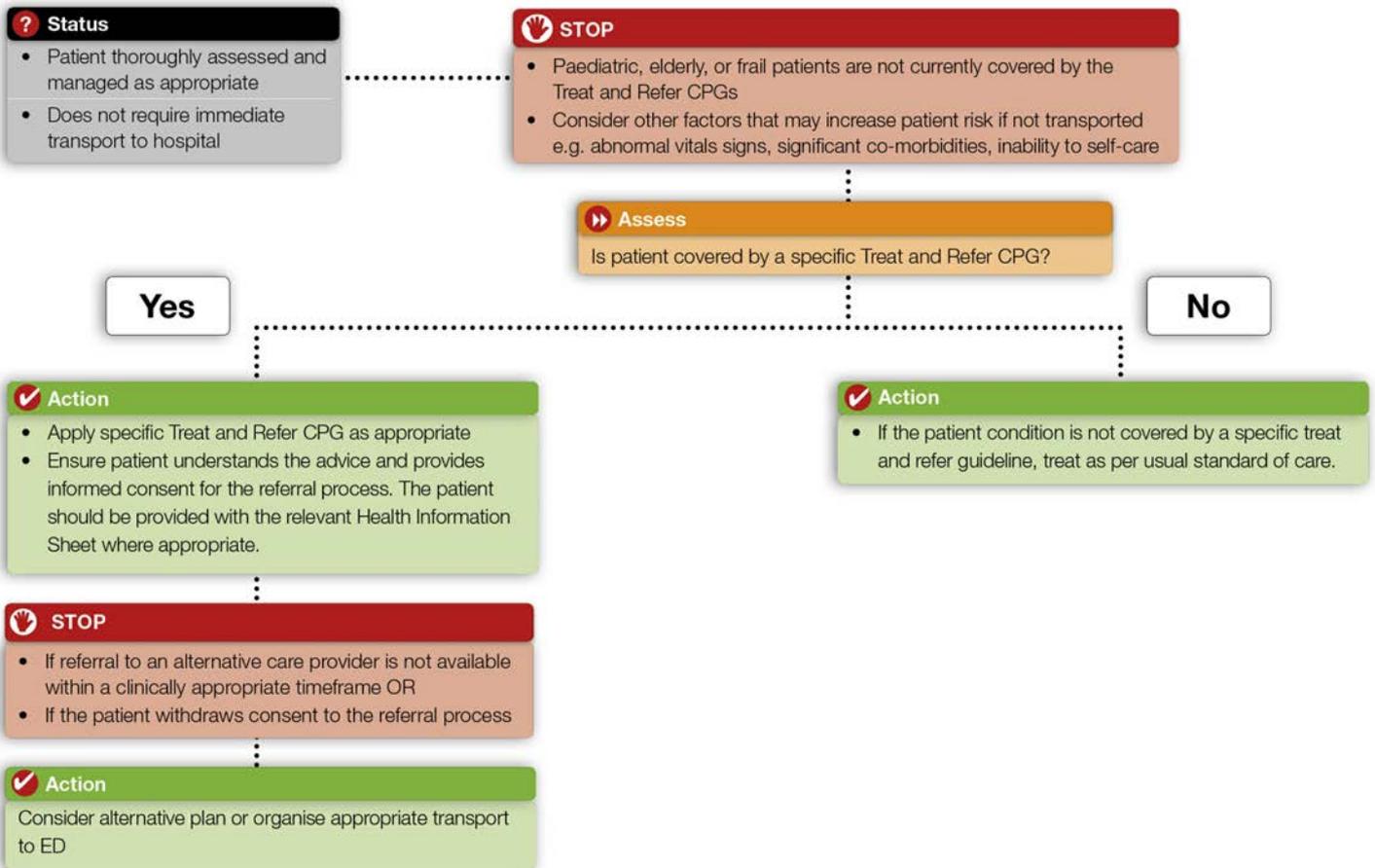
Special Notes

- The intent of the Treat and Refer CPGs is to provide the patient with the most appropriate care for their clinical condition. Paramedics should involve the patient in the decision-making process and explain the rationale for self-care and/or referral. If the patient does not provide informed consent for out-of-hospital management then other alternatives should be considered. In some cases it may be appropriate for patients to be transported to hospital by other means.
- The Treat and Refer CPGs only apply to adult patients:
 - Elderly / frail patients have a higher risk of deterioration or serious pathology and are not currently covered by these CPGs.
 - Paediatric patients are not currently covered by these CPGs.
- The Treat and Refer CPGs cover selected common clinical conditions. Other conditions may also be appropriate for self-care and/or referral to an alternative care provider. These options should be reserved for stable patients with simple, isolated conditions that are unlikely to require hospital management.
- The Treat and Refer pathway does not replace Paramedic clinical judgement. Transport should still be provided if there are reasonable concerns or doubts about:
 - The nature or severity of the patient's condition, or if multiple issues exist.
 - Patient (or carer) ability to self-care or seek further assistance.
 - Availability or appropriateness of alternative care providers, particularly if a direct referral is not made.
 - Any other factors that are of concern to the Paramedic.
- At the time of approval of this CPG, a number of initiatives are being developed to assist Paramedics with patient referral (such as the In-Field Referral Project). These services can be utilised where appropriate.

General Care

- When providing advice and/or referral to patients and their carers, paramedics should take into account:
 - Underlying anxiety and distress of the patient / carer.
 - Barriers to communication e.g. language.
 - Health literacy and ability to follow recommendations.
- AV Health Information Sheets are an important part of the Treat and Refer pathway. Patients with written instructions are more likely to retain and follow the advice given by Paramedics. Where available they should be provided to all patients as appropriate.
- Paramedics who are unsure of the specific advice to provide for a minor condition should refer the patient to the appropriate health professional e.g. GP, pharmacist, physiotherapist.

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC May 2015 Treat and Refer Overview.pdf>

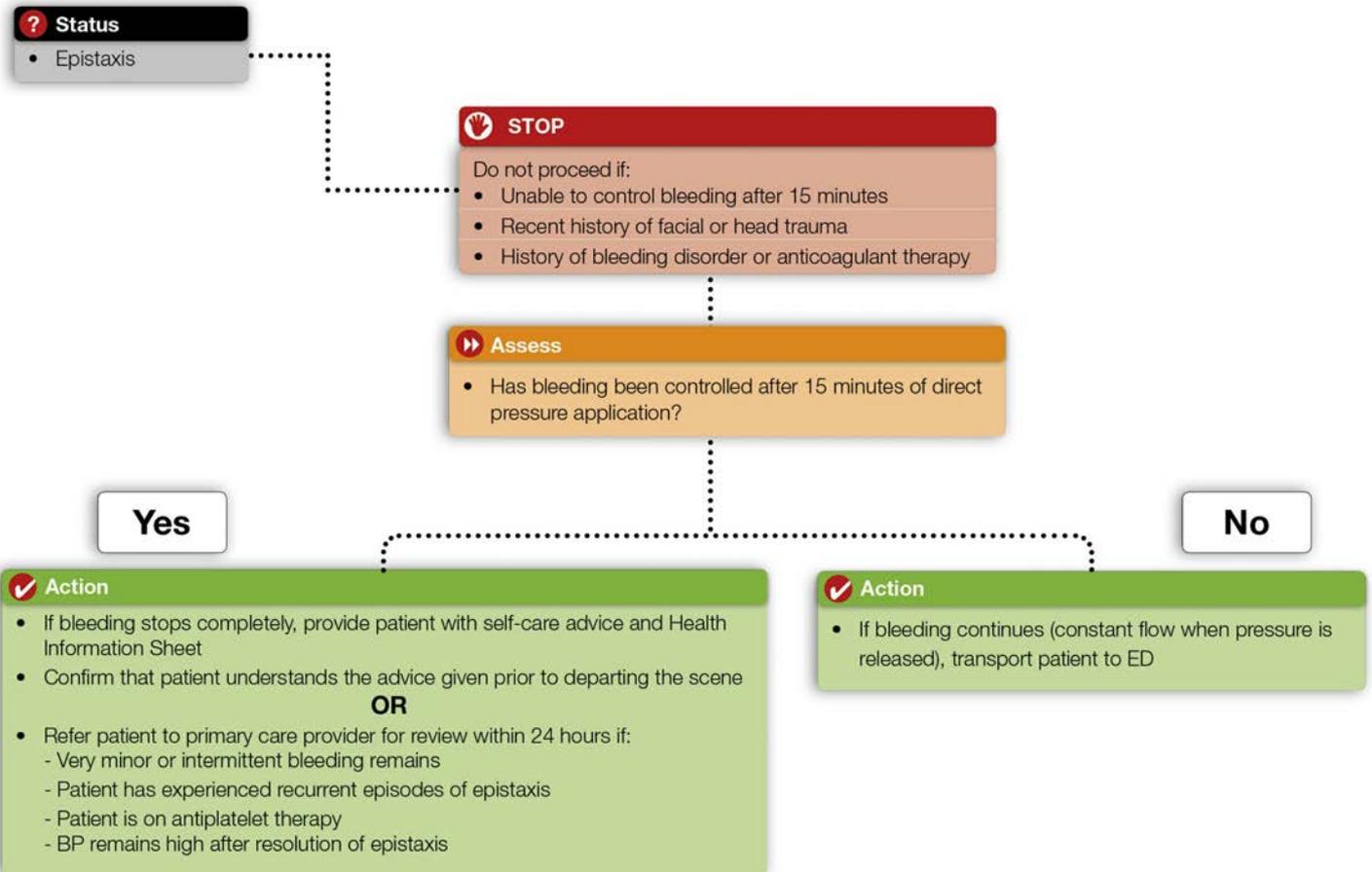
Special Notes

- Approximately 5% of epistaxis cases originate from the posterior area of the nose which are unlikely to be controlled with manual pressure.
- Posterior or anterior bleeding that is unable to be controlled with manual pressure will require further medical management, which may include application of topical vasoconstrictors, cauterisation, nasal packing and/or surgery.
- Consider transporting patients where epistaxis has resulted from trauma (e.g. fall, assault, sporting injury) as there may be other injuries present.
- Examples of anticoagulant medications include warfarin, dabigatran, rivaroxaban and apixaban.
- There are a number of conditions that can impair the blood clotting process. Examples of bleeding disorders include haemophilia and Von Willebrand Disease.
- If the patient does not require active management or monitoring by paramedics then alternative methods of transport to hospital may be considered if available within a reasonable timeframe.

General Care

- Initial management of epistaxis involves positioning the patient upright with slight forward neck flexion. Ask the patient to pinch the soft part of their nose firmly for fifteen minutes, without releasing pressure. Some patients may require assistance. If bleeding does not cease continue to pinch the nose as before.
- If available, a cold cloth or cold compress may be applied to the forehead.
- Encourage patient to breathe through their mouth and to spit out any blood collecting in their mouth.
- Patients should avoid blowing or picking their nose for at least 12 hours after cessation of bleeding.

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC May 2015 Treat and Refer - Epistaxis.pdf>

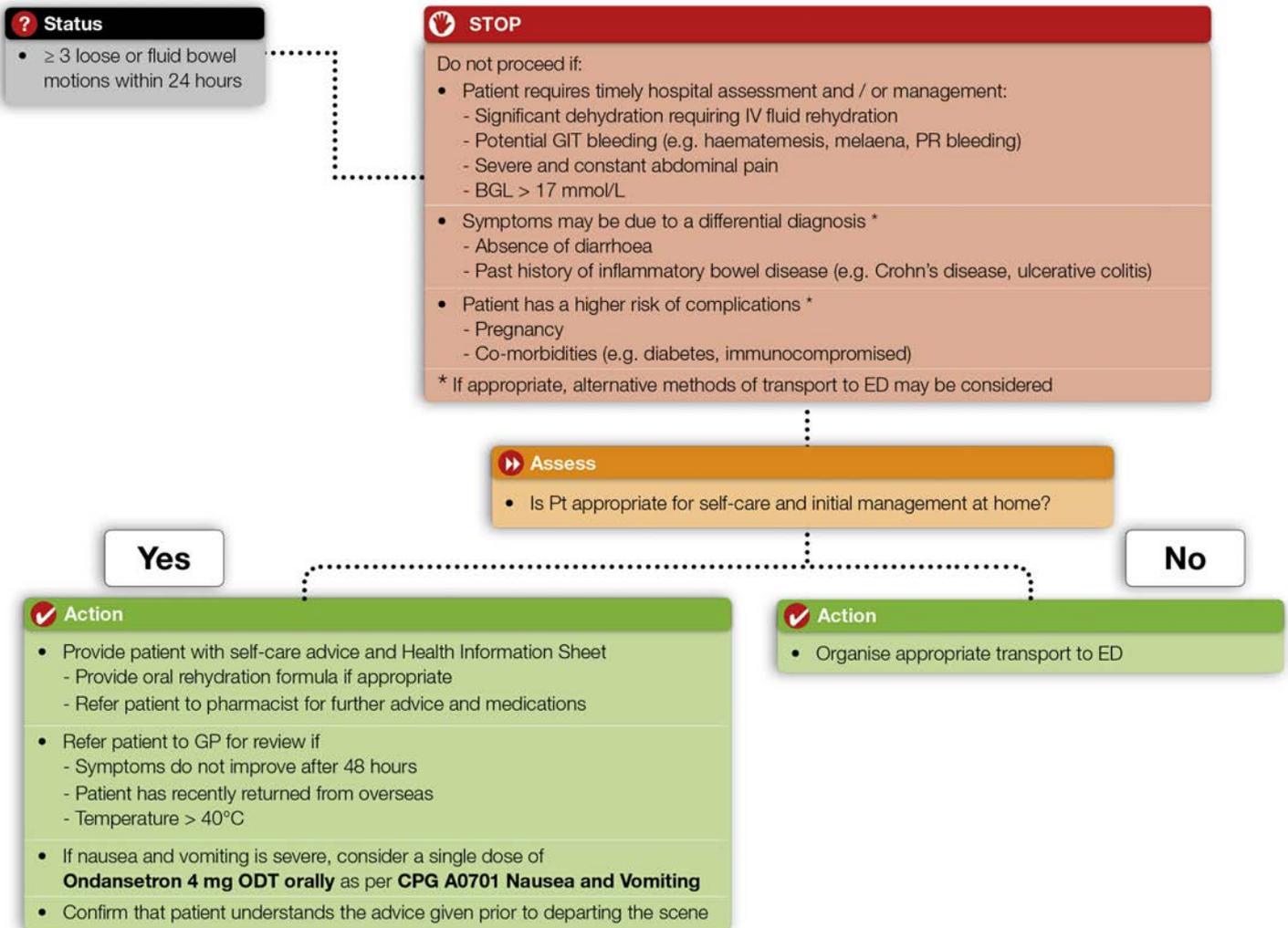
Special Notes

- For the purpose of this CPG, a patient can be suspected to have gastroenteritis because they present with acute onset of diarrhoea (≥ 3 loose or fluid bowel motions over 24 hours). Associated symptoms may include nausea and vomiting, abdominal cramping, lethargy and fever.
- Examples of signs of significant dehydration are listed in **CPG A0701 Nausea and vomiting**.
- The presence of blood in the stools or vomit may indicate bacterial / parasitic infection or GIT haemorrhage.
- Patients with a high BGL are also likely to be significantly dehydrated. A hyperglycaemic emergency (e.g. diabetic ketoacidosis) can also mimic symptoms of gastroenteritis.
- Diarrhoea is a non-specific symptom. Non-infectious causes of diarrhoea include medications, food intolerances and other disorders of the GIT. Patients with symptoms lasting > 48 hours should be referred on for further investigation.
- Patients who have recently returned from overseas should be referred to a GP for further investigation to exclude potentially serious infectious diseases.
- Paramedics should utilise all PPE and take appropriate precautions when assessing and managing suspected gastroenteritis patients. The risk of transmission of disease is not a valid reason for a non-transport decision if transport is clinically required.
- Patients with potential differential diagnoses (e.g. inflammatory bowel disease) or who are at higher risk of complications may not require emergency ambulance transport if they are otherwise well. Alternative methods of transport to hospital may be considered if available within a reasonable timeframe and the patient does not require active management or monitoring by Paramedics.

General Care

- Most cases of gastroenteritis in adults are caused by viral infection. Symptoms will usually resolve within a few days without the need for specific treatment.
- Patients should be referred to their local pharmacist or GP for further advice and management.
- The principle treatment for gastroenteritis is maintaining adequate hydration with water or commercial oral rehydration preparations (such as Gastrolyte or Hydralyte). “Sports” drinks should be avoided as these contain a different balance of sugar and electrolytes which can impair rehydration.
- If required, anti-diarrhoea medication can be purchased from a pharmacy after consultation with a pharmacist.
- Antibiotics are only indicated if a bacterial or parasitic infection is suspected. These patients generally present with a high fever ($>40^{\circ}\text{C}$), severe abdominal cramping and bloody diarrhoea and should be referred for further investigation.
- Encourage patients to maintain good hygiene practices including regular hand washing, minimising food handling and regular cleaning of potentially infected materials and surfaces. As a general guide attendance at work or school should be avoided until 48 hours after symptoms cease.
- Patients should be advised to seek further medical attention if, after 48 hours from onset their symptoms are not improving, or have actually worsened.
- If **Ondansetron** is administered, inform patient and / or carer of potential for extrapyramidal adverse effects and to call an ambulance immediately if this occurs.

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC May 2015 Treat and Refer - Suspected Gastroenteritis.pdf>

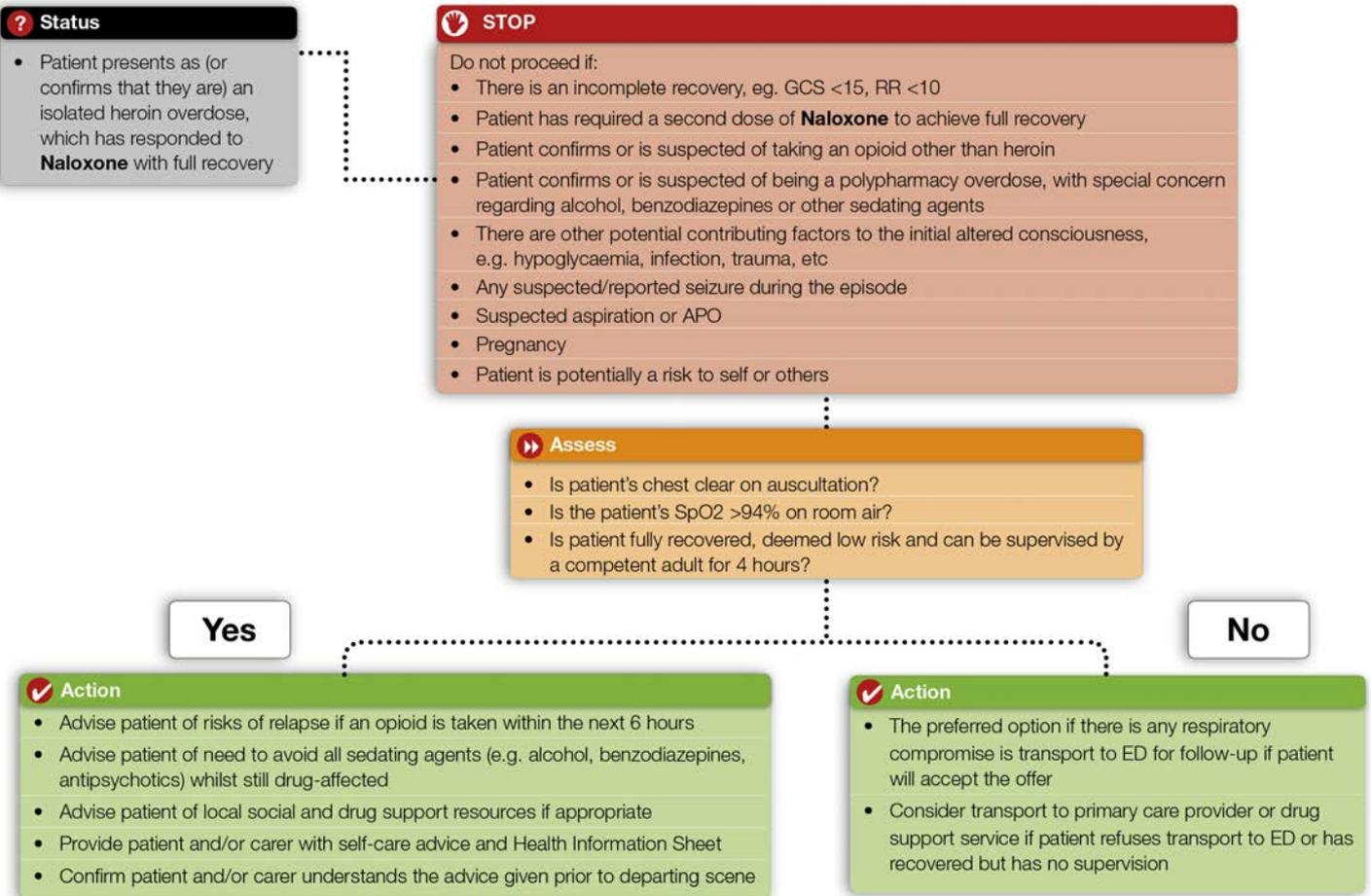
Special Notes

- There are a number of studies indicating that isolated heroin overdose patients are at low risk if not transported, providing that they have fully recovered after a single dose of Naloxone.
- The same evidence does not exist for overdose on other opioids due to their variable duration of action when compared to the relatively short action of Naloxone.
- The incidence of isolated heroin overdose is decreasing in Australia, with corresponding increases in prescription opioid abuse and polypharmacy overdose. Co-administration of other substances such as alcohol, benzodiazepines and other sedating agents increases the risk of harm to the patient and will generally require hospital monitoring and management.

General Care

- Manage heroin overdose as per **CPG A0707 Overdose: Opioids**.
- This guideline **ONLY** applies to confirmed or suspected cases of isolated heroin overdose. Suspicion can be based on evidence of heroin use (which should subsequently be documented) or information from the patient or bystanders.
- There may be a cohort of opioid overdose patients who may be resistant to transport, even if transport is recommended as per this CPG. These patients should still be provided advice on local social and drug support resources and provided with a Health Information Sheet if good rapport can be established. At no stage are Paramedics expected to put themselves at risk in implementing this guideline.
- It should not be assumed that all opioid overdose patients will be resistant to follow-up care.

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC May 2015 Treat and Refer - Heroin OD.pdf>

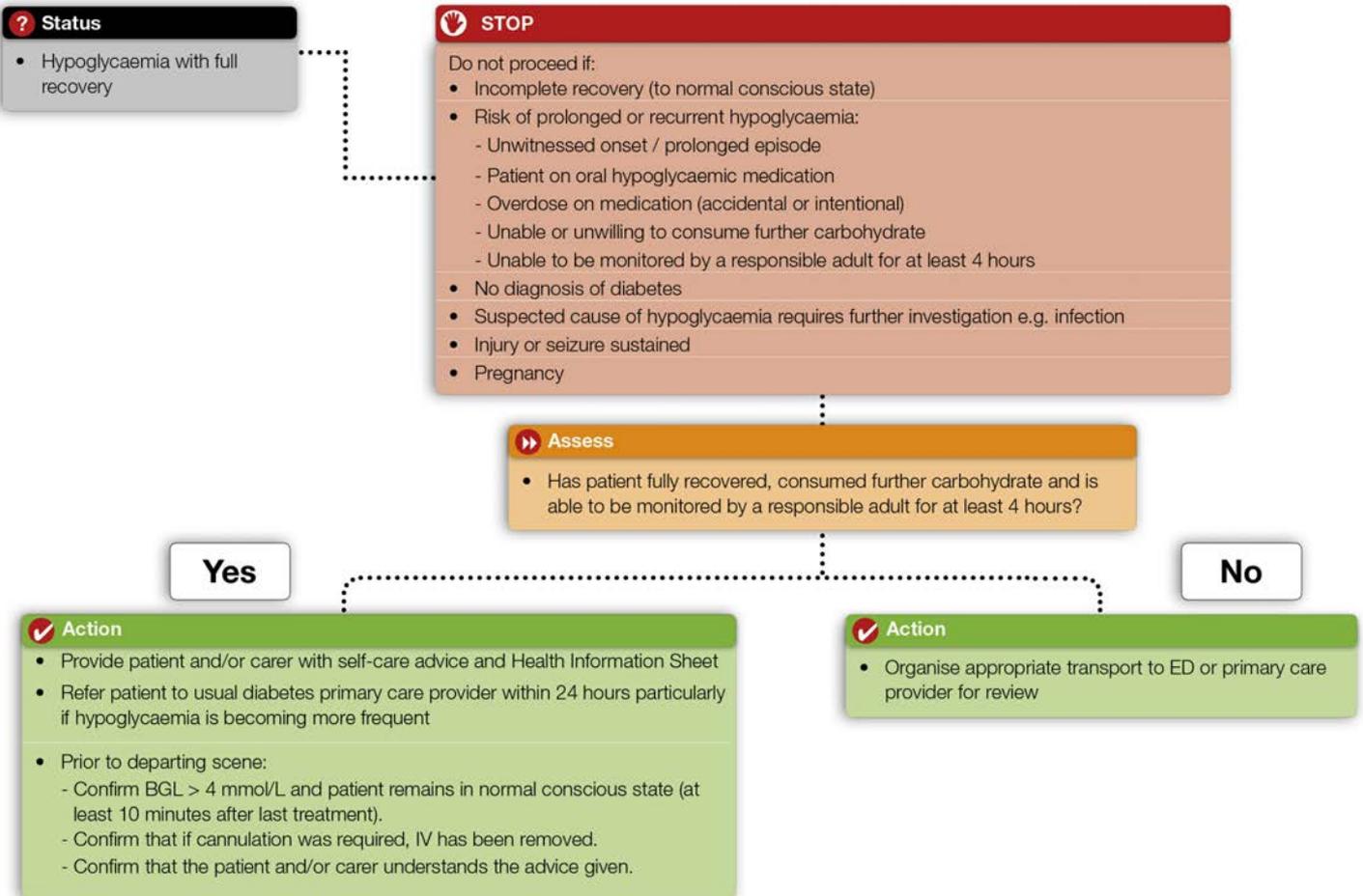
Special Notes

- This CPG is intended for adult patients with diagnosed diabetes who have fully recovered from an episode of hypoglycaemia.
- There is often a clear cause that triggers a hypoglycaemic episode, such as a missed meal or strenuous exercise. However in patients with poorly controlled diabetes, hypoglycaemia can still occur without a readily identifiable cause.
- Hypoglycaemia is a common adverse effect of oral hypoglycaemic medications. Due to their long duration of action, there is a risk of recurrent hypoglycaemia if a patient on oral hypoglycaemics is left at home.
- Patients who have overdosed on diabetes medication(s) require monitoring and management in hospital as well as investigation into the reason behind the overdose.
- Hypoglycaemia in patients without a history of diabetes may be triggered by a potentially serious condition such as drug / alcohol overdose, liver or endocrine disease, tumour, sepsis or malnourishment.

General Care

- Manage hypoglycaemia as per **CPG A0702 Hypoglycaemia**.
- Following resolution of hypoglycaemia the patient should be given a longer-acting carbohydrate to prevent recurrent hypoglycaemia. Suitable options include a sandwich, dried fruit or yoghurt.
- Remind patient of appropriate sources of glucose to consume for future episodes of hypoglycaemia:
 - 6 to 7 jelly beans
 - 1 tablespoon of honey
 - 200 mL of fruit juice
 - 150 to 200 mL of soft drink (not “diet” or “zero”)
 - 20 g of glucose tablets
- Advise patient to inform their usual diabetes provider (e.g. GP, endocrinologist, diabetes educator) about their hypoglycaemic episode within 24 hours, particularly if hypoglycaemia is becoming more frequent.

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC May 2015 Treat and Refer - Hypoglycaemia.pdf>

Special Notes

- This CPG is intended for adult patients who have sustained a minor, superficial burn injury from a thermal source e.g. scald or contact with hot objects.
- **If any doubt exists as to the nature, size or depth of the burn then the patient should be transported to hospital for further assessment. Continue management as per CPG A0805 Burns.**

Superficial Burns

- **Superficial** burns only involve the epidermal layer of the skin. Common characteristics include:
 - **Appearance:** Dry and red, no blisters, skin not broken
 - **Sensation:** May be painful
 - **Circulation:** Normal or increased
 - **Colour:** Red, warm
 - **Blisters:** None (or appears days later)

Partial / Full-thickness burns

- **Partial or full-thickness** burns have the following characteristics:
 - **Appearance:** Pale pink / white / black
 - **Sensation:** Increased sensation to no sensation
 - **Circulation:** Rapid capillary refill to no circulation
 - **Colour:** Pink / white / charred / black
 - **Blisters:** Yes (partial), no (full-thickness)

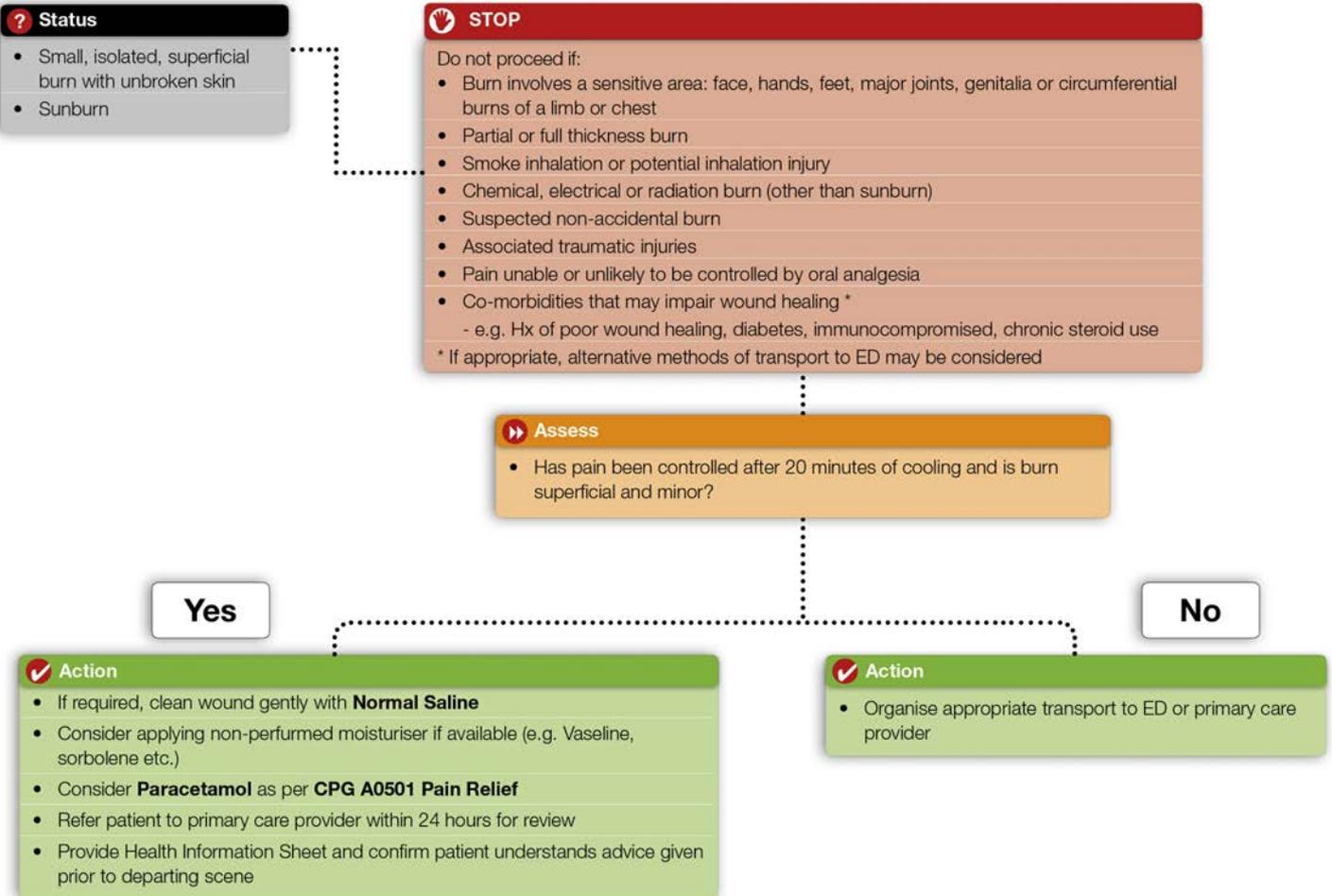
Partial / full-thickness burn management is not covered by this CPG.

- Sunburn may involve a larger area of skin, but may be appropriate for self-care or referral if the patient is otherwise well.

General Care

- Provide cooling with cool running water for 20 minutes as per **CPG A0805 Burns**.
- After initial cooling the burn area can be gently cleaned with gauze and **0.9% Normal Saline**.
- If available a soothing gel such as a non-perfumed moisturiser can be applied to superficial epidermal burns e.g. Vaseline, sorbolene. Gels or creams should not be applied to any burn with broken skin.
- No other dressing is required for superficial burns.
- Patient should be referred to a GP for review within 24 hours.
- Epidermal burns generally heal within 7 days without scarring.
- If required, **Paracetamol** can be administered for pain relief as per **CPG A0501 Pain Relief**.

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC MAg 2015 Treat and Refer - Minor burns.pdf>

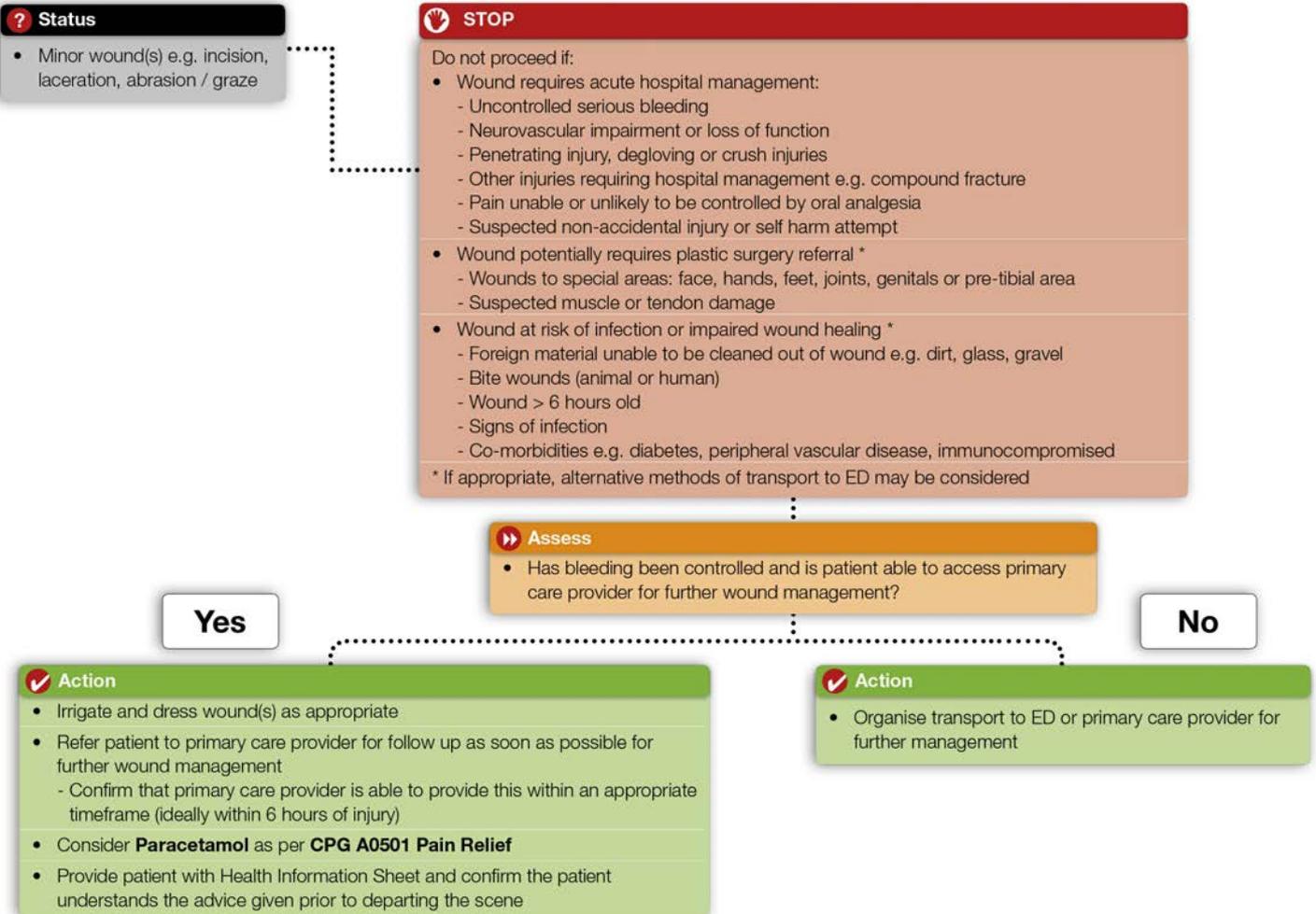
Special Notes

- This CPG is intended for adult patients who have sustained minor wounds (e.g. incisions, lacerations, abrasions / grazes), where bleeding is controlled and there are no other significant injuries.
- Paramedics should consider the mechanism of injury when assessing a patient and lower their threshold for transport if the mechanism could potentially result in more serious injury.
- Patients who meet any of the exclusion criteria in this CPG should be transported to hospital as their wounds are likely to require specialised management and / or potential plastic surgery.
- Patients with wounds potentially requiring plastic surgery referral, or wounds at risk of infection or impaired healing may not require emergency ambulance transport. Where appropriate, alternative methods of transport may be considered if available within a reasonable timeframe and the patient does not require active management or monitoring from paramedics.

General Care

- Irrigate wound(s) with Normal Saline and dress with a moistened Combine dressing.
- Small incisions, lacerations or abrasions that appear to be free from foreign matter and are not actively bleeding can alternatively be dressed with a film dressing e.g. Tegaderm or Opsite.
- **Paracetamol** is appropriate to treat mild pain if required as per **CPG A0501 Pain Relief**.
- Many wounds are caused by non-sterile agents and should be considered to be potentially contaminated. Patients who are not transported to hospital should be referred to a GP or practice nurse as soon as possible to ensure the wound is appropriately cleaned, debrided and closed. Patients may also require tetanus and / or antibiotic prophylaxis.
- If patients are being referred to a GP or nurse for wound management, Paramedics should confirm that they are able to provide this service. It should not be assumed that all medical clinics are able to provide wound management.
- Wounds requiring closure (e.g. sutures) should be ideally attended to within 6-10 hours of initial injury. If a significant delay is anticipated before the patient can access alternative care then they should be referred to ED.

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC May 2015 Treat and Refer - Minor Wounds.pdf>

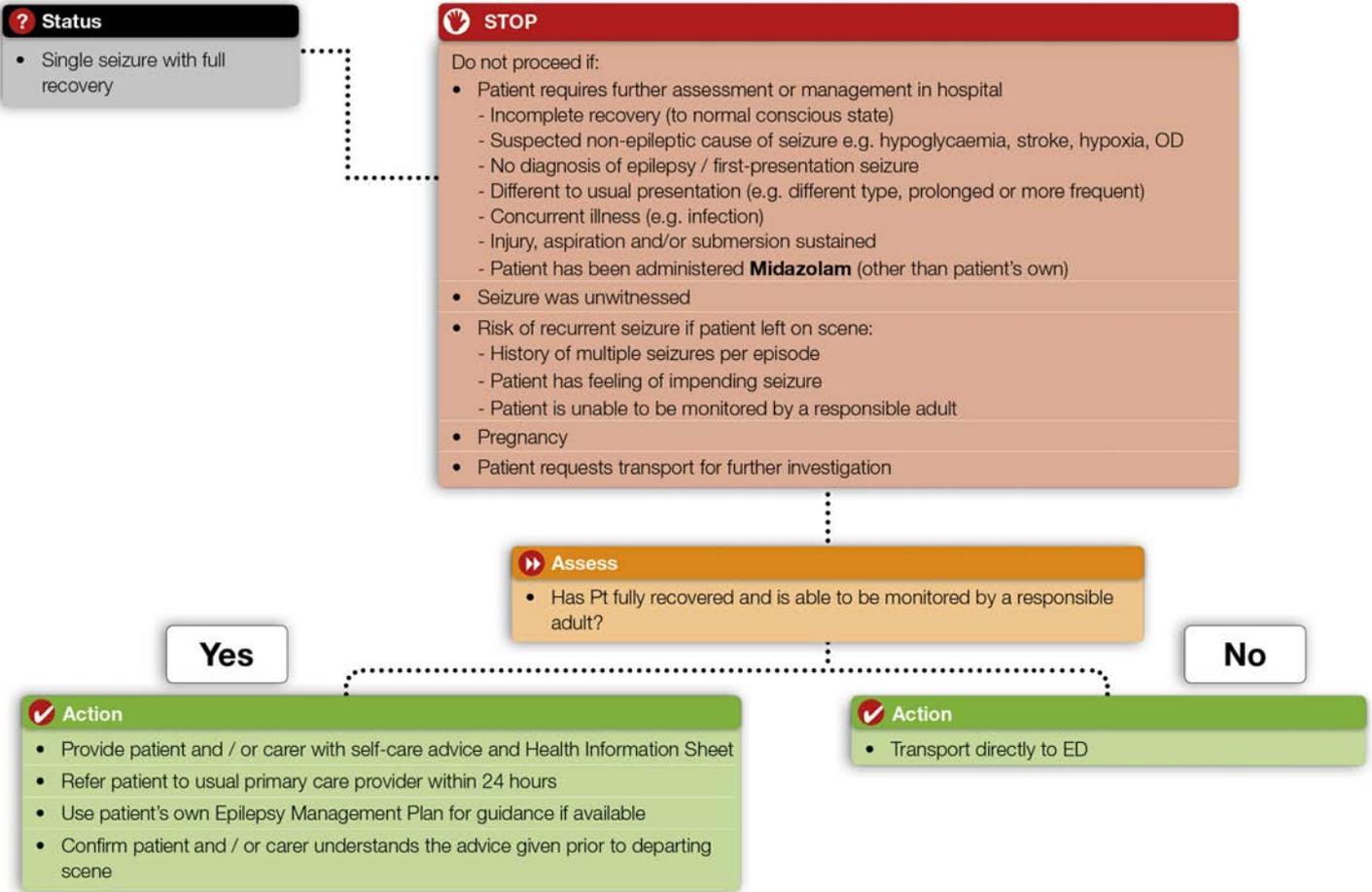
Special Notes

- This CPG is intended for adult patients with diagnosed epilepsy who have experienced a single, uncomplicated seizure with full recovery to their normal conscious state.
- Patients who meet any of the exclusion criteria in this CPG should be transported to hospital for further investigation and monitoring. Continue management as per **CPG A0703 Seizures** or other appropriate CPG.
- Transport to hospital is not necessarily indicated if a patient has been administered medication (e.g. buccal midazolam or rectal diazepam) according to their Epilepsy Management Plan and has subsequently recovered. Consult their individual plan for guidance.
- Consider eclampsia in patients with new onset seizures in the second half of pregnancy. Manage as per **CPG A0703 Seizures** and **CPG O0202 Pre-eclampsia / Eclampsia**.

General Care

- Provide initial management as per **CPG A0703 Seizures**.
- Patients may have their own written Epilepsy Management Plan. If available Paramedics should consult this when making decisions regarding treatment, referral or transport.
- If not transported, advise patient to inform usual primary care provider (e.g. GP or specialist) of event within 24 hours.
- Advise patient's carer / family to call an ambulance if:
 - Seizure recurs before patient is reviewed by doctor.
 - Future seizures do not stop after 5 minutes OR are different to usual presentation.
 - Seizure continues despite following Epilepsy Management Plan.
 - Patient sustains injury, vomits, or is immersed in water during seizure.
 - Patient has not regained consciousness or is taking longer to wake up than usual.
 - Carer / family have any other concerns and require advice.

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC May 2015 Treat and Refer - Seizures.pdf>

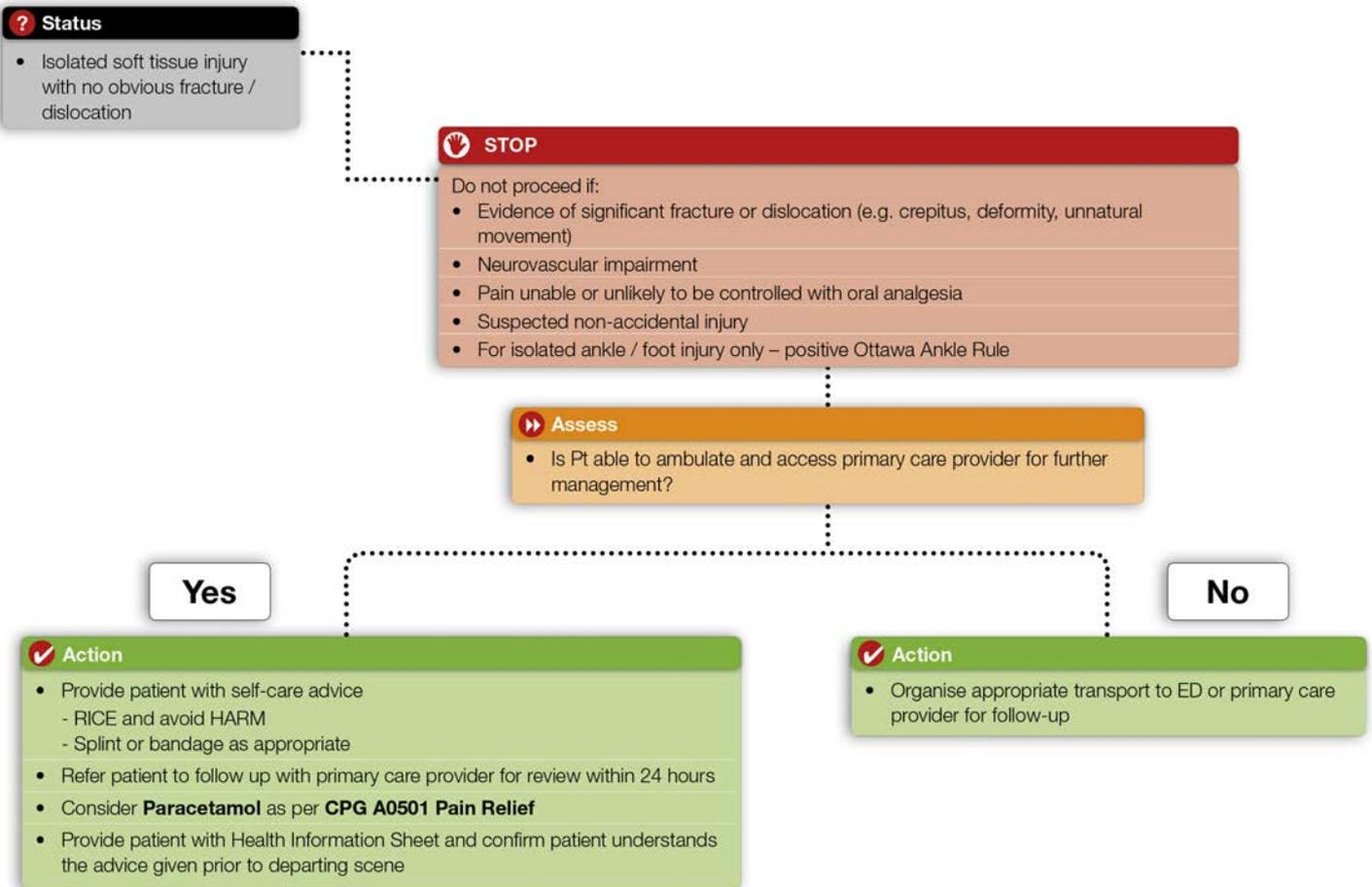
Special Notes

- This CPG is intended for adult patients who have sustained an isolated soft tissue injury as a result of minor trauma and have no obvious fracture or dislocation.
- Paramedics should consider the mechanism of injury when assessing a patient and lower their threshold for transport if the mechanism could potentially result in more serious injury.
- Where appropriate, transport to hospital by alternative methods may be considered if available within a reasonable timeframe and the patient does not require active management or monitoring by Paramedics during transport.
- The Ottawa Ankle Rules are a tool to assess foot and ankle injuries in adult patients (>18 years) to determine the requirement for radiography. They should be utilised on appropriate patients to help inform the management plan. Refer to **CPG A0110 Ottawa Ankle Rules** for instructions.

General Care

- The principles of management for soft tissue injury include “RICE” during the first 48-72 hours:
 - R** Rest
 - I** Ice (15 - 20 minutes every 1 - 2 hours when awake)
 - C** Compression
 - E** Elevation and also avoiding “HARM” in the first 48 - 72 hours:
 - H** Heat (increases blood flow and swelling)
 - A** Alcohol (increases blood flow and swelling)
 - R** Reinjury
 - M** Massage (promotes blood flow and swelling)
- **Paracetamol** is appropriate to treat mild to moderate pain. Refer patient to a pharmacist or GP for advice on other painkillers including anti-inflammatory medications, as these may not be suitable for all patients.
- Referral to a physiotherapist may also be beneficial to assist the recovery process.

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC May 2015 Treat and Refer - Soft Tissue Injury.pdf>

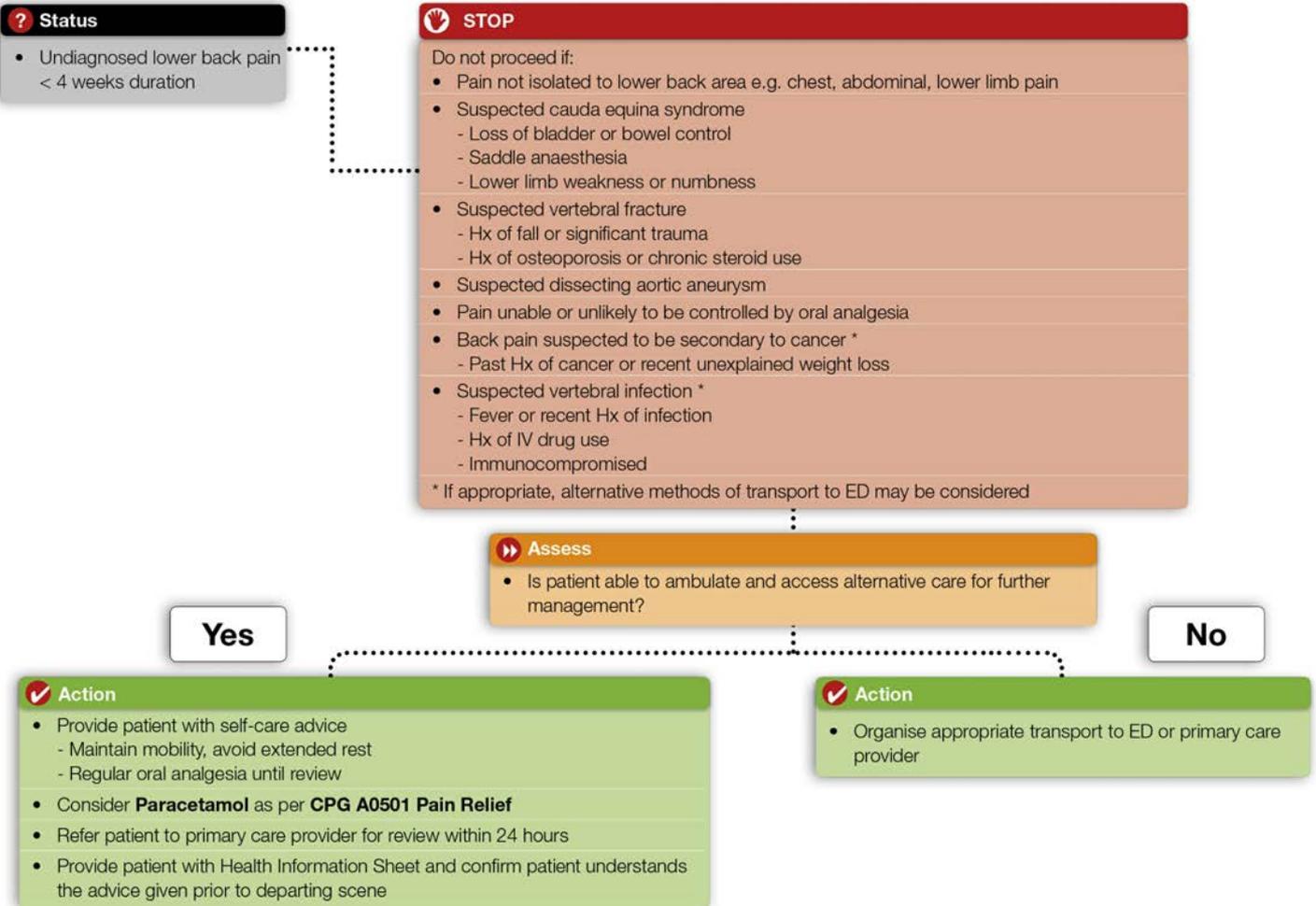
Special Notes

- This CPG is intended for adult patients presenting with lower back pain that is suspected to have been caused by a minor mechanical injury (e.g. lifting, bending or twisting of the back). For the purposes of this CPG, acute pain is defined as < 4 weeks duration.
- Patients with undiagnosed back pain of > 4 weeks duration should be referred to a GP for further investigation.
- Approximately 1% of cases of acute lower back pain are due to a serious medical aetiology requiring further investigation in hospital.
- Cauda equina syndrome arises from compression of nerve roots in the lower spinal cord. Signs and symptoms include “saddle” anaesthesia (altered sensation around groin and inner thigh area), incontinence and leg weakness or numbness.
- The risk of vertebral fracture is increased in patients with osteoporosis, chronic steroid use or those who have sustained a significant traumatic injury.
- Acute severe back pain may be a symptom of a dissecting aortic aneurysm.
- Back pain that does not improve can be a symptom of cancer particularly in older patients.
- Patients with weakened immune function (e.g. IV drug use, immunocompromised) are at risk of vertebral infection.
- Patients with back pain suspected as being secondary to cancer or suspected vertebral infection require investigation in hospital but may not require emergency ambulance transport. Where appropriate, alternative methods of transport may be considered if available within a reasonable timeframe and the patient does not require active management or monitoring by Paramedics.

General Care

- Most cases of acute non-specific lower back pain can be managed in the primary care setting.
- Patients should be referred to their GP or physiotherapist for further advice and management.
- Advise patient to self-medicate with regular Paracetamol until they are reviewed if there are no contraindications. If required, the initial dose can be administered by Paramedics as per **CPG A0501 Pain Relief**.
- Refer patient to a pharmacist or GP for advice on other analgesic agents including anti-inflammatory medications, as these may not be suitable for all patients.
- Advise patient to maintain gentle exercise (e.g. walking) as their pain allows and to avoid resting for long periods of time. The use of heat packs may also be of benefit.

Flowchart



Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC May 2015 Treat and Refer - Lower Back Pain.pdf>

Presentation	6 mg in 2 mL glass ampoule
Pharmacology	A naturally occurring purine nucleoside found in all body cells Actions: <ul style="list-style-type: none"> Slows conduction through the A-V node, resulting in termination of re-entry circuit activity within or including the A-V nodal pathway
Metabolism	By adenosine deaminase in red blood cells and vascular endothelium
Primary emergency Indications	<ol style="list-style-type: none"> AVNRT with adequate or inadequate perfusion but not deteriorating rapidly AVRT and associated Wolff-Parkinson-White (WPW) or other accessory tract SVT with adequate or inadequate perfusion but not deteriorating rapidly
Contraindications	<ol style="list-style-type: none"> Second degree or third degree A-V block (may produce prolonged sinus arrest / A-V blockade) AF Atrial flutter Ventricular tachyarrhythmias Known hypersensitivity
Precautions	<ol style="list-style-type: none"> Adenosine may provoke bronchospasm in the asthmatic patient Adenosine is antagonised by methylxanthines (e.g. caffeine or theophyllines). The drug may not be effective in patients with large caffeine intake or those on high doses of theophylline medication
Route of administration	IV

Side effects	<ul style="list-style-type: none">• Usually brief and transitory• Transient arrhythmia (including asystole, bradycardia or ventricular ectopy) may be experienced following reversion• Chest pain• Dyspnoea• Headache or dizziness• Nausea• Skin flushing
Special notes	Adenosine has a very short half life. It should be administered rapidly through an IV as close to the heart as practicable, such as the cubital fossa Intravenous effects: Duration: < 10 seconds

Presentation	1 mg in 1 mL glass ampoule (1:1,000) 1 mg in 10 mL glass ampoule (1:10,000)
Pharmacology	A naturally occurring alpha and beta-adrenergic stimulant Actions: <ul style="list-style-type: none"> • Increases HR by increasing SA node firing rate (Beta 1) • Increases conduction velocity through the A-V node (Beta 1) • Increases myocardial contractility (Beta 1) • Increases the irritability of the ventricles (Beta 1) • Causes bronchodilatation (Beta 2) • Causes peripheral vasoconstriction (Alpha)
Metabolism	By monoamine oxidase and other enzymes in the blood, liver and around nerve endings; excreted by the kidneys
Primary emergency Indications	<ol style="list-style-type: none"> 1. Cardiac arrest - VF/VT, Asystole or PEA 2. Inadequate perfusion (cardiogenic or non-cardiogenic/non-hypovolaemic) 3. Bradycardia with poor perfusion 4. Anaphylaxis 5. Severe asthma - imminent life threat not responding to nebulised therapy, or unconscious with no BP 6. Croup
Contraindications	1. Hypovolaemic shock without adequate fluid replacement
Precautions	Consider reduced doses for: <ol style="list-style-type: none"> 1. Elderly / frail patients 2. Patients with cardiovascular disease 3. Patients on monoamine oxidase inhibitors 4. Higher doses may be required for patients on beta blockers

Route of administration	IV IM Nebulised IV infusion IO
Side effects	<ul style="list-style-type: none"> • Sinus tachycardia • Supraventricular arrhythmias • Ventricular arrhythmias • Hypertension • Pupillary dilatation • May increase size of MI • Feeling of anxiety/palpitations in the conscious patient
Special notes	<p>IV Adrenaline should be reserved for life threatening situations.</p> <p>IV effects: Onset: 30 seconds Peak: 3 – 5 minutes Duration: 5 – 10 minutes</p> <p>IM effects: Onset: 30 – 90 seconds Peak: 4 – 10 minutes Duration: 5 – 10 minutes</p>

Presentation	150 mg in 3 mL glass ampoule
Pharmacology	Class III anti-arrhythmic agent
Metabolism	By the liver
Primary emergency Indications	<ol style="list-style-type: none"> VF / pulseless VT refractory to cardioversion Sustained or recurrent VT
Contraindications	<ol style="list-style-type: none"> VF / pulseless VT refractory to cardioversion <ul style="list-style-type: none"> • Nil of significance in above indication VT <ul style="list-style-type: none"> • Pregnancy TCA OD Do not administer Amiodarone if VT follows Ondansetron administration
Precautions	1. Nil of significance in the above indications
Route of administration	IV
Side effects	<ul style="list-style-type: none"> • Hypotension • Bradycardia
Special notes	<p>IV effects (bolus):</p> <p>Onset: 2 minutes</p> <p>Peak: 20 minutes</p> <p>Duration: 2 hours</p> <p>Amiodarone is incompatible with Normal Saline. Glucose 5% must be used as diluent when preparing an IV infusion.</p> <p>An IV infusion of Amiodarone may be required during interhospital transfer.</p> <p>This will be prescribed by the referring physician and will normally be at a dose of 10 - 20 mg/kg run over 24 hours.</p>

Presentation	300 mg chewable tablets 300 mg soluble or water dispersible tablets
Pharmacology	An analgesic, antipyretic, anti-inflammatory and antiplatelet aggregation agent Actions: <ul style="list-style-type: none"> To minimise platelet aggregation and thrombus formation in order to retard the progression of coronary artery thrombosis in ACS Inhibits synthesis of prostaglandins - anti-inflammatory actions
Metabolism	Converted to salicylate in the gut mucosa and liver; excreted mainly by the kidneys
Primary emergency Indications	1. ACS
Contraindications	1. Hypersensitivity to aspirin / salicylates 2. Actively bleeding peptic ulcers 3. Bleeding disorders 4. Suspected dissecting aortic aneurysm 5. Chest pain associated with psychostimulant OD if SBP >160 mmHg
Precautions	1. Peptic ulcer 2. Asthma 3. Patients on anticoagulants
Route of administration	Oral
Side effects	<ul style="list-style-type: none"> Heartburn, nausea, gastrointestinal bleeding Increased bleeding time Hypersensitivity reactions
Special notes	Aspirin is C/I for use in acute febrile illness in children and adolescents The anti-platelet effects of Aspirin persist for the natural life of platelets. Onset: n/a Peak: n/a Duration: 8 - 10 days

Presentation	0.6 mg in 1 mL polyamp 1.2 mg in 1 mL polyamp
Pharmacology	An anticholinergic agent Actions: <ul style="list-style-type: none"> • inhibits the actions of acetylcholine on post-ganglionic cholinergic nerves at the neuro-effector site, e.g. as a vagal blocker and allows sympathetic effect to: <ul style="list-style-type: none"> – increase heart rate by increasing SA node firing rate – increase the conduction velocity through the A-V node • antidote to reverse the effects of cholinesterase inhibitors, (e.g. organophosphate insecticides) at the post-ganglionic neuro-effector sites of cholinergic nerves to: <ul style="list-style-type: none"> – reduce the excessive salivary, sweat, GIT and bronchial secretions; and – relax smooth muscles
Metabolism	By the liver; excreted mainly by the kidneys
Primary emergency Indications	1. Unstable bradycardia 2. Organophosphate poisoning with excessive cholinergic effects 3. Hypersalivation as a side effect of ketamine
Contraindications	1. Previous heart transplant
Precautions	1. Atrial flutter 2. AF 3. Myocardial infarction 4. Do not increase HR above 100 bpm except in children under 6 years 5. Glaucoma
Route of administration	IV

Side effects	<ul style="list-style-type: none">• Tachycardia• Palpitations• Dry mouth• Dilated pupils• Visual blurring• Retention of urine• Confusion, restlessness (in large doses)• Hot, dry skin (in large doses)
Special notes	IV effects: Onset: < 2 minutes Peak: < 5 minutes Duration: 2 - 6 hours 10 mL flush of Normal Saline must be administered after Atropine if Adrenaline is to also be administered.

Mode of action

- Electrolyte – replaces depleted serum calcium.
- Calcium directly antagonises the effects of hyperkalaemia on myocardial cells, but has no effect on potassium levels
- Hypocalcaemia is associated with blood transfusions due to the addition of citrate to packed red cell concentrate (PRCC). Citrate chelates ionised calcium, reducing plasma concentrations.

Indications

- Cardiac arrest where hyperkalaemia is suspected
- Following transfusion of PRCC (MFP only)

Contraindications

- Suspected digoxin toxicity

Precautions

- Monitor injection site carefully and stop administration immediately if extravasation occurs.

Adverse effects

- Hypercalcaemia
- Tissue necrosis (extravasation)
- Rapid administration may cause:
 - Hot flushes
 - Chalky taste
 - Hypotension
 - Bradycardia
 - Cardiac arrhythmias (AV dissociation, ventricular ectopics, VT and VF)
 - Syncope
 - Cardiac arrest

Significant interactions

- Nil significant

Pregnancy

- Considered safe to use

Breastfeeding

- Considered safe to use

Administration Advice

- **Calcium gluconate may precipitate. Do not use if the solution is cloudy or contains particles**
- **Do not administer via IM or SC injection due to risk of tissue necrosis**
- **Presentation:** 953 mg (considered equivalent to 1 gram / 2.2 mmol) calcium in 10 mL glass vial.
- **Route:** Slow IV injection into a large peripheral vein. Administer over 2 – 5 minutes to reduce adverse effects. May be given faster in cardiac arrest.
- **Onset of action:** < 3 minutes
- **Duration of action:** 30 – 60 min

Notes

- **Do not confuse or use interchangeably with calcium chloride.** Calcium chloride is associated with a high risk if extravasation occurs and contains three times as much calcium per mL as calcium gluconate.

Infusion

- None

Presentation	1 g sterile powder in a glass vial
Pharmacology	Cephalosporin antibiotic
Metabolism	Excreted unchanged in urine (33% - 67%) and in bile
Primary emergency Indications	<ol style="list-style-type: none"> Suspected meningococcal septicaemia Severe sepsis (consult only)
Contraindications	1. Allergy to Cephalosporin antibiotics
Precautions	1. Allergy to Penicillin antibiotics
Route of administration	IV (preferred) IM (if IV access unavailable)
Side effects	<ul style="list-style-type: none"> Nausea Vomiting Skin rash
Special notes	<p>Usual dose: adult 1 g, child 50 mg/kg (max. 1 g)</p> <p>Ceftriaxone IV must be made up to 10 mL using sterile water and dose administered over 2 minutes</p> <p>Ceftriaxone IM must be made up to 4 mL using 1% Lignocaine and dose administered in lateral upper thigh</p> <p>IM/IV effects:</p> <p>Onset: n/a</p> <p>Peak: n/a</p> <p>Duration: n/a</p>

Presentation	8 mg in 2 mL glass vial
Pharmacology	A corticosteroid secreted by the adrenal cortex Actions: <ul style="list-style-type: none"> • Relieves inflammatory reactions • Provides immunosuppression
Metabolism	By the liver and other tissues; excreted predominantly by the kidneys
Primary emergency Indications	<ol style="list-style-type: none"> 1. Bronchospasm associated with acute respiratory distress not responsive to nebulised Salbutamol 2. Moderate - severe croup 3. Acute exacerbation of COPD 4. Adult stridor (non-foreign body obstruction)
Contraindications	1. Known hypersensitivity
Precautions	1. Solutions which are not clear or are contaminated should be discarded
Route of administration	IV (administered over 1 - 3 minutes), Oral
Side effects	<ul style="list-style-type: none"> • Nil of significance in the above indication
Special notes	Does not contain an antimicrobial agent, therefore use solution immediately and discard any residue IV effects: Onset: 30 - 60 minutes Peak: 2 hours Duration: 36 - 72 hours

Presentation	100 mL infusion soft pack
Pharmacology	<p>An isotonic crystalloid solution</p> <p>Composition:</p> <ul style="list-style-type: none"> • Sugar – 5% dextrose • Water <p>Actions:</p> <ul style="list-style-type: none"> • Provides a small source of energy • Supplies body water
Metabolism	<ul style="list-style-type: none"> • Dextrose: <ul style="list-style-type: none"> – Broken down in most tissues – Stored in the liver and muscle as glycogen • Water: <ul style="list-style-type: none"> – Excreted by the kidneys – Distributed throughout total body water, mainly in the extracellular fluid compartment
Primary emergency Indications	1. Vehicle for dilution and administration of IV emergency drugs
Contraindications	1. Nil of significance in the above indication
Precautions	1. Nil of significance in the above indication
Route of administration	IV infusion
Side effects	<ul style="list-style-type: none"> • Nil of significance in the above indication
Special notes	IV half life: Approximately 20 - 40 minutes

Presentation	25 g in 250 mL infusion soft pack
Pharmacology	A slightly hypertonic crystalloid solution Composition: <ul style="list-style-type: none"> • Sugar – 10% dextrose • Water Actions: <ul style="list-style-type: none"> • Provides a source of energy • Supplies body water
Metabolism	<ul style="list-style-type: none"> • Dextrose: <ul style="list-style-type: none"> – Broken down in most tissues – Stored in the liver and muscle as glycogen • Water: <ul style="list-style-type: none"> – Excreted by the kidneys – Distributed throughout total body water, mainly in the extracellular fluid compartment
Primary emergency Indications	1. Diabetic hypoglycaemia (BGL analysis < 4 mmol/L) in patients with an altered conscious state who are unable to self-administer oral glucose
Contraindications	1. Nil of significance in the above indication
Precautions	1. Nil of significance in the above indication
Route of administration	IV infusion
Side effects	<ul style="list-style-type: none"> • Nil of significance in the above indication
Special notes	IV effects: Onset: 3 minutes Peak: n/a Duration: Depends on severity of hypoglycaemic episode

Presentation	100 mcg in 2 mL glass ampoule 250 mcg in 1 mL glass ampoule or cartridge (IN use only)
Pharmacology	A synthetic opioid analgesic Actions: CNS effects: <ul style="list-style-type: none"> • Depression – leading to analgesia • Respiratory depression – leading to apnoea • Dependence (addiction) Cardiovascular effects: <ul style="list-style-type: none"> • Decreases conduction velocity through the A-V node
Metabolism	By the liver; excreted by the kidneys
Primary emergency Indications	<ol style="list-style-type: none"> 1. Sedation to facilitate intubation (<i>RSI - modified or Paediatric IFS</i>) 2. Sedation to maintain intubation 3. Sedation to facilitate transthoracic pacing 4. Sedation to facilitate synchronised cardioversion 5. CPR interfering patient - ALS 6. Analgesia – IV/IN <ul style="list-style-type: none"> • History of hypersensitivity or allergy to morphine • Known renal impairment / failure • Short duration of action desirable • Hypotension • Nausea and/or vomiting • Severe headache
Contraindications	<ol style="list-style-type: none"> 1. History of hypersensitivity 2. Late second stage of labour
Precautions	<ol style="list-style-type: none"> 1. Elderly/frail patients 2. Impaired hepatic function 3. Respiratory depression, e.g. COPD 4. Current asthma 5. Patients on monoamine oxidase inhibitors 6. Known addiction to opioids 7. Rhinitis, rhinorrhea or facial trauma (IN route)

Route of administration	IV IN IV infusion
Side effects	<ul style="list-style-type: none"> • Respiratory depression • Apnoea • Rigidity of the diaphragm and intercostal muscles • Bradycardia
Special notes	<p>Fentanyl is a Schedule 8 drug under the Poisons Act and its use must be carefully controlled with accountability and responsibility</p> <p>Respiratory depression can be reversed with Naloxone</p> <p>100 mcg Fentanyl is equivalent in analgesic activity to 10 mg Morphine</p> <p>IV effects:</p> <p>Onset: Immediate</p> <p>Peak: < 5 minutes</p> <p>Duration: 30 - 60 minutes</p> <p>IN effects:</p> <p>Peak: 2 minutes</p>

Presentation	40 mg in 4 mL glass ampoule
Pharmacology	A diuretic Actions: <ul style="list-style-type: none"> • Causes venous dilatation and reduces venous return • Promotes diuresis
Metabolism	Excreted by the kidneys
Primary emergency Indications	1. Consider in cardiogenic acute pulmonary oedema
Contraindications	1. Nil of significance in the above indication
Precautions	1. Hypotension
Route of administration	IV
Side effects	<ul style="list-style-type: none"> • Hypotension
Special notes	<p>The effect of vasopressor drugs will often be reduced after treatment with Furosemide.</p> <p>IV effects:</p> <p>Onset: 5 minutes</p> <p>Peak: 20 - 60 minutes</p> <p>Duration: 2 - 3 hours</p>

Presentation	1 mg (IU) in 1 mL hypokit
Pharmacology	A hormone normally secreted by the pancreas Actions: <ul style="list-style-type: none"> • Causes an increase in blood glucose concentration by converting stored liver glycogen to glucose
Metabolism	Mainly by the liver, also by the kidneys and in the plasma
Primary emergency Indications	<ol style="list-style-type: none"> 1. Diabetic hypoglycaemia (BGL < 4 mmol/L) in patients with an altered conscious state who are unable to self-administer oral glucose 2. Anaphylaxis (adult) where patients remain hypotensive following adrenaline therapy with past history of heart failure or patients taking beta-blocker medication
Contraindications	1. Nil of significance in the above indication
Precautions	1. Nil of significance in the above indication
Route of administration	IM IV
Side effects	<ul style="list-style-type: none"> • Nausea and vomiting (rare)
Special notes	<p>Not all patients will respond to Glucagon, e.g. those with inadequate glycogen stores in the liver (alcoholics, malnourished).</p> <p>IM effects:</p> <p>Onset: 5 minutes</p> <p>Peak: n/a</p> <p>Duration: 25 minutes</p>

Presentation	0.3 mg tablet 0.6 mg tablets Transdermal GTN Patch (50 mg 0.4 mg/hr release)
Pharmacology	Principally, a vascular smooth muscle relaxant Actions: <ul style="list-style-type: none"> • Venous dilatation promotes venous pooling and reduces venous return to the heart (reduces preload) • Arterial dilatation reduces systemic vascular resistance and arterial pressure (reduces afterload) The effects of the above are: <ul style="list-style-type: none"> • Reduced myocardial O₂ demand • Reduced systolic, diastolic and mean arterial blood pressure, whilst usually maintaining coronary perfusion pressure • Mild collateral coronary arterial dilatation may improve blood supply to ischaemic areas of myocardium • Mild tachycardia secondary to slight fall in blood pressure • Preterm labour: Uterine quiescence in pregnancy
Metabolism	By the liver
Primary emergency Indications	<ol style="list-style-type: none"> 1. Chest pain with ACS 2. Acute LVF 3. Hypertension associated with ACS 4. Autonomic dysreflexia 5. Preterm labour (consult)

Contraindications	<ol style="list-style-type: none"> 1. Known hypersensitivity 2. Systolic blood pressure < 110 mmHg tablet 3. Systolic blood pressure < 90 mmHg patch 4. Sildenafil Citrate (Viagra) or Vardenafil (Levitra) administration in the previous 24 hr or Tadalafil (Cialis) administration in the previous 4 days (PDE5 inhibitors) 5. Heart rate > 150 bpm 6. Bradycardia HR < 50 bpm (excluding autonomic dysreflexia) 7. VT 8. Inferior STEMI with systolic BP < 160 mmHg 9. Right ventricular MI
Precautions	<ol style="list-style-type: none"> 1. No previous administration 2. Elderly patients 3. Recent MI 4. Concurrent use with other tocolytics
Route of administration	<p>SL Buccal Transdermal Infusion (interhospital transfer only)</p>
Side effects	<ul style="list-style-type: none"> • Tachycardia • Hypotension • Headache • Skin flushing (uncommon) • Bradycardia (occasionally)

<p>Special notes</p>	<p>Storage:</p> <ul style="list-style-type: none"> • GTN is susceptible to heat and moisture. Make sure that tablets are stored in their original light resistant, tightly sealed bottles. The foil pack of the patches should be intact. • Do not administer patient's own tablets, as its storage may not have been in optimum conditions or it may have expired. • Patches should be discarded prior to use-by date. • Since both men and women can be prescribed PDE5 inhibitors all patients should be asked if and when they last had the medication to determine if GTN is C/I. • Tadalafil (Cialis) may also be prescribed to men for treatment of benign prostatic hypertrophy. This is a new indication for the medication and may lead to an increased number of patients under this treatment regimen. • GTN by IV infusion may be required for an interhospital transfer as per the treating doctor's orders. <p>Interhospital transfer:</p> <p>The IV dose is to be prescribed and signed by the referring hospital medical officer. Infusions usually run in the range of 5 mcg/minute to 200 mcg/minute and increased 3 - 5 mcg/minute.</p> <p>S/L effects:</p> <p>Onset: 30 seconds – 2 minutes</p> <p>Peak: 5 - 10 minutes</p> <p>Duration: 15 - 30 minutes</p> <p>Intravenous effects</p> <p>Onset: 30 seconds – 1 minute</p> <p>Peak: 3 - 5 minutes</p> <p>Duration: 15 - 30 minutes</p> <p>Transdermal effect</p> <p>Onset: Up to 30 minutes</p> <p>Peak: 2 hours</p>
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Presentation	5000 units in 5 mL plastic ampoule
Pharmacology	Anticoagulant Inactivates clotting factors IIa (thrombin) and Xa by binding to antithrombin III
Metabolism	Metabolised by the liver; excreted by the kidneys
Primary emergency Indications	1. Acute STEMI
Contraindications	<ol style="list-style-type: none"> 1. Known allergy or hypersensitivity 2. Active bleeding (excluding menses) 3. Oral anticoagulants 4. Bleeding disorders 5. History of Heparin-Induced Thrombocytopenia (HIT) 6. Severe hepatic impairment / disease, including oesophageal varices 7. Recent trauma or surgery (< 3 weeks)
Precautions	1. Renal impairment
Route of administration	IV
Side effects	<ul style="list-style-type: none"> • Bleeding • Bruising and pain at injection site • Hyperkalaemia • Thrombocytopenia (mild to severe)
Special notes	<p>Do not inject IM due to risk of causing haematoma</p> <p>Onset: immediate</p> <p>Duration: 3-6 hours.</p> <p>The plasma half-life of Heparin is 60 minutes. As such, any patient receiving Heparin as a bolus dose will also require repeat doses if their travel time to PCI is > 1 hour.</p>

Presentation	250 mcg in 1 mL nebuler or polyamp
Pharmacology	Anticholinergic bronchodilator Actions: <ul style="list-style-type: none"> Allows bronchodilatation by inhibiting cholinergic bronchomotor tone (i.e. blocks vagal reflexes which mediate bronchoconstriction)
Metabolism	Excreted by the kidneys
Primary emergency Indications	<ol style="list-style-type: none"> Severe respiratory distress associated with bronchospasm Exacerbation of COPD irrespective of severity
Contraindications	1. Known hypersensitivity to Atropine or its derivatives
Precautions	<ol style="list-style-type: none"> Glaucoma Avoid contact with eyes
Route of administration	Nebulised (in combination with Salbutamol)
Side effects	<ul style="list-style-type: none"> Headache Nausea Dry mouth Skin rash Tachycardia (rare) Palpitations (rare) Acute angle closure glaucoma secondary to direct eye contact (rare)
Special notes	<p>There have been isolated reports of ocular complications (dilated pupils, increased intraocular pressure, acute angle glaucoma, eye pain) as a result of direct eye contact with Ipratropium Bromide formulations.</p> <p>The nebuliser mask must therefore be fitted properly during inhalation and care taken to avoid Ipratropium Bromide solution entering the eyes.</p> <p>Ipratropium Bromide must be nebulised in conjunction with Salbutamol and is to be administered as a single dose only.</p> <p>Onset: 3 - 5 minutes Peak: 1.5 - 2 hours Duration: 6 hours</p>

Mode of action

Anaesthetic agent with analgesic properties at lower doses.

Exact mechanism of action is unclear, but primarily works as an antagonist at N-methyl-D-aspartate (NMDA) receptors. Ketamine may also interact with opioid, muscarinic and other receptors. Produces a trance-like dissociative state with amnesia, with preservation of laryngeal and pharyngeal reflexes.

Indications

- Intubation
- Analgesia
- Sedation:
 - Agitation
 - Patient movement during CPR

Contraindications

- Suspected non-traumatic brain injury with severe hypertension (SBP > 180)

Precautions

- May exacerbate cardiovascular conditions (e.g. uncontrolled hypertension, stroke, recent MI, cardiac failure) due to effects on HR and BP.

Adverse effects

- **CV:** hypertension, tachycardia
- **CNS:** emergence reactions (e.g. vivid dreams, restlessness, confusion, hallucinations, irrational behavior); increased skeletal muscle tone (may resemble seizures)
- **Respiratory:** transient respiratory depression and apnoea (rare)
- **GI:** nausea and vomiting
- **Other:** injection site pain, lacrimation, hypersalivation, diplopia, nystagmus

Significant interactions

- Nil

Pregnancy

- Considered safe to use¹

Breastfeeding

- Monitoring required - observe the infant for potential adverse effects (drowsiness, poor feeding, sleeping pattern changes)¹
(*NB. Unlikely scenario in context of emergency indications)

Details

- **Presentation:** 200 mg / 2 mL glass ampoule
- **Route:**
 - **IV** (dilute ketamine 200 mg / 2 mL to 20 mL with 18 mL of Normal Saline (10 mg/mL).
Administer IV doses slowly (over at least 1 minute); rapid administration may result in respiratory depression and enhanced hypertensive response
 - **IM** (do not dilute)
 - **IN** (add 0.1 mL to required volume to account for dead space in the MAD)
- **Onset of action:**
 - **IV** 30 seconds (anaesthesia)
 - **IM** 3 – 4 minutes
 - **IN** 5 minutes
- **Peak:**
 - **IN** 20 minutes
- **Duration of action:**
 - **IV** 5 – 10 minutes (anaesthesia)
 - **IM** 12 – 25 minutes
 - **IN** 45 minutes

Notes

- Ketamine is managed as a restricted medication in AV
- Emergence reactions associated with ketamine administration for analgesia in adult patients may be managed with midazolam. Consultation with the RCH is required to administer midazolam to paediatric patients

Infusion

- **AAV only:** Ketamine 50mg added to make 50 mL with Dextrose 5% or Normal Saline to make 1 mg/mL dilution

References

1. The Women's Pregnancy and Breastfeeding Medicines Guide (online). Melbourne: The Royal Women's Hospital. Available from: <https://thewomenspbmg.org.au>

Mode of action

Sodium channel blocker – interrupts impulse conduction in peripheral nerves and stabilises excitable cell membranes

Indications

- Local anaesthetic to reduce pain associated with:
 - Intramuscular administration of ceftriaxone
 - Chest decompression in patients with GCS > 10 (MICA only)
 - Intraosseous administration of medication or fluid in a conscious patient (MICA only)

Contraindications

- Known hypersensitivity to lidocaine or related local anaesthetics (bupivacaine, levobupivacaine, prilocaine, ropivacaine)

Precautions

- IM and local infiltration – inadvertent intravascular administration may result in systemic toxicity (see below)
- IO – impaired CV function (e.g. hypotension, bradycardia, poor perfusion, heart block, heart failure)

Adverse effects

- Allergic reactions are rare and may present as localised oedema, urticaria, bronchospasm and anaphylaxis
- Signs of systemic toxicity include:
 - CNS: tinnitus, blurred vision, sudden change in conscious state, agitation, convulsions,
 - CV: hypotension, bradycardia, arrhythmias (e.g. conduction blocks, ventricular tachyarrhythmias), cardiac arrest

Significant interactions

- Nil

Pregnancy

- Safe to use

Breastfeeding

- Safe to use

Details

- **Presentation:** 50 mg in 5 mL amp (1% solution)
- **Route:** IM (when used to reconstitute ceftriaxone only)
Local tissue infiltration (for chest decompression)
IO - infuse slowly over 120 seconds and allow to dwell for 60 seconds. Flush IO catheter with normal saline (5-10mL for adults, 2-5 mL for paediatrics)
- **Onset of action:** 1-5 minutes (infiltration); 5-15 minutes (other routes)
- **Duration of action:** 1-1.5 hours

Notes

- Lidocaine and lignocaine are the same medication, but lidocaine is the preferred name internationally. Both names will be in use in Australia until 2023.

Infusion

- None

Presentation	50 mg in 5 ml amp (1%)
Pharmacology	A local anaesthetic agent Actions: <ul style="list-style-type: none"> Prevents initiation and transmission of nerve impulses (local anaesthesia)
Metabolism	By the liver (90%) Excreted unchanged by the kidneys (10%)
Primary emergency Indications	1. To reduce the pain of IO drug and fluid administration in the responsive patient
Contraindications	1. Known hypersensitivity
Precautions	1. Hypotension and poor perfusion 2. Chronic LVF 3. Liver disease
Route of administration	IO
Side effects	<ul style="list-style-type: none"> CNS effects (common): <ul style="list-style-type: none"> drowsiness disorientation decreased hearing blurred vision change or slurring of speech twitching and agitation convulsions Cardiovascular effects (uncommon): <ul style="list-style-type: none"> hypotension bradycardia sinus arrest A-V block Respiratory effects (uncommon): <ul style="list-style-type: none"> difficulty in breathing respiratory arrest

Special notes	IO effects Onset: 1 – 4 minutes Peak: 5 – 10 minutes Duration: 20 minutes
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Mode of action

Sodium channel blocker – interrupts impulse conduction in peripheral nerves and stabilises excitable cell membranes

Indications

- **Investigational agent – for patients enrolled in the AVOID-2 clinical trial only**
 - Pain associated with suspected ST-elevation myocardial infarction

Contraindications

- AVOID-2 exclusion criteria:
 - Known hypersensitivity to lidocaine
 - Bradycardia (HR < 50)
 - Cardiac arrest or cardiogenic shock (SBP < 90mmHg)
 - Past history of epilepsy, renal failure or liver failure

Precautions

- Nil

Adverse effects

- Allergic reactions are rare and may present as localised oedema, urticaria, bronchospasm and anaphylaxis
- Signs of systemic toxicity include:
 - CNS: tinnitus, blurred vision, sudden change in conscious state, agitation, convulsions,
 - CV: hypotension, bradycardia, arrhythmias (e.g. conduction blocks, ventricular tachyarrhythmias), cardiac arrest

Significant interactions

- Nil

Pregnancy

- Safe to use

Breastfeeding

- Safe to use

Details

- **Presentation:** 50 mg in 5 mL amp (1%)
- **Route:** IV – administer each dose over 1-2 minutes
- **Onset of action:** 5-15 minutes
- **Duration of action:** 1-1.5 hours

Notes

- Lidocaine and lignocaine are the same medication, but lidocaine is the preferred name internationally. Both names will be in use in Australia until 2023.

Infusion

- None

Presentation	3 mL glass bottle
Pharmacology	Inhalational analgesic agent at low concentrations
Metabolism	Excreted mainly by the lungs By the liver
Primary emergency Indications	1. Pain relief
Contraindications	<ol style="list-style-type: none"> 1. Pre-existing renal disease / renal impairment 2. Concurrent use of tetracycline antibiotics 3. Exceeding total dose of 6 mL in a 24 hour period 4. Personal or family history of malignant hyperthermia 5. Muscular dystrophy
Precautions	<ol style="list-style-type: none"> 1. The Pentrox™ inhaler must be hand-held by the patients so that if unconsciousness occurs it will fall from the patient's face. Occasionally the operator may need to assist but must continuously assess the level of consciousness 2. Pre-eclampsia 3. Concurrent use with Oxytocin may cause hypotension
Route of administration	Self-administration under supervision using the hand held Pentrox™ Inhaler
Side effects	<ul style="list-style-type: none"> • Drowsiness • Decrease in blood pressure and bradycardia (rare) • Exceeding the maximum total dose of 6 mL in a 24 hour period may lead to renal toxicity

Special notes	<p>The maximum initial priming dose for Methoxyflurane is 3 mL. This will provide approximately 25 minutes of analgesia and may be followed by one further 3 mL dose once the initial dose is exhausted if required. Analgesia commences after 8 - 10 breaths and lasts for approximately 3 - 5 minutes once discontinued.</p> <p>Do not administer in a confined space. Ensure adequate ventilation in ambulance.</p> <p>Malignant hyperthermia is a very rare condition that can be induced by volatile anaesthetics such as methoxyflurane. Ask patients about any past history or family history of adverse reactions to inhaled anaesthetics.</p> <p>In patients with muscular dystrophy, volatile agents may precipitate lifethreatening rhabdomyolysis.</p>
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Related Resources

- [https://av-digital-cpg.web.app/assets/pdf/MAC/4.1.1 \(5\) Methoxyflurane MAC March 2021.pdf](https://av-digital-cpg.web.app/assets/pdf/MAC/4.1.1 (5) Methoxyflurane MAC March 2021.pdf)

Presentation	5 mg in 1 mL glass ampoule 15 mg in 3 mL glass ampoule
Pharmacology	Short acting CNS depressant Actions: <ul style="list-style-type: none"> • Anxiolytic • Sedative • Anti-convulsant
Metabolism	In the liver; excreted by the kidneys
Primary emergency Indications	<ol style="list-style-type: none"> 1. Status epilepticus 2. Sedation to maintain intubation 3. Sedation to facilitate intubation (<i>RSI - modified or Paediatric IFS</i>) 4. Sedation to facilitate synchronised cardioversion 5. Sedation to facilitate transthoracic pacing 6. Sedation in the agitated patient (including patients under the Mental Health Act 2014) 7. Sedation in psychostimulant OD
Contraindications	1. Known hypersensitivity to benzodiazepines
Precautions	<ol style="list-style-type: none"> 1. Reduced doses may be required for the elderly/frail, patients with chronic renal failure, CCF or shock 2. The CNS depressant effects of benzodiazepines are enhanced in the presence of narcotics and other tranquillisers including alcohol 3. Can cause severe respiratory depression in patients with COPD 4. Patients with myasthenia gravis
Route of administration	IM IV IV infusion
Side effects	<ul style="list-style-type: none"> • Depressed level of consciousness • Respiratory depression • Loss of airway control • Hypotension

Special notes	IM effects: Onset: 3 – 5 minutes Peak: 15 minutes Duration: 30 minutes IV effects: Onset: 1 – 3 minutes Peak: 10 minutes Duration: 20 minutes
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Presentation	10 mg in 1 mL glass ampoule
Pharmacology	<p>An opioid analgesic</p> <p>Actions:</p> <ul style="list-style-type: none"> • CNS effects: <ul style="list-style-type: none"> – Depression (leading to analgesia) – Respiratory depression – Depression of cough reflex – Stimulation (changes of mood, euphoria or dysphoria, vomiting, pin-point pupils) – Dependence (addiction) • Cardiovascular effects: <ul style="list-style-type: none"> – Vasodilatation – Decreases conduction velocity through the A-V Node
Metabolism	By the liver; excreted by the kidneys
Primary emergency Indications	<ol style="list-style-type: none"> 1. Pain relief 2. Sedation to maintain intubation 3. Sedation facilitate intubation (where fentanyl not appropriate for <i>RSI - modified or Paediatric IFS</i>)
Contraindications	<ol style="list-style-type: none"> 1. History of hypersensitivity 2. Renal impairment / failure 3. Late second stage of labour
Precautions	<ol style="list-style-type: none"> 1. Elderly/frail patients 2. Hypotension 3. Respiratory depression 4. Current asthma 5. Respiratory tract burns 6. Known addiction to opioids 7. Acute alcoholism 8. Patients on monoamine oxidase inhibitors
Route of administration	IV / IM / Subcutaneous

Side effects	<ul style="list-style-type: none"> • CNS effects: <ul style="list-style-type: none"> – Drowsiness – Respiratory depression – Euphoria – Nausea, vomiting – Addiction – Pin-point pupils • Cardiovascular effects: <ul style="list-style-type: none"> – Hypotension – Bradycardia
Special notes	<p>Morphine is a Schedule 8 drug under the Poisons Act and its use must be carefully controlled with accountability and responsibility.</p> <p>Side effects of Morphine can be reversed with Naloxone.</p> <p>Occasional wheals are seen in the line of the vein being used for IV injection. This is not an allergy, only a histamine release.</p> <p>IV effects: Onset: 2 – 5 minutes Peak: 10 minutes Duration: 1 – 2 hours</p> <p>IM effects: Onset: 10 – 30 minutes Peak: 30 – 60 minutes Duration: 1 – 2 hours</p>

Presentation	0.4 mg in 1 mL glass ampoule
Pharmacology	An opioid antagonist Actions: <ul style="list-style-type: none"> • Prevents or reverses the effects of opioids
Metabolism	By the liver
Primary emergency Indications	1. Altered conscious state and respiratory depression secondary to administration of opioids or related drugs
Contraindications	1. Nil of significance in the above indication
Precautions	1. If patient is known to be physically dependent on opioids, be prepared for a combative patient after administration 2. Neonates
Route of administration	IM IV
Side effects	Symptoms of opioid withdrawal: <ul style="list-style-type: none"> • Sweating, goose flesh, tremor • Nausea and vomiting • Agitation • Dilatation of pupils, excessive lacrimation • Convulsions

Special notes	<p>The duration of action of Naloxone is often less than that of the opioid used, therefore repeated doses may be required.</p> <p>Naloxone reverses the effects of opioids with none of the actions produced by other opioid antagonists when no opioid is present in the body. (For example, it does not depress respiration or cause pupillary constriction). In the absence of opioids, Naloxone has no perceivable effects.</p> <p>Following an opioid associated cardiac arrest Naloxone should not be administered. Maintain assisted ventilation.</p> <p>Following head injury Naloxone should not be administered. Maintain assisted ventilation if required.</p> <p>IV effects:</p> <p>Onset: 1 – 3 minutes</p> <p>Peak: n/a</p> <p>Duration: 30 – 45 minutes</p> <p>IM effects:</p> <p>Onset: 1 – 3 minutes</p> <p>Peak: n/a</p> <p>Duration: 30 – 45 minutes</p>
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Presentation	10 mL polyamp 500 mL and 1000 mL infusion soft pack
Pharmacology	An isotonic crystalloid solution Composition: <ul style="list-style-type: none"> • Electrolytes (sodium and chloride in a similar concentration to that of extracellular fluid) Action: <ul style="list-style-type: none"> • Increases the volume of the intravascular compartment
Metabolism	Electrolytes: <ul style="list-style-type: none"> • Excreted by the kidneys Water: <ul style="list-style-type: none"> • Excreted by the kidneys • Distributed throughout total body water, mainly in the extracellular fluid compartment
Primary emergency Indications	<ol style="list-style-type: none"> 1. As a replacement fluid in volume-depleted patients 2. Cardiac arrest secondary to hypovolaemia or where the patient may be fluid responsive 3. To expand intravascular volume in the non-cardiac, non-hypovolaemic hypotensive patient e.g. anaphylaxis, burns, sepsis 4. As a fluid challenge in unresponsive, non-hypovolaemic, hypotensive patients (other than LVF). e.g. asthma 5. Fluid for diluting and administering IV drugs 6. Fluid TKVO for IV administration of emergency drugs
Contraindications	1. Nil of significance in the above indication
Precautions	1. None
Route of administration	IV IO
Side effects	Nil of significance in the above indication

Special notes	IV half life: Approximately 30 – 60 minutes
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- 5 mg ODT

Mode of action	Atypical antipsychotic – antagonist at multiple receptor sites, particularly serotonin (5-HT), dopamine, and histamine
Primary emergency Indications	1. Mild agitation
Contraindications	1. Nil
Precautions	1. Olanzapine may be less effective if patient agitation is due to drug intoxication (especially stimulants) or alcohol withdrawal. Benzodiazepines are considered first-line agents in these patients ² 2. Elderly / frail patients and children are more susceptible to adverse effects ¹ .
Significant interactions	1. Sedative medications / alcohol – over sedation due to synergistic effects ¹ . Avoid combination where possible
Adverse effects	CNS: Sedation, dizziness ^{1,3} Other: Extrapyrimal symptoms and QT prolongation are unlikely when administered at the approved doses ^{1,3}
Administration advice	Route of administration: Oral – ODT is dissolved in the mouth and then swallowed Onset of action: 15 mins ⁴ Duration of action: 12 – 24 hours ⁵
Pregnancy & breastfeeding category	Pregnancy: Limited evidence. Administer only if benefit outweighs risk ⁶ Breastfeeding: Considered safe to use ⁶
AV Special notes	Administration to patients < 16 years of age can only occur after consultation with the receiving hospital. The patient should self-administer the dose under paramedic supervision. Olanzapine is managed as a restricted medication in AV. Olanzapine and Ondansetron ODTs are similar in name and presentation. Extra care must be taken to ensure the right medication is selected prior to administration
Infusion information	N/A

References

1. Australian Medicines Handbook. Online via Clinicians Health Channel
2. Wilson MP et al. The psychopharmacology of agitation: Consensus statement of the American Association for Emergency Psychiatry Project BETA Psychopharmacology Workgroup. Western Journal of Emergency Medicine. 2012;13(1):26-34
3. Zun LS. Evidence-based review of pharmacotherapy for acute agitation. Part 2: Safety. Journal of

Emergency Medicine. 2018;54(4):522-532

4. Zun LS. Evidence-based review of pharmacotherapy for acute agitation. Part 1: Onset of Efficacy. Journal of Emergency Medicine. 2018;54(3):364-374
5. St John (NZ) Clinical Procedures and Guidelines. Olanzapine. https://www.stjohn.org.nz/globalassets/documents/health-practitioners/cpg_comprehensive_web170525.pdf
6. Royal Women's Hospital Pregnancy and Breastfeeding Medicines Guide. Online via Clinicians Health Channel

Presentation	4 mg orally dissolving tablet 8 mg in 4 mL glass ampoule
Pharmacology	Anti-emetic Actions: <ul style="list-style-type: none"> • 5HT₃ antagonist which blocks receptors both centrally and peripherally
Metabolism	By the liver
Primary emergency Indications	<ol style="list-style-type: none"> 1. Undifferentiated nausea and vomiting 2. Prophylaxis for spinally immobilised or eye injured patients 3. Vestibular nausea in patients < 21 years of age
Contraindications	<ol style="list-style-type: none"> 1. Known hypersensitivity 2. Concurrent Apomorphine use 3. Known Long Q-T syndrome 4. Hypokalaemia or hypomagnesaemia
Precautions	<ol style="list-style-type: none"> 1. Patients with liver disease should not receive more than 8 mg of Ondansetron per day 2. Care should be taken with patients on diuretics who may have an underlying electrolyte imbalance 3. Ondansetron contains aspartame and should not be given to patients with phenylketonuria 4. Concurrent use of Tramadol 5. Pregnancy
Route of administration	Oral (ODT), IV, IM

Side effects	<p>Rare (< 0.1%)</p> <p>Hypersensitivity reactions (including anaphylaxis)</p> <p>Q-T prolongation</p> <p>Widened QRS complex</p> <p>Tachyarrhythmias (including AF and SVT)</p> <p>Seizures</p> <p>Extrapyramidal reaction</p> <p>Visual disturbances (including transient loss of vision)</p> <p>Common (> 1%)</p> <p>Constipation</p> <p>Headache</p> <p>Fever</p> <p>Dizziness</p> <p>Rise in liver enzymes</p>
Special notes	<p>ODT</p> <p>Onset: 2 minutes</p> <p>Peak: 20 minutes</p> <p>Duration: 120 minutes</p> <p>IV</p> <p>Onset: 5 minutes</p> <p>Peak: 10 minutes</p> <p>Duration: between 2.5 and 6.1 hours</p> <p>IV doses should be delivered as a slow push (minimum 30 seconds).</p>

Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/Ondansetron MAC March 2021.pdf>

Presentation	10 units (IU) in 1 mL glass ampoule
Pharmacology	A synthetic oxytocic Actions: <ul style="list-style-type: none"> Stimulates smooth muscle of the uterus producing contractions
Metabolism	By the liver; excreted by the kidneys
Primary emergency Indications	1. Primary Postpartum Haemorrhage (PPH)
Contraindications	<ol style="list-style-type: none"> Previous hypersensitivity Severe toxemia (pre-eclampsia) Exclude multiple pregnancy before drug administration Cord prolapse
Precautions	<ol style="list-style-type: none"> If given IV may cause transient hypotension Concurrent use with Methoxyflurane may cause hypotension
Route of administration	IM
Side effects	Uncommon via IM route: Tachycardia Bradycardia Nausea
Special notes	Must be stored between 2 - 8°C IM effects: Onset: 2 – 4 minutes Peak: n/a Duration: 30 – 60 minutes

Related Resources

- [https://av-digital-cpg.web.app/assets/pdf/MAC/4.1.1 \(2\) Oxytocin MAC March 2021.pdf](https://av-digital-cpg.web.app/assets/pdf/MAC/4.1.1 (2) Oxytocin MAC March 2021.pdf)

Presentation	500 mg tablets 120 mg in 5 mL oral liquid (24 mg/mL) 1000 mg in 100 mL soft pack (AAV only)
Pharmacology	An analgesic and antipyretic agent Actions: <ul style="list-style-type: none"> Exact mechanism of action unclear; thought to inhibit prostaglandin synthesis in the CNS
Metabolism	By the liver; excreted by the kidneys
Primary emergency Indications	<ol style="list-style-type: none"> Mild pain Headache
Contraindications	<ol style="list-style-type: none"> Hypersensitivity to paracetamol Children < 1 month of age Paracetamol already administered within past 4 hours Total paracetamol intake within past 24 hours exceeding 4 g (adults) or 60 mg/kg (children) Chest pain in suspected acute coronary syndrome
Precautions	<ol style="list-style-type: none"> Impaired hepatic function or liver disease Elderly / frail Malnourished
Route of administration	Oral IV
Side effects	<ul style="list-style-type: none"> Hypersensitivity reactions including severe skin rashes (rare) Haematological reactions (rare)

Special notes	<p>There are several brands of Paracetamol available in Australia. Paracetamol is also found in many combination medicines, both prescription and over-the-counter.</p> <p>Carefully determine previous Paracetamol intake before dose administration.</p> <p>The usual dose of Paracetamol for children is 15 mg/kg per dose. The maximum total dose of 60 mg/kg therefore equates to 4 doses within a 24 hour period.</p> <p>Hepatic damage is very rare when Paracetamol is taken at recommended dosages.</p> <p>Paracetamol is not indicated for the treatment of fever in the emergency setting.</p> <p>Onset: 30 minutes</p> <p>Peak: N/A</p> <p>Duration: 4 hours</p>
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Related Resources

- <https://av-digital-cpg.web.app/assets/pdf/MAC/MAC IV Paracetamol review AAV.pdf>

Presentation	12.5 mg in 1 mL glass ampoule
Pharmacology	An anti-emetic Actions: <ul style="list-style-type: none"> • Acts on several central neuro-transmitter systems
Metabolism	Metabolised by the liver; excreted by the kidneys
Primary emergency Indications	<ol style="list-style-type: none"> 1. Treatment or prophylaxis of nausea / vomiting for <ul style="list-style-type: none"> • Motion sickness • Planned aeromedical evacuation • Known allergy or C/I to Ondansetron administration • Headache irrespective of nausea / vomiting • Vertigo
Contraindications	<ol style="list-style-type: none"> 1. Circulatory collapse (cool, pale, clammy skin, tachycardia, hypotension) 2. CNS depression 3. Previous hypersensitivity 4. Patients < 21 years of age 5. Pregnancy
Precautions	<ol style="list-style-type: none"> 1. Hypotension 2. Epilepsy 3. Pts affected by alcohol or on anti-depressants
Route of administration	IM
Side effects	<ul style="list-style-type: none"> • Drowsiness • Blurred vision • Hypotension • Sinus tachycardia • Skin rash • Extrapyrmidal reactions (usually the dystonic type)

Special notes	IM effects Onset: 20 minutes Peak: 40 minutes Duration: 6 hours
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Related Resources

- [https://av-digital-cpg.web.app/assets/pdf/MAC/4.1.1 \(4\) Prochlorperazine MAC March 2021.pdf](https://av-digital-cpg.web.app/assets/pdf/MAC/4.1.1 (4) Prochlorperazine MAC March 2021.pdf)

Presentation

- 50mg in 5mL glass vial

Mode of action

- Non-depolarising neuromuscular blocking agent
- Competes with acetylcholine to block cholinergic receptors located at the motor endplate of striated muscle

Indications

- Intubation, to provide skeletal muscle paralysis

Contraindications

- Nil significant

Precautions

- Status epilepticus – consult with receiving hospital for ongoing maintenance of paralysis if required for patient safety reasons

Adverse effects

- **CV:** tachycardia, hypotension
- **Other:** anaphylaxis (rare: <0.1%)

Significant interactions

- Nil significant

Pregnancy

- Considered safe to use

Breastfeeding

- Considered safe to use

Administration advice

- **Route of administration:** IV, IO, IV infusion
- **Onset of action:** Adequate intubating conditions are established within 60 seconds in nearly all patients
- **Duration of action:** Varies depending on dose (up to 60 minutes for a 1mg/kg dose). However, repeat doses are administered prior to the previous dose wearing off to prevent any problems that may arise e.g. asynchronous ventilation, rise in ICP etc.

Notes

- Rocuronium is incompatible with several medications including dexamethasone and furosemide. Ensure each bolus dose is flushed thoroughly with Normal Saline
- Rocuronium is stable for up to 3 months when stored below 30°C, once removed from the branch refrigerator to stock a medication kit. Note the date of removal and discard any unused rocuronium after 3 months.

Infusion

- Rocuronium 10 mL (100 mg) undiluted in a 10 mL syringe. Administer at 5 mL/hr (50 mg/hr).

Presentation	5 mg in 2.5 mL polyamp pMDI (100 mcg per actuation)
Pharmacology	A synthetic beta adrenergic stimulant with primarily beta 2 effects Actions: <ul style="list-style-type: none"> • Causes bronchodilatation
Metabolism	By the liver; excreted by the kidneys
Primary emergency Indications	1. Respiratory distress with suspected bronchospasm: <ul style="list-style-type: none"> • asthma • severe allergic reactions • COPD • smoke inhalation • oleoresin capsicum spray exposure
Contraindications	1. Nil of significance in the above indications
Precautions	1. Large doses of Salbutamol have been reported to cause intracellular metabolic acidosis
Route of administration	Nebulised, pMDI
Side effects	<ul style="list-style-type: none"> • Sinus tachycardia • Muscle tremor (common)
Special notes	<p>Salbutamol nebulised / polyamps have a shelf life of one month after the wrapping is opened. The date of opening of the packaging should be recorded and the drug should be stored in an environment of < 30°C</p> <p>Although infrequently used, Salbutamol by IV infusion may be required during interhospital transfers of some women in premature labour</p> <p>The dose is to be prescribed and signed by the referring hospital medical officer</p> <p>Nebulised effects:</p> <p>Onset: 5 – 15 minutes</p> <p>Peak: n/a</p> <p>Duration: 15 – 50 minutes</p>

Presentation	50 mL prepared syringe 100 mL glass bottle
Pharmacology	A hypertonic crystalloid solution Composition: <ul style="list-style-type: none"> • Contains sodium and bicarbonate ions in a solution of high pH Actions: <ul style="list-style-type: none"> • Raises pH
Metabolism	Sodium: excreted by the kidneys Bicarbonate: excreted by the kidneys as bicarbonate ion and by the lungs as CO ₂
Primary emergency Indications	1. Cardiac arrest secondary to TCA overdose or hyperkalaemia 2. Symptomatic TCA OD
Contraindications	1. Nil in the above indications
Precautions	1. Administration of Sodium Bicarbonate 8.4% must be accompanied by effective ventilation and ECC if required 2. Since Sodium Bicarbonate 8.4% causes tissue necrosis, care must be taken to avoid leakage of the drug into the tissues 3. Because of the high pH of this solution do not mix or flush any other drug or solution with Sodium Bicarbonate 8.4%
Route of administration	IV
Side effects	<ul style="list-style-type: none"> • Sodium overload may provoke pulmonary oedema • Excessive doses of Sodium Bicarbonate 8.4%, especially without adequate ventilation and circulation, may cause an intracellular acidosis
Special notes	IV effects: Onset: 1 – 2 minutes Peak: n/a Duration: Depends on cause and patient's perfusion

Presentation	50 mg in glass vial with weight marked and pre-filled syringe containing water for IV administration (must reconstitute all drug then discard unwanted amount according to weight)
Pharmacology	Fibrinolytic, a modified form of tissue plasminogen activator (tPA) that binds to fibrin and converts plasminogen to plasmin
Metabolism	Metabolised by the liver
Primary emergency Indications	1. Acute STEMI
Contraindications (Exclusion criteria)	<ol style="list-style-type: none"> 1. Major surgery in the past 3 months 2. Significant head injury in the past 3 months 3. Major trauma in the past 3 months 4. Stroke/TIA in the past 3 months 5. ICH at any time 6. GI or genitourinary bleed in the past month 7. Current bleeding disorder, active bleeding (excluding menses) or bleeding tendencies 8. Anticoagulants or glycoprotein IIb/IIIa inhibitors 9. Allergy to tenecteplase or gentamicin
Precautions (Relative contraindications)	<ol style="list-style-type: none"> 1. Age \geq 75 years 2. Non-compressible vascular puncture 3. History of liver disease 4. SBP > 160 mmHg or DBP > 110 mmHg 5. Low body weight 6. Active peptic ulcer 7. Anaemia 8. Acute pericarditis or subacute bacterial endocarditis 9. Traumatic or prolonged (>10 mins) CPR 10. Pregnant or within 1 week post-partum 11. HR > 120 bpm
Route of administration	IV, using vial adapter on pre-prepared syringe, as single bolus over 10 seconds; IO (consult)

Side effects	<p>Bleeding – including injection sites, ICH, internal bleeding</p> <p>Transient hypotension</p> <p>Infrequent</p> <ul style="list-style-type: none"> • Allergic reactions including fever, chills, rash, nausea, headache, bronchospasm, vasculitis, nephritis and anaphylaxis <p>Rare</p> <ul style="list-style-type: none"> • Cholesterol embolism
Special notes	<p>Weight optimised dosing improves efficacy and safety outcomes in drugs with narrow therapeutic index e.g. Fibrinolytics</p> <p>Other drugs which affect the clotting process may increase risk of bleeding associated with Tenecteplase.</p>

Presentation	10 mL polyamp
Pharmacology	Water for injection is a clear, colourless, particle free, odourless and tasteless liquid. It is sterile, with a pH of 5.6 to 7.7 and contains no antimicrobial agents
Metabolism	Distributed throughout the body; excreted by the kidneys
Primary emergency Indications	1. Used to dissolve Ceftriaxone in preparation for IV injection
Contraindications	1. Nil in the above indication
Precautions	1. Nil in the above indication
Route of administration	IV
Side effects	Nil
Special notes	Nil