Clinical Practice Guidelines

ALS and MICA Paramedics

AmbulanceVictoria

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Flowchart

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

Dynamic Risk Assessment

Assessment

Pre-arrival
- Plan for case
- Biases / human factors

Dangers
- PPE
- Dangers

Rapid Assessment
- Alertness
- Work of breathing
- Skin

Well
- Rapport
- Rest / position
- Reassurance

Unwell

Primary Survey
- **R** Response
- **A** Airway
- **B** Breathing
- **C** Circulation
- **D** Disability
- **E** Exposure

- Manage life-threatening findings as per appropriate CPG/s and CWI/s
- Early SITREP as required
- Establish if limitation of treatment documented

History

As appropriate:
- Timeline
- Nature
- Prodromal symptoms
- History of similar episodes
- Associated circumstances
- Aggravating / relieving factors

Dynamic Risk Assessment

VSS & Adjuncts

- PSA
- RSA
- GCS/AVPU
- Temp
- ECG
- BGL
- SpO_2
- $ETCO_2$

Past History

- Medical conditions
- Medications
- Allergies
- Risk factors

Secondary Survey

As appropriate:

- Trauma secondary survey
- Focused assessments (specific CPG)
- General physical exam

Social / environmental

- Consider social/ environmental factors

Diagnosis

Discuss each stage with other AV staff and patient where possible

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

Care Pathways

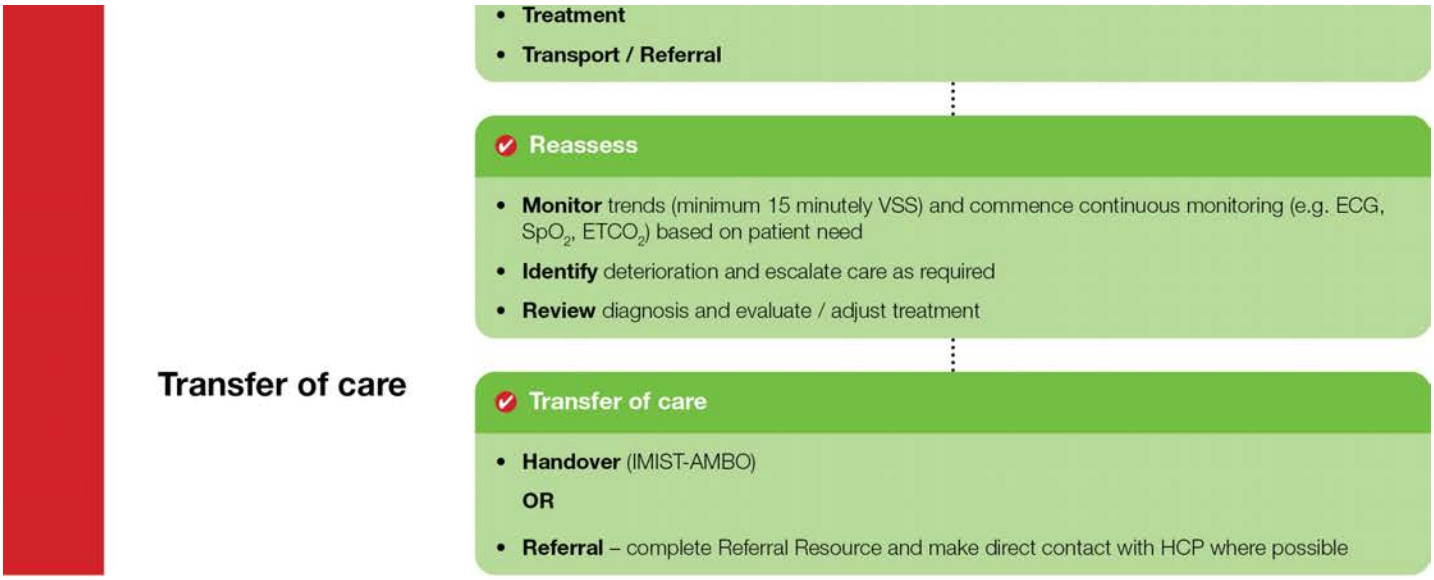
Plan

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

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

Implement

- **Escalation of care** (as required)



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:
  - **H**ungry
  - **A**ngry
  - **L**ate

- **T**ired
- **S**tressed

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, SpO_2 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.

Scene leadership

- Complex scenes and cases require leadership and defined roles that assist in creating clarity, efficiency and safety. Scene leadership for complex cases will commonly require delegation to the following roles:
  - **Clinical Lead**: Coordinates clinical care, assessment and management. This role will delegate other lead roles and escalate care where additional support is required.
  - **Patient Monitoring Lead**: In high-risk situations (e.g. complex or chaotic scenes, high acuity patients with multiple clinical priorities), the Clinical Lead will assign a team member to continuously monitor the patient's physiological status during extrication. Where possible, this role should only be tasked with scribing and patient monitoring and not to be tasked with any other functions. While staff numbers may be limited at times, patient safety risk must be considered, and the role prioritised where possible.
  - **Airway Lead**: Where the patient requires ventilation support, the Airway Lead will manage ventilation, airway patency, ventilation equipment function, and ensure the endotracheal tube / SGA are secure.
  - **Manual Handling Lead**: Coordinates the extrication of the patient in cooperation with the other scene leaders.
- For complex multi-patient scenes, refer to **Major Incidents CPG F0026** and the Emergency Response Plan.

Vital signs & adjuncts

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

Physical examination

- **Focused 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:
  - SpO_2, 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)

Continuous monitoring

- Line of sight observation involves direct visual observation of the patient's physiological status including skin, work of breathing, and conscious state (noting level of consciousness and distress). This baseline monitoring technique is required for all patients to detect early signs of deterioration.
- Monitoring equipment should be initiated based on the patient's clinical presentation and associated clinical risks. This may include:
  - ECG
  - SpO_2
  - $ETCO_2$
- Continuous monitoring is required for any high-risk patient groups including (but not limited to) post-sedation care, altered conscious state, moderate to severe respiratory distress, major trauma, shock, and cardiac presentations.

Extrication

- Use monitoring equipment with the alarms activated.
- Allocate a Patient Monitoring Lead, a staff member who is tasked to maintain line of sight monitoring

of the patient's physiological status.

More information

Extrication is a period of risk for all patients. Intentional line of sight monitoring is recommended for all patients. This is necessary for real time assessment and early detection of deterioration and is of particular importance during extrication.

During extrication, monitoring may be streamlined to minimise manual handling risks, but remains essential for two reasons:

- Likelihood of deterioration: Extrication can increase stress on the patient's respiratory and cardiovascular systems, thus increasing the likelihood of deterioration.
- Distraction: The complexities of extrication can distract staff from clinical care as they problem solve logistical challenges.

These challenges increase the risk of delayed identification of patient deterioration.

Do not silence the monitor's alarms. Silencing the monitor's alarms further increases the risk of unrecognised deterioration.

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.

Related Resources

- 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/MAC241211_Extrication Monitoring.pdf

First resource to any major incident

1. Adopt Roles - Triage Officer (most experienced) and Transport Officer
2. SITREP
3. Triage

1 Adopt Roles

Triage Officer	Transport Officer
Most experienced staff member assumes scene leadership role	Supports and follows directions of the Triage Officer
• Put on Triage Officer vest • Assume scene leadership (direct the Transport Officer) • Assess scene safety • Do initial scene walkthrough and scene size-up to inform a SitRep (≤15 min) • Triage patients (SmartPac triage cards) or direct Transport Officer to triage patients • Establish scene layout - Casualty Clearing Point and, Loading Point, Holding Point • Direct newly arrived resources to patients • Regular SitReps • Handover / Report to Incident Health Commander when established	• Put on Transport Officer vest • Follow directions of the Triage Officer • Assess scene safety • Triage patients (SmartPac triage cards) as directed by the Triage Officer • Provide clinical care as directed by the Triage officer • Coordinate access and egress • Maintain Casualty Movement Log for all patients • Supervise Casualty Clearing Point • Coordinate transport vehicles and briefs responding crews (access; egress; safety)

2 SitRep

E xact location of incident

T ype of incident

H azards at scene

A ccess/Egress to/from scene

N umber of patients (based on priority)

E mergency Services at scene and required

3 Triage

Triage - Sieve

Use Sieve for initial triage and whenever time / resources restrict detailed assessment.

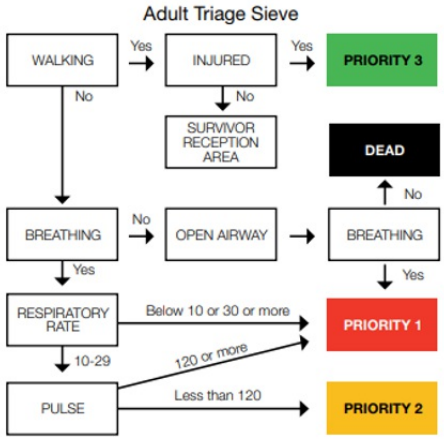
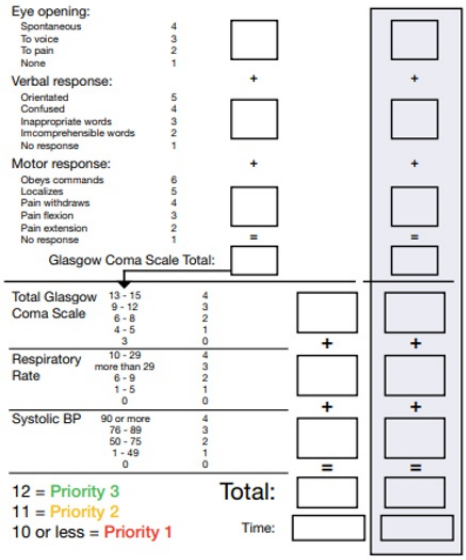


Fig 4: Adult Triage Sieve Image copyright: TSG Associates LLP

Triage Sort

When sufficient time and resources are available, a more detailed secondary triage using the Sort method.



General Notes

- This information is a summary of the AV Emergency Response Plan which provides a framework for the management of major incidents across AV.

Safety

- When approaching an incident, personnel must:
  - Undertake a **Dynamic Risk Assessment**
  - Be aware of the Safety Zones (hot, warm, cold zones)

  - Limit or mitigate exposure to risks and hazards

- Actual or potential High Threat Environment (e.g. Active Armed Offender)
  - If you don't believe it is safe, then don't enter.
  - Request Police immediately, with clear information
  - If suspected after entry, retreat and activate duress alarm immediately. Offer limited assistance to others where it is safe to do so.

Incident Health Commander (IHC) Role

- The IHC will received handover from the Triage Officer once at scene and assumes command including the coordination of AV resources. AV staff attending the scene must follow the directions of the IHC who is the strategic leader at scene. IHC tasks include:
  - Put on Health Commander vest
  - Reviewing scene safety and the need for a Safety Officer
  - Ensure Triage and Transport Officers are in place
  - Assess the scene (patients; geography; complexity)
  - ETHANE SITREPs <=15 min to DM and RHC
  - Sectorise the scene as required
  - Conduct crew briefings and HIMT as needed, and be part of the EMT
  - Determine additional resource requirements
  - Monitor consequences and impact for community
  - Ensure information is issued to community and AV as required
  - Record actions and decisions
  - Monitor staff welfare, requirement for evacuations and Health Monitoring, and scene convergence issues
  - Confirm: Regional recovery

Size-up

Initial and literal walk around the scene by the Triage Officer to gather all the information needed for a SitRep:

- Identify
  - Type and size of the event / mechanism
  - Hazards and scene and scene safety (including environmental conditions)
  - Access
  - Number of patients (count only initially)
  - Emergency service resources needed

- Discuss scene priorities with the Incident Controller

Related information

Emergency Response Plan https://ambulancevic.sharepoint.com/sites/OneAV-resource-hub/_layouts/15/viewer.aspx?sourcedoc=%7bb6ed6c4a-90dd-4542-b180-fbd4f56d9840%7d

This information is governed by Ambulance Victoria's Emergency Management Unit.

For any non-urgent questions related to Ambulance Victoria's Emergency Response Plan please contact: 1300 851 121

Clinical Care Outside Scope of Practice

CPG F0027

Care Objectives

- Provide appropriate clinical care in consultation with a credentialed staff member or in accordance with treatment that has been prescribed.
- Provide rapid clinical care where the need is urgent and any absence or delay in this care will very likely lead to patient harm and / or suffering.

General Notes

Intended patient group

- All adult and paediatric patients.

Introduction

The care outlined in the AV paramedic CPGs and ACO/CERT CPPs is appropriate for most patients and conditions. However, in some circumstances a more tailored approach may be required to meet the clinical needs of the patient. In order to meet urgent and life-saving needs, a varied approach may need to be considered in some cases. Approval for care that is not presented in the AV CPGs or which may be outside of the staff's usual scope of practice should be guided by the following principles and workflows.

Case type 1

Treatment is authorised in the CPGs, but is not in the scope of practice of attending staff

Action	**Consult the AV Clinician or a paramedic on scene with the appropriate scope of practice** The AV Clinician will link in further support where required such as the AV Medical Advisor.

More information

The first category involves AV operational staff administering care under the instruction of an appropriately credentialed AV staff member who possesses the scope of practice being provided.

More specifically, examples might include:

- ACO/CERT, paramedic student or ALS paramedic receiving instruction from a more senior paramedic on scene or via the AV Clinician.
- ALS / MICA / ACO / CERT receiving instruction from an ARV medical doctor or Victorian Poisons Information Centre (VPIC), e.g. the administration of an antidote.
- ALS / MICA / ACO / CERT receiving instruction from the AV Medical Advisor, endorsed medical consultation line (e.g. cardiology, palliative care) or a medical doctor from the receiving hospital.
- ALS / MICA / ACO / CERT receiving instruction from the AV Medical Advisor to perform a

skill for paediatric care that is usually only approved for adult based clinical care.

- AV staff receiving instruction from a medical doctor at scene or via VVED. Please note that VVED guidelines, medicines, or medicine doses can vary from AV practice. This is acceptable, however can be checked with the AV Medical Advisor if there are concerns. If this occurs, document the doctor's name and phone number in the patient care record.

In these circumstances the treating staff member must ensure there is clear instruction about how to deliver the care and the required procedural skills are reasonably within the staff member's usual skill set or training. e.g. credentialed to cannulate for IV based therapy.

See PRO/QPE/009 Patient Care Documentation Standard for full documentation requirements.

Case type 2

Treatment is not authorised in the CPGs, but is medically prescribed for the patient.

Inclusion criteria

- Exacerbation of pre-existing illness
- Patient's medical practitioner has provided a treatment directive related to the condition (i.e. prescribed medication or treatment / action plan with clear instructions)
- Clear benefit to patient, where a delay will most probably lead to clinical deterioration or harm to the patient

Exclusion criteria

- Voluntary assisted dying

Action	**Administration of care is permissible** Consultation is not mandatory but may assist clinical decision-making

More information

This category relates to exacerbation of a patient's pre-existing illness where the patient's medical practitioner has provided a treatment directive related to the condition. This is usually in the form of prescribed medication and may also include detailed treatment or action plans. Many patients and carers are well informed about their illness and the treatments required.

In these circumstances, the indications for timely care will include clear patient benefit where a delay will most probably lead to clinical deterioration or harm to the patient.

Examples of this may be the care of a patient with:

- Migraine who has been prescribed anti-inflammatory medicines or Triptan based therapy
- Bradykinin-mediated angioedema who has been prescribed tranexamic acid, icatibant or ecallantide

In some circumstances, the patient care plan may be registered in Ambulance Victoria's Special Patient (SPPT) information. See PRO/OPS/230.

As per **CPG A0712 Palliative Care**, this care principle also relates to palliative care patients who require support within a prescribed care plan. This may include administering medicines such as an anti-emetic or analgesia. (NOTE: this does not include administration of medicines associated with voluntary assisted dying).

Clear instructions must accompany the medicine including at a minimum, the name of the person the medicine is prescribed for, the medicine's indications and how to administer the medicine.

Consultation with the AV Clinician in these circumstances may assist clinical decision-making but is not mandatory.

Case type 3

Treatment is not authorised in the CPGs, but is immediately available

Inclusion criteria

- Cannot wait until hospital management
- Will likely avoid or minimise patient deterioration and critical illness
- Clear instructions accompanying the medicine (indications and how to administer) OR ability to source this information via AV Medical Advisor.
- Practical skills reasonably within staff member's usual skill set or training or credentialed
- Life threat
- Required therapy is available

Action	**Administration of care is permissible** Consult with the AV Clinician / AV Medical Advisor where possible

More information

A circumstance where this can occur is in an industrial environment where there is a risk of toxic exposure to a poison. In this context where there is a known risk, a company may have made arrangements to have a specific antidote available in case of accidental exposure. e.g. hydroxocobalamin for cyanide poisoning, or calcium gluconate for hydrofluoric acid exposure.

In these circumstances it is anticipated that the care required will hold a level of urgency (i.e. cannot wait until hospital management) and will likely avoid or minimise patient deterioration and critical illness. Where there are clear instructions such as the medicine's indications and how to administer the medicine, it is permissible to administer the medicine providing the required practical skills are reasonably within the staff member's usual skill set or training e.g. credentialed to cannulate for IV-based therapy. Note that instructions in how to administer the information may accompany the medicine or can be accessed via the AV Medical Advisor.

In the context of toxic exposure, consultation with VPIC via the AV Clinician is encouraged.

This principal is not limited to this example but may be applied where there is a life-threat and the required therapy and instruction is available.

Consult with AV Clinician / AV Medical Advisor where possible.

When you should not administer treatment outside scope of practice:

- Where you have not been trained or you are not currently credentialled in a practical procedure. This would include techniques such as IV cannulation, IV medicine preparation and administration, intubation and cricothyroidotomy.
- Where you are instructed to deliver care that you believe is inconsistent with good clinical practice.
- Where medicine administration information is not available and you are not familiar with the medicine.

Documentation and case follow-up

Following a case where treatment has been provided which is outside of the AV CPGs, care **must be documented and reported for audit purposes**. This includes entering the case information into Riskman. This reporting process helps to ensure the required supports are in place for your clinical practice including review of potential gaps in current clinical guidelines and systems of care. Document the situation and rationale for care in the patient care record. The person providing the treatment is responsible for ensuring the information is submitted for review. The exception is as per 'Case Type 1' where treatment is authorised through consultation or care is provided by a student under supervision.

Decision Support Checklist

Is there a need?

- Clinical need is urgent and the absence or delay in this care will very likely lead to patient harm and / or suffering

Is it doable?

- Care option available / instruction and potential adverse effects information available.
- Required skills

Approval

- Consult – AV Clinician / AV Medical Advisor where possible

Related Resources

- POL/OPS/030 Clinical Credentialling
- PRO/QPE/009 Patient Care Documentation Standard
- PRO/OPS/230 Special Patient (SPPT) information
- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC paper - Non CPG management.pdf

Perfusion Status Assessment CPG A0102

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	Able to cough **Asthma**: mild expiratory wheeze	Able to cough **Asthma**: expiratory wheeze, +/– inspiratory wheeze	Unable to cough **Asthma**: expiratory wheeze +/– inspiratory wheeze, maybe no breath sounds (late)
	No crackles or scattered fine basal crackles, e.g. postural	**LVF**: may be some fine crackles at bases	**LVF**: crackles at bases - to mid-zone	**LVF**: fine crackles – full field, with possible wheeze **Upper Airway Obstruction**: Inspiratory stridor
Respiratory rate	12 – 16	16 – 20	> 20	> 20 Bradypnoea (< 8)
Respiratory rhythm	Regular even cycles	**Asthma**: may have slightly prolonged expiratory phase	**Asthma**: prolonged expiratory phase	**Asthma**: prolonged expiratory phase
Work of breathing	Normal chest movement	Slight increase in normal chest movement	Marked chest movement +/– use of accessory muscles	Marked chest movement with accessory muscle use, intercostal retraction +/– tracheal tugging
HR	60 – 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 from 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.

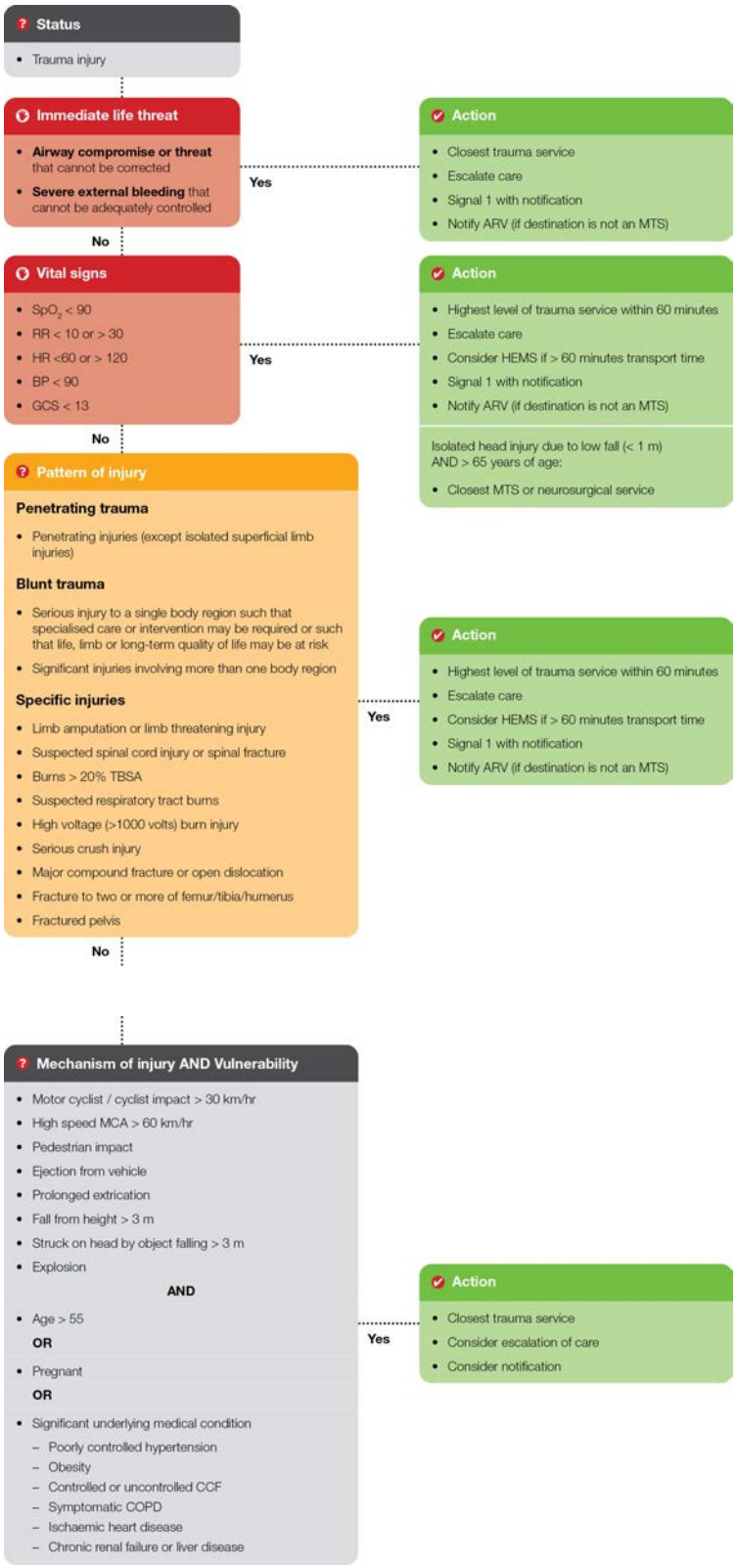
When assessed, is the Pt:

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

Flowchart


Status
Trauma injury
Immediate life threat
Airway compromise or threat that cannot be corrected
Severe external bleeding that cannot be adequately controlled
Yes
Action
Closest trauma service
Escalate care
Signal 1 with notification
Notify ARV (if destination is not an MTS)
No
Vital signs
SpO2 < 90
RR < 10 or > 30
HR <60 or > 120
BP < 90
GCS < 13
Yes
Action
Highest level of trauma service within 60 minutes
Escalate care
Consider HEMS if > 60 minutes transport time
Signal 1 with notification
Notify ARV (if destination is not an MTS)
Isolated head injury due to low fall (< 1 m) AND > 65 years of age:
Closest MTS or neurosurgical service
No
Pattern of injury
Penetrating trauma
Penetrating injuries (except isolated superficial limb injuries)
Blunt trauma
Serious injury to a single body region such that specialised care or intervention may be required or such that life, limb or long-term quality of life may be at risk
Significant injuries involving more than one body region
Specific injuries
Limb amputation or limb threatening injury
Suspected spinal cord injury or spinal fracture
Burns > 20% TBSA
Suspected respiratory tract burns
High voltage (>1000 volts) burn injury
Serious crush injury
Major compound fracture or open dislocation
Fracture to two or more of femur/tibia/humerus
Fractured pelvis
Yes
Action
Highest level of trauma service within 60 minutes
Escalate care
Consider HEMS if > 60 minutes transport time
Signal 1 with notification
Notify ARV (if destination is not an MTS)
No
Mechanism of injury AND Vulnerability
Motor cyclist / cyclist impact > 30 km/hr
High speed MCA > 60 km/hr
Pedestrian impact
Ejection from vehicle
Prolonged extrication
Fall from height > 3 m
Struck on head by object falling > 3 m
Explosion
AND
Age > 55
OR
Pregnant
OR
Significant underlying medical condition
– Poorly controlled hypertension
– Obesity
– Controlled or uncontrolled CCF
– Symptomatic COPD
– Ischaemic heart disease
– Chronic renal failure or liver disease
Yes
Action
Closest trauma service
Consider escalation of care
Consider notification

Care Objectives

- Identify patients with injuries that may benefit from care in a trauma service and triage accordingly.

Intended patient group

- Patients aged ≥ 16 with traumatic injuries.

Notes

Immediate life threat

- Transport to the closest trauma service capable of addressing the life threat.
- Early notification of the receiving hospital to ensure the required staff and equipment are immediately available.
- Notify ARV as soon as possible to facilitate early arrangement of secondary transfer.

More information

> The immediate life threat criteria are aimed at identifying patients who are highly unlikely to survive the longer transfer to a major trauma service. They should be transported to the closest hospital capable of correcting the problem. In general, this will involve transporting to a closer metropolitan trauma service versus the more distant MTS. The destination may vary depending on the exact services available at the closer facility, transport times involved and the condition of the patient. Clinical judgement is required and consultation with the AV Clinician is encouraged if there is any uncertainty.

Vital signs criteria & pattern of injury

- Patients meeting these criteria should be transported to the highest level of trauma service within 60 minutes.
- If a major trauma service is not available within 60 minutes transport time, consider:
  - HEMS

  OR

  - Transport to the closest metropolitan / regional trauma service within 60 minutes AND notify ARV via the AV Clinician
- HEMS vs transport to closest trauma service requires clinical judgement and should consider:
  - Time to arrival of HEMS vs arrival at a trauma service

  - Severity of the patient's injuries
- Consult the AV Clinician if there is uncertainty regarding the most appropriate disposition.

More information

Patients meeting the vital sign or pattern of injury criteria either have or likely have major trauma.

Vital sign criteria

The patient's vital signs indicate that they are seriously injured (shocked, hypoxic, unconscious, etc).

Pattern of injury

The type and location of injuries are serious or complex in themselves. There is a reasonable likelihood of deterioration (e.g. developing haemorrhagic shock) and of occult serious injury.

HEMS vs closest trauma service

If the transport time to a major trauma service is greater than 60 minutes, either HEMS or transport to the closest trauma service is recommended. There is no single criterion that dictates whether HEMS or the closest trauma service is more appropriate. The decision requires clinical judgement.

- **Time to HEMS vs trauma service:** in general transport to the closest trauma service is appropriate if the transport time is substantially shorter than the time to arrival of HEMS.
- **Severity of injuries:** patients with extremely severe injuries or the conditions outlined in the special circumstances section may not survive until the arrival of HEMS. They may require immediate transport to the closest trauma service. Conversely, a patient with injuries on the less severe end of the spectrum such as an open, complex fracture/dislocation is unlikely to benefit from transport via HEMS if a trauma service is available within an approximately comparable timeframe.

These decisions are often subjective and dependant on the nuances of the individual patient and circumstances. Consultation with the AV Clinician is encouraged if there is any uncertainty. They may also choose to involve ARV or the AV Medical Advisor in the decision.

Transport to urgent care or primary care services is not generally recommended. In some circumstances (e.g. very remote locations), transporting the patient to one of these services to facilitate additional assistance, space or resources while waiting for HEMS or ARV may be appropriate.

Trauma service list

Major Trauma Service (adult, age ≥ 16 years)

- The Royal Melbourne Hospital
- The Alfred Hospital

Major Trauma Service (paediatric, age < 16 years)

- The Royal Children's Hospital

Metropolitan Trauma Services (adult and paediatric)

- Austin Health
- Box Hill Hospital
- The Northern Hospital
- Monash Medical Centre, Clayton Campus
- Dandenong Hospital
- Frankston Hospital

Metropolitan Trauma Services (adult only)

- Maroondah Hospital
- St Vincent's Hospital
- Western Hospital Footscray

Regional Trauma Services

- Barwon South Western
  - Geelong
  - Hamilton
  - Warrnambool
- Grampians
  - Ballarat
  - Horsham
- Loddon Mallee
  - Bendigo
  - Mildura
- Hume
  - Albury
  - Shepparton
  - Wangaratta
- Gippsland
  - Traralgon

Mechanism of injury and vulnerability

- Patients meeting these criteria should be transported to the closest trauma service.

More information

Mechanism of injury alone is a poor predictor of occult injury. However, this guideline considers patients with a significant mechanism of injury and a pre-existing vulnerability to be at additional risk. In general, they are unlikely to benefit from bypassing metropolitan or regional trauma centres to be taken to a major trauma service. However, they should not be referred to community-based pathways or transported to hospitals without a trauma service.

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Trauma Triage.pdf
- Walkthrough video - Trauma triage

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. Police support will be required to enact Section 232.
- 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* **Remember verbal de-escalation strategies, active listening and calm/open body language**		
OBSERVE	**Safety**	Paramedic, patient and bystander safety is the first priority. Assess the scene for dangers i.e. location, weapon. Obtain police support early if required. Maintain vigilant reassessment of scene safety.
	Appearance	Look for signs indicative of mental health issues or poor self-caring; uncleanliness, dishevelled, malnourished, signs of addiction (injection marks/nicotine stains), posture, pupil size, odour.
	Behaviour	Patient may display; odd mannerisms, impaired gait, avoidance or 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

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 aged ≥ 16 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.

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 to an ED in most circumstances. Exceptions include:
  - **Virtual emergency department:** For patients who are otherwise eligible, VED Ambulance Referral may be appropriate if the patient presents with borderline abnormal vital signs. VED is not appropriate for patients with red flag specific conditions.
  - **Transient or treatable vital signs:** Some patients will meet the abnormal vital sign criteria at initial presentation but have a clearly correctable cause and respond well to treatment (e.g. 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.
  - **Paramedic judgement or patient refusal:** Contact the AV Clinician prior to leaving the scene to discuss the case. This may include them speaking with the patient.
- 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.
- **Clinician concern:** 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.
- **MICA:** 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.

Yellow Flags

- **Mandate medical review within two hours** if transport is not required. Options include:
  - VED Ambulance referral
  - Emergency department self-presentation
  - GP (if an appointment can be made within in the required timeframe)
  - 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 / $\geq$ 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

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. For some patients with borderline red flag vital signs, non-transport may be appropriate following VED Ambulance referral.**

- 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 (if VED is not available or appropriate)

"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.

Consent and Capacity CPG A0111

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 $\geq$ 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:

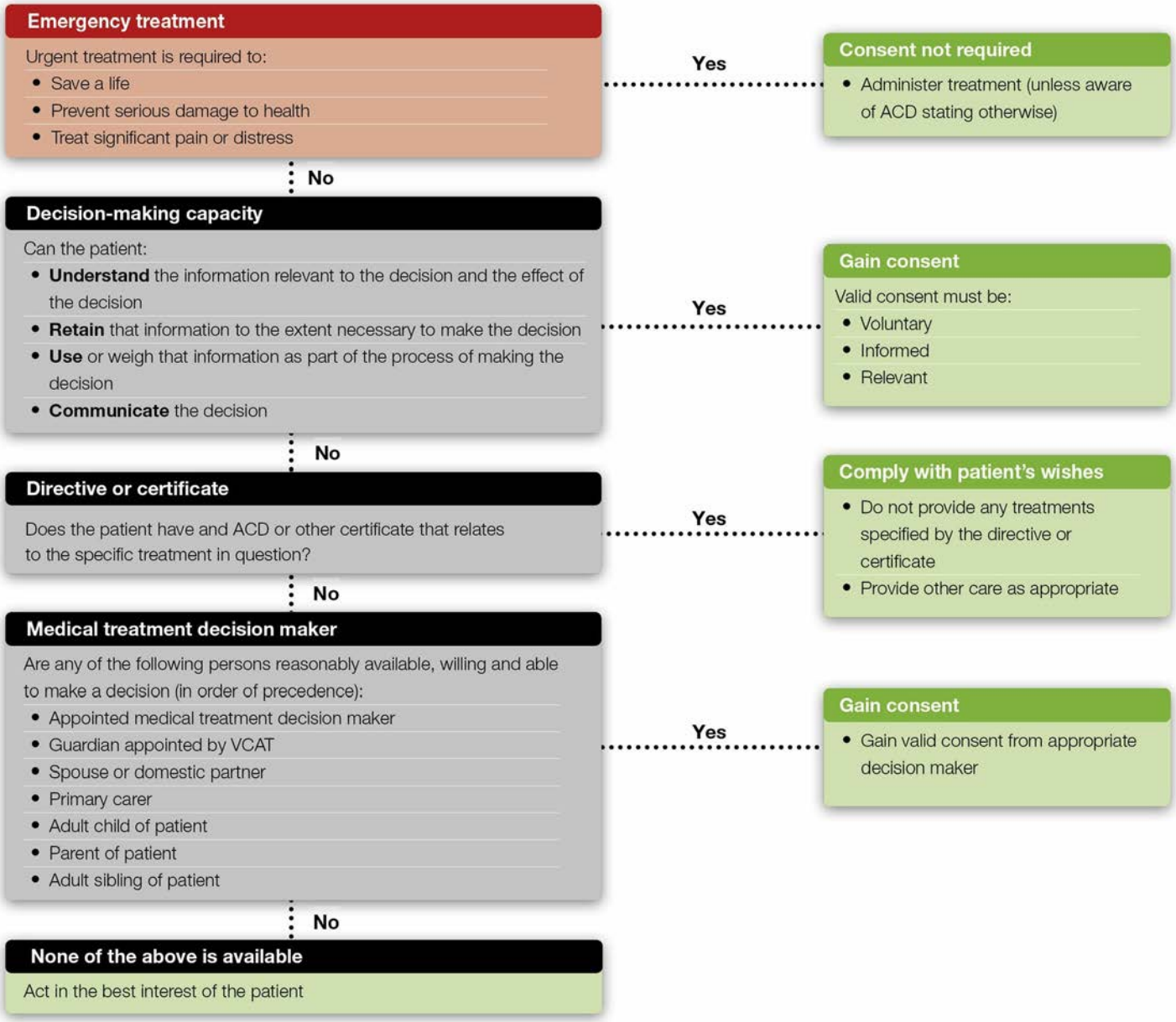
- **Voluntary:** Paramedics may outline what they believe to be the best course of action, but this cannot include undue pressure or coercion. Coercion includes any behaviours that may manipulate a patient's decision-making but that are not a transparent and balanced description of clinical issues. Discouraging 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 patients being cared for under a Section 232
- Patients being cared for under a Section 232 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

Ambulation Risk Assessment CPG A0112

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.

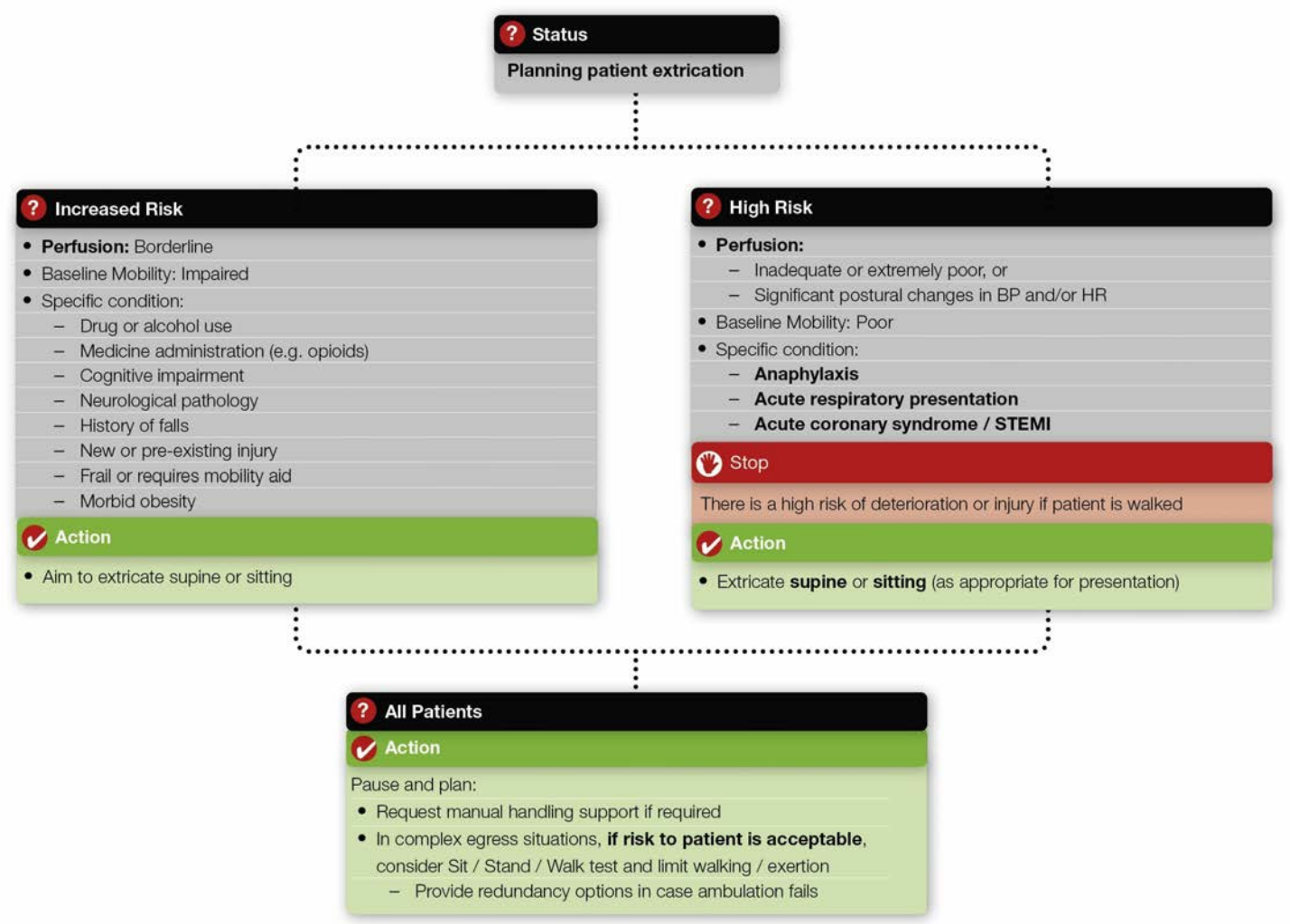
The patient who deteriorates

- 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.

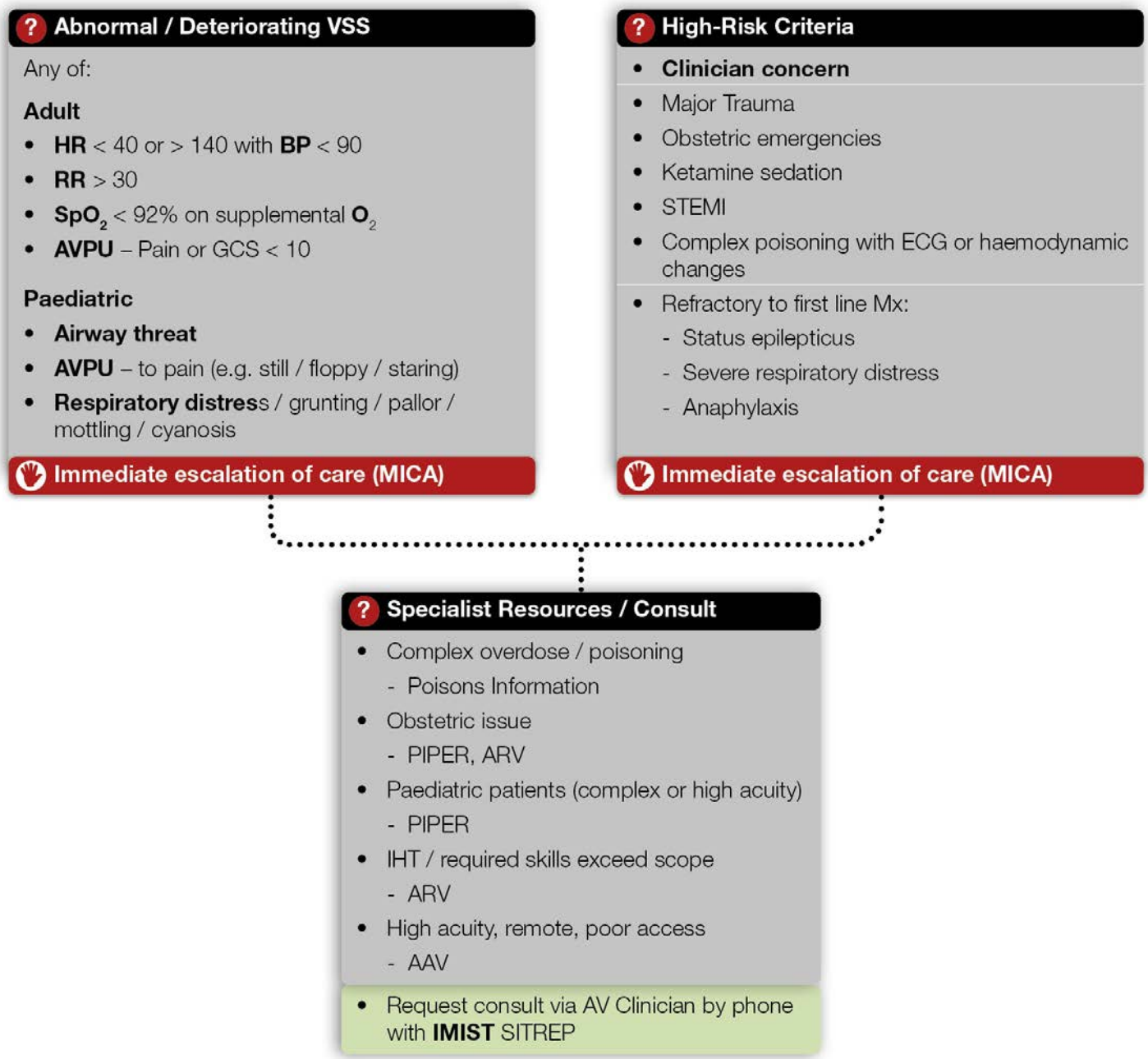
Specific circumstances

- 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


Status
Planning patient extrication
Increased Risk
Perfusion: Borderline
Baseline Mobility: Impaired
Specific condition:
– Drug or alcohol use
– Medicine administration (e.g. opioids)
– Cognitive impairment
– Neurological pathology
– History of falls
– New or pre-existing injury
– Frail or requires mobility aid
– Morbid obesity
Action
Aim to extricate supine or sitting
High Risk
Perfusion:
– Inadequate or extremely poor, or
– Significant postural changes in BP and/or HR
Baseline Mobility: Poor
Specific condition:
– Anaphylaxis
– Acute respiratory presentation
– Acute coronary syndrome / STEMI
Stop
There is a high risk of deterioration or injury if patient is walked
Action
Extricate supine or sitting (as appropriate for presentation)
All Patients
Action
Pause and plan:
Request manual handling support if required
In complex egress situations, if risk to patient is acceptable, consider Sit / Stand / Walk test and limit walking / exertion
– Provide redundancy options in case ambulation fails

Flowchart



Care Objectives

- Identify patients with abnormal or deteriorating vital signs or with conditions likely to deteriorate.
- Escalate care to provide senior clinical review or intervention, specialist consultation or specialist resources.

General Notes

Definition

- 'Escalation of care' refers to the recognition of, and response to, patients who are seriously ill or deteriorating and who require a higher level of clinical review and care. The National Safety and Quality Health Service Standards require that health services establish and maintain systems for recognising and responding to acute deterioration[1].
- In the AV setting this refers specifically to:
  - Requesting MICA / AAV, and/or
  - Consulting by phone with specialist services, hospitals, the AV Medical Advisor, or the AV Clinician

Principles

- The need for senior clinician review is independent of the perceived requirement for particular procedures or medications. The intention of escalation of care is to offer further clinical support which includes assessment, decision-making and care planning.
- Deterioration or abnormal vital signs may initially be mistaken for faulty equipment or technology. Troubleshooting equipment should be prompt, methodical and timely and should not delay escalation of care.
- Team consensus to escalate care is not required. Any team member can trigger escalation of care.
- If abnormal vital signs are normal for patients with a particular condition (e.g. hypotension in the setting of previous spinal cord injury), transport without escalation of care may be appropriate. However, a high degree of caution should be maintained.
- Major Trauma criteria for escalation includes meeting the Vital Signs Major Trauma criteria or any of the Specific Injuries criteria as per **CPG A0105** or **CPG P0105 Trauma Triage**.
- Palliative care patients who present as part of their trajectory towards an expected death do not require escalation of care. If in doubt, consult the AV Clinician for advice.
- Escalation of care should always be consistent with the wishes of the patient or an Advance Care Directive if one is present.
- If escalation of care is required, MICA should be requested regardless of whether the attending paramedics think a MICA resource will be available.
- Some patients will not require escalation of care but will still require expedited care via Signal 1 transport and hospital notification as per the relevant CPGs (e.g. stroke).
- In the setting of an altered conscious state, GCS <10, and an immediately reversible condition such as, but not limited to, hypoglycaemia, opioid toxicity and post-ictal, escalation of care may be reasonably delayed to allow time for patient response to initial treatment and reassessment.
- Additional ALS resources may be required in some circumstances to assist with complex patients or situations (e.g. cardiac arrest in remote location with no MICA available).
- In some circumstances, patient maybe tachycardic and tachypneic related to pain with no other indication of serious illness. In these cases, allow initial therapy to take effect. Where abnormal vital signs don't improve despite analgesia, escalate care.

Immediate escalation of care

Request for MICA should occur via the Dispatch channel by providing a CMDT SITREP:

CMDT SITREP

C	Code (required dispatch code)
M	Main presenting problem
D	Destination hospital (if known)
T	Time until departure (estimated)

Other actions:

- Hospital notification
- Consider RV with MICA en route to hospital
- Signal 1 transport

Specialist resources / consult

Consultation, as well as the activation of specialist resources (e.g. AAV) requires a detailed IMIST SITREP.

IMIST SITREP

I	Identification
M	Mechanism / main presenting problem
I	Injuries / illness
S	Signs / symptoms
T	Treatment

- Consultation should ideally occur via the AV Clinician (as it is a recorded phone line) in a 3-way conference call.
- For staff to initiate medication or procedures outside their usual scope of practice, initial consultation with the AV Clinician is required.
- Telehealth services such as ARV and PIPER should be accessed as early as possible by the AV Clinician or treating paramedics, particularly in the setting of IHT.
- Where AAV are unable to provide a primary response to an identified major trauma patient, the AV Clinician will notify ARV of the need for secondary transfer from a regional base hospital.

References

1. National Safety and Quality Health Service (NSQHS) Standards

The Victorian Virtual ED (VVED) provides an 'ED-in-the-Home' service, using video telehealth technology to connect patients to emergency physicians at their home or residential facility.

Paramedics are strongly encouraged to refer patients who require a timely medical review **now or within the next 24 hours** but do not present with high acuity symptoms or conditions that require time critical transport to ED. Paramedics should continue to refer patients directly to their GP for review and/or self-monitor if they require **non-urgent medical review** (i.e., in 24-48 hours).

It is recommended that AV staff familiarise themselves with the VVED service prior to first use. For more detailed information refer to the 'Paramedic Assistance Tool' app under 'Alternate Care Pathways' (click here to access).

Inclusion Criteria

- The patient/guardian (or care facility) has a phone they can be contacted on post consult (landline or mobile)
- Patient or Medical Treatment Decision Maker (MTDM) provides verbal consent to VVED referral

Exclusion Criteria

1. Request for ambulance attendance made by specialist service (e.g. Residential In-Reach) or specialist doctor (Geriatrician)

OR

2. Main Presenting Problem:
   - Suspected fractured NOF
   - Acute injury causing severe pain and/or new significant limitation on function
   - Acute mental health condition (not including dementia/delirium)
   - Alcohol or other drug intoxication

OR

3. Concern or suspicion of family violence or child safety issues

OR

4. Clinical Red Flag (CPG **A0108** / **P0108**):
   - Vital Sign/s at rest (borderline accepted), or
   - Specific Condition/s

   UNLESS

   the patient has severe frailty (**CPG A0109**: Category 7 or 8) or advanced end-stage illness (Category 9)

Further Information on Specialist Doctor/Service Exclusion Criteria

Specialist Service or Specialist Doctor

If a clinician from a specialist service, such as Residential In-Reach or Palliative Care or specialist doctor, such as a Geriatrician or Cardiologist has assessed the patient and requested ambulance transport to hospital then referral to VVED should not occur.

Interfacility Transfers (standard)

If an interhospital transfer has been requested and the attending crew identify upon arrival that the patient's condition has improved and may no longer require transfer, then consultation with the AV Clinician (and receiving hospital) should occur to determine if an alternate care plan is suitable.

GP/Locum

If a GP has conducted a face-to-face assessment of the patient and requested ambulance transport to hospital then paramedics are encouraged to liaise with the GP prior to referring to VVED (or RIR), if they believe consultation will be of potential benefit. For example, the attending paramedics believe VVED may be able to facilitate the required care without having to physically attend the ED and/or the patient (or their family) are wanting advice on 'at-home' care options.

If a GP has **not** conducted a face-to-face assessment of the patient prior to requesting ambulance transport, then paramedic referral to VVED (or RIR) is encouraged if the patient meets the referral criteria.

Further Information on Acute Injury Exclusion Criteria

Please ensure comprehensive direct observation and palpation of body areas has been undertaken to assess for potential injury.

If the patient is observed to be experiencing severe pain, then they will almost always require transport to ED for further investigation of the underlying causative factor/s.

The impact of the injury or pain on the patient's functional status must be assessed. If their ability to transfer, mobilise and/or attend to personal ADL's is significantly reduced and they do not live in a care facility this poses a significant patient safety risk, as their care needs will likely exceed the care/support available to them in the short-term.

All patients with a suspected fractured neck of femur (NOF) must be transported to ED and not referred to VVED as even those who are very severely frail will almost always be recommended for surgery.

Further Information on Clinical Red Flag Exclusion Criteria

Patients Approaching End-of-Life

Many people with a life-limiting illness such as end-stage cancer, organ failure (e.g. heart), respiratory failure (e.g. COPD), neurological disease (e.g. dementia) or severe frailty wish to be cared for and die at home. Paramedics are often called to care for these patients in situations of sudden deterioration, unexpected symptoms or symptoms that are more acute than anticipated. In such circumstances the clinical red flag criteria do not apply.

Knowing when a patient would benefit from a palliative care approach can be difficult. The VVED, RIR or the Palliative Care Advice Service (1800 360 000) can assist paramedics in recognising the patient who is approaching their final days of life, provide supportive communication and develop a patient and family-centred care plan that optimises their comfort and quality of life.

Key Categories from **CPG A0109 Frailty Scale**.

- **Category 7. Severely Frail:** Completely care dependent for personal care from whatever cause (physical or cognitive).

- **Category 8. Very Severely Frail:** Completely dependent and typically could not recover from even a minor illness.
- **Category 9. Terminally Ill:** Have advanced end-stage illness but are not otherwise evidently frail.

Please note, the clinical red flag exclusion criteria **do apply** to patients that do not have advanced end-stage illness or severe frailty.

Residential Aged Care Facility (RACF) patients

It is highly recommended that paramedics refer patients living in a RACF to VVED or Residential In-Reach (RIR) service prior to transport if assessed as clinically appropriate by the attending crew. It is widely accepted that patients often have improved outcomes and recovery when care is provided in-home with fewer complications such as infection, delirium and falls. Additionally, patients and their families commonly prefer to receive care in-home as opposed to hospital where it is considered safe and effective in meeting their needs.

RIR services vary from region to region. When RIR services are available please consider accessing this service first instead of VVED.

The contact details, catchment areas and operating hours for each RIR can be found in the 'Paramedic Assistance Tool' app under 'Alternate Care Pathways' (click here to access). Alternatively, for patients in the Metro region telephone central referral on 1300 657 585.

Ambulance Referral

The attending crew must remain on scene until advised they can clear by the VVED clinician.

1. Register the patient via the 'Ambulance' registration form

Scan the QR code to access the electronic ambulance registration form, alternatively you can access it from the VVED website (vved.org.au) or from the 'VVED registration' app on the AV phone.

Once submitted, the mobile phone number registered for the consult will receive the weblink to the consult platform via SMS.

Do not direct the patient to use the patient self-referral registration form for non-COVID presentations except in the context of safety netting for post VVED consult follow up if required.

2. Enter the VVED consult waiting room

Click on the consult platform weblink sent via SMS, alternatively, access the weblink from the 'VVED consult' app on the AV phone. Once the consult form is submitted you will be placed in the consult waiting room queue.

To submit the form and identify the patient in the waiting room record the **patient's own name** and the phone number of the phone to be used for the consult. Additionally, select the 'Ambulance Victoria Referral' field so your case is prioritised higher (note: for South East Metro patients select 'South East Metro Melb Ambulance Victoria Referral' instead).

If the consult has not commenced within 15 minutes, use the 'chat box' function located on the consult waiting room screen to request an estimated consult start time. If the estimated start time is beyond a further 5 minutes or you don't receive a response within 5 minutes, call the VVED ANUM (0459 847 364) to discuss next steps.

If needing to cancel the registration call the VVED ANUM and they will notify the relevant service. If accidentally disconnected from the waiting room simply re-enter by clicking on the same consult weblink (you will not lose your place in the queue).

3. Provide handover and assist with further assessment and/or management

The video will go full screen when the consult begins. Provide an IMISTAMBO handover to the VVED clinician once this occurs.

4. Clear from case once confirmed by VVED clinician that AV transport is not required

Medication Prescription & Administration

The VVED doctor or nurse practitioner may prescribe medication to the patient and/or recommend medication administration by paramedics. For medication within the AV staff member's scope of practice this may differ to the indications or doses in the AV CPGs (e.g. antibiotic administration to a patient with a lower respiratory tract infection). In these circumstances this is supported by AV governance. If a paramedic has any concern they should communicate this to the VVED clinician and if required, also engage the AV Clinician.

Administration of medications before or during the VVED consult does not mandate transport to ED. The clinical decision regarding transport to ED will be made by the VVED clinician and will be based on medication half-life, duration and the potential for adverse effects, tolerance and medication interactions. Additional time on scene may be required to monitor for effect including potential side effects.

Paramedics can only administer medication when on scene and are not authorised to supply extra medication for the patient to self-administer at a later time.

Assessment criteria

	Normal	Inadequate
Colour	Normal	Pale May appear grey or yellow in dark skin tones Mottling Cyanosis
Temperature	Warm	Cool Decreased arterial supply Hot Decreased venous return or inflammation
Capillary refill	≤ 3 Seconds	> 3 seconds
Distal Pulses Radial or pedal	Strong	Weak Absent
Sensation	Normal	Reduced Paraesthesia E.g. pins and needles, tingling, Absent
Movement	Normal	Reduced Absent
Pain	No pain Pain consistent with injury/condition	Pain out of proportion for injury/condition

- Interpret assessments with reference to:
  - Findings at other points of the body
    I.e. the contralateral limb, or other unaffected areas
  - Patient baseline
    E.g. diabetic neuropathy or peripheral vascular disease

Introduction

Intended patient group

- Patients with an injury or illness requiring neurovascular assessment of a limb.
- Patients requiring physical restraint to monitor the neurovascular status of restrained limbs.

Overview

- A neurovascular assessment evaluates the function of the vascular and nerve pathways along that limb. It assesses vascular supply and return, as well as afferent (sensory return) and efferent (motor innervation) nerve function.
- Examples of conditions requiring neurovascular assessment:
  - Limb injury
  - Limb ischaemia
  - Limb infection
  - Before and after reduction/realignment of a limb
- In the pre-hospital setting, neurovascular assessment is usually limited to a broader assessment of the limb, rather than the function of individual nerves. In some circumstances, such as when referring to community-based care, a more in-depth assessment is indicated.
  - **CPG A0810 Fracture/Dislocation – Shoulder**
    Assessment details

    - Motor function:
      - Thumb and index finger touching (“OK” position)
      - Finger abduction (spreading fingers out)
      - Wrist and finger extension
    - Sensation:
      - Deltoid - altered sensation in the deltoid indicates axillary nerve damage
    - Abnormal findings over the deltoid are not uncommon following dislocation and usually resolve following reduction. However, abnormal findings at any stage still warrant transport to hospital.

  - **CPGA0812 Wound Care**
    Assessment details

    - Assess tissue next to the wound for dusky colouring or poor perfusion.

Assessment

General principles

- Findings should be interpreted with reference to:
  - Findings at other points of the body
    I.e. the contralateral limb, or other unaffected areas
  - Patient baseline
    E.g. diabetic neuropathy or peripheral vascular disease
- Repeat observations may be required as neurovascular status can change in patients with significant injuries.
- Modified assessment may be required:
  - Unconscious / altered conscious state patients - limited to circulation.
  - Young children / neurodiverse patients – consider assessments appropriate for patient (e.g. observe movements).

Circulation assessment

Colour / Temperature / Capillary refill / Distal pulses

- Assess circulation at multiple points along the injured extremity.
- Changes in skin colour in patients with dark skin tones may be subtle and pallor may appear grey or yellow. Comparison with the unaffected limb is essential for effective assessment. Consider asking the patient or a family member to assist in identifying changes.
- Mark the location of pedal pulses for reassessment.

More information

- Pedal pulses may be located on the top of the foot (dorsalis pedis) or behind the medial malleolus (posterior tibial pulse).

Sensory assessment

- Ask the patient to close their eyes
  This helps to exclude responses confounded by the patient seeing, rather than feeling, touch
- Assess for global changes in sensation
- Lightly touch the patient’s limb to check sensation
- Assess sensation at multiple points above and below the injury

Motor assessment

- Assess for strength of major muscle groups

i.e. normal strength during flexion/extension of major joints

- Upper limbs: Push, pull and grasp
- Lower limbs: Push, pull and raise legs

- Assess for ability to perform normal movements of joints and fingers/toes.

Pain

- Assess for pain both at the site of injury and distal to injury
  Pain out of proportion for the injury may indicate possible compartment syndrome

More information

Muscle groups of the limbs are divided into compartments. **Acute compartment syndrome** occurs when pressure within a compartment increases, leading to swelling and impairment of circulation and function in that area. It is most commonly seen after traumatic injury, particularly fractures, but may also occur due to a range of traumatic and non-traumatic causes including:

- Crush injury
- Burns
- Injury to blood vessels
- Thrombosis
- Extravasation of IV fluid

Documentation

- All aspects of neurovascular assessment should be documented in VACIS®.
- If multiple neurovascular assessments are required (e.g. pre and post reduction), document the times and all aspects of both assessments.

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Neurovascular Assessment.pdf

Sedation Assessment Tool CPG A0116

A Sedation Assessment Tool (SAT) score should be regularly recorded for the purposes of ongoing monitoring, clinical handover and case documentation, in the context of:

- Administration of sedation or analgesia, or
- Drug / alcohol intoxication

SCORE	RESPONSIVENESS	SPEECH
+3	Combative, violent out of control	Continual loud outbursts
+2	Very anxious and agitated	Loud outbursts
+1	Anxious / restless	Normal / talkative
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 recognisable words
-3	No response to stimulation	Nil

General Notes

Intended patient group

- Patients aged ≥ 16 years

Mx principles

- O_2 is a treatment for hypoxaemia, not breathlessness. O_2 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 SpO_2 in acutely ill patients. O_2 should be administered to achieve a target SpO_2 while continuously monitoring the patient for any changes in condition.
- O_2 should not be administered routinely to patients with normal SpO_2. This includes those with stroke, ACS and arrhythmias.
- In patients who are acutely short of breath, the administration of O_2 should be prioritised before obtaining an O_2 saturation reading. O_2 can later be titrated to reach a desired target saturation range.
- If pulse oximetry is not available or unreliable, provide an initial O_2 dose of 2 - 6 L/min via nasal cannulae or 5 - 10 L/min via face mask until a reliable SpO_2 reading can be obtained or symptoms resolve.

Special circumstances

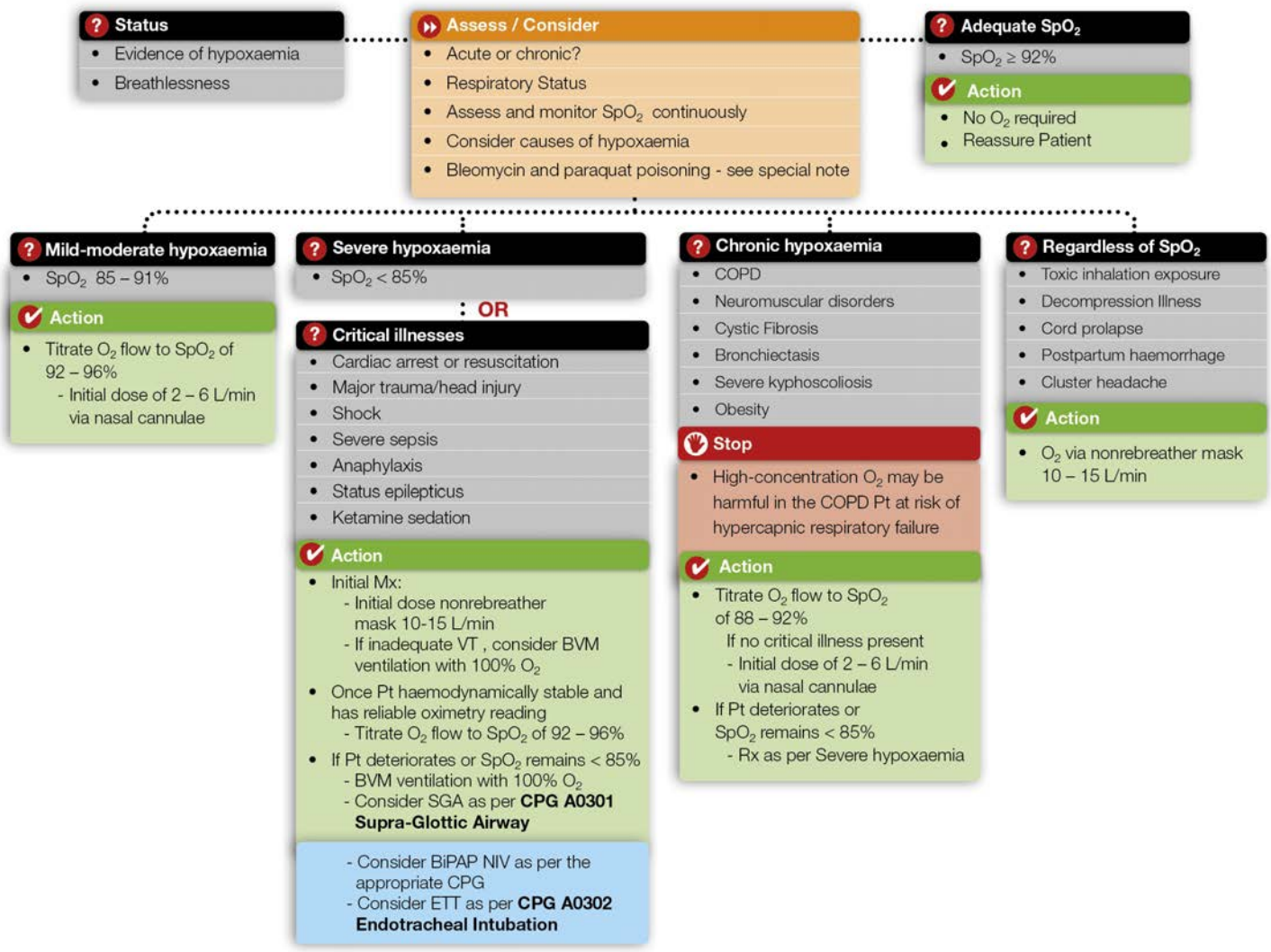
- Early aggressive O_2 administration may benefit patients who develop critical illnesses and are haemodynamically unstable, such as cardiac arrest or resuscitation; major trauma / head injury; shock; severe sepsis; and anaphylaxis. In the first instance, O_2 should be administered with the aim of achieving an SpO_2 of 100%. Once the patient is haemodynamically stable, the O_2 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 O_2 administration. Once the patient is haemodynamically stable, the O_2 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 O_2 therapy may prove detrimental to the patient. The maintenance of prophylactic hypoxaemia in these patients (SpO_2 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 SpO_2 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 O_2. Maintain oxygen therapy regardless of $Sp0_2$ or signs of breathlessness.
- Where the patient may have been exposed to other poisons, administer O_2 to maintain an SpO_2 of 92- 96%. Consult VPIC for toxicology advice.
- Patients with medically diagnosed pneumothorax, but without an intercostal catheter in situ, may benefit from high dose O_2 regardless of SpO_2.
- Irrespective of SpO_2, patient tidal volume should be assessed to ensure ventilation is adequate.
- O_2 exchange is at its greatest in the upright position. Unless other clinical problems determine otherwise, the upright position is the preferred position when administering O_2.
- 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). O_2 is not required however no attempt should be made to retain CO_2 (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 CO_2 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 O_2 therapy.

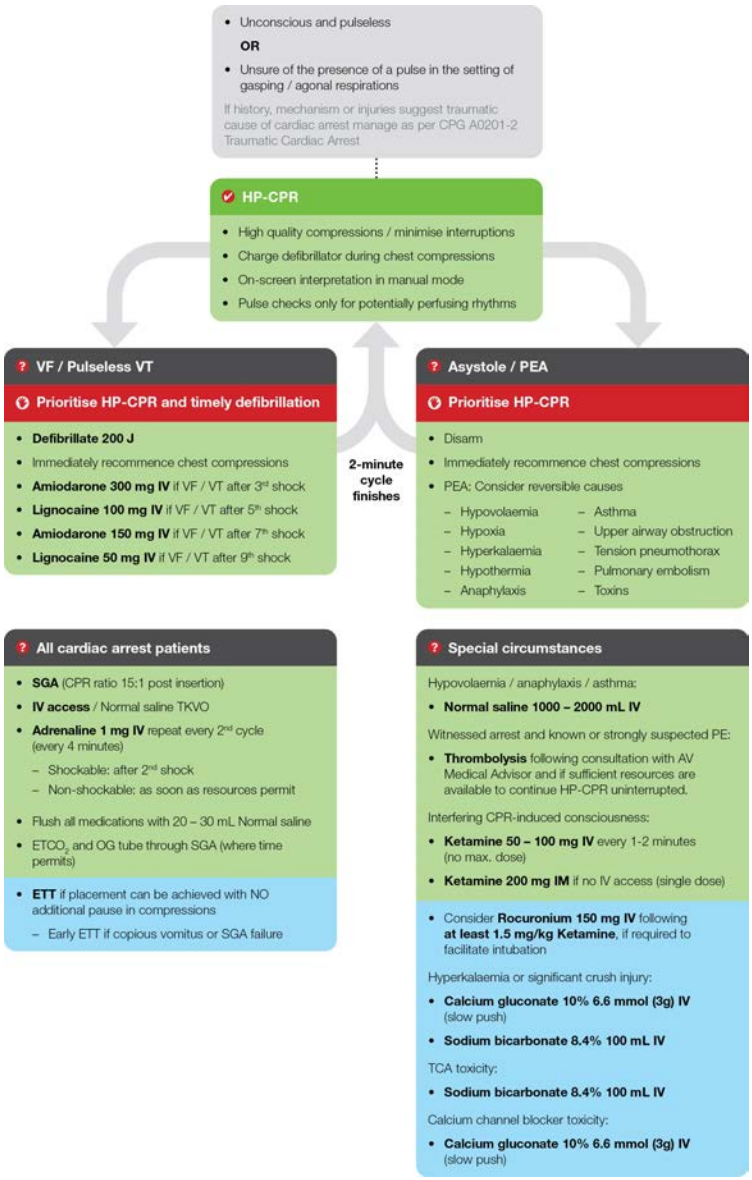
Flowchart



Related Resources

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

Flowchart



Care Objectives

- High quality chest compressions with minimal interruptions
- Rapid defibrillation of VF / pulseless VT (if in doubt, shock)
- Advanced care (e.g. adrenaline, antiarrhythmics, intubation) where it does not interrupt high-quality compressions / defibrillation
- Address correctable causes where possible

Intended patient group

- Patients aged ≥ 16 years in cardiac arrest

Assessment

- **If any doubt exists as to the presence of a pulse**, chest compressions must be commenced.
- **Trauma vs medical cause:** If the history, mechanism or pattern of injury are strongly suggestive of a traumatic cause of arrest, treat as per **CPG A0201-2 Traumatic Cardiac Arrest**. If there is any doubt as to the cause of the arrest, default to using the Medical Cardiac Arrest CPG.
- Carotid pulse checks are only required for a potentially perfusing rhythm (e.g. the presence of QRS complexes which may be accompanied by a rise in $ETCO_2$).

Capnography

- $ETCO_2$ can be used as a surrogate marker of cardiac output and therefore, compression quality. It may approach physiological values with high quality CPR.
- A gradual fall in $ETCO_2$ suggests CPR fatigue.
- A sudden rise in $ETCO_2$ suggests ROSC.

Management

- An **SGA** is an appropriate option to manage the airway initially and to facilitate continuous compressions. When **ETT** is attempted, it should not interrupt compressions.
- **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

- **Prioritise immediate rhythm interpretation and defibrillation on arrival**
  - Time to first defibrillation ≤ 2 minutes
  - Perform chest compressions while the defibrillator is being applied
  - If access is compromised, consider rhythm interpretation and defibrillation before gaining 360-degree access
- **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 interpretation
  - Hover hands over chest and resume compressions immediately after defibrillation or disarm

- **Utilise Team Leader and checklist**
- Pause CPR briefly to interpret the rhythm before delivering a shock. A decision to defibrillate should not be made on the basis of 'See-Thru CPR' as it is often misleading.
- Defibrillation using shock advisory mode is not compatible with high-performance CPR and should not be combined.

Compression / Ventilation ratios

No ETT / SGA in situ	• 30 compressions : 2 ventilations • Pause for ventilations
ETT / SGA in situ	• 15 compressions : 1 ventilation • 6-8 ventilations / minute • No pause for ventilations

Defibrillation

Refractory VF/VT

- A patient is considered to be in refractory VF/VT where they remain in a shockable rhythm after 3 defibrillation attempts (including shocks delivered prior to AV arrival).
- Check the placement of pads and adjust if necessary.
  Optimal pad placement improves the likelihood of successful defibrillation.
  - Sternal pad: Right side of chest, under clavicle and above nipple.
  - Apex pad: Left mid-axillary line, 6th intercostal space.
  - Ensure pads are adhered to the skin properly.

Monitored VF/VT arrest

- **Stacked shocks:** Administer up to three shocks prior to progressing to HP-CPR if the patient has a monitored VF/VT arrest with the defibrillation pads attached during AV care. See **CWI/OPS/210 Defibrillation – Stacked Shocks** for full procedure.
  - Deliver the first shock within 20 seconds of the arrest occurring.
  - Aim for < 10 seconds pause between shocks and immediately interpret the rhythm after each one.
  - If there is any delay to defibrillation, commence HP-CPR.
  - Treat the stacked shocks as a single shock for the purpose of medication administration and other management.

Adrenaline

- **VF/VT:** Administer adrenaline after the 2nd shock.
- **PEA/Asystole:** Administer adrenaline as soon as resources allow medication administration without interrupting HP-CPR.

More information

Adrenaline is used to increase coronary and cerebral perfusion pressure during CPR. The intent is to increase the likelihood of:

- Neurologically intact survival
- Successful defibrillation

However, adrenaline for cardiac arrest is controversial. There is evidence that it improves ROSC, but no high quality evidence that it improves neurologically intact survival to discharge.[1] There is also evidence that adrenaline may be:

- associated with poorer neurological outcomes
- arrhythmogenic
- a contributor to post-ROSC myocardial dysfunction

Shockable rhythms: given the balance of potential risks and benefits, the preference is to attempt defibrillation a number of times prior to introducing adrenaline.

Non-shockable rhythms: given there is no preferred alternative treatment as with shockable rhythms, adrenaline may be introduced for non-shockable rhythms as early as practicable. This is especially true if the cause of arrest is more likely to respond to adrenaline (e.g. anaphylaxis, asthma).

There is strong evidence that high quality compressions with minimal interruptions and timely defibrillation improve survival to discharge. Medication administration and IV access should not interrupt HP-CPR.

Antiarrhythmics

- HP-CPR should always be prioritised over medication administration. Antiarrhythmics should not be considered until there are sufficient resources to continue uninterrupted HP-CPR in parallel to medication administration.
- Antiarrhythmics should be administered for refractory VF/VT after 3 shocks.

More information

There is strong evidence that high quality compressions with minimal interruptions and timely

defibrillation improve survival to discharge. Medication administration and IV access should not interrupt HP-CPR.

Administration is recommended after the 3rd, 5th, 7th and 9th shocks. If IV access is not obtained until later in the arrest, deliver 2 shocks between doses (e.g. if the first dose is given after the 5th shock, administer the 2nd dose after the 7th shock).

The 3 shocks may include those given by public AEDs or first responders (e.g. FRV, ACO or CERT). They do not include shocks that were inadvertently given to a patient in a non-shockable rhythm.

It is acceptable to administer antiarrhythmics in the same HP-CPR cycle as adrenaline.

Mechanical CPR (mCPR)

- Transport eligible patients in refractory cardiac arrest to an Extracorporeal Membrane Oxygenation (ECMO) centre if a collapse-to-ED time of < 60 minutes can be achieved following 20 minutes of HP-CPR.

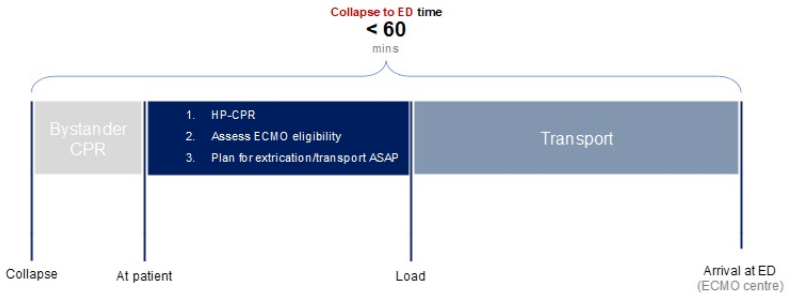
More information

mCPR is most commonly used as a bridge to ECMO during CPR (ECPR) for eligible patients with refractory cardiac arrest.

The patient's best chance of ROSC is achieved through HP-CPR at the scene.

Applying mCPR in the initial 16 minutes of the resuscitation should be avoided wherever possible as it may be detrimental to patient outcomes.

If ROSC is not achieved within 20 minutes, the patient is considered to have refractory cardiac arrest and should be transported if they are eligible.



ECMO transport eligibility

All criteria must be met

- Age 16 - 70 years

- Suspected cardiac cause of cardiac arrest
- Bystander or paramedic witnessed arrest
- Timely and effective chest compressions provided
- Initial rhythm VF / VT
  Patients who subsequently deteriorate into asystole are still eligible.
- No major medical co-morbidities such as end stage renal failure, cirrhosis, dementia, significant COPD or malignancy
- Collapse-to-ED (ECMO centre) time of < 60 minutes can be achieved
- ECMO-1 vehicle not dispatched
  Usually operates 0900-1700, Monday – Thursday

ECMO Centres

Alfred Hospital	**24/7**
Austin Hospital Box Hill Hospital Geelong University Hospital Royal Melbourne Hospital St Vincent's Hospital Victorian Heart Hospital	**0800 - 1700** Monday - Friday

Preference transport to the Alfred Hospital where the transport time to another ECMO centre is approximately the same.

- If a collapse-to-ED time of < 60 minutes cannot be achieved, eligible patients should receive continued resuscitation. Longer resuscitation attempts should be considered if there are compelling reasons to continue.
- Consult the AV Medical Advisor via the AV Clinician if unsure about eligibility for ECMO.

Potential patient eligibility

- Some patient types may benefit from longer resuscitation durations and / or ECMO including:
  - Younger / healthy patients
  - Hypothermia
  - Known pulmonary embolism
  - Select toxicological causes
    ECMO or an antidote may be appropriate. Early consultation with VPIC via the AV Clinician is recommended.
- Consult the AV Clinician early for decision support and advice on the most appropriate destination.

Workflow for patients eligible for ECMO

- **Start HP-CPR:** Approximately 10 rounds (20 minutes) of high-performance CPR and intubation should be performed prior to transport.
- **Identify eligible patients** as early as possible to expedite extrication and any additional resources. Provide an early SITREP noting the patient is an ECPR candidate and the initial arrest rhythm.
  - If the ECMO-1 vehicle is available or has been dispatched, remain on scene and provide an early SITREP.
- **Do not apply the mCPR device until 16 minutes** of resuscitation has been provided.
- **Prepare for ROSC and extrication simultaneously to HP-CPR** if sufficient resources are available on scene.
- **Transport the patient as soon as possible after 20 minutes** of resuscitation if ROSC is not achieved.
- **Notify hospital as soon as possible** once the decision to transport is made.

During transport

- Continue adrenaline 1 mg IV/IO every 4 minutes
- Perform rhythm check every 2 minutes. If a potentially perfusing rhythm is present, check for pulse. Do not stop vehicle for confirmation of shockable rhythm or pulse check.

More information

> Artefact caused by movement of the ambulance could potentially be interpreted as VF, leading to defibrillation that is not indicated.
>
> However, the risk of significantly delaying ECPR for all mCPR patients is greater than the low risk of an erroneous defibrillation (which is unlikely to lead to a worse outcome should it occur).

Exhaustion

- Consider mCPR as a last resort if:

  - Limited resources at scene (e.g. 1 - 2 staff)
  - All staff are extremely fatigued
  - There are no other options to provide effective HP-CPR with manual chest compressions

- mCPR should not routinely be applied to patients outside of these circumstances. It should never be applied to facilitate other interventions such as IV access.

Special Circumstances

Pregnant Patient (> 20 weeks gestation)

- Push the uterus to the left side to minimise aorto-caval compression (manual uterine displacement).
  - If this is not feasible, consider tilting the patient to the left.
- Where mCPR is available, consult early with the AV Medical Advisor and PIPER via the AV Clinician for consideration of transport for resuscitative hysterotomy.
- **Notify hospital as soon as possible** once the decision to transport is made.

Manual uterine displacement procedure

- Manual displacement of the uterus is challenging and requires one person dedicated to this task throughout the arrest.
- The purpose is to relieve aorto-caval compression and improve cardiac output.
- **Positioned to left of patient (A):** Use two hands to cup and lift the uterus to the left
- **Positioned to right of patient (B):** Use one hand to push the uterus up and to the left

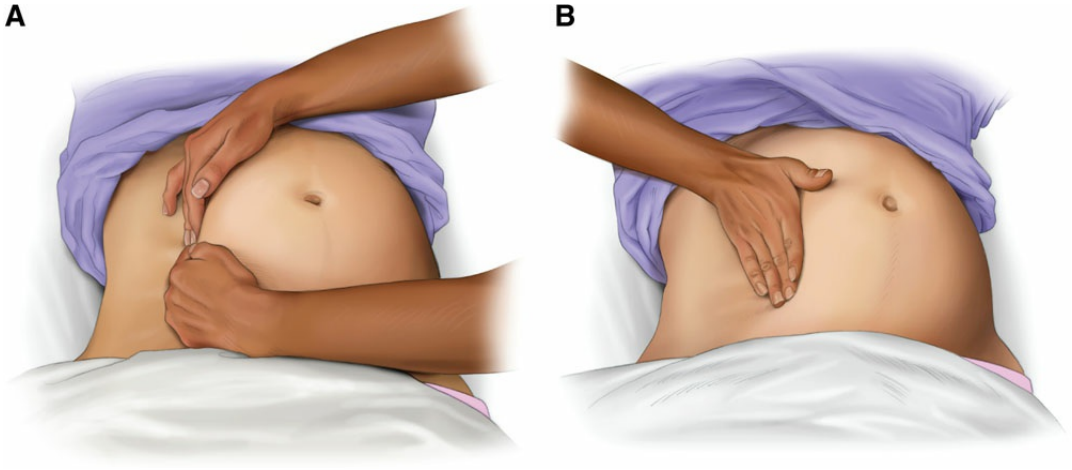


Image: Manual uterine displacement[2]

- Consider tilting the patient to the left (approx. 15°- 30°) if manual uterine displacement is not feasible, however this may negatively impact the effectiveness of chest compressions.

Implantable devices

- Permanent pacemaker
  - Apply ECG electrodes when time / resources permit without interrupting HP-CPR.

More information

> Pacing spikes may be mistaken for QRS complexes despite the patient being in a shockable rhythm. Applying ECG electrodes and viewing alternative leads can assist in differentiating pacing spikes from QRS complexes.

- Ventricular assist devices (VAD)
  - Anterior-posterior pad placement if possible:
    - Apex pad: Left anterior chest wall, halfway between the xiphoid process and the left nipple.
    - Sternal pad: To the left of the spine and below the scapula.
  - Do not disconnect the pump.
  - Contact the Alfred Hospital Heart Failure Registrar or Consultant via the AV Clinician as soon as possible.
  - Patients with a VAD do not generally have a palpable pulse. Pulse checks cannot be used to diagnose cardiac arrest or ROSC.

Interfering CPR-induced consciousness (CPRIC)

- The primary aim of management is to gain control of patient symptoms **as soon as possible** to recommence HP-CPR.
- Where any of the following are present:
  - Interference with CPR
  - Gag reflex is present preventing adequate oxygenation / ventilation or SGA / ETT insertion
  - Suspected awareness / pain / combative movements interrupting resuscitation
- Administer:
  - **Ketamine 50 – 100 mg IV every 1-2 minutes** (no max. dose).
  - No IV access: **Ketamine 200 mg IM** (single dose).
  - Consider **Rocuronium 150 mg IV** to facilitate intubation if unable to provide adequate oxygenation / ventilation following at least **1.5 mg / kg IV Ketamine**.
- Consider the patient's weight and severity of symptoms to determine ketamine dose.

Cardiac arrest secondary to hypothermia < 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, amiodarone and lignocaine doses.
- ROSC is unlikely to be achieved if more than 3 shocks are required while the patient remains severely hypothermic - consider AAV or 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. Consult the AV Medical Advisor via the Clinician for management advice.

Tension pneumothorax

- Where tension pneumothorax is considered to be the cause of cardiac arrest, in either medical or traumatic arrest, decompress the chest bilaterally.
- Clinically significant pneumothorax as a result of chest compressions is very unusual and chest decompression should not be routine in medical cardiac arrest. Point of care ultrasound should be used if credentialled to confirm absence of lung sliding before attempting chest decompression.

Hyperkalaemia

- Indiscriminate use of calcium in cardiac arrest is associated with harm.[3, 4]
- A hyperkalaemic cause of arrest should only be considered if:
  - The potassium level has been measured and is known to be elevated (>6 mmol/L) or
  - Hyperkalaemia is very strongly suspected (typically only patients with renal failure / dialysis or following a significant crush injury).
- Outside of these settings, the use of calcium will cause more harm than any benefit obtained.
- Flush with 10 mL normal saline between administration of calcium gluconate and sodium bicarbonate.

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 1000 – 2000 mL IV.

Hypoglycaemia

- Measure BGL after all other management is established. Manage hypoglycaemia as per **CPG A0702 Hypoglycaemia**.

More information

> Hypoglycaemia in cardiac arrest is rare. However, BGL should be measured and hypoglycaemia treated. It is important that measurement of BGL does not interrupt other more important management in any way.

Intra-arrest thrombolysis

- Consult AV Medical Advisor via the AV Clinician for thrombolysis as per **CPG A0408 STEMI**

Management if the patient experiences a witnessed arrest due to a known or strongly suspected PE.

- Thrombolysis should only be considered if there are sufficient resources at the scene to continue HP-CPR for up to 60 minutes post administration of thrombolysis.

Related Resources

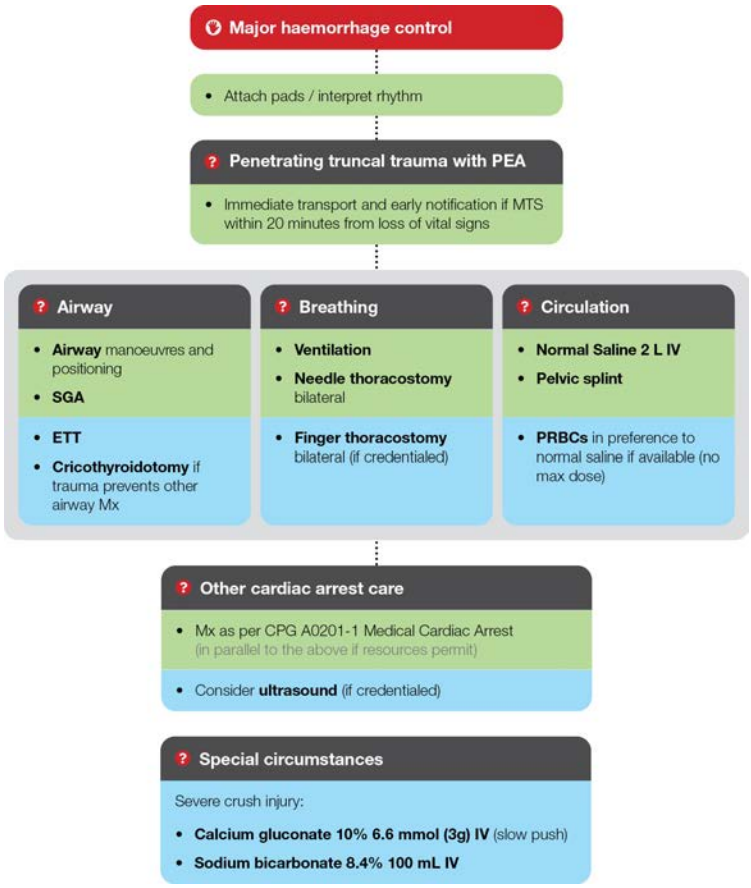
- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Medical Cardiac Arrest 2024.pdf

References

1. Soar J, Maconochie I, Wyckoff MH, Olasveengen TM, Singletary EM, Greif R, et al. 2019 international consensus on cardiopulmonary resuscitation and emergency cardiovascular care science with treatment recommendations: summary from the basic life support; advanced life support; pediatric life support; neonatal life support; education, implementation, and teams; and first aid task forces. Circulation. 2019;140(24):e826-e80.
2. Panchal AR, Bartos JA, Cabañas JG, Donnino MW, Drennan IR, Hirsch KG, et al. Part 3: adult basic and advanced life support: 2020 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. Circulation. 2020;142(16_Suppl_2):S366-S468.
3. Vallentin MF, Granfeldt A, Meilandt C, Povlsen AL, Sindberg B, Holmberg MJ, et al. Effect of intravenous or intraosseous calcium vs saline on return of spontaneous circulation in adults with out-of-hospital cardiac arrest: a randomized clinical trial. Jama. 2021;326(22):2268-76.
4. Padrao EMH, Bustos B, Mahesh A, de Almeida Castro M, Randhawa R, Dipollina CJ, et al. Calcium use during cardiac arrest: A systematic review. Resuscitation Plus. 2022;12:100315.

Traumatic Cardiac Arrest CPG A0201-2

Flowchart



Care Objectives

- Major haemorrhage control over all other interventions
- Management of correctable causes in order of clinical need:
  - Hypoxia
  - Tension pneumothorax
  - Hypovolaemia
- Standard cardiac arrest management concurrent to addressing correctable causes (if resources permit)

General Notes

Intended patient group

- Patients aged ≥ 16 years in traumatic cardiac arrest
- **Consider medical cause:** In cases where the history, mechanism 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 **CPG A0201-1 Medical Cardiac Arrest**.

More information

The Traumatic Cardiac Arrest CPG should be applied only when the cause of cardiac arrest is clearly traumatic. Medical cardiac arrest may lead to incidents with the potential to cause injury (e.g. slow speed MVA, standing height fall). If these patients receive traumatic cardiac arrest care, it may delay defibrillation and chest compressions. Strongly suspect a medical cause of arrest where the MOI and history do not suggest the potential for severe injuries.

Management

- The potential causes of cardiac arrest should be managed in order of clinical need.
- Treating correctable causes should be prioritised over standard cardiac arrest care (chest compressions and adrenaline).

More information

Undifferentiated trauma vs obvious cause

- Uncertain cause: in the absence of a clear cause, or where it is probable there are multiple causes, it is reasonable to apply all interventions in the CPG in the order presented (i.e. haemorrhage control, airway, breathing, circulation). This is likely to be the most common type of traumatic arrest. If resources permit, multiple interventions should be performed concurrently including standard cardiac arrest care.
- Obvious causes: Where there is a clear etiology (e.g. amputation), it is not mandatory to provide all interventions in this CPG (e.g. chest decompression). In cases of witnessed traumatic arrest, prioritise treatment to address the most likely cause first. If there is any doubt as to the cause, all interventions should be provided.

Standard medical arrest

Chest compressions are not likely to be effective in the setting of hypoxia, tension pneumothorax and severe hypovolaemia. As such they are not the priority. However, there is no requirement that standard cardiac arrest care be delayed until correctable causes have been addressed. Ideally, haemorrhage control, airway management, chest decompression, fluid resuscitation, chest compressions and adrenaline should be delivered simultaneously.

- Where clear signs of prolonged cardiac arrest are present or continued resuscitation may be futile, consider **CPG A0203 Withholding or Ceasing Resuscitation**.

Major haemorrhage

- Control of major haemorrhage is the absolute priority in all circumstances. It can be achieved with:
  - Arterial tourniquets
  - Haemostatic dressings / wound packing
  - 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.

Blood components

- Where available, Packed Red Blood Cells (PRBC) are preferred for fluid resuscitation over normal saline.
- MICA paramedics credentialed in blood component administration may administer PRBC.
- Legal minor: PRBC must only be administered to a child < 18 years if:
  - A parent / legal guardian can be contacted and the parent / legal guardian consents to the administration of a blood transfusion.

  OR
  - A medical doctor approves administration (preferably AV Medical Advisor via the AV Clinician or RCH)
- Religious objection: PRBC must not be administered to a patient with a known religious objection to blood transfusion (e.g. Jehovah's Witness) and who refuses consent.

Chest decompression

- Finger thoracostomy is the preferred method for chest decompression (where credentialed).
- Perform needle thoracostomy if finger thoracostomy is delayed or not available.

Ultrasound

- Where all correctible causes have been addressed, focused assessment with sonography for trauma may be considered (where credentialled) to:
  - Assess cardiac wall motion and identify patients with a low flow state (low cardiac output).
  - Assess for cardiac tamponade.
  - Ensure correctible causes have been adequately managed (e.g. tension pneumothorax).

Perfusion assessment

- $ETCO_2$ can be used as a surrogate marker for cardiac output and may assist in identifying patients with a low flow state.

Return of Spontaneous Circulation

- Where ROSC is achieved, manage the patient as per **CPG A0810 Major Trauma**.

Special circumstances

Penetrating truncal trauma and PEA

- Where a Major Trauma Service is within 20 minutes from loss of vital signs:
  - Immediately transport Signal 1 with early notification.
  - Do not stop to manage the patient if they lose vital signs en-route to hospital. Provide an updated notification to hospital and continue Signal 1.
  - Only perform limited interventions: haemorrhage control, basic airway management (+/- SGA) and chest decompression.
  - Chest compressions are not required during transport.
  - Do not delay for MICA, mCPR, IV or ETT insertion.

More information

In-hospital resuscitative thoracotomy is a priority over standard traumatic cardiac arrest management if it can be performed within 20 minutes of loss of vital signs. It can:

- Release tension pneumothorax
- Provide surgical relief of cardiac tamponade
- Allow direct control of intrathoracic haemorrhage

Severe crush injury

- In the setting of cardiac arrest due to severe crush injury, manage as per **CPG A0201 Medical Cardiac Arrest** - “Hyperkalaemia”:
  - Calcium gluconate 10% 6.6 mmol (3 g) IV (slow push)
  - Sodium bicarbonate 8.4% 100 mL IV

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Traumatic Cardiac Arrest 2024.pdf

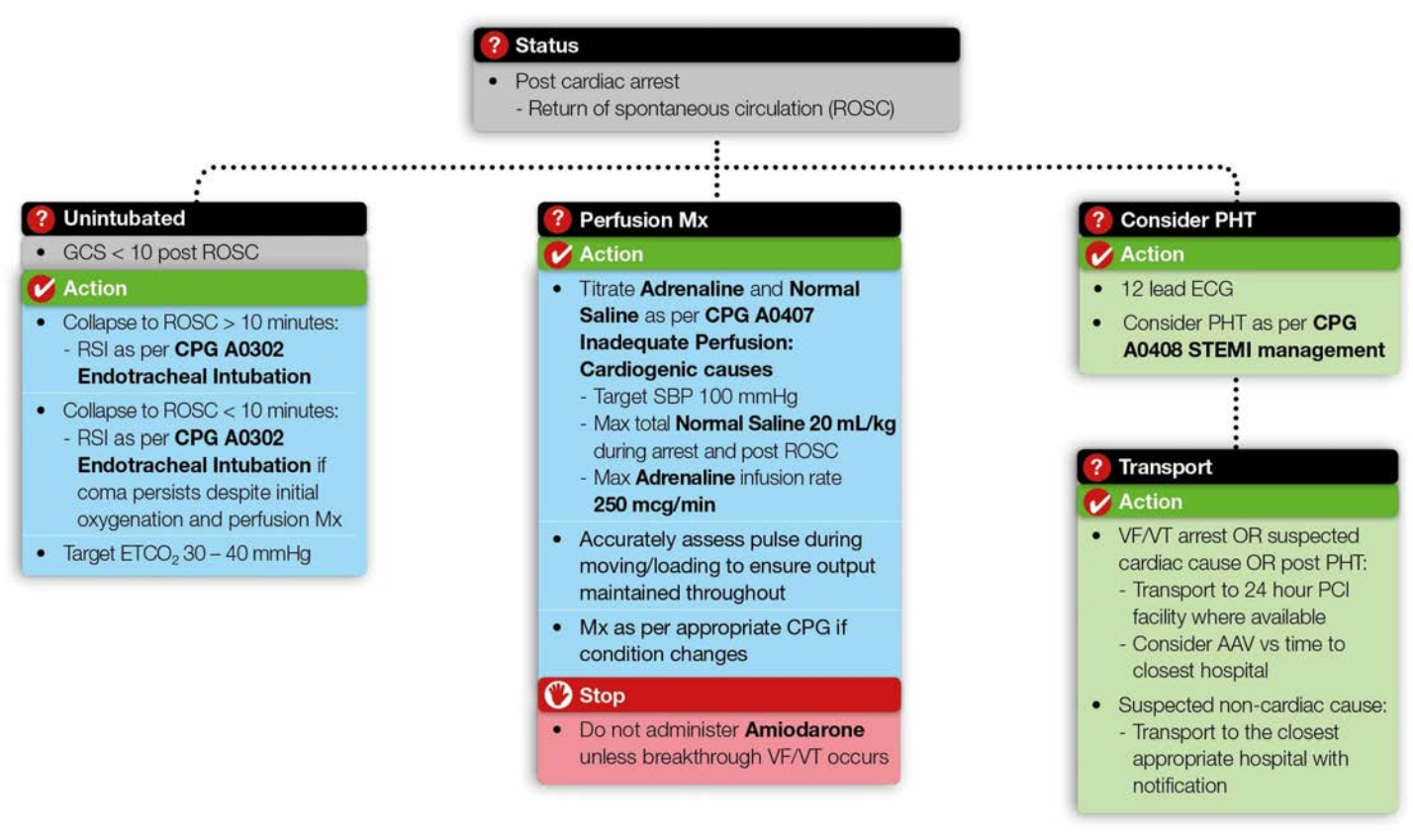
General Notes

- 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:
  - **Ketamine 50 – 100 mg IV every 1-2 minutes** (no max. dose).
  - No IV access: **Ketamine 200 mg IM** (single dose).
  - Consider the patient's weight and severity of symptoms to determine dose.
  - Consider a half dose if the patient is shocked.

Flowchart

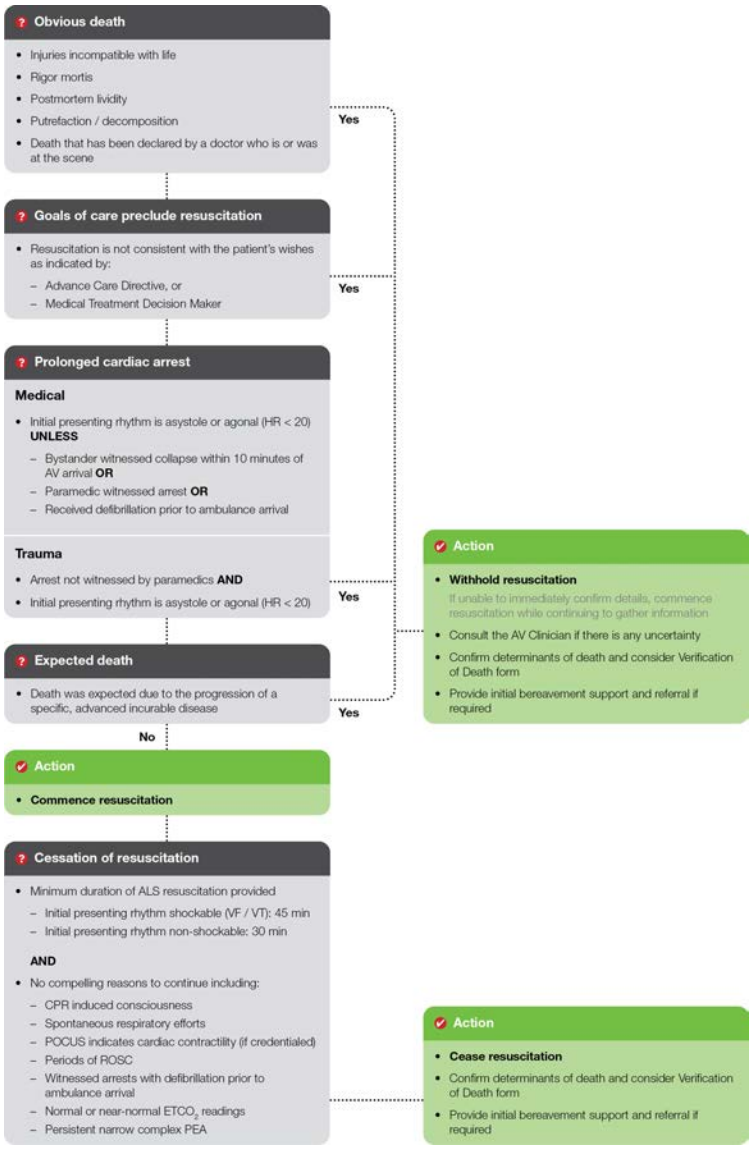


Related Resources

- 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

Withholding or Ceasing Resuscitation CPG A0203-1

Flowchart



Care Objectives

- Identify patients who will not benefit from resuscitation or where there is a legal requirement to withhold resuscitation
- Provide guidance for the cessation of resuscitation following an unsuccessful resuscitation attempt

Intended patient group

- Patients aged ≥ 16 years presenting in medical or traumatic cardiac arrest

General Notes

Withholding resuscitation

- Where it is unclear whether to withhold resuscitation, commence resuscitation while continuing to gather information through history taking, reviewing medical documentation (if available), and visual observations.

Obvious death

- Obvious death is characterised by any of the following:
  - Injuries where survival is impossible (e.g. decapitation, incineration, cranial destruction, hemicorporectomy)
  - Rigor mortis
  - Postmortem lividity
  - Putrefaction / decomposition
  - Death that has been declared by a doctor who is or was at the scene

Advance Care Directives

- Paramedics have a legal obligation and duty of care to act in accordance with an Advance Care Directive (ACD) or the decisions of a medical treatment decision maker.
- A paramedic may provide or withhold treatment based upon the patient's wishes as recorded on an ACD 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 ACD 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.
- Please note: The law permits provision of medical treatment in an emergency (e.g. resuscitation), without consent, to a person who does not have decision-making capacity. Emergency treatment should not be delayed while searching for an ACD (or a medical treatment decision maker), but a health practitioner must comply with a known ACD.
  Except in circumstances where:
  - The ACD instructs a health care professional to provide medically futile or unethical treatment,

  or
  - The ACD instructs a health care professional to take action(s) that would go against their code of conduct,

  or
  - The ACD cannot be readily and confidently understood and applied by the health care professional.

For more information, see The Victorian Office of the Public Advocate's A clinicians guide to medical decision making and **CPG A0111 Consent and Capacity**

Medical treatment decision maker

The medical treatment decision maker should be determined as per **CPG A0111 Consent and Capacity**.

Prolonged cardiac arrest

- Less than 1% of patients presenting to paramedics in an asystolic or agonal rhythm survive to hospital discharge. Resuscitation should only be commenced on this patient cohort if they have received prior defibrillation or are known to have a bystander witnessed collapse AND paramedics begin resuscitative attempts within 10 minutes of that collapse, or a paramedic witnessed arrest.
- Bystander CPR and/or normal temperature is not associated with increased survival in patients with asystolic or agonal rhythms and is not a compelling reason to commence or continue resuscitation.
- Patients who initially present to AV in asystole following traumatic cardiac arrest not witnessed by paramedics have a 0% survival rate. Commencing resuscitation is not indicated.

Initial presenting rhythm

- “Initial presenting 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.). If a patient has received defibrillation prior to AV arrival, the patient is assumed to have presented in VF / VT.
- Where patients present with Pulseless Electrical Activity (PEA), a heart rate < 20 is considered to be an agonal rhythm.
- The duration of resuscitation should be based on the initial rhythm rather than the rhythm the patient is presenting in at the time of deciding to cease resuscitation.

Expected death

- Patients who are at or near end-of-life are unlikely to benefit from resuscitation or life prolonging measures. In this patient cohort the risk of potential harm and suffering outweighs any chances of meaningful survival.
- Withhold resuscitation where the death was expected due to the progression of a specific, advanced incurable disease. There will often be a period of deterioration in the days or weeks leading up to death.
- Some patients may not have an ACD in place or the family may be unsure of the details.
- Consider consulting the AV Medical Advisor via the AV Clinician if there is uncertainty around the decision to withhold resuscitation (e.g. there are differences of opinion in a family around the patient’s treatment).
- Patients with significant functional decline and frailty or severe, life limiting co-morbidities may not meet the criteria for expected death or other criteria to withhold resuscitation.
  - In this circumstance, early cessation of resuscitation may be considered in consultation with the AV Medical Advisor via the AV Clinician. This is considered separately to frail patients where a medical treatment decision maker is available at scene to make an informed decision on behalf of the patient.

More information

- Patients with significant frailty or severe comorbidity rarely recover from cardiac arrest. This includes patients who are dependent on others for personal care (frailty score ≥ 7) or comorbidities such as severe COPD, chronic renal failure, advanced dementia.
- Current health legislation and AV policy support health practitioners, including paramedics,

in not offering or administering medically futile or non-beneficial treatments. However, these decisions are often complex and challenging and it is appropriate to continue resuscitative efforts while information is collected and consultation with the AV Medical Advisor occurs.

- While most patients with significant comorbidities will not have the physiological reserve to recover from resuscitation, some patients may benefit from resuscitation such as a patient with renal failure who is receiving dialysis awaiting kidney transplant.

Voluntary Assisted Dying

- In Victoria, patients with a terminal diagnosis may choose to undertake Voluntary Assisted Dying (VAD).
- The medication used leads to deep sedation and respiratory depression. In most patients, death from respiratory depression occurs within one hour after oral ingestion.
- Where 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 paramedics 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 VAD care navigator or patient's specialist VAD doctor. If this is unsuccessful, please contact the patient's palliative care team.
- For more information see the Victorian Department of Health's Voluntary Assisted Dying website.

Mass casualty incidents

- 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 guidance (**CPG F0026**) for patient assessment that may differ significantly from guidelines used in other situations.

Aeromedical

- Resuscitation efforts may be ceased during Air Ambulance transport when cardiac arrest occurs in the setting of severe injury, a quickly reversible cause for the cardiac arrest has been excluded (i.e. pneumothorax, cardiac arrhythmia) and it is not practical to continue chest compressions to hospital.

Communicating death, dying and comfort care

- If it is safe and appropriate to do so, you may offer to support a family member in viewing resuscitation efforts before they are discontinued.

More information

- Studies have shown that some people benefit from witnessing resuscitative efforts on their loved one. If someone elects to watch the resuscitation efforts, it is essential to pre-brief them and outline the expectation of how the scene looks, how the patient looks (they will not look like themself, they will appear deceased, they may have tubes and machinery attached to them) **prior** to them witnessing the resuscitation. Ensure all team members are aware that a family member will be viewing the resuscitation.
- Once the decision to withhold or cease resuscitation is made, the priority should be providing comfort care to the patient and their family. Paramedics should consult with relevant stakeholders such as family, palliative care services, VVED, and/or the AV Medical Advisor regarding further steps in providing comfort care through the dying process.

- Principles that can be used to communicate when a death has occurred include:
  - Speak slowly, clearly and concisely.
  - Clump information together in 1-3 sentences and leave a pause in between to help the receiver process the news.
  - Use the D- words to convey death “Death” “Dying” “Die” “Dead”. Avoid phrases such as “passed away” or “your loss”.
  - Content may need to be repeated several times
  - Use a non-judgemental approach as people may respond with a range of reactions.
  - Provide practical guidance on next steps
- AV staff can use the Palliative Care Advice Service (PCAS) for advice and support in navigating both expected and unexpected deaths. PCAS can also provide grief counselling to the family both whilst AV is on scene and at a later time.
- The SPIKES communication framework provides a helpful approach to conversations around death and dying.

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC paper - Withholding or Ceasing Resuscitation (Adult) 2.2.pdf
- CPG Walkthrough Video - Withholding or Ceasing Resuscitation

Verification of death

- Verification of Death refers to ‘establishing that a death has occurred after thorough clinical assessment of a body’.
- Registered 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 and Wellbeing 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.

Supra-Glottic Airway (SGA) CPG A0301

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

Endotracheal Intubation CPG A0302

Care Objectives

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

General Notes

Intended patient group

- Patient ≥ 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 administration in the setting of serotonin syndrome/hyperthermia.

Delayed Sequence Intubation (DSI)

- This pathway is intended for patients with respiratory failure and/or 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**.

- A Zoll and an EMMA capnograph (or a second Zoll as a last resort) must both be connected and functional prior to all intubations.
- Following intubation, if a waveform / reading is lost on one device, immediately check the other capnograph.

Waveform remains on second capnograph:

- **Leave ETT in situ**
- Troubleshoot faulty capnograph

Waveform lost on **both** devices:

- **Immediately remove ETT**
- **CPG A0303 Difficult airway guideline**

- Trouble shooting should include:
  - Check airway circuit for kinks and check monitor connections
  - Remove PEEP valve
  - Change disposable capnography sensor
  - Connect new capnograph (if immediately available)
  - Ensure the BVM pop-off valve is set to 'override' (valve closed).

The extremely combative patient

- Pre-RSI combativeness in TBI should be managed judiciously with analgesia as per CPG **A0501** / **P0501** 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

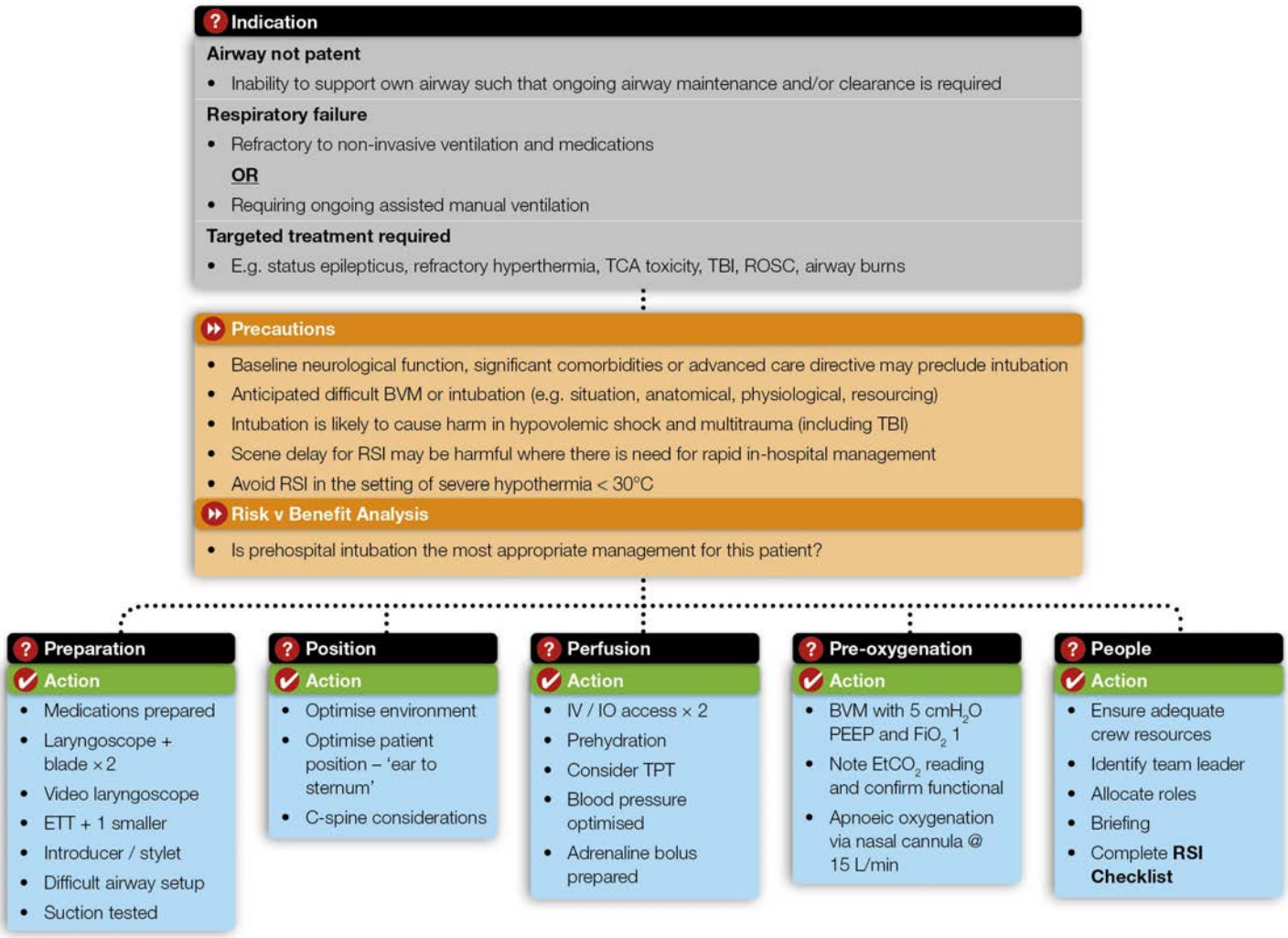
- In the absence of any precautions, Ketamine may be considered in the setting of severe hypertension BP > 180mmHg (e.g. asthma or severe pain aetiology such as burns).
- Ketamine is the ideal agent for RSI in patients with burns. Expect high BP in this patient group and manage with aggressive opioid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

Unassisted intubation

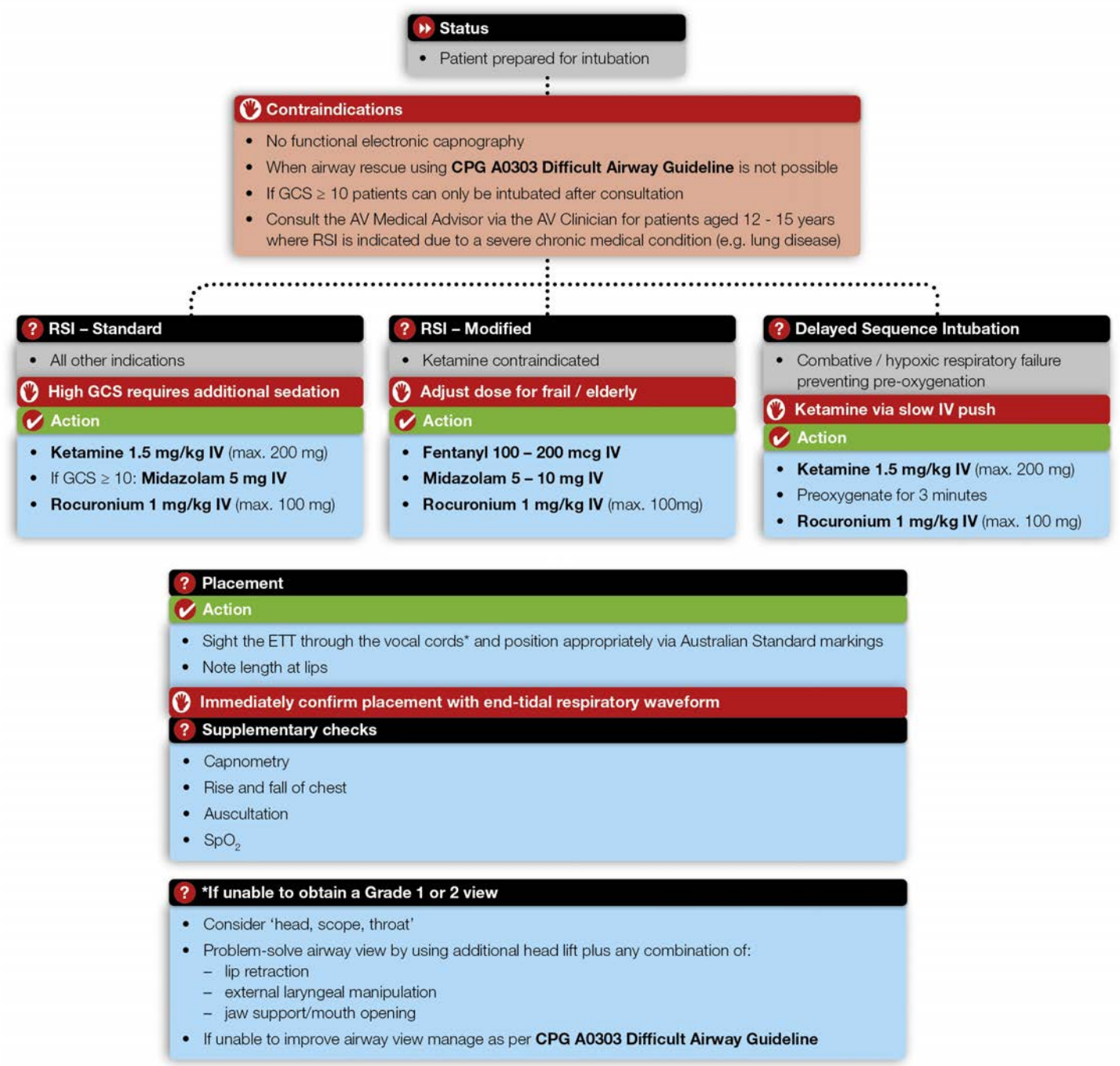
- Unassisted intubation is permitted in patients with a GCS of 3 where there are no airway reflexes present, excluding TBI / NTBI.
- Unassisted intubation is permitted in the setting of pre- and peri-arrest multi-trauma with TBI and no airway reflexes, however transport unintubated is preferred.

- 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



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/MAC CPG A0501-1 Hypersalivation management post ketamine (atropine).pdf

Difficult Airway Guideline CPG A0303

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.
- Paramedics should in general abide by the limitation of two intubation attempts. However a third attempt may be appropriate in the setting of:
  - Oxygen saturations can be maintained
  - There is an identified corrective intubation strategy (E.g. technique issues, airway visibility, insufficient ramping, equipment failure, etc.)

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.

Flowchart

Airway Maintenance CPG A0305

Care Objectives

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

General Notes

Intended patient group

- Patients aged ≥ 12 years requiring airway maintenance

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

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.
- Normal saline and inotropes/vasopressors may be used as per **CPG A0705 Shock**.

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 inotropes/vasopressors may be used to achieve SBP > 120 mmHg as per **CPG A0705 Shock**.

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.

General care

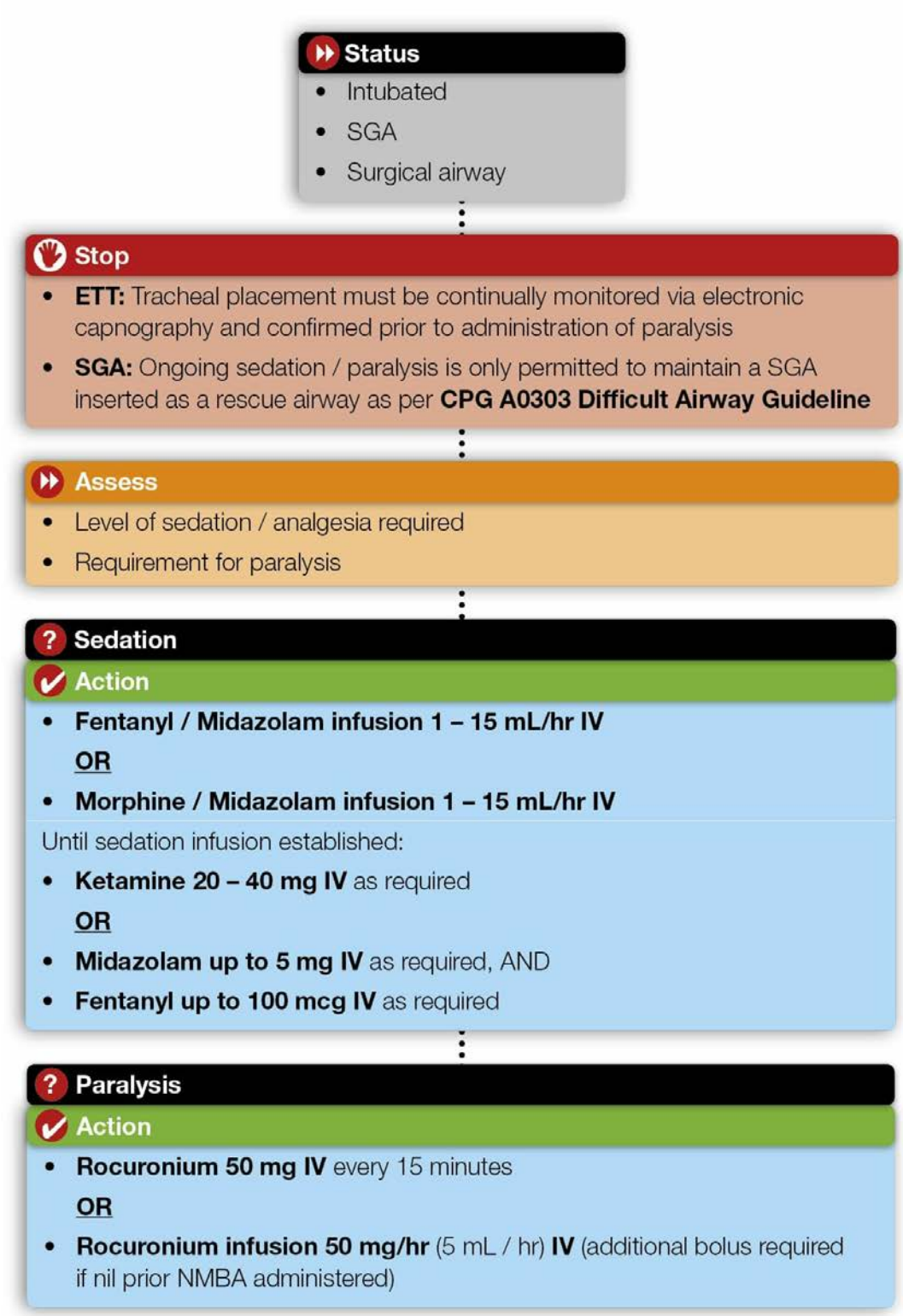
- Insert bite block (non-paralysed patients)
- Suction ETT and oropharynx
- Gastric decompression
- Consider disconnecting ETT circuit during transfer if clinically appropriate
- Reconfirm tracheal placement following each movement
- Monitor $ETCO_2$ using both the Zoll waveform capnography and EMMA capnograph.
- Position patient in a 30° head-up semi-recumbent position if clinically appropriate
- Check cuff pressure and ensure 20 – 30 cmH_2O
- Maintain normothermia unless otherwise indicated
- Monitor temperature using oesophageal probe where available
- Undertake the **Critical IHT Checklist** to ensure comprehensive patient care post intubation

Mechanical Ventilation

Adult Mechanical Ventilation Calculator

	Obstructive lung	Normal lung	Restrictive lung
	Acute bronchospasm, COPD, asthma		Pneumonia, aspiration, ARDS, bariatric, COVID
Mode	**SIMV** Volume-Control		
FiO_2	**1.0** Titrate to SPO_2 > 94 % (minimum FiO_2 0.4) *once clinically stable, stationary and the ventilator / ETT is secure.*		
Tidal Volume	**6 – 8 mL/kg**		
Rate	**6 – 8 / min** Titrate to blood pressure, AutoPEEP, $ETCO_2$ and PIPs	**12 – 15 / min** Titrate rate first, then V_T to target $ETCO_2$ 30 – 35 mmHg or as appropriate according to clinical condition	**> 18 / min** Titrate rate to target $ETCO_2$ 30 – 35 mmHg, only increase V_T above 6 mL/kg as last resort
	Rate is usually the primary method for adjusting Minute Volume **Blood gas analysis** should be used to guide ventilation settings where possible		
PEEP	**< 5 cmH_2O**	**5 cmH_2O**	**5 – 15 cmH_2O**
	Titrate according to clinical condition (max 15 cmH_2O)		
I : E	**1 : 6 – 8** cross-referenced with Rate and Inspiration time	**1 : 2 – 3** cross-referenced with Rate and Inspiration time	**1 : 1 – 1.5** cross-referenced with Rate and Inspiration time
Inspiration time	**1 – 1.5 seconds**		**Titrate to above I : E**
Considerations	**PIPs** may exceed 40 – 60 cmH_2O, particularly in acute asthma. **Accept hypercapnia.** Aim for a slow reduction in $ETCO_2$ **Monitor TPT** in the setting of persistent poor perfusion.	**Many critical patients are acidotic.** Does the patient require respiratory compensation and higher MVs? **$ETCO_2$ target** may change for specific conditions, such as TCA overdose.	**Avoid unnecessary disconnection / suctioning.** Optimal lung recruitment depends on continuous airway pressure. **Mild hypercapnia** is acceptable in restrictive lung patients without brain injury. **Severe multi-trauma**: Where combined TBI & chest injury, blood pressure preservation outweighs normalisation of $ETCO_2$ or blood gases.
Spontaneously ventilating	**Ensure** triggering and sensitivity accurately captures breaths **Sedation must be adequate to avoid asynchrony** **Pressure support (5 – 10 cmH_2O)** titrated to expected V_T and compliance **Monitor** for ventilator synchrony and MV		

Flowchart


Status
Intubated
SGA
Surgical airway
Stop
ETT: Tracheal placement must be continually monitored via electronic capnography and confirmed prior to administration of paralysis
SGA: Ongoing sedation / paralysis is only permitted to maintain a SGA inserted as a rescue airway as per CPG A0303 Difficult Airway Guideline
Assess
Level of sedation / analgesia required
Requirement for paralysis
Sedation
Action
Fentanyl / Midazolam infusion 1 – 15 mL/hr IV
OR
Morphine / Midazolam infusion 1 – 15 mL/hr IV
Until sedation infusion established:
Ketamine 20 – 40 mg IV as required
OR
Midazolam up to 5 mg IV as required, AND
Fentanyl up to 100 mcg IV as required
Paralysis
Action
Rocuronium 50 mg IV every 15 minutes
OR
Rocuronium infusion 50 mg/hr (5 mL / hr) IV (additional bolus required if nil prior NMBA administered)

Tracheostomy / Laryngectomy Airway Emergencies

CPG A0306

Flowchart

*If required as per **CPG A0001 Oxygen Therapy**

Care Objectives

- Secretion clearance

- Establish airway (stoma) patency
- Oxygenation +/- ventilation via the stoma

Intended patient group

- All patients with a tracheostomy or laryngectomy

Pathophysiology

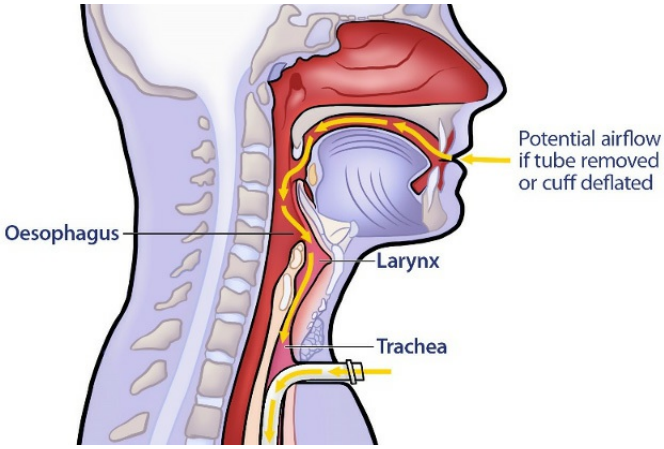
Tracheostomy

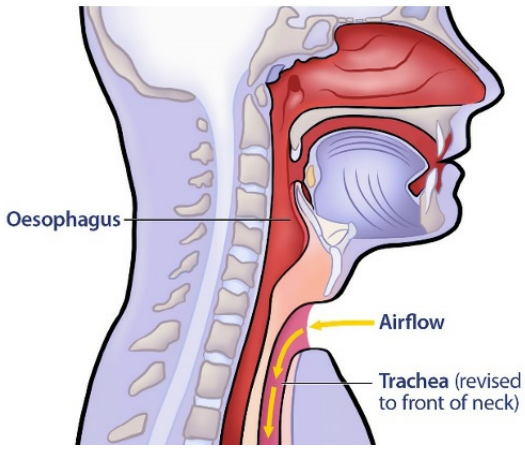
- A stoma is created through the neck to the trachea to form an airway below the larynx. The larynx remains intact.
- Tracheostomy patients can breathe through their stoma and potentially their mouth / nose to some extent.
- A tracheostomy tube +/- inner tube may be present.

Laryngectomy

Patients with a laryngectomy cannot be oxygenated, ventilated or intubated via the mouth.

- A stoma is created through the neck to the trachea to form an airway, however the larynx is completely removed. The trachea is only connected to the neck and stoma. Airflow from the mouth and nose into the trachea is impossible.
- Patients with a laryngectomy **cannot** be oxygenated, ventilated or intubated via the mouth.
- Usually, a tube will not be in situ. Other devices such as laryngeal buttons, heat-moisture exchangers (HME) or tracheo-oesophageal puncture ('TOP') speaking valves may be present.





Further information on tracheostomies, laryngectomies and tube types

Tracheostomy

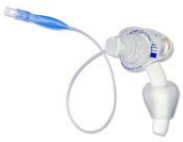
A tracheostomy stoma is a surgical opening in the neck and trachea. The larynx remains intact. A tracheostomy tube +/- inner tube may be inserted. Tracheostomy tube may or may not have a cuff and / or an above-cuff suction port. Tracheostomy patients potentially have two airways: they can breathe through their stoma and mouth / nose. Although the reason for the tracheostomy is that the mouth /nose airway is not enough to sustain life.

Tracheostomy tubes:

There are many different brands and tubes available usually held in situ by tape around the neck. The tube is usually made with a polyvinyl chloride (PVC), silicone, or polyurethane but some people with tracheostomies in the community may still have silver tubes.

Single lumen: Outer tube only. Holds tracheostomy open.

Double lumen: Outer tube within which sits a disposable inner/reusable tube (cannula). The inner tube can be easily removed for cleaning.



Cuffed tracheostomy tube with inner cannula

Uncuffed tracheostomy tube with inner cannula

Uncuffed or Cuffed: A cuff is a balloon attached to the base of a tracheostomy tube. Cuffed tubes are typically used for the mechanically ventilated patient, or for patient who cannot swallow. Cuffed tubes prevent air from escaping and aspiration. A cuff needs to be deflated whilst speaking valves are in-situ. Uncuffed tubes will in generally be sized to allow air to escape into the upper airway above the tracheostomy tube

The outer flange of the tracheostomy tube will have information regarding type and size.

Uncuffed tracheostomy tube with speaking value (Passe Muir)

Uncuffed tracheostomy tube

Inner cannula

Swedish nose (HME for tracheostomy tubes)

Fenestrated: Fenestrated tracheostomy tubes have holes or an opening that allow for movement of air into the larynx. When a speaking device (Passy Muir Valve) is placed on the end of a fenestrated tube, speech can be generated.

Laryngectomies

Laryngectomy patients also have a surgical opening in their neck and trachea, but unlike tracheostomy patient's, they have had their larynx removed. Their oropharynx is completely detached from their trachea.

They only have an airway via their tracheal stoma. Typically, a tracheostomy tube will not be in situ. Devices such as laryngeal buttons, Buchanan bibs, Voice prosthesis (not always visable as they are internal and on the posterior wall of the trachea) and HME (heat moisture exchangers) baseplates and filters could be insitu.

Buchanan Bib

Assessment

Tube or stoma occlusion

- Noisy breathing
- Blood / tissue / secretions around the stoma or tracheotomy tube if present
- Increased work of breathing (e.g. accessory muscle use, tracheal tugging)
- Agitation, tachypnoea, diaphoresis, pallor, hypoxia

Other complications

- A stomal review by a nurse consultant or other specialist may be required if any of the following are identified: red mucosa, granulated tissue, pain, bleeding, strong odour, exudate or swelling.

Management

- Patients and carers will frequently be familiar with the management of tracheostomy / laryngectomy emergencies. Consider their advice and follow any action plans that may be present.

Oxygen

The default route of oxygenation and ventilation in **all patients** should be the stoma.

- **Oxygen via the stoma:** Initially it may be hard to establish whether the patient has a laryngectomy or tracheostomy. Providing oxygen via both routes is recommended where the patient's history is uncertain. However, oxygen via the stoma is the priority as it is appropriate for both laryngectomy and tracheostomy patients.
- **Oxygen via the mouth:** If two sources of oxygen are available, a second mask should be added to the patient's face as some tracheostomy patients may benefit from oxygenation via a partially patent upper airway, especially if their tracheostomy is totally blocked.
- Supplemental oxygen should be administered if required as per **CPG A0001 Oxygen therapy** while the patient is being assessed and in between interventions such as suctioning.

Suction

- **Adult:** 10-12 FG Y catheter
- **Paediatric:** catheter size no more than half of the diameter of the tracheostomy or stoma.
- **Procedure:** Insert (> 10 cm) → apply continuous suction → slowly withdraw (< 10 seconds) (depth of insertion should be at least the length of the tracheostomy tube if present)

Full procedure: **CWI/OPS/193 Suction**

- The patency of the tracheostomy tube or stoma should be established by removing potentially blocked devices and passing a suction catheter. **Only remove devices as required to pass a suction catheter** (e.g. a cap, cover, speaking valve, HME filter and the inner tube of a dual lumen tube if it is present). Other devices such as the outer tracheostomy tube or laryngectomy tube (if present) should not be removed at this stage. Do not attempt to remove tracheoesophageal puncture valves / voice prosthesis embedded in the posterior tracheal wall.
- **Suction catheter can be passed:** suction as required. Frequent repeat suctioning may be required if there are copious secretions.
- Consider other causes for respiratory distress if the stoma/tube is patent.
- If the patient improves following the removal of a blocked inner tube, it can be flushed with normal saline and reinserted if required (e.g. to facilitate reattaching the patient to a ventilator or a BVM).

Unable to pass suction catheter

- The stoma or tube is likely to be totally blocked.
- If a tracheostomy tube is present, the tube may be displaced. If the tracheostomy tube has a cuff, deflating the cuff without removing the tube may partially correct the displacement and allow for spontaneous ventilation and oxygenation.
- Suction may be required following deflation as secretions collected above the cuff may be released into the lower airways.

No improvement / deterioration

- If unable to pass a suction catheter and cuff deflation has not led to improvement, the tracheostomy tube (if present) must be removed. Further attempts at troubleshooting are unlikely to be successful.

Apnoeic / cardiac arrest

- Ventilation / intubation should be attempted via the stoma.
- When ventilating through the stoma, assess for significant air leak through the mouth. If this is present the upper airway may be patent to some extent. BVM ventilation via the stoma is unlikely to be successful. Paramedics should attempt to cover the stoma with an occlusive dressing to achieve an airtight seal and manage the patient via the upper airway.

Related Resources

- Ventilation via the stoma
- CPG Walkthrough Video -Tracheostomy / laryngectomy airway emergencies
- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Tracheostomy and laryngectomy emergencies - March 2021.pdf

Acute Coronary Syndromes CPG A0401

Care Objectives

- Rapid identification of STEMI to facilitate timely reperfusion (PCI or PHT) is the primary goal of prehospital management.
- Provision of antiplatelet therapy (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 (NSTEACS) 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

Chest pain following mRNA vaccine

Some patients may experience chest pain 1 – 10 days following mRNA vaccine (Pfizer or Moderna). This is more common amongst males 12 – 29 years of age. It usually self resolves within 24-48 hours and is not

typically associated with more serious adverse outcomes. However, other serious underlying causes such as pulmonary embolism and myocardial infarction should be considered. Severe myocarditis is very rare but has been reported following mRNA vaccine. These patients will present with ECG changes and other concerning symptoms that would prompt transport regardless of cause.

There is no need to specifically identify severe myocarditis.

Patients with low pre-existing cardiovascular risk and no other concerning aspects to their presentation should be referred to their GP for assessment within 24 hours and do not need to be assessed in an emergency department. Myocarditis or pericarditis following mRNA vaccines can be identified following investigations by a GP.

This pathway should **NOT** be applied to COVID positive patients.

Chest pain (< 10 days following mRNA vaccine)

AND

Age < 35

Non-ischaemic chest pain

≤ 1 cardiovascular risk factors

Normal vital signs

Normal 12-Lead ECG

No other serious symptoms
SOB, syncope, dizziness

No Hx of coronary artery disease
AMI, CABG, PCI

No PHx PE / thromboembolic events

Refer to GP (24 hrs)

Provide patient with copy of ECG for GP

Provide safety netting information

Cardiovascular risk factors

Current smoker

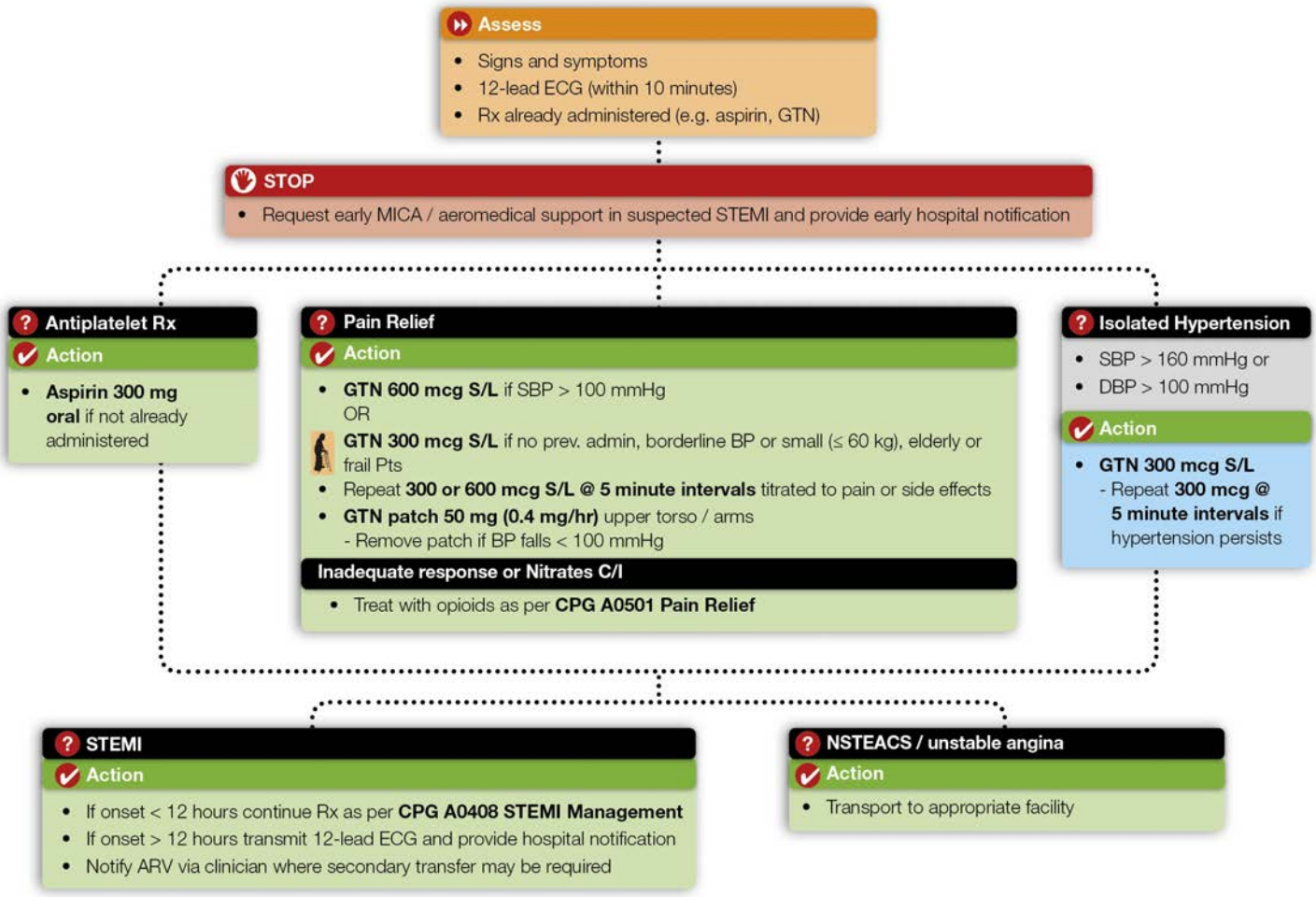
Diabetes

Hypertension

Hypercholesterolaemia

Family Hx of premature coronary artery disease
AMI, CABG, PCI

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

Bradycardia CPG A0402

Care Objectives

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

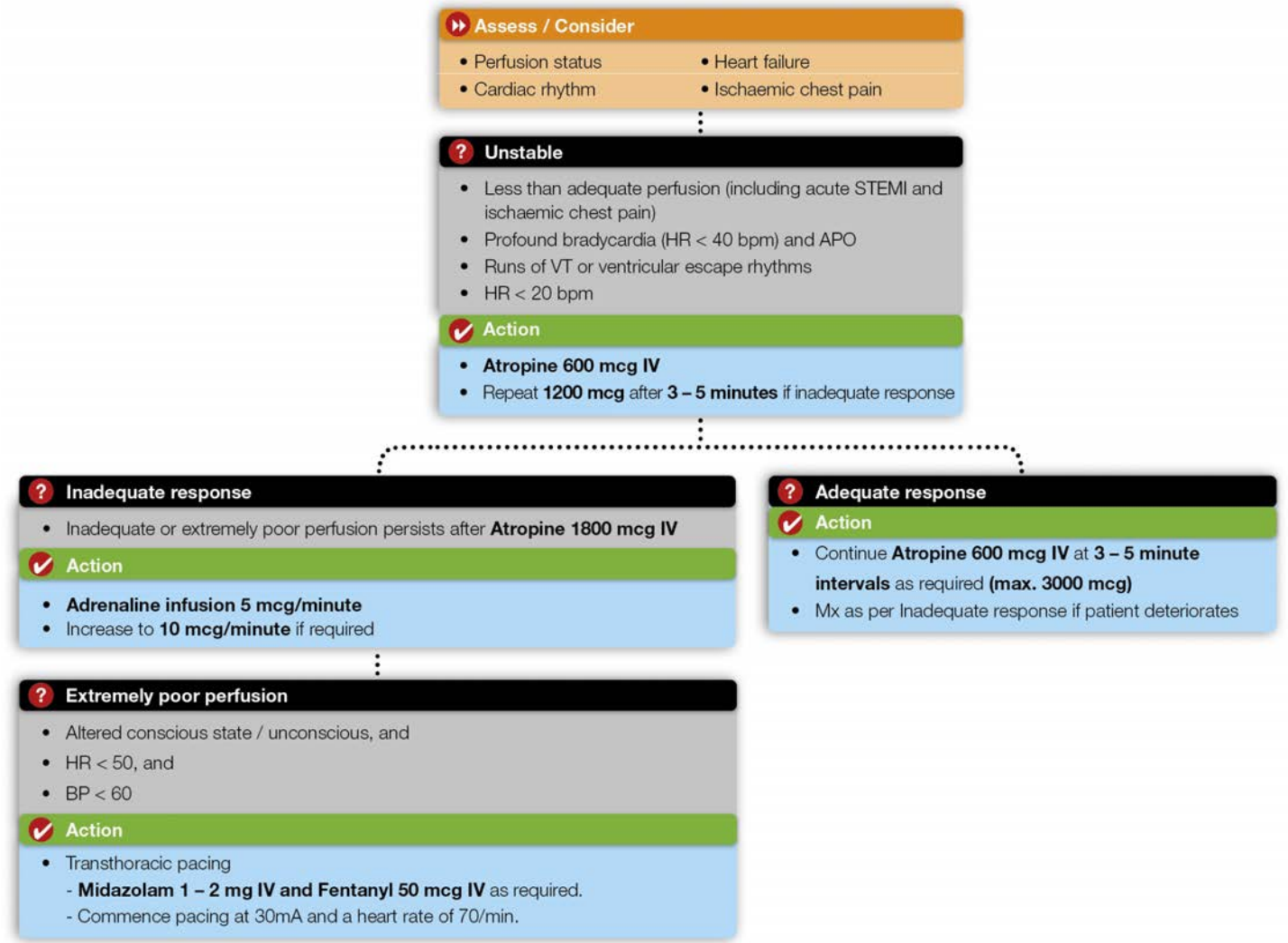
General Notes

- **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

Tachycardia (Narrow complex) CPG A0403

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.

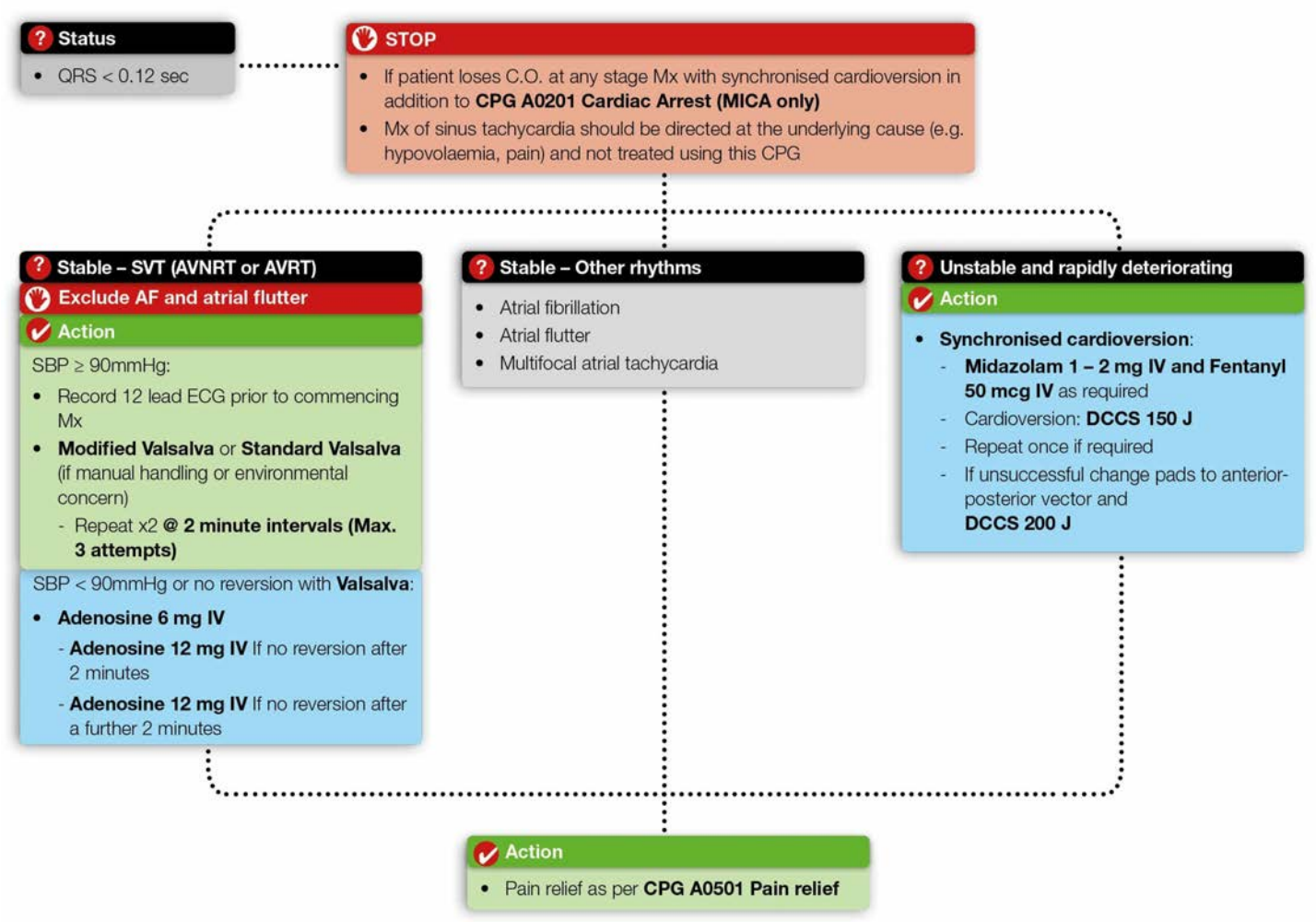
Standard Valsalva

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

Tachycardia (Broad complex) CPG A0404

Care Objectives

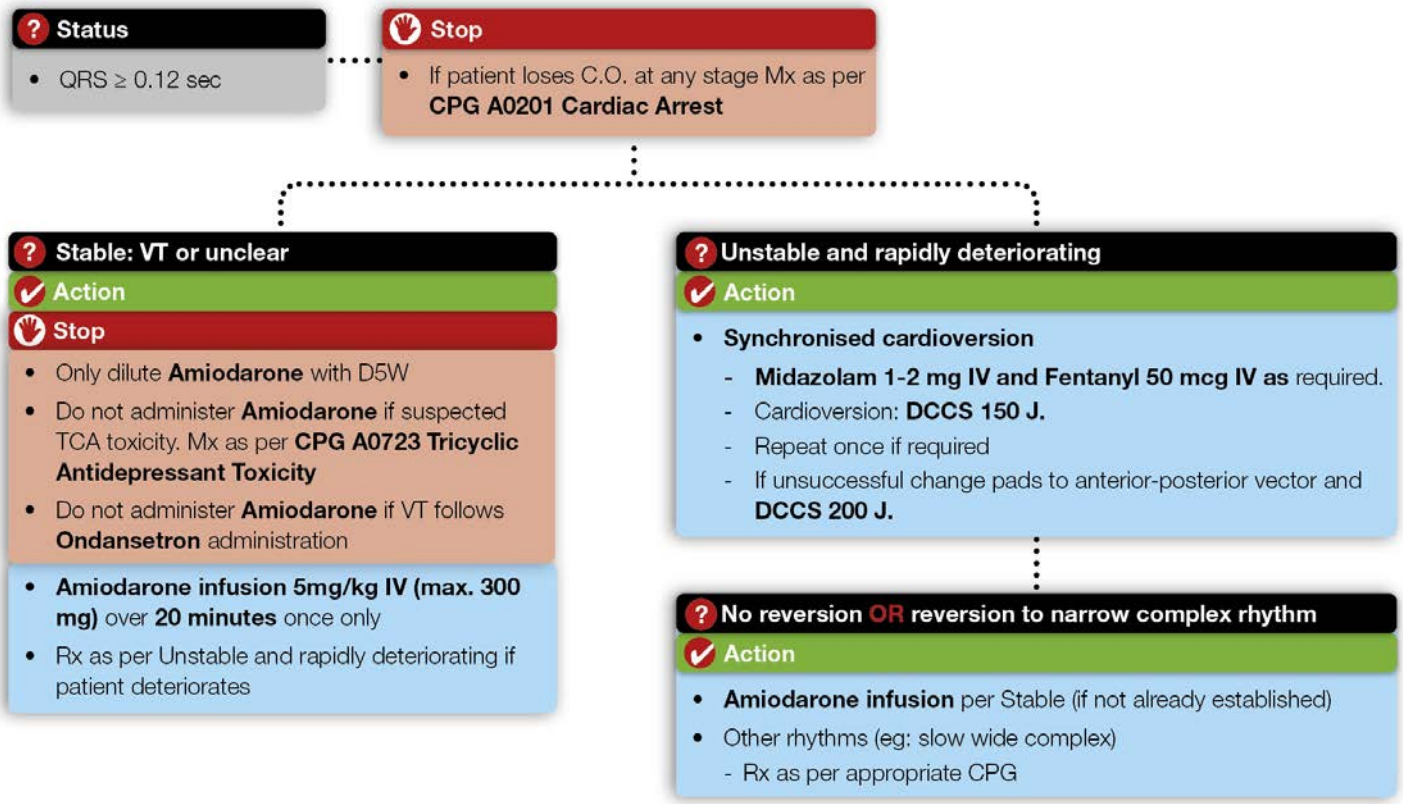
- Rapid termination of life threatening arrhythmias and transport to a facility capable of definitive care.
- Rapid transport to facilitate the treatment of the arrhythmia where treatment is not available in the prehospital environment.

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.

Tachycardia (Broad complex) CPG A0404

Flowchart



Related Resources

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

Pulmonary Oedema CPG A0406

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

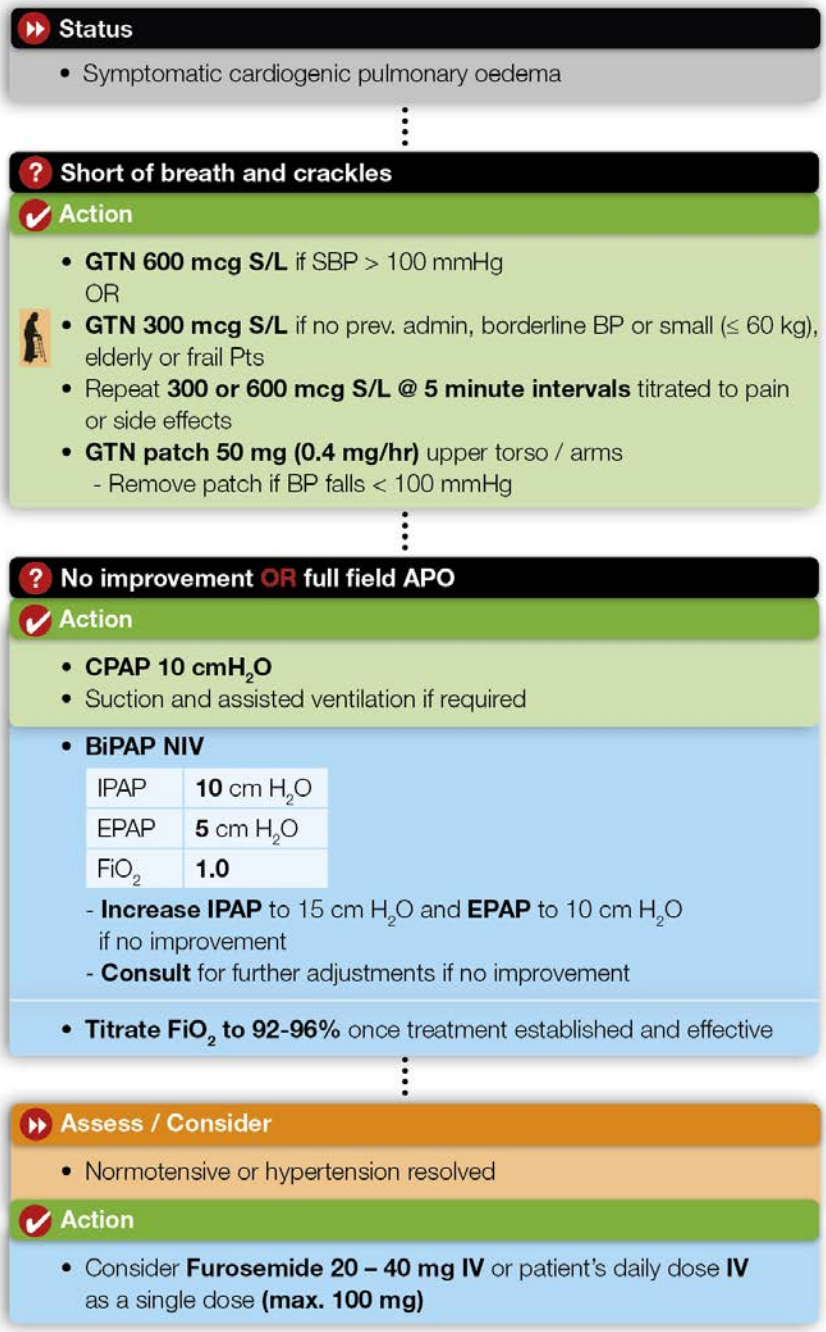
- **Cardiogenic APO:** This CPG is primarily directed at symptomatic cardiogenic pulmonary oedema, secondary to LVF or CCF. Other medical causes of pulmonary oedema should not be treated under this CPG. Asymptomatic APO does not require treatment.
- **Non-cardiac APO:** causes include smoke/toxic gas 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

Non-invasive ventilation

- The patient on BiPAP NIV must be continuously observed by at least one MICA Paramedic and any extrication/egress plan ***must*** incorporate this requirement as a priority.
- Indications for the removal of Bi-PAP or CPAP include:
  - Ineffective (cardiac/respiratory arrest, mask intolerance, decreasing respiratory effort, nil improvement after 1 hour of treatment)
  - Deteriorating vital signs
  - Risk to patient (loss of airway control, copious secretions, active vomiting, paramedic judgement of clinical deterioration)
- BiPAP should commence with a FiO_2 of 1.0. Once treatment efficacy and patient comfort/tolerance is established, the FiO_2 should be gradually titrated to normalise SpO_2 levels dependant on the patient's presentation and pathology.
- Consider NIV where intubation is clinically indicated but not possible due to an ACD specifically declining intubation. In this context, it may be applied even if the patient has a reduced level of consciousness that would usually contraindicate NIV.
- ALS Paramedic attends the patient first:
  - CPAP applied and effective: continue CPAP
  - CPAP applied and not effective: switch to BiPAP. It is reasonable to start at 10 cm H_2O of PEEP
- MICA Paramedic attends the patient first:
  - Apply BiPAP in the first instance as per the flowchart

Flowchart



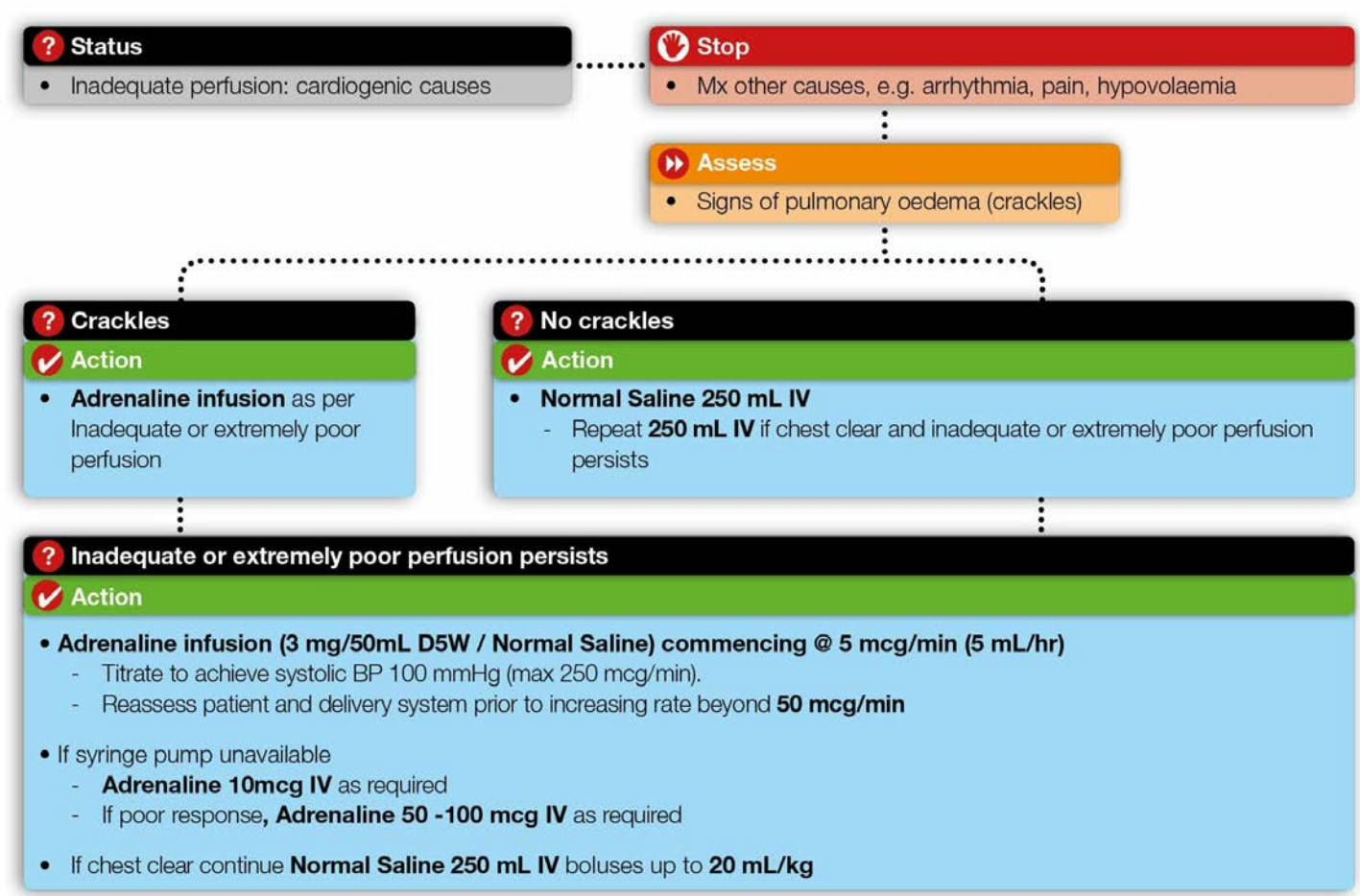
Related Resources

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

Inadequate Perfusion (Cardiogenic) CPG A0407

Stop and consider PANDA enrolment
Use metaraminol while assessing **eligibility criteria**.

Flowchart



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.

Stop and consider PANDA enrolment
Further Information

Use metaraminol as per **CPG A0705 Shock** to support blood pressure while assessing eligibility.

Inclusion criteria

Patient must be:

- Adults ≥ 18 years; AND
- Evidence of shock with an indication to commence vasoactive infusion as per **AV CPG A0705** and systolic blood pressure ≤90mmHg despite adequate filling; AND
- Suspected cardiac aetiology of shock

Exclusion criteria

Patient must not be any of:

- In traumatic, anaphylactic, or asthmatic shock
- Have a heart rate <50/min at assessment
- Dependent on others for daily activities
- An inter-hospital transfer OR receiving a vasoactive infusion prior to randomization
- If post-cardiac arrest, downtime before ROSC should not exceed 30 mins
- Known or suspected to be pregnant.

- **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.

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

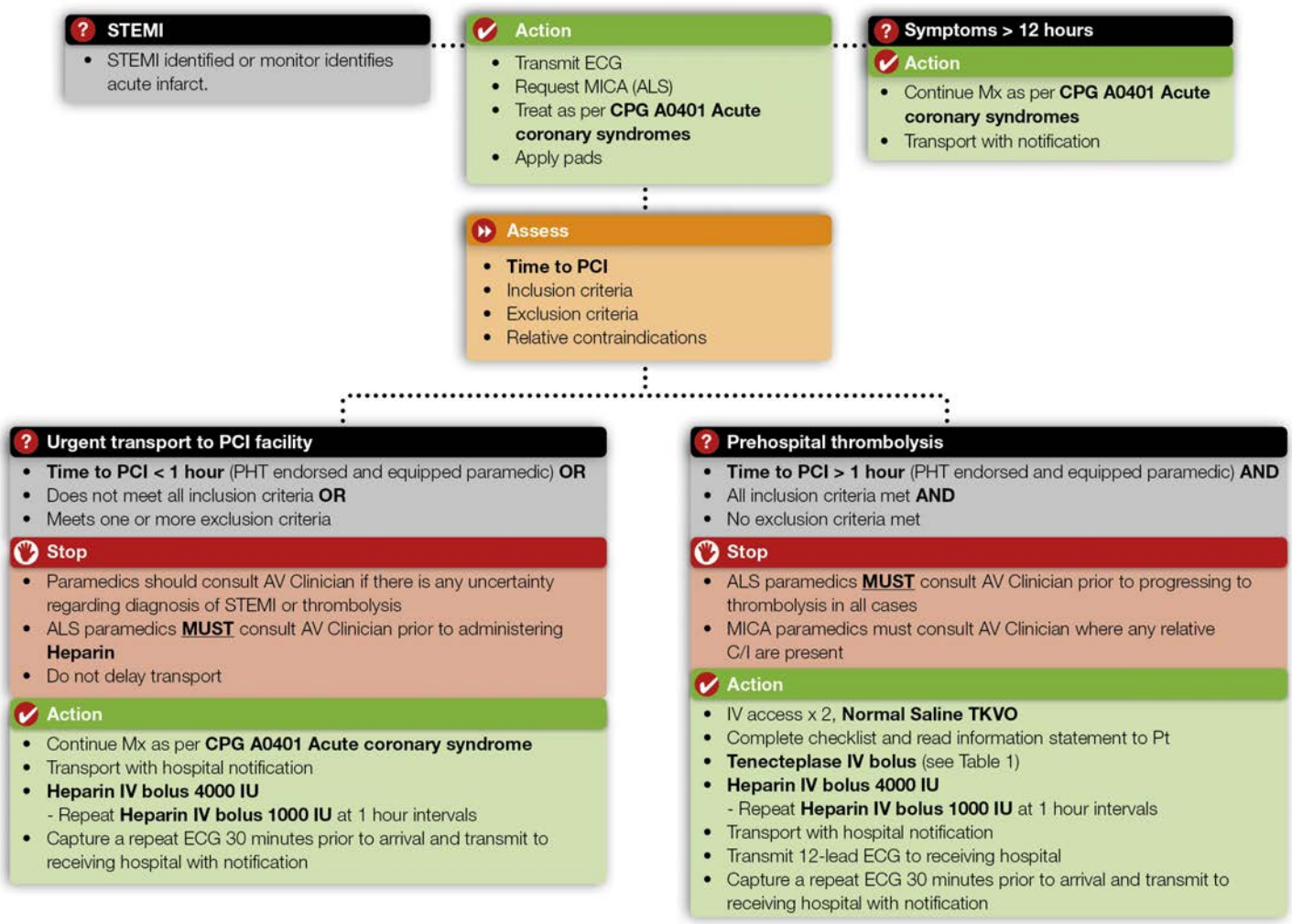
- The time to PCI facility is measured from the time at which the 12-lead ECG changes consistent with a STEMI are identified by a PHT endorsed and equipped paramedic.
- If a 12-lead ECG identifies a potential STEMI and the patient is eligible for thrombolysis, but the ALS paramedic believes the monitor's interpretation of the ECG is incorrect, the AV Clinician must be contacted. (ALS only. MICA please use clinical judgement and own ECG assessment skills independent of ECG monitor reading, however consult AV Clinician if needed.)

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.*

Flowchart



Tenecteplase Dose Table

Tenecteplase Dose (IV)			
Following consultation for Pts ≥ 75 years, the Tenecteplase dose MUST 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
≥ 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? • *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? • *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? • *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: • ≥ 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 AV Clinician** 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.

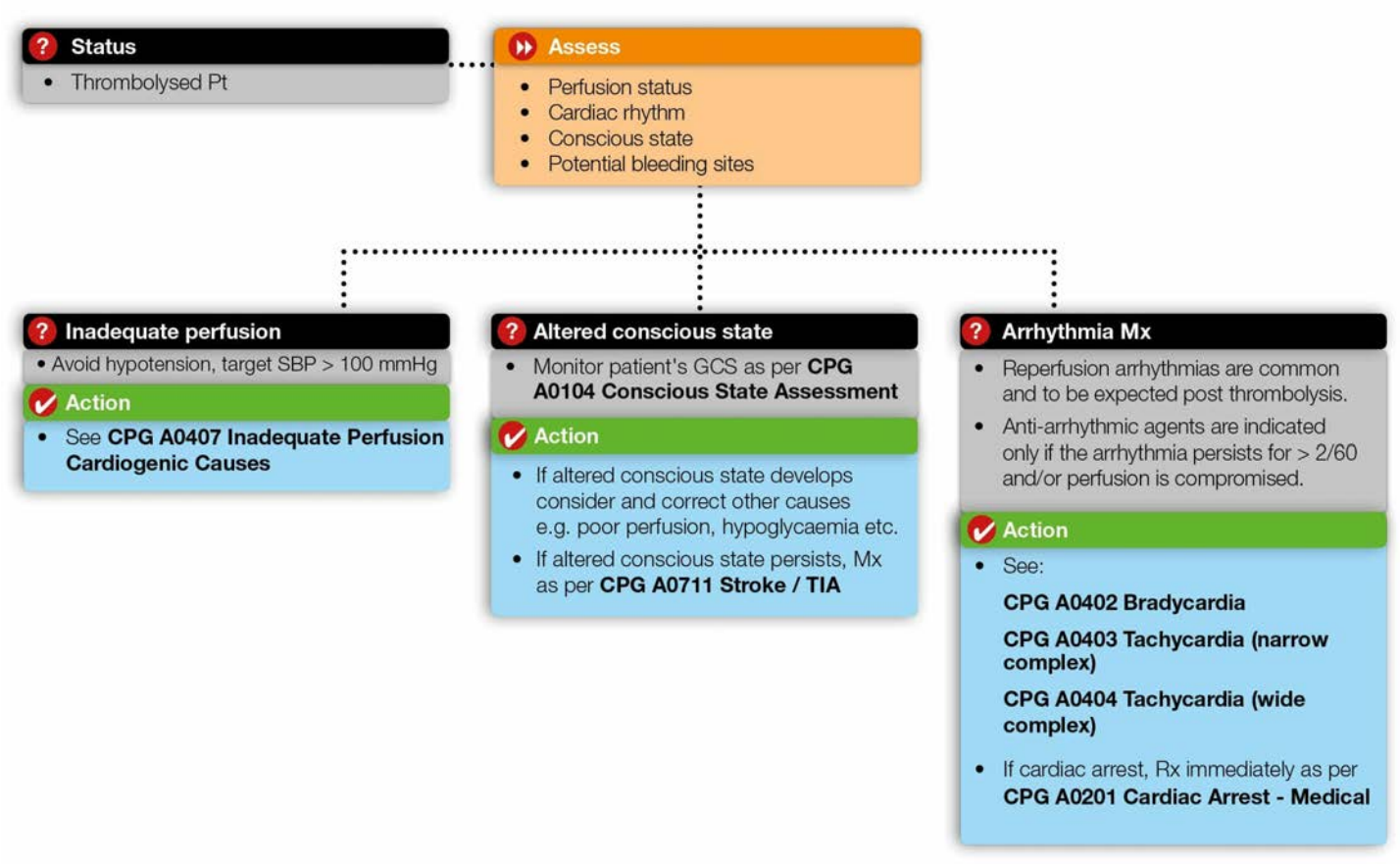
If the answer is yes to **ANY** relative contraindications, **call the AV Clinician prior to proceeding to thrombolysis.**

Post Thrombolysis Care CPG A0408

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


Status
Thrombolysed Pt
Assess
Perfusion status
Cardiac rhythm
Conscious state
Potential bleeding sites
Inadequate perfusion
Avoid hypotension, target SBP > 100 mmHg
Action
See CPG A0407 Inadequate Perfusion Cardiogenic Causes
Altered conscious state
Monitor patient's GCS as per CPG A0104 Conscious State Assessment
Action
If altered conscious state develops consider and correct other causes e.g. poor perfusion, hypoglycaemia etc.
If altered conscious state persists, Mx as per CPG A0711 Stroke / TIA
Arrhythmia Mx
Reperfusion arrhythmias are common and to be expected post thrombolysis.
Anti-arrhythmic agents are indicated only if the arrhythmia persists for > 2/60 and/or perfusion is compromised.
Action
See:
CPG A0402 Bradycardia
CPG A0403 Tachycardia (narrow complex)
CPG A0404 Tachycardia (wide complex)
If cardiac arrest, Rx immediately as per CPG A0201 Cardiac Arrest - Medical

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:

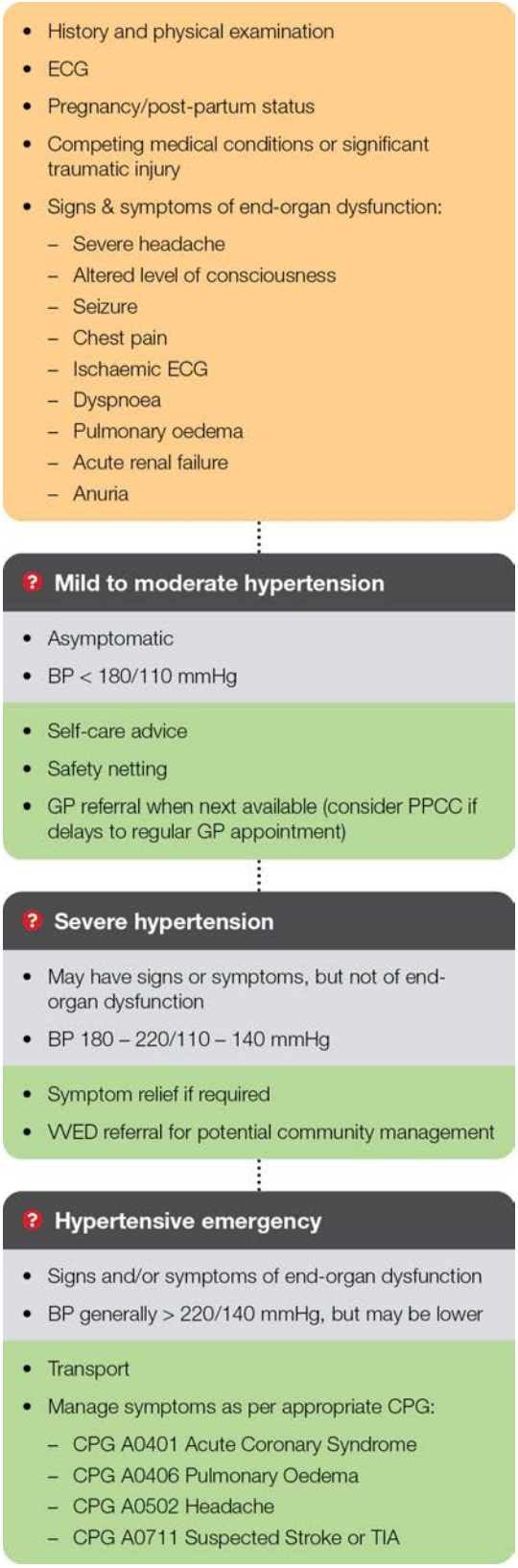
"Your ECG (heart tracing) shows that you are having a heart attack. The best treatment for you right now is a clot dissolving drug called Tenecteplase, and the sooner you receive this medication, the lower your risk of long-term, severe heart muscle damage.

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."

Flowchart


History and physical examination
ECG
Pregnancy/post-partum status
Competing medical conditions or significant traumatic injury
Signs & symptoms of end-organ dysfunction:
– Severe headache
– Altered level of consciousness
– Seizure
– Chest pain
– Ischaemic ECG
– Dyspnoea
– Pulmonary oedema
– Acute renal failure
– Anuria
Mild to moderate hypertension
Asymptomatic
BP < 180/110 mmHg
Self-care advice
Safety netting
GP referral when next available (consider PPCC if delays to regular GP appointment)
Severe hypertension
May have signs or symptoms, but not of end-organ dysfunction
BP 180 – 220/110 – 140 mmHg
Symptom relief if required
VVED referral for potential community management
Hypertensive emergency
Signs and/or symptoms of end-organ dysfunction
BP generally > 220/140 mmHg, but may be lower
Transport
Manage symptoms as per appropriate CPG:
– CPG A0401 Acute Coronary Syndrome
– CPG A0406 Pulmonary Oedema
– CPG A0502 Headache
– CPG A0711 Suspected Stroke or TIA

Care Objectives

- Identify patients suffering from hypertension and the severity.
- Symptomatic management as required.
- Plan care pathway appropriate to patient's condition and risk profile.

Intended patient group

- Patients ≥ 16 years of age with hypertension as their primary presenting complaint.
- Patients who are pregnant or immediately post-partum are excluded from this guideline
  - Refer to **CPG M0202 Pre-Eclampsia / Eclampsia** for this patient group

Overview

- Hypertension is an important and readily treatable cause of cardiovascular morbidity and mortality.
- A hypertensive emergency occurs when blood pressure is severely elevated (> 220/140 mmHg) and there is identifiable end-organ dysfunction, such as heart failure, pulmonary oedema, myocardial infarction, aortic aneurysm, renal failure, or neurological dysfunction.
- Asymptomatic or minimally symptomatic hypertension is generally safely managed within a community setting
- 1 in 3 Australians currently suffer from hypertension, with 1 in 5 Australians suffering from uncontrolled hypertension
  - Hypertension is more common in men and most common in the lowest socioeconomic areas of Australia
  - Aboriginal and Torres Strait Islander people are more likely to suffer from hypertension than non-Aboriginal and Torres Strait Islander people

Assessment

History

- Patients with hypertension may often present asymptomatic; but specific symptoms can suggest complications requiring further out-patient investigations.
- Blood pressure
  - Previous measurements, current or past antihypertensive medications, medications influencing blood pressure
- Risk factors:
  - Family or personal history of kidney disease, hypertension, diabetes, dyslipidaemia, stroke,

early onset coronary heart disease

- Symptoms related to secondary hypertension:
  - Sleep apnoea (obesity, snoring, daytime sleepiness)
  - Hypokalaemia (muscle weakness, cramps, arrhythmia)
  - Phaeochromocytoma (frequent headaches, sweating, palpitations)
  - Thyroid disease

Medications influencing blood pressure

A variety of medications (prescribed and non-prescribed) used by patients may influence blood pressure and can interfere with antihypertensive medications.

See table

Medication	Impact on blood pressure
NSAIDs	↑
Sympathomimetics (e.g., decongestants, cocaine)	↑
Stimulants (e.g., methylphenidate, amphetamine)	↑
Alcohol	↑
Oral oestrogen contraceptives	↑
Hormone replacement therapy	↑ / ↓
Corticosteroids	↑
SNRIs (e.g., venlafaxine)	↑
MAOIs	↑
Bupropion	↑
Herbal supplements (e.g., bitter orange, ginseng)	↑
Caffeine pills or excessive caffeine intake	↑
Natural liquorice	↑
St John's Wort	Reduced efficacy of antihypertensives
Energy drinks	↑

Physical Examination

- Correct measurement of blood pressure as per **CWI/OPS/200** is essential for appropriate referral.
  - If an automated blood pressure measurement is used for initial identification of hypertension, confirm with a non-automated blood pressure measurement.
  - If the patient is initially found to be hypertensive and patient condition allows, repeat after 15 minutes of conversation, reassurance, relaxation, and assessment.

- Many patients with newly identified hypertension will require non-emergency laboratory investigations.
- Physical examination findings can assist with identifying end-organ damage associated with uncontrolled hypertension (most commonly the neurological, cardiovascular, and renal systems).
  - Neurological: Stroke/TIA, syncope, severe headache, altered neurological examination
  - Cardiovascular: Ischaemia on ECG, altered limb perfusion, signs or symptoms of heart failure
  - Renal: Reduced or absent urine production, haematuria, unexplained confusion, central and/or peripheral oedema
- Paramedics may receive referrals to emergency departments from general practitioners for reasons outside of those considered by this CPG. These patients should be transported regardless of measured blood pressure on paramedic arrival. These may include findings of:
  - Retinal haemorrhage
  - Proteinuria
  - Papilloedema
  - Abnormal measured laboratory values

Management

Mild to moderate hypertension

Referral

- If patient has no competing clinical priorities requiring ED care, they may be safely referred for an appointment with their own general practitioner as soon as feasible.
  - In patients with limited access or delayed access to a regular GP, consider referring the patient to a PPCC for earlier review.
- The importance of this follow-up should be emphasised with the patient, given the deleterious effects of uncontrolled hypertension (neurological, renal, and cardiovascular disease).

Self-care advice

- Dependent on a holistic assessment, paramedics may provide some general advice for patients with hypertension including:
  - Accumulate 150 - 300 minutes of moderate activity, or 75 - 150 minutes of vigorous activity, each week.
  - Reduce salt consumption to 6 g or less per day and consume five serves of vegetables and two serves of fruit daily.
  - Engage in smoking cessation programs if patient currently smokes.
  - For adults without high-risk drinking behaviours, consume no more than two standard drinks on any day and no more than four on one occasion.
- Further information for patients is available from Better Health Victoria

Safety netting

- Call 000 if patient develops:

- Chest pain
- Shortness of breath
- Severe headache
- Reduced or absent urine production
- Syncope or collapse

Severe hypertension

Referral

- If patient has no competing clinical priorities requiring ED care, consult with Victorian Virtual Emergency Department (VVED).

Self-care advice

- As per mild-moderate disposition

Safety netting

- Call 000 if patient develops:
  - Chest pain
  - Shortness of breath
  - Severe headache
  - Reduced or absent urine production
  - Syncope or collapse

Hypertensive emergency

- Requires urgent care in hospital.
- Provide care as per relevant CPG for any end-organ dysfunction identified on examination.
  - **CPG A0401 Acute Coronary Syndrome**
  - **CPG A0406 Pulmonary Oedema**
  - **CPG A0502 Headache**
  - **CPG A0711 Suspected Stroke or TIA**

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Hypertension.pdf
- Walkthrough video - Hypertension

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.
- **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 or frail 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.

Intranasal Administration

- In most cases, adding extra medication to prime the mucosal atomisation device is unnecessary, as the volume is clinically insignificant. When administering very small doses, consider adding 0.1 mL to account for dead space.
- Administer half of the dose into each nostril where possible to maximise absorption.
- Limit the volume of medication to a maximum of 1 mL per nostril per dose. Volumes exceeding 1 mL per nostril are not reliably absorbed and often result in medication runoff.

Monitoring

- Patients managed with methoxyflurane, fentanyl, morphine, or ketamine, require on-going pain assessments as well as monitoring for side-effects
- At a minimum, observations must be undertaken and documented every 15 minutes as per https://av-digital-cpg.web.app/assets/pdf/professional-standards/Patient Assessment Standards.pdf
- Minimum repeat assessments in the context of moderate-to-severe pain include:
  - Airway patency
  - RR, SpO_2, HR, BP
  - Sedation Assessment Tool (SAT) Score
- Where ketamine is used or in the event of inadvertent sedation (SAT < 0) following analgesia administration, in addition to the above, nasal $ETCO_2$ monitoring should be commenced, line-of-sight monitoring initiated, and consideration given to more frequent vital sign assessment

Managing side effects

- **Significant respiratory depression** due to opioids:
  - Titrate small doses of IV Naloxone as per **CPG A0722 Opioid toxicity**. 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

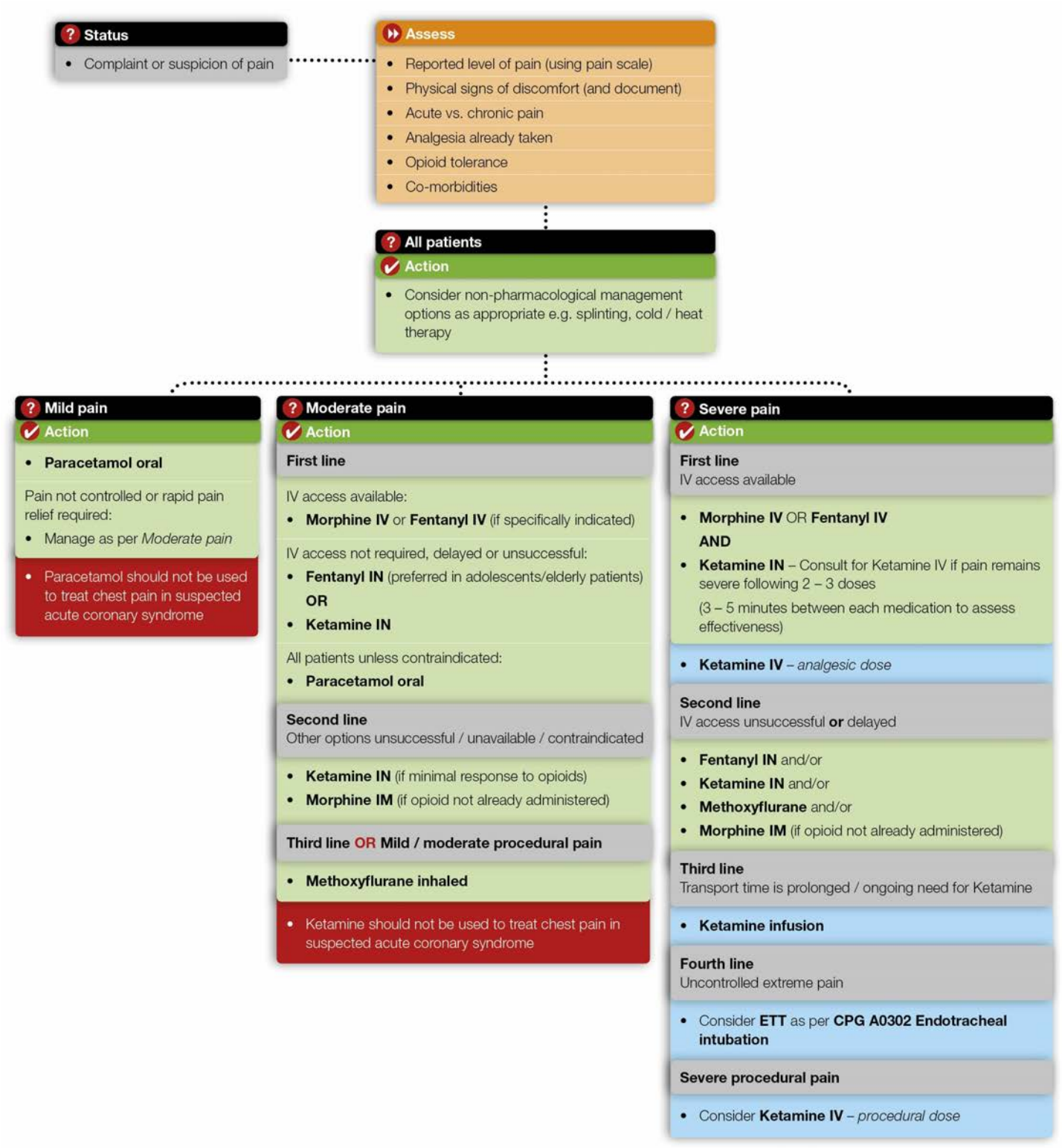
Supply issue

- 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.

Wilderness response paramedics

- Wilderness response paramedics who are appropriately trained and credentialed may provide additional analgesia as per **CPG AAV 05 Pain Relief – AAV**
- The minimum monitoring equipment standard for all patients receiving analgesia in remote and austere environments is:
  - manual blood pressure cuff,
  - stethoscope, and
  - pulse oximeter.

Flowchart


Status
Complaint or suspicion of pain
Assess
Reported level of pain (using pain scale)
Physical signs of discomfort (and document)
Acute vs. chronic pain
Analgesia already taken
Opioid tolerance
Co-morbidities
All patients
Action
Consider non-pharmacological management options as appropriate e.g. splinting, cold / heat therapy
Mild pain
Action
Paracetamol oral
Pain not controlled or rapid pain relief required:
Manage as per Moderate pain
Paracetamol should not be used to treat chest pain in suspected acute coronary syndrome
Moderate pain
Action
First line
IV access available:
Morphine IV or Fentanyl IV (if specifically indicated)
IV access not required, delayed or unsuccessful:
Fentanyl IN (preferred in adolescents/elderly patients)
OR
Ketamine IN
All patients unless contraindicated:
Paracetamol oral
Second line
Other options unsuccessful / unavailable / contraindicated
Ketamine IN (if minimal response to opioids)
Morphine IM (if opioid not already administered)
Third line OR Mild / moderate procedural pain
Methoxyflurane inhaled
Ketamine should not be used to treat chest pain in suspected acute coronary syndrome
Severe pain
Action
First line
IV access available
Morphine IV OR Fentanyl IV
AND
Ketamine IN – Consult for Ketamine IV if pain remains severe following 2 – 3 doses
(3 – 5 minutes between each medication to assess effectiveness)
Ketamine IV – analgesic dose
Second line
IV access unsuccessful or delayed
Fentanyl IN and/or
Ketamine IN and/or
Methoxyflurane and/or
Morphine IM (if opioid not already administered)
Third line
Transport time is prolonged / ongoing need for Ketamine
Ketamine infusion
Fourth line
Uncontrolled extreme pain
Consider ETT as per CPG A0302 Endotracheal intubation
Severe procedural pain
Consider Ketamine IV – procedural dose

Dose Table

Paracetamol

Oral

- **1000 mg**

OR

500 mg (< 60 kg / frail / elderly / malnourished / liver disease)

Methoxyflurane

Inhaled

- **3 mL**
  - Repeat **3 mL** if required (max. 6 mL)

Morphine

IV

- **Up to 5 mg** at **5 minute intervals**
  - ALS Consult after 20 mg
- As above – no max dose

IM

- **10 mg**
  - **Repeat 5 mg** after **15 minutes** if required (once only)

OR

0.1 mg/kg (< 60 kg / frail / elderly)
- No repeat dose

Fentanyl

IV

- **Up to 50 mcg** at **5 minute intervals**
  - ALS Consult after 200 mcg
- As above – no max dose

IN

- **100 mcg**
  - Repeat up to **50 mcg** at **5 minute intervals** if required (max. **400 mcg IN**)

OR

50 mcg (< 60 kg / frail / elderly)
- Repeat up to **50 mcg** at **5 minute intervals** if required (max. **200 mcg IN**)

IM

- **100 mcg**
  - **Repeat 50 mcg** after **15 minutes** if required (once only)

OR

1 mcg/kg (< 60 kg / frail / elderly)
- No repeat dose

Ketamine

IN

- **75 mg**
  - Repeat **50 mg** at **20 minute intervals**
  - No max dose

OR

50 mg (< 60 kg / frail / elderly)
- Repeat **25 mg** at **20 minute intervals**
- No max dose

IV – *Analgesic dose*

- Consult only
- **10 – 20 mg** at **5 – 10 minute intervals**

IV – *Procedural dose*

- Consider **20 – 30 mg** at **2 minute intervals** until patient is dissociated or analgesia is adequate

IV – *Infusion*

- **Ketamine infusion 0.1 – 0.3 mg/kg/hr**

Related Resources

- The Pain Management CPG **walkthrough video**
- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC250219_Intranasal Fentanyl.pdf
- 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/4.1.1 (5) Methoxyflurane MAC March 2021.pdf
- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC241211_Alpine Wilderness Pain Relief.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, post-stroke 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.

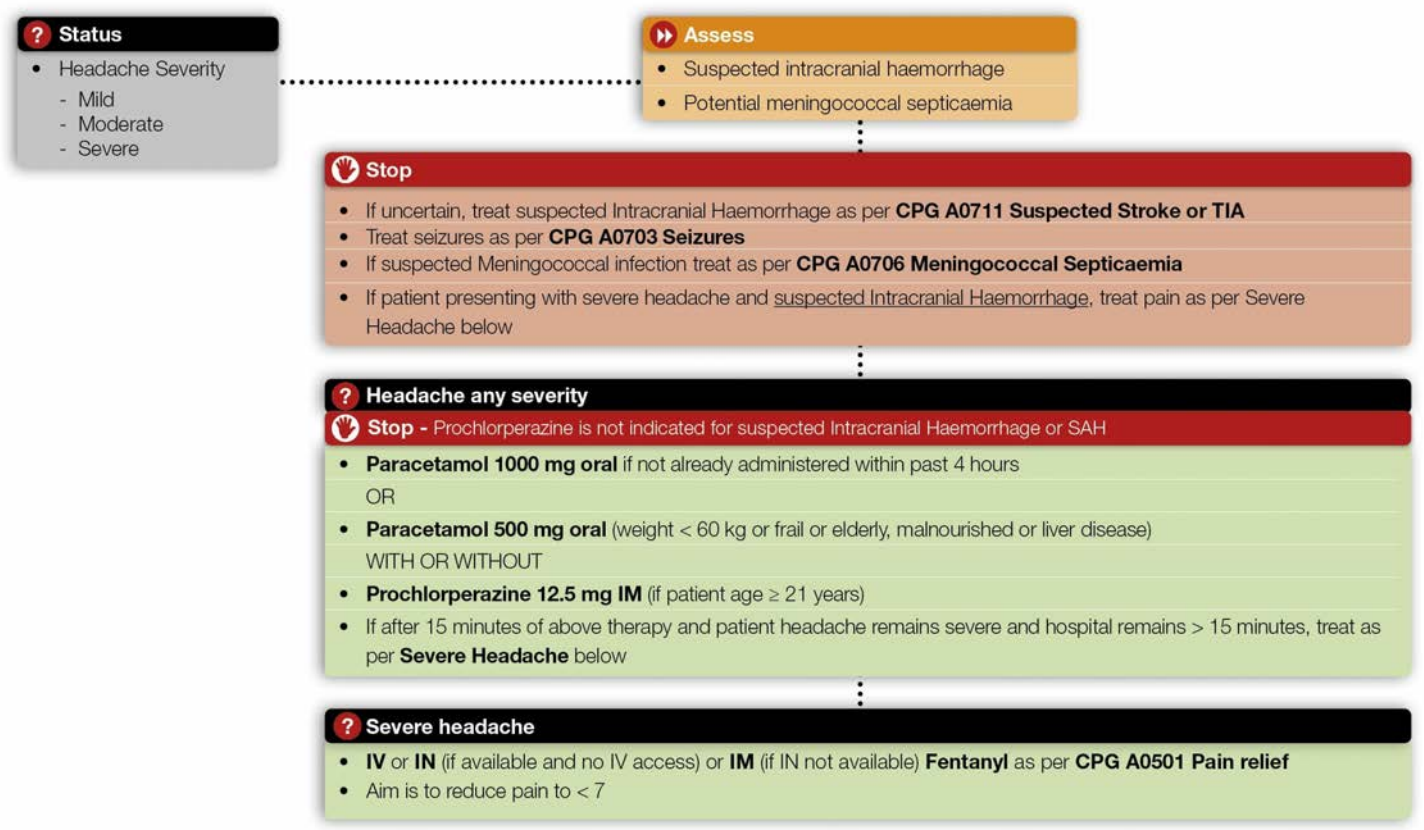
General Notes

- **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 a severe headache which is considered to be or previously diagnosed to be a 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 SpO_2 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.

  * In a major thunderstorm asthma event where delays to consult are likely, IV adrenaline for severe asthma unresponsive to IM adrenaline may be initiated by ALS paramedics. See dose information in the Flowchart.

Non-invasive ventilation

- **Contraindications (asthma):** altered level of consciousness.
- **Risks:** pneumothorax, drop in conscious state and/or respiratory failure
- **Monitoring:**
  - The patient on BiPAP NIV must be continuously observed by at least one MICA Paramedic and any extrication/egress plan must incorporate this requirement as a priority.
  - $ETCO_2$ monitoring must be commenced as soon as practicable.
- BiPAP should be viewed as a part of a comprehensive bundle of care, including an adrenaline infusion and other pharmacological interventions as required. Prepare to rapidly progress to RSI in any patient commenced on NIV for asthma.
- Severe asthma patients can deteriorate rapidly. In the period immediately following initiation (approx 10 minutes), one of three pathways are possible.

Deterioration	No change / small change	Improvement

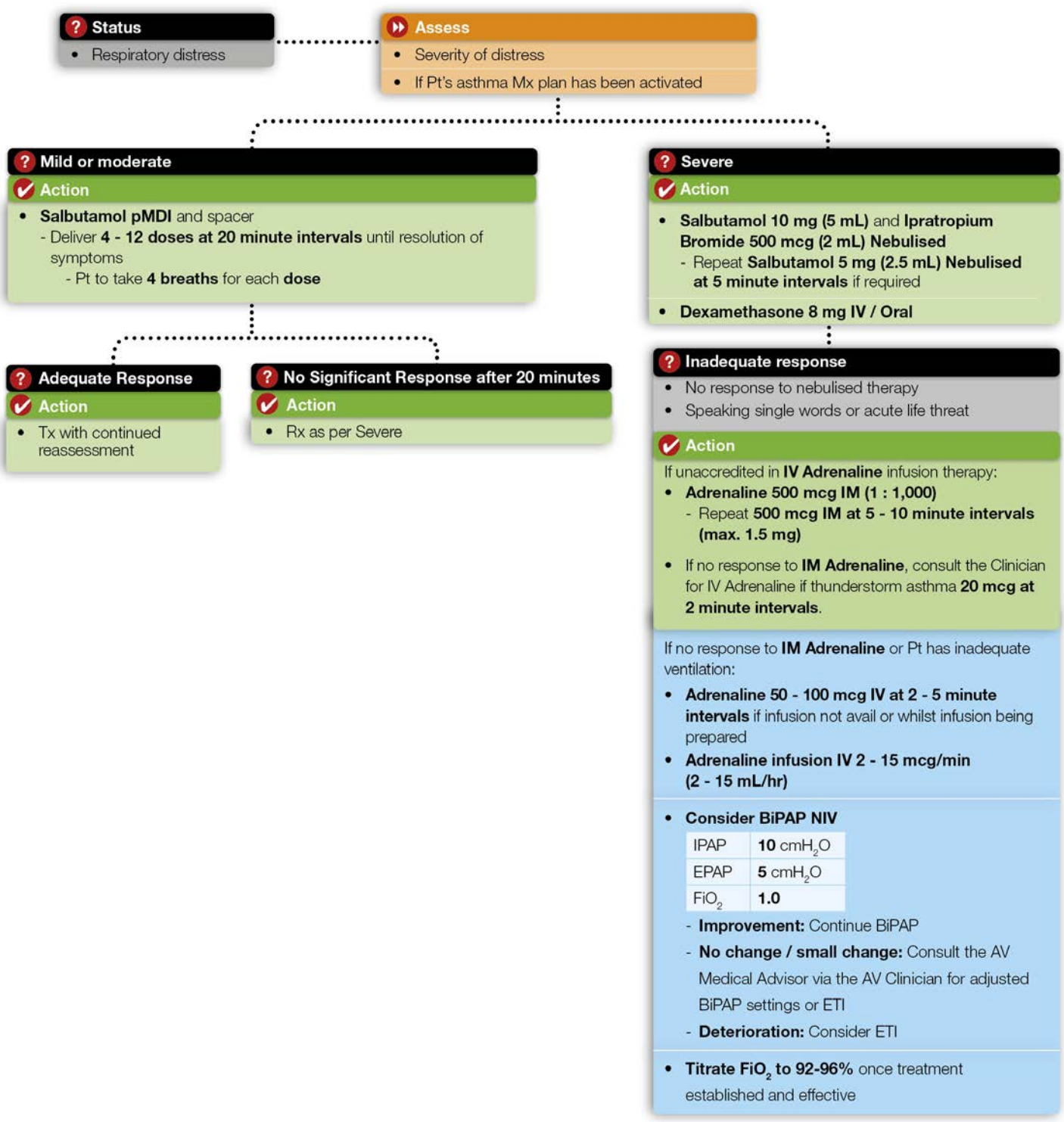
Remove BiPAP NIV Consider immediate intubation	Consult the AV Medical Advisor via the AV Clinician Options include: • Adjusting BiPAP settings • Intubation Due to the dynamic nature of this pathology including the risks of iatrogenic barotrauma and the impairment of venous return, changes to BiPAP settings should only be made following consultation.	Continue BiPAP

- **Signs of deterioration** (indications for removal of BiPAP)
  - Ineffective (cardiac/respiratory arrest, mask intolerance, decreasing respiratory effort, nil improvement in work of breathing)
  - Deteriorating vital signs
  - Risk to patient (loss of airway control, copious secretions, active vomiting, paramedic judgement of clinical deterioration)
- BiPAP should commence with an FiO2 of 1.0. Once treatment efficacy and patient comfort/tolerance are established, the FiO2 should be gradually titrated to normalise SpO_2 levels dependant on the patient's presentation and pathology.
- Consider NIV where intubation is clinically indicated but not possible due to an ACD specifically declining intubation. In this context, it may be applied even if the patient has a reduced level of consciousness that would usually contraindicate NIV.

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.
- Maintain a high index of suspicion for anaphylaxis in patients with a history of asthma or food allergy.

Flowchart



Related Resources

- National Asthma Handbook

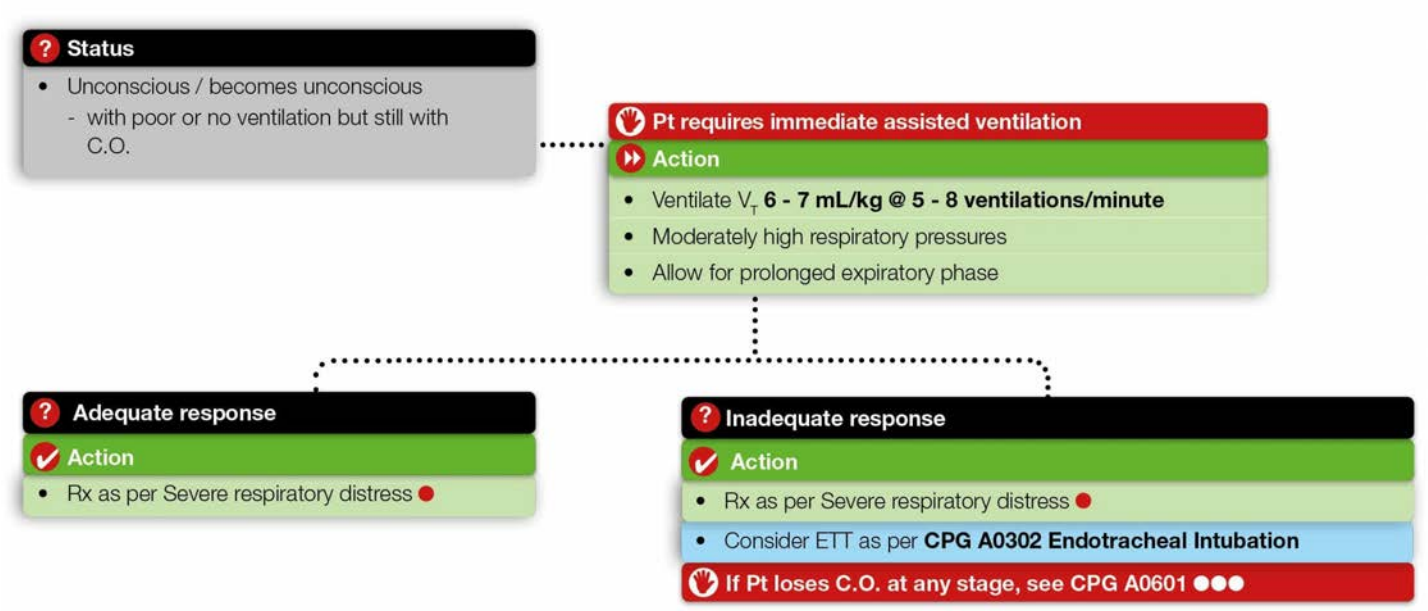
- VIDEO - IV adrenaline dilution for ALS
- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC April 2016 CPG A0601 P0602 Steroid use in AV.pdf

Unconscious (Asthma) CPG A0601

General Notes

- High $ETCO_2$ levels should be anticipated in the intubated asthmatic patient and are considered safe.
- Despite $ETCO_2$ levels, treatment should not be adjusted and managing ventilation should be conscious of the effect of gas trapping when attempting to reduce $ETCO_2$.
- 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

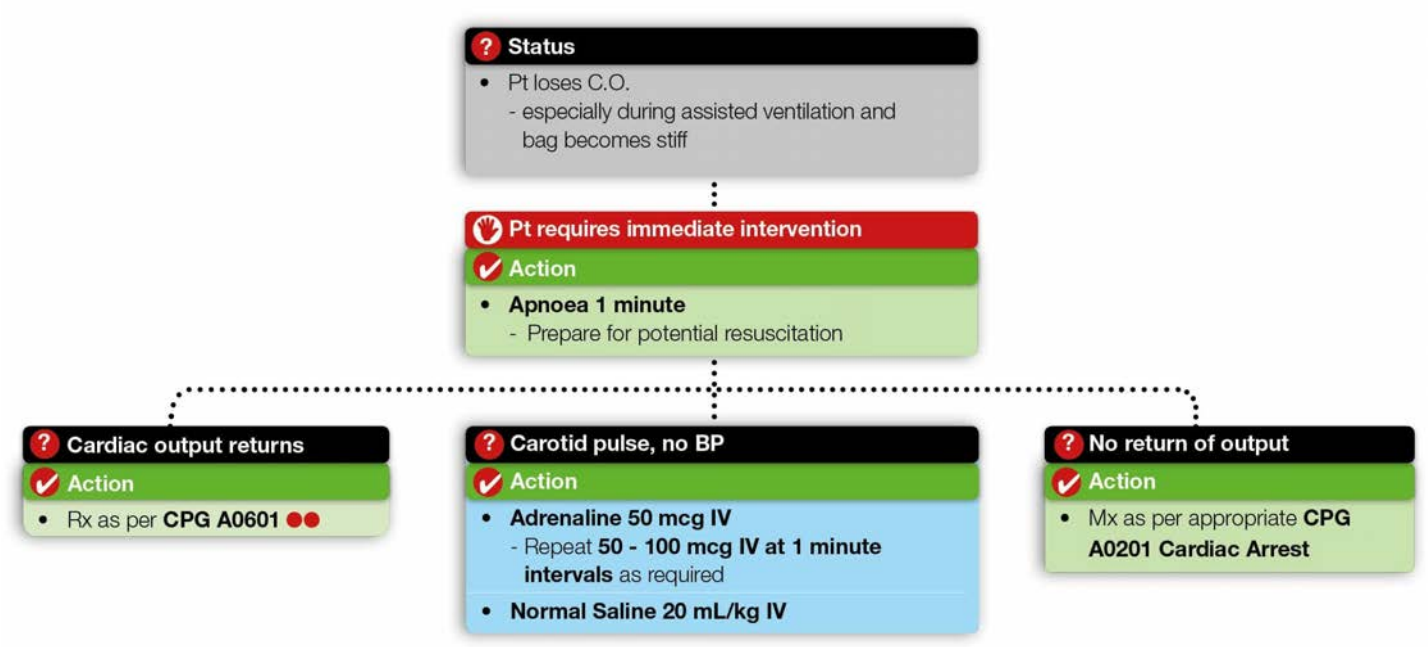


Loss of Cardiac Output (Asthma) CPG A0601

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



IV Adrenaline for ALS CPG F0015

Stop

ALS paramedics **MUST** consult with the clinician prior to drawing up and administering IV adrenaline in the following patients:

- severe asthma not responding to initial treatment **including at least one dose of IM adrenaline**, or
- orolingual oedema secondary to tPA administration in stroke.

In a thunderstorm asthma event, where MICA and the clinician are not available, ALS paramedics should initiate treatment.

Hypertension is not a contraindication in this setting.

Exercise caution in the elderly patient that may be having an exacerbation of COPD. IV adrenaline is **NOT** indicated for COPD.

Patients may deteriorate despite IV adrenaline. Do not delay transport.

Preparation:

1. Open an ampoule of adrenaline 1/1,000 (1 mg/1 mL) and draw up the whole 1 mL (1000 mcg) from this ampoule into a 10 mL syringe
2. Dilute this 1 mL with 9 mL saline to a total of 10mL giving a concentration of 100mcg/mL
3. Discard 9mL of this leaving 1mL and then draw up 9mL saline to a total of 10mL, giving a final concentration of 10 mcg/mL
4. Administer 2 mL (20 mcg) IV and if not improved repeat at 2 min intervals

VIDEO - IV adrenaline dilution for ALS

Dose:

Adrenaline 20 mcg (2 mL) IV
Repeat 20 mcg (2 mL) IV, 2 minutely as required*

*Patients with subtle improvements may still require IV adrenaline. Paramedics should only discontinue adrenaline where significant side effect occur or where the patient improves to speaking in full sentences (mild distress). Consult with the Clinician where there is any uncertainty.

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:

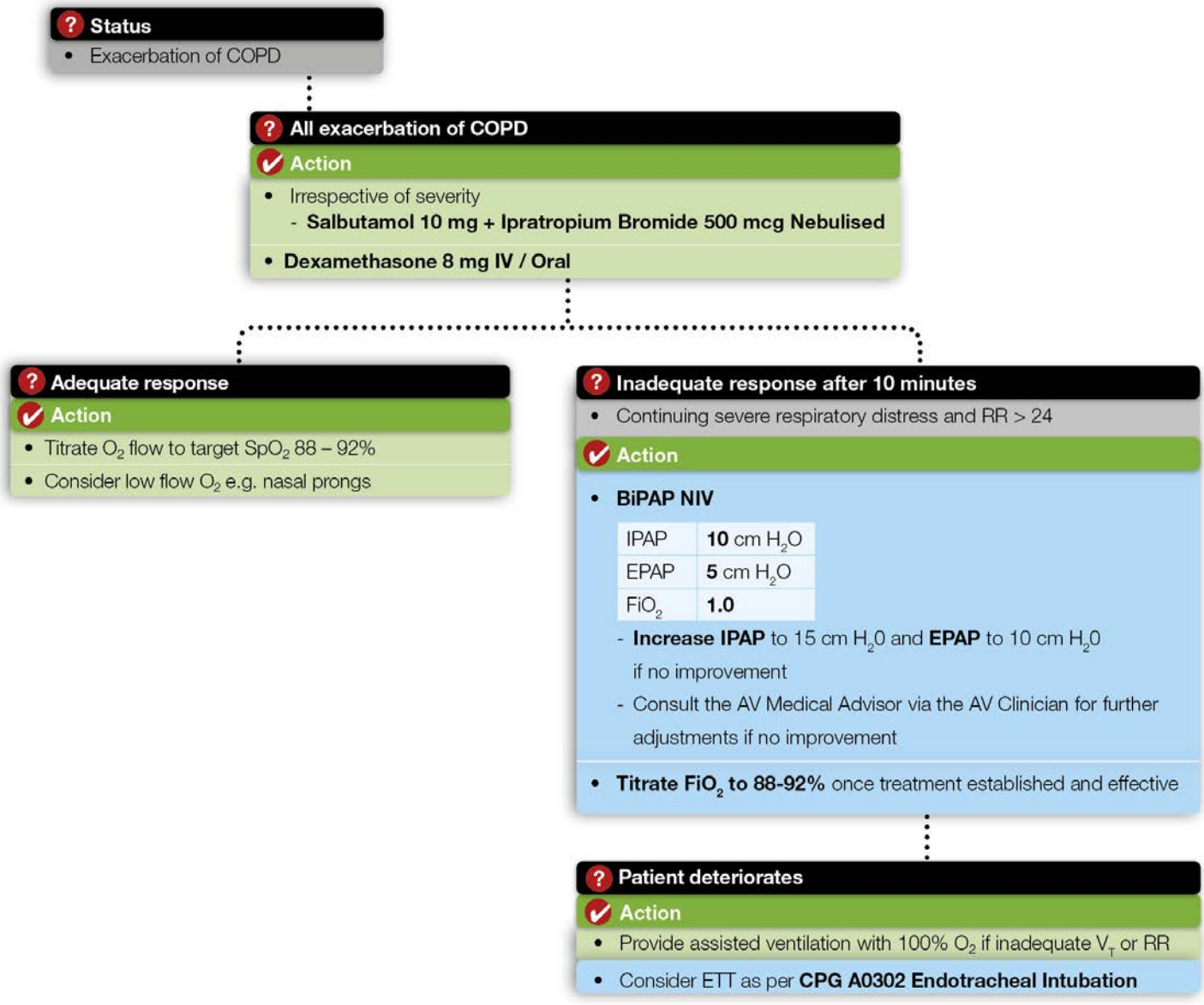
- increased dyspnoea
- increased cough
- increased sputum production
- complete removal of wheeze in these patients may not be possible due to chronic airway disease.

Non-invasive ventilation

- In a patient with known COPD who is also known or strongly suspected to be a CO_2 retainer, NIV may be applied if the patient is obtunded, as long as they are protecting their airway. Some patients with severe COPD may be obtunded due to hypercarbia which may be successfully treated with NIV. These patients are at high risk of deterioration and must be monitored very closely.
- **Monitoring:**
  - The patient on BiPAP NIV must be continuously observed by at least one MICA Paramedic and any extrication/egress plan must incorporate this requirement as a priority.
  - $ETCO_2$ monitoring must be commenced as soon as practicable.
- Indications for the removal of Bi-PAP or CPAP include:
  - Ineffective (cardiac/respiratory arrest, mask intolerance, decreasing respiratory effort, nil improvement after 1 hour of treatment)
  - Deteriorating vital signs
  - Risk to patient (loss of airway control, copious secretions, active vomiting, paramedic judgement of clinical deterioration)
- BiPAP should commence with a FiO_2 of 1.0. Once treatment efficacy and patient comfort/tolerance is established, the FiO_2 should be gradually titrated to normalise SpO_2 levels dependant on the patient's presentation and pathology.
- Consider NIV where intubation is clinically indicated but not possible due to an ACD specifically declining intubation. In this context, it may be applied even if the patient has a reduced level of consciousness that would usually contraindicate NIV.
- BiPAP NIV not available:
  - CPAP 7.5 cm H_2O

– Increase CPAP to 10 cm H_2O at 5-10 minutes if no improvement in patient condition

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/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

Upper Airway Obstruction CPG A0603

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**.

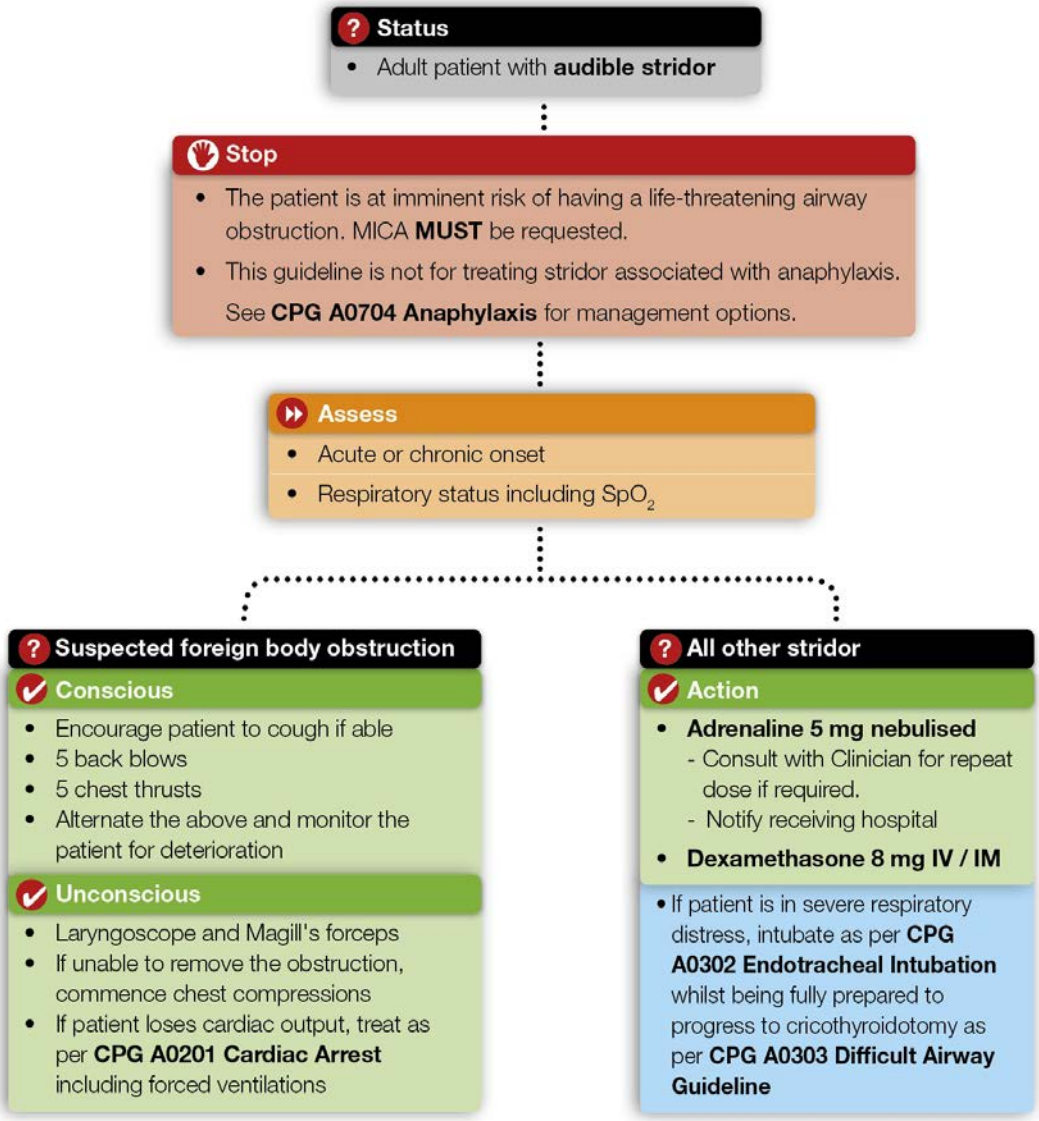
Management

- 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



Related Resources

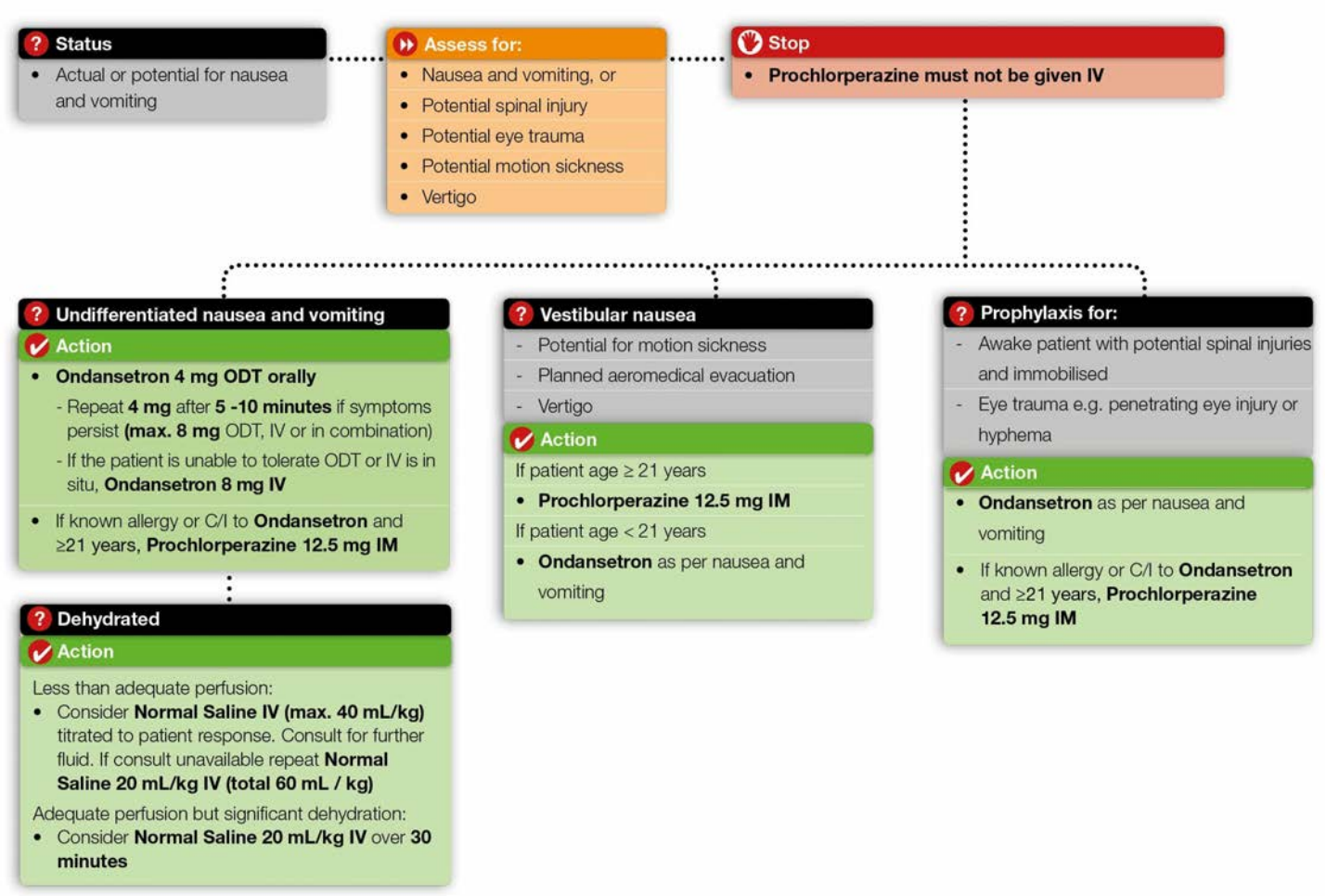
- https://av-digital-cpg.web.app/assets/pdf/MAC/Adult Upper airway obstruction MAC 2019 V3 final.pdf

Nausea and Vomiting CPG A0701

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.
- **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 focused on transport with cardioversion or (if unconscious or pulseless) defibrillation.
- **Prochlorperazine** must only be administered via the IM route.

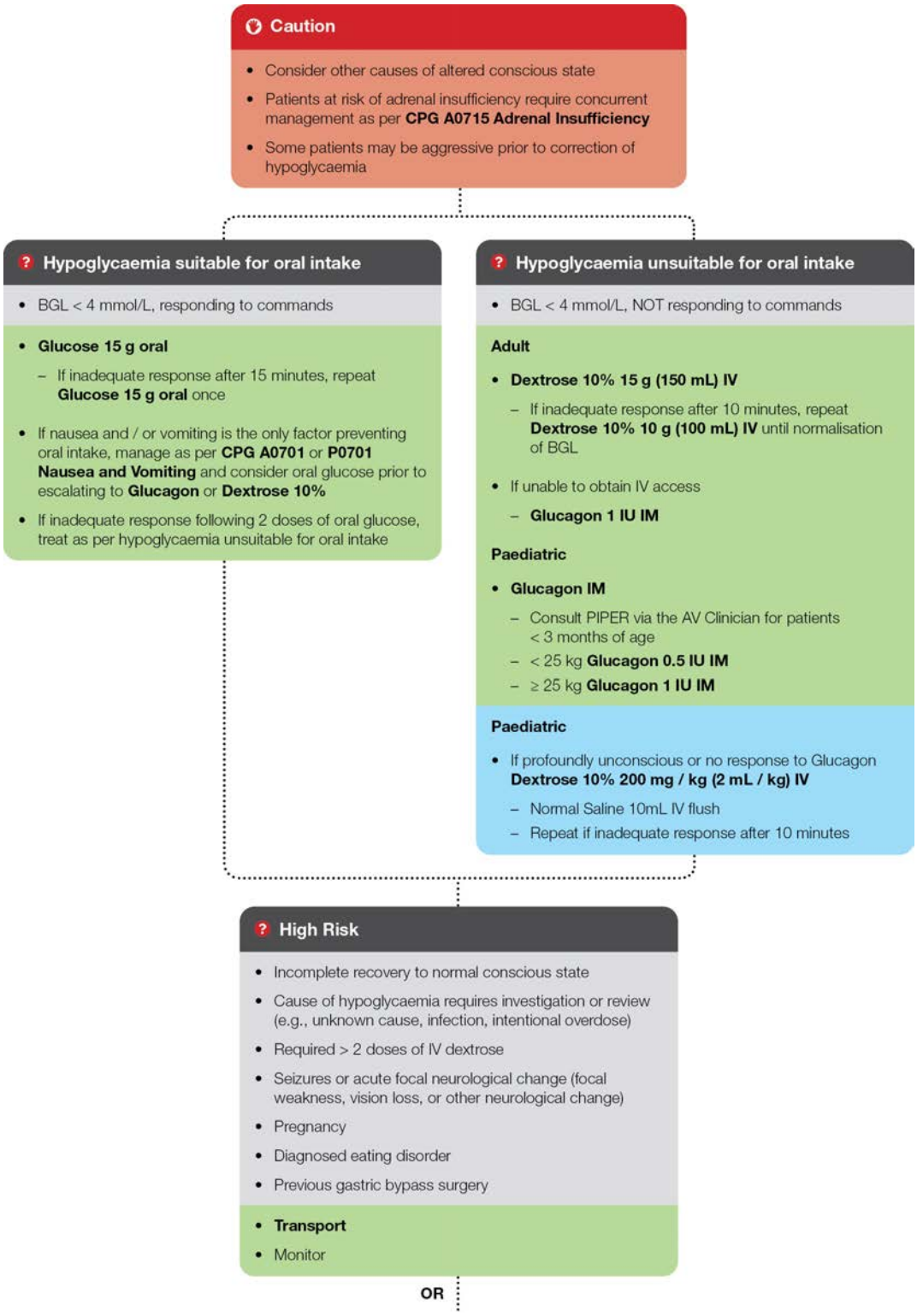
Flowchart

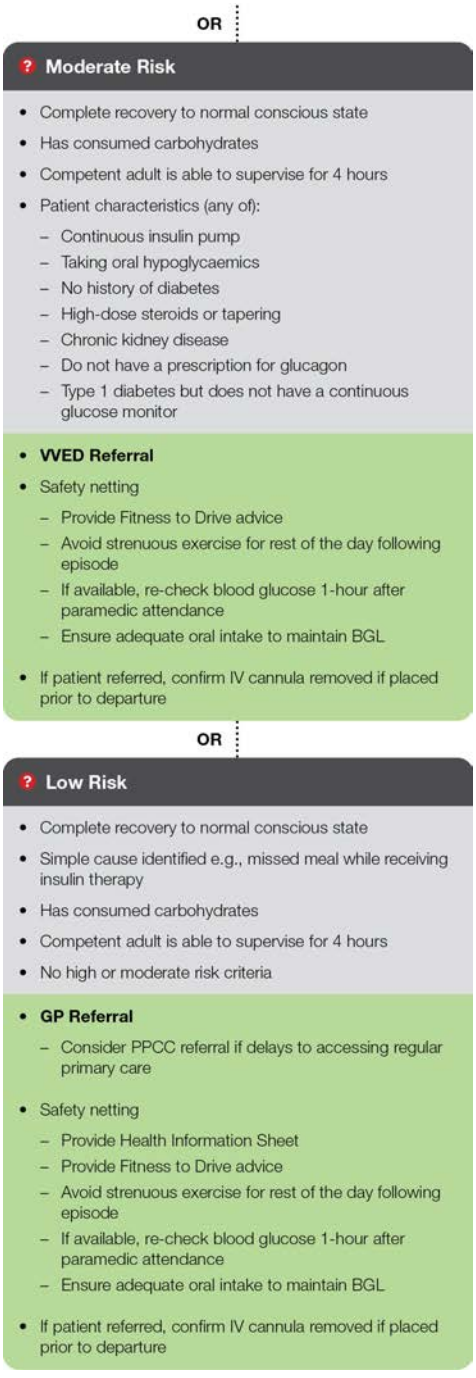


Related Resources

- 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

Flowchart


Caution
Consider other causes of altered conscious state
Patients at risk of adrenal insufficiency require concurrent management as per CPG A0715 Adrenal Insufficiency
Some patients may be aggressive prior to correction of hypoglycaemia
Hypoglycaemia suitable for oral intake
BGL < 4 mmol/L, responding to commands
Glucose 15 g oral
If inadequate response after 15 minutes, repeat Glucose 15 g oral once
If nausea and / or vomiting is the only factor preventing oral intake, manage as per CPG A0701 or P0701 Nausea and Vomiting and consider oral glucose prior to escalating to Glucagon or Dextrose 10%
If inadequate response following 2 doses of oral glucose, treat as per hypoglycaemia unsuitable for oral intake
Hypoglycaemia unsuitable for oral intake
BGL < 4 mmol/L, NOT responding to commands
Adult
Dextrose 10% 15 g (150 mL) IV
If inadequate response after 10 minutes, repeat Dextrose 10% 10 g (100 mL) IV until normalisation of BGL
If unable to obtain IV access
Glucagon 1 IU IM
Paediatric
Glucagon IM
Consult PIPER via the AV Clinician for patients < 3 months of age
< 25 kg Glucagon 0.5 IU IM
≥ 25 kg Glucagon 1 IU IM
Paediatric
If profoundly unconscious or no response to Glucagon Dextrose 10% 200 mg / kg (2 mL / kg) IV
Normal Saline 10mL IV flush
Repeat if inadequate response after 10 minutes
High Risk
Incomplete recovery to normal conscious state
Cause of hypoglycaemia requires investigation or review (e.g., unknown cause, infection, intentional overdose)
Required > 2 doses of IV dextrose
Seizures or acute focal neurological change (focal weakness, vision loss, or other neurological change)
Pregnancy
Diagnosed eating disorder
Previous gastric bypass surgery
Transport
Monitor
OR



Care Objectives

- Identification of high-risk hypoglycaemia
- Normalisation of blood glucose level
- Identification of appropriate patient disposition

Intended Patient Group

- Patients > 24 hours old with hypoglycaemia
  - For patients < 24 hours old refer to **CPG N0201 Newborn Resuscitation**

Overview

- The most common symptoms of hypoglycaemia include diaphoresis, tremors, and tachycardia, but can progress to altered conscious state, slurred speech, seizures, and complete loss of consciousness
- Many patients experiencing an episode of hypoglycaemia are suitable for continuing care in the community following management by paramedics

Assessment

- Blood glucose and ketones should be assessed in any patient with diabetes, or symptoms suggestive of diabetes, who presents with any illness or injury.
  - Some patients with hypoglycaemia may have elevated ketones. In this case, manage the episode of hypoglycaemia as per this CPG and then consult **CPG A0713 Hyperglycaemia** for appropriate disposition planning following resolution of hypoglycaemia.
- Blood glucose and ketones should also be assessed in all patients who are pregnant and present to paramedics.

History

- History taking should focus on excluding alternative causes of altered conscious state and subsequent identification of the precipitating cause of hypoglycaemia.
- Collateral history from the patient's friends and / or family may be essential, as some patients living with diabetes experience impaired awareness of hypoglycaemic symptoms and may be unaware of when the episode began.
- Hypoglycaemia in people with diabetes commonly occurs as a result of:
  - Medicines
    - Accidental or intentional additional doses of insulin or oral hypoglycaemic medications
    - Injection of insulin into a new site or a site that warmed up with exercise
    - Medications (e.g., salicylates, sulfa drugs, pentamidine)
  - Diet and exercise
    - Increased, or more strenuous, exercise than usual
    - Fasting
    - Insufficient carbohydrate intake
  - Intercurrent illness
    - Any illness resulting in kidney impairment, e.g., sepsis, dehydration

  - Gastroenteritis
  - Significant hepatic or cardiovascular disease

- Drugs and alcohol
  - Excessive alcohol
  - Overdose – intentional or accidental

Accelerated Starvation Ketosis

- An accelerated version of starvation ketosis may occur in some paediatric patients following a relatively short period of decreased caloric intake.
- These patients will often present with hypoglycaemia, but significantly elevated ketones, despite not having a diagnosis of diabetes.
- The most common symptoms are abdominal pain, nausea, and vomiting, which may impede efforts to increase glucose levels.
- Patients in this cohort should receive management for nausea and vomiting initially, with a priority on subsequent oral replenishment of glucose.
  - Glucagon is unlikely to be of benefit in this cohort, likely producing more side effects than improvements, and most cases will respond appropriately to anti-emetic therapies allowing for oral replacement to occur.

In-Dwelling Devices

Continuous Glucose Monitor (CGM)

- Some patients may have a CGM in-situ which has alerted a hypoglycaemic event.
- These are subcutaneous devices that read interstitial fluid glucose levels at 5-minute intervals.
- Fingerstick blood glucose readings are more reliable than a CGM reading at extreme values. Accordingly, care should be based on BGL assessments via AV glucometers.
- National Diabetes Services CGM Fact Sheet

Insulin Pumps

- A continuous subcutaneous insulin pump may be present in some patients. Patients and their families will be familiar with the devices and likely will have a pre-developed plan for if the patient develops hypoglycaemia which will have been created with their endocrinology specialist.
  - If no plan is in place, there is no urgency to pause or discontinue the infusion as the hypoglycaemia will generally respond to usual therapies.
  - People with type 1 diabetes on insulin pump therapy do not have long-acting insulin on board. As a result, they are at high risk of developing ketosis, hyperglycaemia, and subsequent DKA with any prolonged cessation of pump therapy as a result of insulin deficiency.

Management

Scene Safety

- Complete dynamic risk assessment
- Be aware of the potential for uncapped sharps from bystander glucagon kits

Hypoglycaemia suitable for oral intake

- Restoration of normoglycaemia through appropriate oral intake is the primary objective in patients without an altered conscious state.
- If a patient presents with normal conscious state but is unable to tolerate oral glucose replacement because of nausea and / or vomiting, management should first be provided as per **CPG A0701** or **P0701 Nausea and Vomiting** (as appropriate) to facilitate oral replacement as the preferred strategy.
- The use of Glucose Paste is the primary management strategy although if the patient is unable to tolerate paste due to taste or texture, alternatives which may be considered include:
  - 6 – 7 jellybeans
  - 3 teaspoons of honey
  - 150 mL of full-strength soft drink
  - 150 – 200 mL of fruit juice
- If patient clinical status does not improve following two attempts at oral glucose replacement, manage as per the guidance for hypoglycaemia unsuitable for oral intake.

Hypoglycaemia unsuitable for oral intake

- Adult patients who are unable to respond to commands sufficiently to safely consume oral glucose replacement should be managed using intravenous dextrose 10% as the first-line preference.
- Patients experiencing an adrenal crisis are unlikely to respond to dextrose until the initiation of corticosteroids. Ensure care is provided in accordance with **CPG A0715 Adrenal Insufficiency**

Glucagon

- If unable to obtain IV access in adults, a single dose of IM glucagon should be provided. People usually regain consciousness within 15 minutes of IM glucagon.
- IM glucagon is the preferred management strategy for paediatric patients presenting with hypoglycaemia who are not suitable for oral intake.
- Glucagon may be ineffective in the following:
  - Chronic hypoglycaemia
  - Adrenal insufficiency
  - Alcohol-induced hypoglycaemia
  - Ketogenic (low carb) diet
  - Starvation-induced hypoglycaemia
  - Prolonged exercise

Disposition Planning

- Patients unsuitable for continuing care in the community following correction of hypoglycaemia include patients who:
  - Have an incomplete recovery to normal conscious state
  - Have an underlying cause of hypoglycaemia which requires further assessment and

management in hospital (e.g., unknown precipitating cause of hypoglycaemia, intentional overdose of medications)
  - Have required > 2 doses of IV dextrose
  - Have suffered a seizure secondary to hypoglycaemia
  - Are pregnant

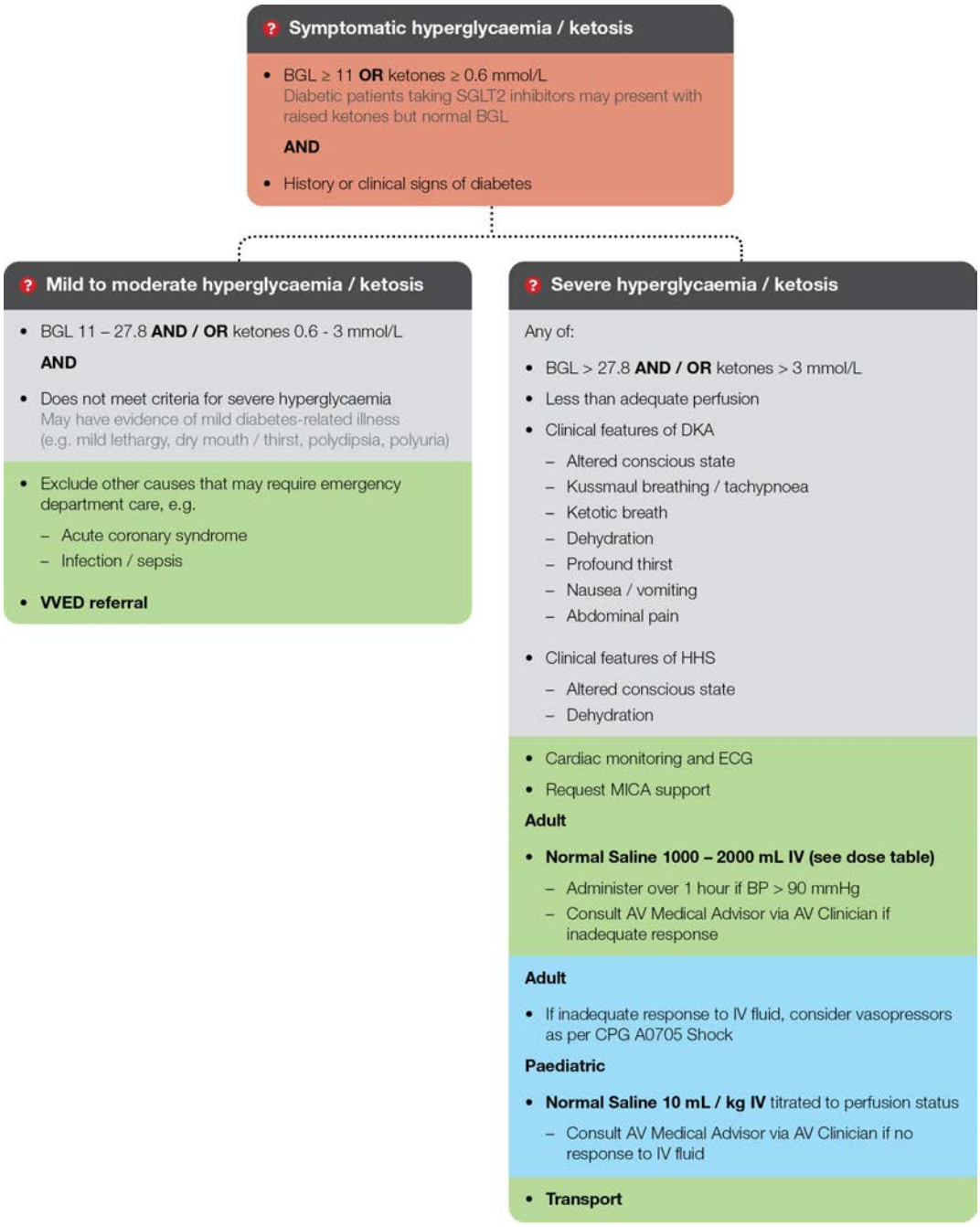
- The Victorian Virtual Emergency Department (VVED) should be consulted for patients who despite blood glucose levels responding to therapy:
  - Have a continuous insulin pump
  - Are taking oral hypoglycaemics
  - Are taking high-dose steroids, or tapering off steroids
  - Do not have a prior history of diabetes
  - Have chronic kidney disease (acute deterioration in renal function impacts clearance of common diabetes medicines including insulin and sulfonylureas)
  - Do not have a prescription for glucagon or require a new prescription following use
  - Have type 1 diabetes but do not have a CGM

- Other patients who have responded well to therapy are likely suitable for referral to their regular primary care provider after consuming a long-acting carbohydrate (e.g., bread, glass of milk, piece of fruit, or one tub of natural low-fat yoghurt) and should be provided with the following advice:
  - The patient should not operate a motor vehicle until assessed by a general practitioner or endocrinologist as per the national driver medical standards.
  - Avoid strenuous exercise for the remainder of the day.
  - If blood glucose monitor is available, re-check BGL every 15 minutes for one-hour if glucagon administered and then hourly for 4 hours, or every one hour for four hours if IV dextrose administered.
  - Ensure adequate oral intake to maintain BGL.

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Hypoglycaemia 2024.pdf

Flowchart


Symptomatic hyperglycaemia / ketosis
BGL ≥ 11 OR ketones ≥ 0.6 mmol/L
Diabetic patients taking SGLT2 inhibitors may present with raised ketones but normal BGL
AND
History or clinical signs of diabetes
Mild to moderate hyperglycaemia / ketosis
BGL 11 – 27.8 AND / OR ketones 0.6 - 3 mmol/L
AND
Does not meet criteria for severe hyperglycaemia
May have evidence of mild diabetes-related illness (e.g. mild lethargy, dry mouth / thirst, polydipsia, polyuria)
Exclude other causes that may require emergency department care, e.g.
– Acute coronary syndrome
– Infection / sepsis
VVED referral
Severe hyperglycaemia / ketosis
Any of:
BGL > 27.8 AND / OR ketones > 3 mmol/L
Less than adequate perfusion
Clinical features of DKA
– Altered conscious state
– Kussmaul breathing / tachypnoea
– Ketotic breath
– Dehydration
– Profound thirst
– Nausea / vomiting
– Abdominal pain
Clinical features of HHS
– Altered conscious state
– Dehydration
Cardiac monitoring and ECG
Request MICA support
Adult
Normal Saline 1000 – 2000 mL IV (see dose table)
– Administer over 1 hour if BP > 90 mmHg
– Consult AV Medical Advisor via AV Clinician if inadequate response
Adult
If inadequate response to IV fluid, consider vasopressors as per CPG A0705 Shock
Paediatric
Normal Saline 10 mL / kg IV titrated to perfusion status
– Consult AV Medical Advisor via AV Clinician if no response to IV fluid
Transport

Normal Saline Dose Table

Risk of fluid overload	All other patients
• History of cardiac failure • Chronic renal failure • Elderly	
• Administer over 1 hour if BP > 90mmHg, otherwise, administer as bolus – **Max. 1000 mL**	• Administer over 1 hour if BP > 90mmHg, otherwise, administer as bolus – **Max. 2000 mL**

Care Objectives

- Identification of high-risk hyperglycaemia
- Hydration where indicated

Intended patient group

- All patients with hyperglycaemia

Overview

- Diabetic ketoacidosis (DKA) and hyperglycaemic hyperosmolar state (HHS) are two of the most serious metabolic complications of diabetes. Risk factors include undiagnosed diabetes, insulin omission, illness / infection, and myocardial infarction.

More information

- Factors associated with increased risk of hyperglycaemic emergencies:
  - Children and young people with known type 1 diabetes
  - Unstable glycaemic control
  - Diabetes medication omission – especially insulin
  - Use of an insulin pump
    As only rapid-acting insulin is administered by pumps (no long-acting insulin is used), any interruption to use of the pump can rapidly lead to hyperglycaemia and DKA.

- Past DKA
- Acute infection and sepsis
- Pancreatitis
- Myocardial infarction / unstable angina
- Trauma, surgery or burns
- Medications – corticosteroids, atypical antipsychotics, immunosuppressive agents, SGLT2i
- Alcohol and recreational drugs
- Elderly people – signs of DKA may be subtle, mortality rates may be higher and type 1 diabetes can present at any age
- Pregnancy

Assessment

- Blood glucose and ketones should be assessed in any person with diabetes, or symptoms suggestive of diabetes, who presents with any illness or injury.
- Blood glucose and ketones should also be assessed in all patients who are pregnant and present to paramedics.

Diabetic Ketoacidosis

- DKA is characterised by hyperglycaemia, increased ketones, and metabolic acidosis. Classic clinical signs include dehydration, polyuria, polydipsia, and tachypnoea. Additional clinical signs may include nausea / vomiting, abdominal pain, confusion, drowsiness / altered conscious state.
- A blood ketone level of < 0.6 mmol/L is normal
- Ketone levels of 0.6 – 3 mmol/L require medical assessment. In the absence of severe illness, VVED will be able to assist in the assessment and care planning for these patients.
- DKA should be suspected in any patient with ketones > 3 mmol/L.

More information

- DKA is often associated with younger patients who have type 1 diabetes (but not always) and is due to an absolute insulin deficiency.
- Approximately one half of diabetic ketoacidosis (DKA) cases will present with low to moderate hyperglycaemia (11 – 29 mmol/L).
- DKA may occur in patients without previously diagnosed diabetes, in particular:
  - Pregnancy
  - Children
  - Elderly

- Euglycaemic ketoacidosis (near-normal BGL with elevated ketones)
  - Euglycaemic ketoacidosis can occur as a result of various diabetic medicines including sodium glucose co-transporter 2 inhibitors (SGLT2i). The risk of this side-effect occurring increases in people who are acutely unwell, fasting, perioperative or have a history of excess alcohol consumption.
  - Any patient who is on an SGLT2i and is unwell (e.g. nausea, vomiting, abdominal pain) should have blood ketones assessed **regardless of BGL**. If ketones > 3 mmol/L, the patient is likely in euglycaemic DKA.
  - Other causes include pregnancy, prolonged fasting, cocaine intoxication, and chronic liver disease.
  - Treatment priorities are based on the same principles.

More information

- SGLT2i medications currently available in Australia include:
  - Dapagliflozin (Forxiga) and Empagliflozin (Jardiance)
- They also come in combinations with:
  - Metformin under the brand names Xigduo and Jardiamet
  - DPP-4 inhibitor under the brand names: Glyxambi and Qtern

https://www.diabetesaustralia.com.au/blog/sglt2-inhibitors/

Hyperglycaemic Hyperosmolar State

- Hyperglycaemic hyperosmolar state (HHS) is a severe, life-threatening acute complication of diabetes, occurring mostly in people with type 2 diabetes. It is characterised by severe hyperglycaemia and dehydration (without elevated ketones). It is important to note that patients may have combined features of DKA and HHS.
- HHS refers to severe hyperglycaemia accompanied by profound dehydration.
- HHS has a significantly higher mortality rate (5 - 20%) than DKA (< 1%).

Co-Presenting Illness and Injury

- In many patients, diabetes may be one of several chronic illnesses which the patient is managing.
- Unstable diabetes may be a sign of one of the patient's other illnesses acutely deteriorating.
- A combination of illnesses being unstable should be considered cautiously in patient assessment and care planning. The root cause of the illness may not be apparent.
- Conversely, a slightly elevated BGL in a presentation of unrelated cause (e.g. soft tissue injury due to sporting injury) does not necessarily require review of the patient's diabetes.

Latent Autoimmune Diabetes in Adults

- Latent autoimmune diabetes in adults (LADA) is a form of diabetes that shares characteristics of both type 1 and type 2 diabetes. It's often referred to as a slow-progressing form of autoimmune diabetes.
- In a hyperglycaemic emergency, manage the patient with LADA as having type one diabetes (i.e. as if they have an insulin deficiency.
- Check ketones, do not withhold a patient's usual long-acting insulin, and consider IV fluid rehydration.
- These cases may be complex so discuss the care with VVED or transport to ED if at high risk.

More information

- Diagnosis may not be known as it is an evolving disease, and the patient could be diagnosed with type 2 diabetes.
- In an acute episode, patients with LADA can be extremely unwell with a similar risk profile as type 1 diabetes.

Continuous Glucose Monitors (CGM)

- Some patients may have a CGM in-situ which has alerted a hyperglycaemic event.
- These are subcutaneous devices that read interstitial fluid glucose levels at 5 - minute intervals
- Fingerstick blood glucose readings are more reliable at extreme values than a CGM reading. Accordingly, care should be based on BGL assessments via AV glucometers.
- National Diabetes Services CGM Fact Sheet

Management

- Adequate fluid replacement is the goal of care in patients with severe hyperglycaemia or ketosis.
- Without access to blood chemistry analysis, the administration of insulin may worsen the patient's clinical status. Do not encourage patients to self-administer additional doses of insulin prior to transport to hospital.

Intubation

- It is advised to only intubate where the patient is unable to maintain their airway or is demonstrating a severely decompensating respiratory status (periods of apnoea). This may require tolerating a profoundly low GCS without providing advanced airway management.
- Tachypnoea is the body's mechanism to manage metabolic acidosis. It is a significant consideration to intubate the acutely unwell hyperglycaemic patient as mechanical ventilation can impact acid-base balance, potentially worsening the patient's metabolic derangements.

- Note the patient's intrinsic rate as this can be used as a guide to selecting ventilator respiratory rate / minute volume setting.
- Titrating respiratory rate to $ETCO_2$ is challenging without knowledge of arterial blood gases including pCO_2. Target an $ETCO_2$ of 25 - 30 mmHg, however, individual trends should be considered. Higher $ETCO_2$ levels may be tolerated where the overall patient condition is improving.

Monitoring

- ECG – Patients who are hyperglycaemic may have unstable serum potassium and be at risk of dysrhythmia. Consider requirement for care as per **CPG A0724 Hyperkalaemia**.

Disposition planning

- Consideration for care planning must include a broad range of factors beyond the BGL reading.
- For the patient being considered for community-based care with near normal physiological status, consider patient safety risk factors (as per **CPG A0108 Clinical Flags / Patient Safety**) as well as:
  - Patient concern, social supports, access to services
  - Patients age, frailty, and other comorbidities
  - Unusual findings based on patient's usual disease process with no cause identified
  - Recency of diagnosis / health literacy
  - Ability to comply with treatment plan and self-regulate insulin
  - SGLT2i medication
  - Nausea / vomiting not responding to antiemetics
  - Presence of abnormal findings such as abdominal pain, jaundice, fever
- VVED consultation may be appropriate in these circumstances.

Interfacility transfers

- Where the patient is acutely unwell and point of care pathology is available including pH, bicarbonate, and potassium, consult ARV to guide care planning which may include IV infusion-based therapies.
- Infusion in-situ:
  - Adjust as required by the care plan handed over at the sending facility.
  - Consult ARV if there is any uncertainty.

More information

- AV often cares for patients with glycaemic emergencies, including DKA, who are being transferred to a specialist unit at another facility. Some of these patients may have an insulin, insulin / dextrose or potassium infusion running via a syringe driver/s. Please note: Where there is an insulin / dextrose infusion commenced, potassium levels can fall rapidly.
- The supporting medical and nursing staff will handover care instructions including infusion rate and monitoring requirements. In some instances, the infusion/s may need to be altered or ceased in consideration of pathology results. Do this in accordance with the care plan /

drug order, or where in doubt, call either the treating medical team or ARV.

- AV currently does not regularly have access to the pathology testing required to guide therapy. However, commencing infusion-based therapy may be considered in consultation with ARV where the patient is acutely unwell, pathology is available to guide therapy and prolonged transport times are expected. Further IV fluid management, insulin, dextrose, and / or potassium therapy may be recommended.

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Hyperglycaemia 2024.pdf
- CPG Walkthrough Video - Hyperglycaemia

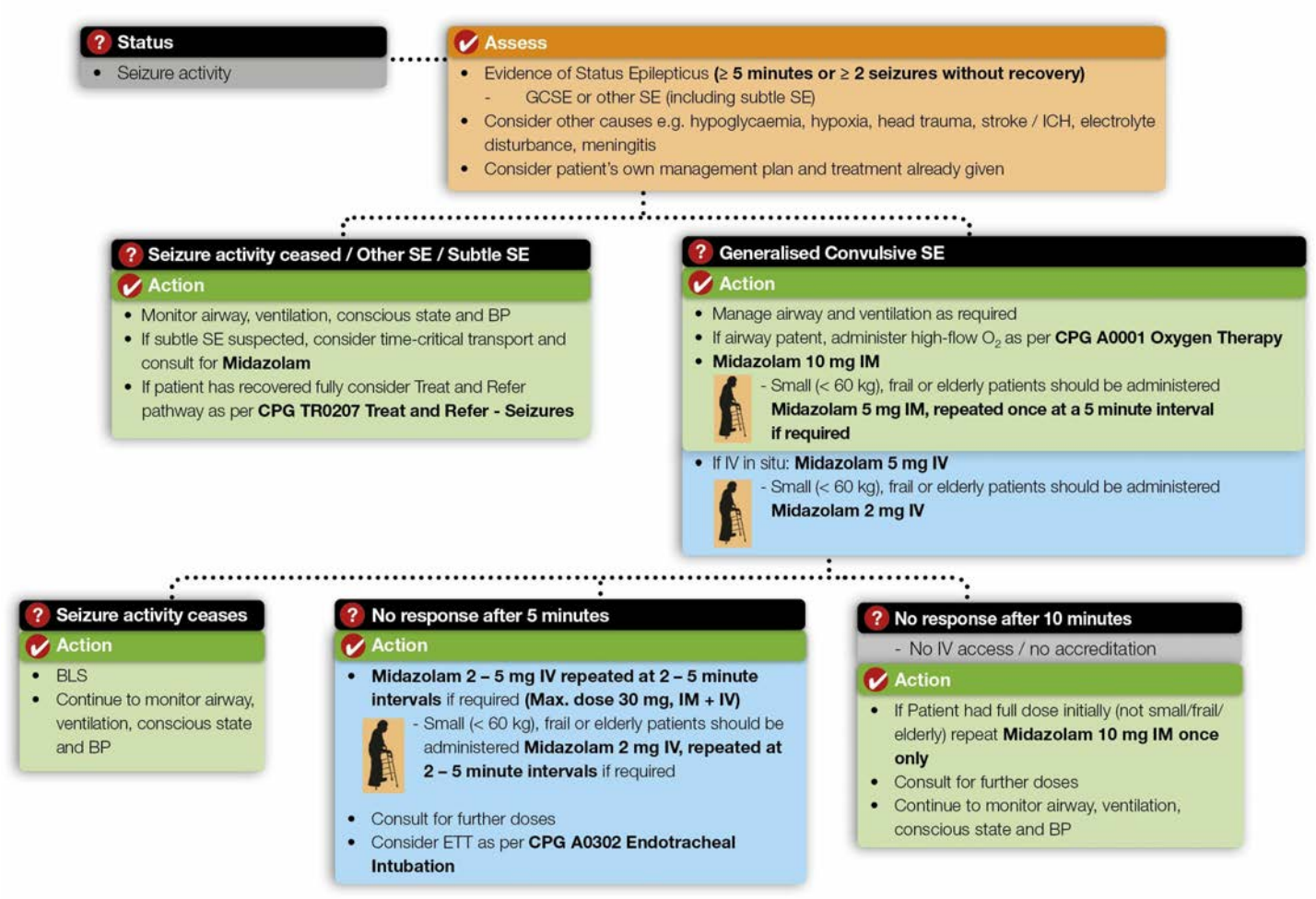
General Notes

- 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 AV 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 M0202 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 AV 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

Anaphylaxis CPG A0704

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

- Patients aged ≥ 16 years with anaphylaxis

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 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.

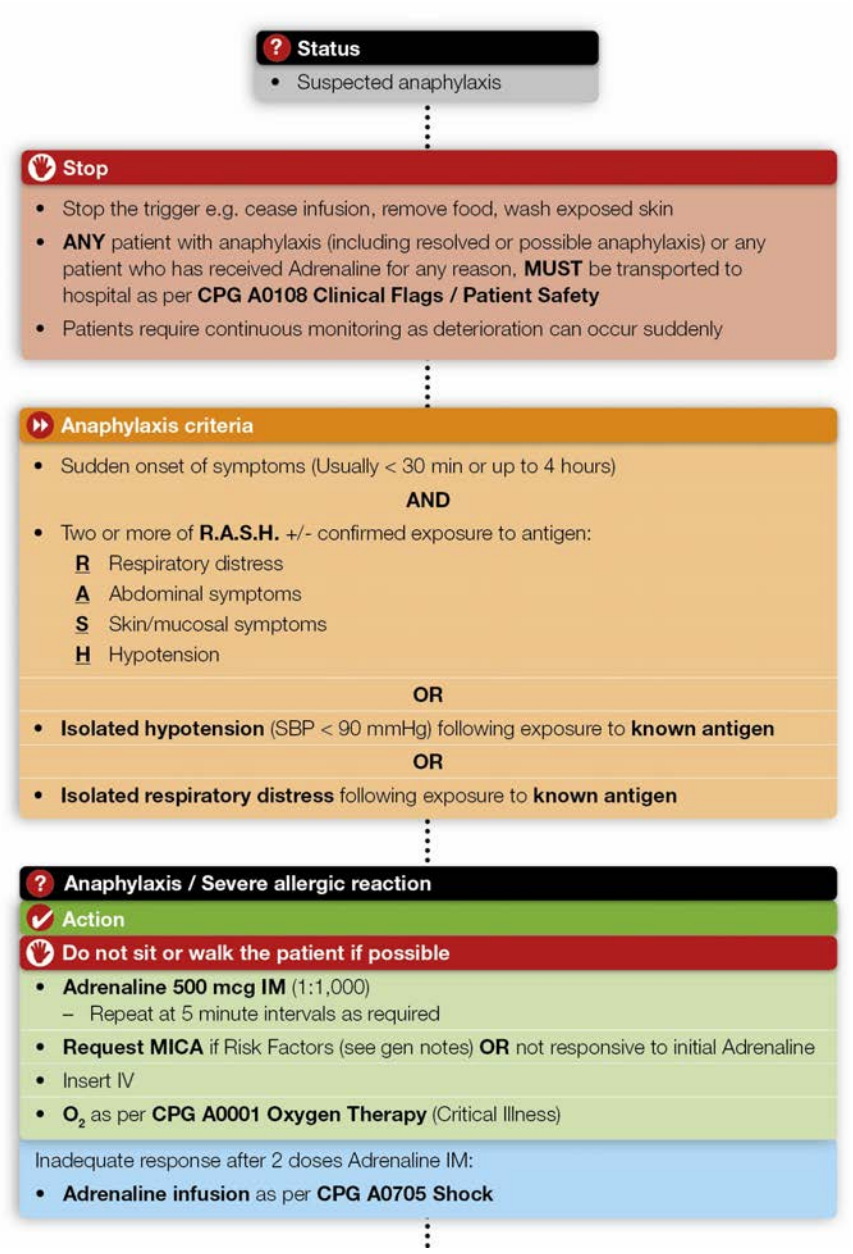
Medication preparation

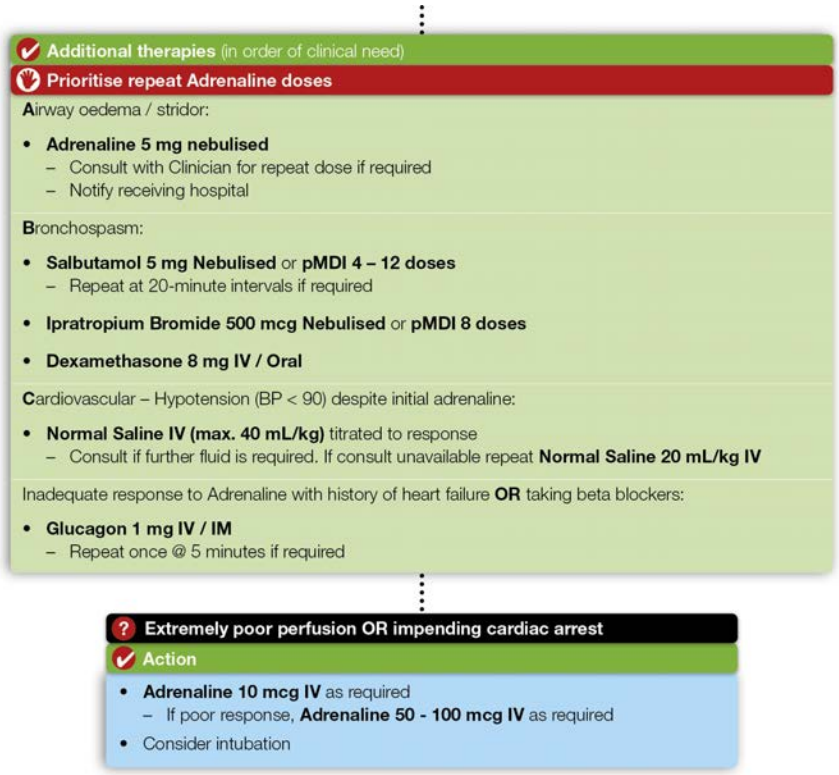
Adrenaline infusion

(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


Status
Suspected anaphylaxis
Stop
Stop the trigger e.g. cease infusion, remove food, wash exposed skin
ANY patient with anaphylaxis (including resolved or possible anaphylaxis) or any patient who has received Adrenaline for any reason, MUST be transported to hospital as per CPG A0108 Clinical Flags / Patient Safety
Patients require continuous monitoring as deterioration can occur suddenly
Anaphylaxis criteria
Sudden onset of symptoms (Usually < 30 min or up to 4 hours)
AND
Two or more of R.A.S.H. +/- confirmed exposure to antigen:
R Respiratory distress
A Abdominal symptoms
S Skin/mucosal symptoms
H Hypotension
OR
Isolated hypotension (SBP < 90 mmHg) following exposure to known antigen
OR
Isolated respiratory distress following exposure to known antigen
Anaphylaxis / Severe allergic reaction
Action
Do not sit or walk the patient if possible
Adrenaline 500 mcg IM (1:1,000)
– Repeat at 5 minute intervals as required
Request MICA if Risk Factors (see gen notes) OR not responsive to initial Adrenaline
Insert IV
O2 as per CPG A0001 Oxygen Therapy (Critical Illness)
Inadequate response after 2 doses Adrenaline IM:
Adrenaline infusion as per CPG A0705 Shock



Related Resources

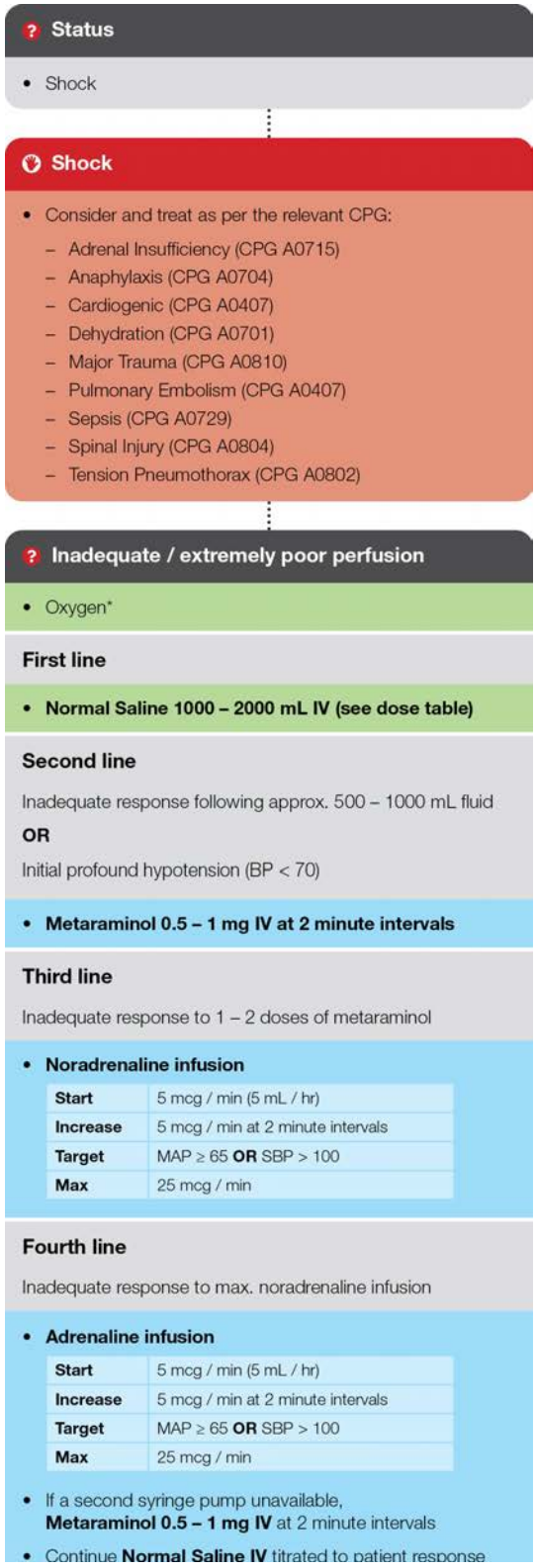
- CPG Walkthrough: Anaphylaxis
- https://www.bettersafercare.vic.gov.au/resources/clinical-guidance/emergency-care/anaphylaxis-adults
- http://www.allergy.org.au/hp/hp-e-training
- https://av-digital-cpg.web.app/assets/pdf/MAC/4.1.2 (a) Anaphylaxis CPG Review 2020 MAC FINAL.pdf

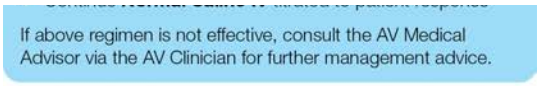
References

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

Stop and consider PANDA enrolment
Use metaraminol while assessing **eligibility criteria**.

Flowchart





* As per CPG A0001 Oxygen Therapy (Critical Illness: Shock)

Normal Saline Dose Table

Risk of fluid overload	All other patients
• History of cardiac failure • Chronic renal failure • Elderly	
• Titrate to response – **Max. 1000 mL**	• Titrate to response – **Max. 2000 mL**

Care Objectives

- To achieve a perfusion target appropriate to the patient and their presenting illness.

Intended patient group

- ≥ 16 years of age.
- The guideline may be applied to any patient with inadequate perfusion not addressed by another guideline or where the cause is not immediately clear.

Assessment

Definition

- Shock is a state of cellular and tissue hypoxia due to either reduced oxygen delivery, increased oxygen consumption, inadequate oxygen utilization, or a combination of these processes.
- The strongest indicator of shock is profound hypotension but this may be transiently offset by a compensatory tachycardia.
- Other signs and symptoms may include:
  - Altered conscious state
  - Tachypnoea

- Diaphoresis, pallor, cold
- Hot, flushed (due to vasodilation)
- Increased thirst

Management

- **Ambulation risk assessment**
  - Do not stand or walk the patient.
  - Extricate supine or sitting (as appropriate for presentation)

IV Access

- Ideally 18G or larger.
- Noradrenaline / adrenaline should be administered through an 18G cannula or larger in a large proximal vein (e.g. antecubital fossa).
  Vasoconstrictive action carries a higher risk of local tissue necrosis if extravasation occurs.
- Fluid and metaraminol may be administered through any size cannula.
  Metaraminol does not act directly at the site of injection but rather stimulates the release of endogenous noradrenaline systemically.
- If access is difficult or a second larger line is being inserted for vasopressor/inotrope, consider using ultrasound (if available) to place cannula and confirm placement in vein.

Metaraminol

- Metaraminol boluses may be required:
  - **Following initial fluid** if there is an inadequate response or deterioration.
    The amount of fluid given prior to progressing to metaraminol and what constitutes an inadequate response is based on clinical judgement. It will generally involve no or minimal improvement in blood pressure following 500 – 1000 mL of normal saline.
  - **In parallel to initial fluid** if the patient presents with profound hypotension.
    This is based on clinical judgement but may include BP < 70 mmHg, altered mental status or no radial pulses.
- There is no requirement to wait for a particular volume of fluid to be infused prior to administering metaraminol.
- Metaraminol boluses may be continued if there is a delay to noradrenaline / adrenaline infusion or adequate infusion pumps are not available.
- Metaraminol 0.5 mg IV increments will be appropriate for most patients. Higher doses (1 mg) may be required in some patients who are significantly hypotensive.

Adrenaline / noradrenaline

- **Do not bolus noradrenaline** under any circumstance as effects can be exaggerated and

unpredictable.

- Adrenaline / noradrenaline infusions may run through the same IV cannula, but this cannula should not be used for bolus medicines / flush.

Vasopressor/inotrope complications

IV extravasation / skin changes

1. Stop infusion and disconnect infusion, leaving the cannula in place
2. Get alternative access and recommence infusion at alternative site (patient may be dependent on vasopressor infusion)
3. Attempt to aspirate residual drug from the cannula
4. Remove cannula whilst aspirating
5. Elevate the limb
6. Mark affected site
7. Hand over to receiving facility
8. Document details clearly including precise location

Palpitations, hypertension

- Reduce rate of infusion

Reflex bradycardia

- Reflex bradycardia in response to metaraminol or noradrenaline may require the addition of an adrenaline infusion +/- a reduction in the rate of infusion.

Medication Preparation

Noradrenaline Infusion

(via syringe pump)

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

Adrenaline Infusion

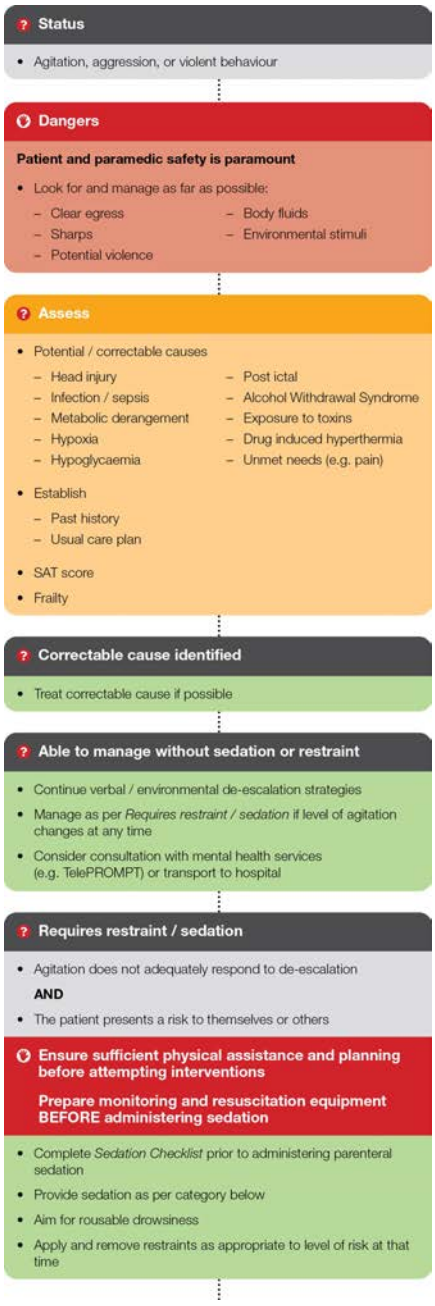
(via syringe pump)

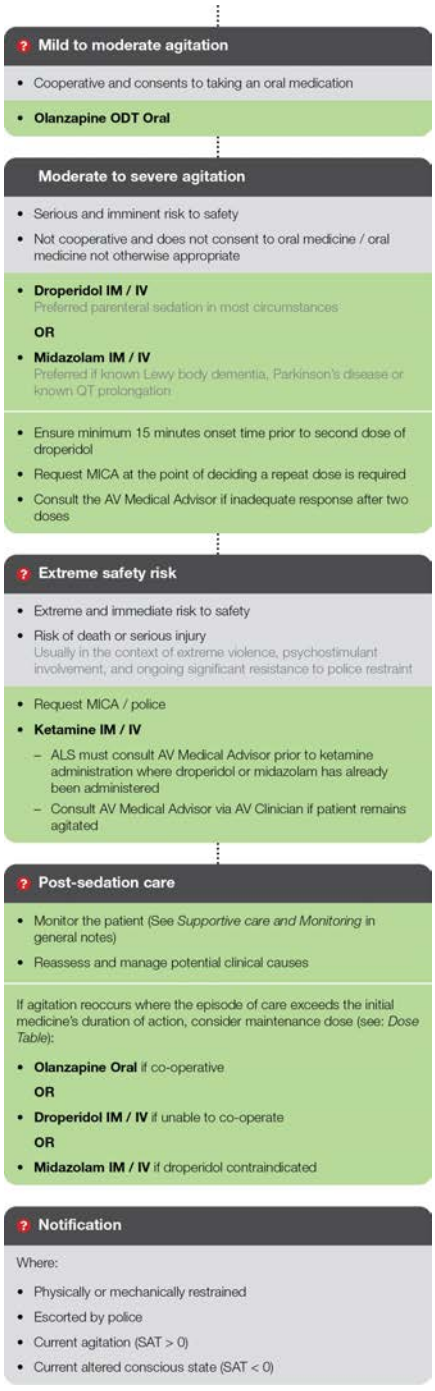
- Dilute **Adrenaline 3 mg** to 50 mL with **Dextrose 5%** or **Normal Saline** (in a 50 mL syringe)
- 1 mL = 60 mcg
- 1 mL / hr = 1 mcg/min

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Shock CPG review.pdf
- CPG Walkthrough video

Flowchart


Status
Agitation, aggression, or violent behaviour
Dangers
Patient and paramedic safety is paramount
Look for and manage as far as possible:
Clear egress
Sharps
Potential violence
Body fluids
Environmental stimuli
Assess
Potential / correctable causes
Head injury
Infection / sepsis
Metabolic derangement
Hypoxia
Hypoglycaemia
Post ictal
Alcohol Withdrawal Syndrome
Exposure to toxins
Drug induced hyperthermia
Unmet needs (e.g. pain)
Establish
Past history
Usual care plan
SAT score
Frailty
Correctable cause identified
Treat correctable cause if possible
Able to manage without sedation or restraint
Continue verbal / environmental de-escalation strategies
Manage as per Requires restraint / sedation if level of agitation changes at any time
Consider consultation with mental health services (e.g. TelePROMPT) or transport to hospital
Requires restraint / sedation
Agitation does not adequately respond to de-escalation
AND
The patient presents a risk to themselves or others
Ensure sufficient physical assistance and planning before attempting interventions
Prepare monitoring and resuscitation equipment BEFORE administering sedation
Complete Sedation Checklist prior to administering parenteral sedation
Provide sedation as per category below
Aim for rousable drowsiness
Apply and remove restraints as appropriate to level of risk at that time



Sedation checklist

Dose Table

Olanzapine

Oral

- **10 mg**
  - Repeat initial dose after 20 minutes if required (once only)

OR

- **5 mg** (< 60 kg / frail / elderly / sedation from drugs or alcohol / maintenance dose)
  - Repeat initial dose after 20 minutes if required (once only)

Droperidol

IM / IV

- **5 – 10 mg**
  - Repeat 5 – 10 mg after 15 minutes if required (once only)

OR

- **5 mg** (< 60 kg / frail / elderly / sedation from drugs or alcohol / maintenance dose)
  - Repeat 5 mg after 15 minutes if required (once only)

Midazolam

IM

- **5 – 10 mg**
  - Repeat 5 – 10 mg after 10 minutes if required (once only)

OR

- **2.5 – 5 mg** (< 60 kg / frail / elderly / sedation from drugs or alcohol / maintenance dose)
  - Repeat 2.5 – 5 mg after 10 minutes if required (once only)

IV

- **2.5 – 5 mg**
  - Repeat 2.5 – 5 mg at 5 minute intervals, titrated to patient response

OR

- **1 – 2 mg** (< 60 kg / frail / elderly / sedation from drugs or alcohol / maintenance dose)
  - Repeat 1 – 2 mg at 5 minutes intervals, titrated to patient response

Notes

- Midazolam max total dose 20 mg (IM and IV)
- For suspected drug induced hyperthermia, consult AV Medical Advisor for further Midazolam

Ketamine

IM

< 60 kg	200 mg
60 – 90 kg	300 mg
> 90 kg	400 mg

IV

- **50 – 100 mg**

IV

- The need for an advanced airway following administration of ketamine is more likely where droperidol or midazolam have been given.
- IV ketamine may cause respiratory depression / apnoea when administered rapidly.

Care Objectives

- Maintain safe environment for patients, staff, other emergency responders, family and bystanders

- Use the least restrictive means possible, maintaining verbal and environmental de-escalation strategies throughout the interaction
- Consider clinical causes of acute behavioural disturbance

Intended patient types

- Patients ≥ 16 years of age who present with agitation, aggression, or violent behaviour.

The following patients are not excluded and may be cared for under this CPG:

- Patients experiencing a mental health crisis including those being cared for under Section 232 of the Mental Health and Wellbeing Act 2022.

Assessment

Causes of acute behavioural disturbance

- Causes vary considerably and are influenced by the situation, environmental factors and staff interactions. These circumstances are typically outside of the control of the patient.
- Critical illness can cause agitation and should be considered in the assessment.
- Potential contributors to acute behavioural disturbances in young patients:
  - Neurodiversity (e.g. autism, ADHD)
  - Severe developmental trauma (e.g. family violence)
- The following are potential causes of acute behavioural disturbances:
  - Physical injury and / or pain (e.g. head injury)
  - Acute medical conditions (e.g. hypoglycemia, post ictal state)
  - Unmet needs (e.g. bladder distension, constipation, hunger, thirst, alcohol / nicotine withdrawal)
  - Substance abuse / poisoning (e.g. methamphetamine, alcohol)
  - Acute and uncontrolled mental health condition (e.g. panic attack, acute mania)
  - Dementia / delirium

Severity of agitation

- **Mild**
  - Able to cooperate, not aggressive
  - Anxious, pacing, restless (can't sit still), excessive talking, hypervigilant
  - Rapid shallow breathing
  - Limited eye contact
- **Moderate agitation**
  - Loud outbursts, frequent non-purposeful movements
  - Not aggressive or violent

- **Severe agitation**
  - Combative, violent, immediate danger to patient and/or staff
  - Unable to cooperate
  - Yelling, verbally abusive

- Assessment should be ongoing as a patient's condition is dynamic. For example, a patient initially managed under *Moderate Agitation* may escalate to a higher level of risk than when initially assessed or risk may decrease in response to effective de-escalation strategies.

Neurodiversity and disability

- Communicating with patients with neurodiversity or disability is likely to require a considered approach. Seek advice from the family / carers as to what communication methods and treatment options are most effective. Seek an established care plan. Contact related health care service to seek advice.
- De-escalation and management strategies listed in this CPG may be effective for all people experiencing acute behavioural disturbance whether they have known neurodiversity or not.

Care approach and de-escalation

Consider **CPG A1101 Mental Health and Wellbeing Principles** where applicable.

Paramedic demeanour

- Nominate one person to build a rapport and communicate directly with the patient
- Don't touch the patient
- Non-threatening stance, neutral position (e.g. don't stand over the patient or cross your arms)
- Be quietly confident – reassures and calms the patient to know that someone has a plan to help them
- Use a quiet, calm and reassuring voice with slower speech
- Exaggerate friendly expressions

Environmental de-escalation

- Reduce stimulus and sensory sensitivities
  - Work with a trusted person who can positively influence the patient's behaviour
  - Minimise sudden movements
  - Find out what sensory sensitivities the patient has and offer calming strategies. This will be unique to each patient.
  - Common sensitivities include:
    - Noise - limit noise where possible (e.g. quiet room, minimise presence of other people, headphones)
    - Light - dim lights or turn off

- Other sensory techniques may include:
  - Calming toys, ice / icy-pole, warm blankets
  - Distraction activities - music / TV / screen distraction

- Food, drink

Verbal de-escalation

- Introduce yourself and other team members
- One person should be speaking only
- Use the patient's name to personalise the interaction
- Focus only on keeping things safe. Emphasise 'we want everyone to be safe'.
- Active listening
- Simple script: instructions should be one at a time, use as few words as possible. Repetitive simple statements.
- Don't make jokes as they may be misunderstood.
- Be clear about what needs to happen, make it predictable.
- Give more time for responses (stressed brains take longer to process information)
- Avoid 'no' language which may prompt an aggressive response
- Forced choices, e.g. 'shall we sit on the kitchen chair or the lounge chair?'
- No threats or ultimatums. No 'show of force' as this will always escalate
- Focus on things that matter (and compromise on things that don't)

Management

- Use interventions proportionate to the severity of risk posed by the acute disturbance. Always use the least restrictive intervention available unless there is an imminent risk of significant harm to self or others.
- Patients displaying these behaviours almost always have a clinical cause for their agitation, and as such it is reasonable that the AV crews are the lead decision-makers at the case. Police at scene will ensure scene safety.

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 use the **Dynamic Risk Assessment** throughout the case.
- Consider exit strategy (e.g. position yourself near exit).
- Verbal de-escalation and communication with the patient is essential and should be maintained throughout all phases of care.
- Where sedation or physical restraint is absolutely necessary, clear communication with all parties involved in restraining the patient is a key factor in reducing the risk of needle-stick or other injuries.

Correctable Causes

- If a correctable cause of agitation is identified (e.g. hypotension, hypoxia, hypoglycaemia), the preference is to treat the cause rather than provide sedation.
- In some circumstances, agitation may be so severe that the cause cannot be treated without sedation. Sedation may be administered if it is required to facilitate safe treatment of the underlying cause. De-escalation should continue while correctable causes are addressed.

Psychostimulant affected patients

- Psychostimulant toxicity, including serotonin syndrome, should ideally be treated with midazolam, cooling, hydration and symptomatic management as per **CPG A0719 Drug Induced Hyperthermia**.
- In some cases, these patients will require initial management with ketamine as per the *Extreme Safety Risk* section of this CPG due to the risk of harm to the patient, bystanders, or paramedics. Ketamine does not treat serotonin syndrome. Midazolam should be administered once agitation is controlled. Combined therapies are likely to lead to the need for airway management and the need for escalation of care.

Traumatic / hypoxic brain injury

- **Severe agitation:** Extraordinary and immediate risk may be managed with ketamine regardless of head injury. RSI should follow successful sedation.
- **Mild / Moderate agitation:** Manage with judicious analgesia. The hypotensive effects of midazolam and droperidol can be detrimental to patient outcomes.

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 such as hypoglycaemia, stroke / TIA, dehydration.
- 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 droperidol or midazolam required.
- Droperidol may cause worsening of symptoms in Parkinson's disease and Lewy body dementia. Where these diagnoses are known, midazolam is the preferred agent over droperidol.

Restrictive practices

Any form of restrictive practice should only be used as a last resort
(e.g. chemical, physical or mechanical restraint).

- If de-escalation strategies are unsuccessful or there is an immediate and likely risk of harm to the patient or staff, oral or IM sedation may be considered. This may or may not require the use of mechanical or physical restraint.

Physical / mechanical restraint

- **Physical restraint** means the use by a person of their body to prevent or restrict another person's movement, where **mechanical restraint** means the use of a device to prevent or restrict a person's movement.

- Mechanical restraint must be proportionate to the risk of harm, and only be employed for the minimum duration that ensures the safety of the patient, staff and others.
- Mechanical restraints may be used without the use of sedation in circumstances where the patient complies with the restraint and will not sustain further harm by fighting against the restraints.
- Observe the patient continuously to ensure their airway, breathing and circulation are not obstructed, and the restraint devices are not causing injury.
- Where the patient has been sedated and mechanical restraints are still required, the patient should be positioned in the lateral position to avoid aspiration.
- DO NOT restrain the patient in the prone position. This position has been associated with asphyxia and death.
- Mechanical restraints 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, the time of application and removal, the patient's response, and any adverse outcomes must be documented on the PCR.

Sedation

- The use of sedation to manage acute behavioural disturbance in patients with a mental health illness is also known as chemical restraint.
- Monitoring and resuscitation equipment must be prepared prior to sedation and immediately available at all times.
- The patient who has taken multiple medicines, drugs or who is intoxicated is at greater risk of airway compromise when sedation is administered.
- Parenteral sedation should aim for *rousable drowsiness* which is defined as the patient being asleep but rousing if their name is called. Aim to use the lowest dose possible and carefully monitor for side effects.
- **Droperidol or midazolam** should be used where there is a *serious and imminent risk* to safety and oral medication (olanzapine) is not appropriate or the patient does not consent.
  - Droperidol is therapeutic and has a longer duration of action. It is the preferred parenteral sedative in most circumstances.
  - Use when safety is not immediately at extreme risk (i.e. does not urgently require control within seconds to minutes) but there is significant potential for harm if the patient is not chemically restrained.
  - Midazolam is the preferred agent if paramedics are aware that the patient has Lewy body dementia, Parkinson's disease, or QT prolongation. However, the nature of cases involving agitation will often mean this history is difficult to identify. There is no requirement that these be systematically excluded prior to providing sedation.
- **Ketamine** should only be used if there is an *extreme and immediate* risk.
  - Ketamine has a shorter duration, is non-therapeutic and does not treat the underlying cause of agitation, but has a slightly shorter onset time.
  - The intent is that ketamine be limited to situations where the risk is so overwhelming that the shorter onset time of ketamine is necessary to prevent harm, despite the medication's disadvantages. This is usually in the context of extreme violence, psychostimulant involvement, and ongoing significant resistance to police restraint.
  - Extreme risk relates to a substantial potential for death or serious injury.

  - Immediate risk refers to the risk being present right now or occurring very soon (i.e. seconds).

- Avoid cutting clothing or administration of an IM injection through patient clothing where possible.
- Olanzapine-only sedation - Patients administered olanzapine may not necessarily require transport to hospital and may be suitable for community-based care. Consider consultation with TelePROMPT as per **CPG A0107 Mental Health Conditions**.
- Consider the use of oral olanzapine to maintain a calm state where the agitated patient has responded to de-escalation yet has a propensity to re-escalate.
- Do not sedate a patient with a history of acute behavioural disturbance 'just in case' where they do not display any anxiety or agitation.
- Some patients have a higher risk of adverse effects from sedation including: frail, elderly, morbid obesity, obstructive sleep apnoea and severe chronic disease.
- **Sedation checklist**

Combining sedation agents

- A combination of sedative agents can cause profound sedation requiring advanced airway management.
- Multiple parenteral agents should only be used for initial sedation where advanced airway management is possible (MICA only) and where the full onset time of the initial medicine administered has passed. If advanced airway management is not possible (e.g. no MICA on scene), ALS paramedics must consult the AV Medical Advisor via the AV Clinician prior to combining different parenteral sedatives. This does not apply to the use of a different agent for maintenance sedation where the episode of care exceeds the duration of action of the initial sedation.
- The use of olanzapine may be considered where care times are extended and the therapeutic effects of droperidol are wearing off and the patient is cooperative but remains agitated.
- Where ketamine is required to manage extreme agitation in the patient who is also experiencing serotonin toxicity or severe drug withdrawal, midazolam can be therapeutic. Prepare for advanced airway management. ALS must consult the AV Medical Advisor via the AV Clinician for midazolam where ketamine has already been administered. See **CPG A0719 Drug Induced Hyperthermia**.

Post-sedation care

- Where parenteral sedation has taken effect and SAT < -1, a minimum standard of monitoring and supportive care is required.

Supportive care

- Supportive care should be provided as required including:
  - Airway management
  - Position patient in lateral position
  - Supplemental O_2 as per **CPG A0001 Oxygen Therapy** (routine if sedated with ketamine)
  - Temperature management as per **CPG A0901 Hypothermia**, **CPG A902 Hyperthermia** and **CPG A0719 Drug Induced Hyperthermia**
  - Reassessment and management of clinical causes of acute behavioural disturbance
  - **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)

Monitoring

- Maintain line-of-sight monitoring at all times
- At a minimum, observation must be undertaken and documented every 15 mins
- Minimum repeat assessment:
  - Airway patency
  - RR, HR
  - SpO_2
  - Continuous cardiac monitoring
  - Sedation Assessment Tool
  - Neurovascular status of restrained limbs
  - Injury from mechanical restraints
  - Blood pressure
  - $ETCO_2$: Any time ketamine is used or sedation SAT < 0, nasal $ETCO_2$ monitoring must be commenced, line-of-sight monitoring initiated, and consideration given to more frequent vital sign assessment.
- **SAT:** Use of the Sedation Assessment Tool (SAT) will assist in ongoing monitoring, clinical handover and case documentation.

SCORE	RESPONSIVENESS	SPEECH
+3	Combative, violent out of control	Continual loud outbursts
+2	Very anxious and agitated	Loud outbursts
+1	Anxious / restless	Normal / talkative
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

Transport destination

- **16 and 17 years old:** Consult with AV Clinician for most appropriate destination hospital.

Aeromedical

- The agitated patient, regardless of the cause, has the potential to endanger both aircrew and the aircraft. A strong index of suspicion should be maintained for the potential for agitation or escalation of behaviour for any patient requiring aeromedical transport and a lower threshold for intervention should form an essential part of the dynamic risk assessment.
- All patients requiring aeromedical transport must be screened for any potential behaviours of concern prior to loading onto an aircraft. All reasonable steps must be undertaken including the use of an appropriate sedation regime as outlined in this CPG and/or mechanical restraints as necessary

to ensure crew and aircraft safety.

- If any doubt exists as to any potential safety issues resulting from patient behaviour or potential behaviour, Aeromedical crew may elect to refuse air transport and notwithstanding the presenting clinical problem, may request road transport of the patient to the nearest appropriate facility.
- Under CASA law, the pilot in command (PIC) can determine that the carriage of a patient may be unsafe and request further steps be undertaken to mitigate any potential risks. The PIC has the statutory power to refuse transport of a patient or persons at any time.

Related Resources

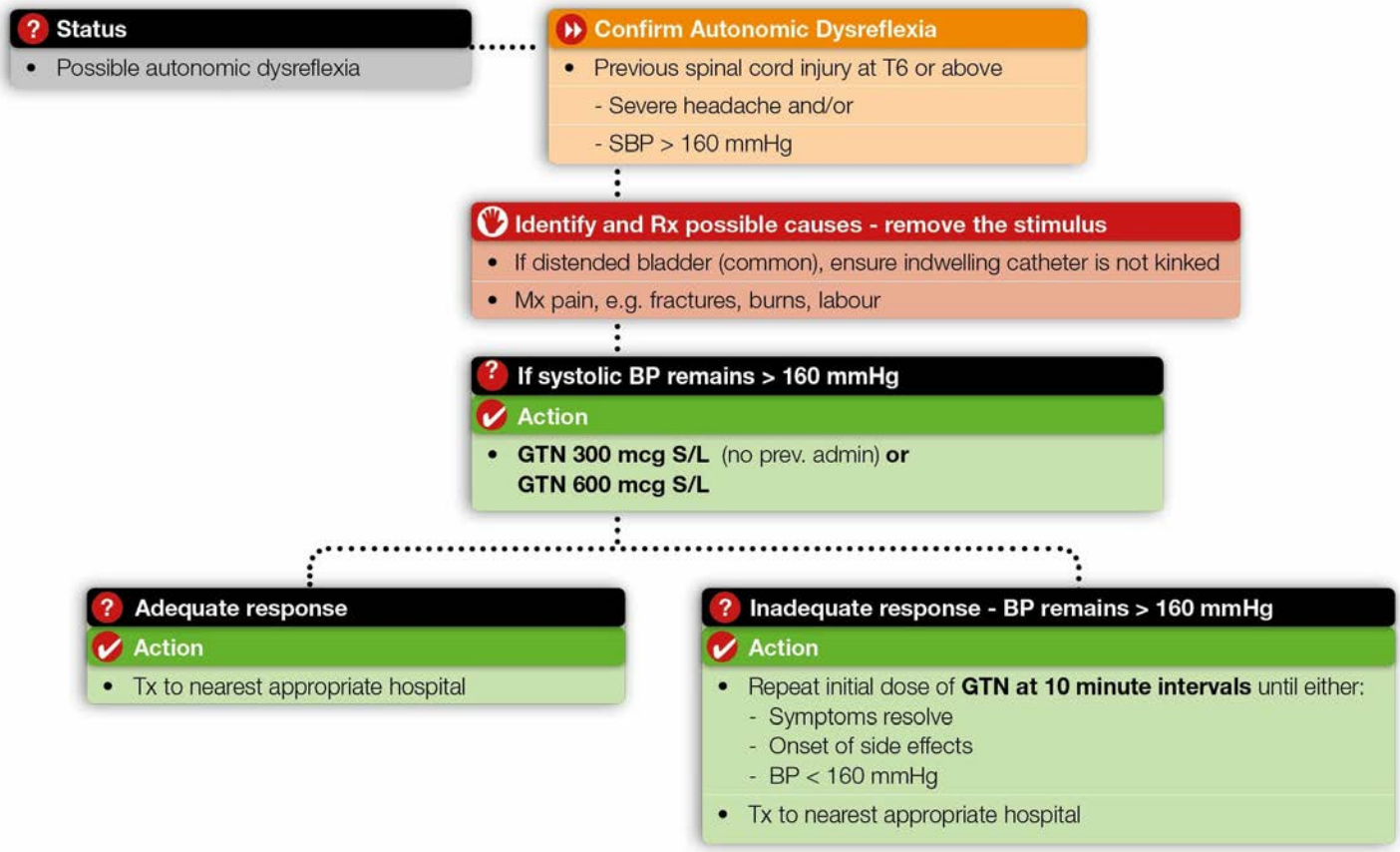
- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Agitation CPG review March 2021.pdf
- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC paper - Acute Behavioural Disturbance updates 2024.pdf
- CPG Walkthrough Video - Acute Behavioural Disturbance (Part 1: Assessment and De-escalation)
- CPG Walkthrough Video - Acute Behavioural Disturbance (Part 2: Restraint and Sedation)
- Key references
  - Therapeutic Guidelines Psychotropic (Acute Behavioural Disturbance chapter). 2021. Available via https://www.tg.org.au/
  - Safer Care Victoria Guidance: Acute Behavioural Disturbance. Jan 2021. Available via https://www.bettersafercare.vic.gov.au/clinical-guidance/emergency/acute-behavioural-disturbance

Autonomic Dysreflexia CPG A0710

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



Suspected Stroke or TIA CPG A0711

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.
- O_2 therapy is reserved for patients with SpO_2 <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 strokes 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 AV 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.
- **Stroke capable ambulance (SCA):** Use the **Zeus app** for all MASS positive patients presenting in the SCA catchment area
  More information

> As part of the SCA trial the Zeus app guides the paramedic through the ACT-FAST assessment and advises the paramedic to consult a RMH Neurologist for Large Vessel Occlusive (LVO) strokes.
>
> The stroke capable ambulance learning package contains more information on the project and how to use the Zeus app.

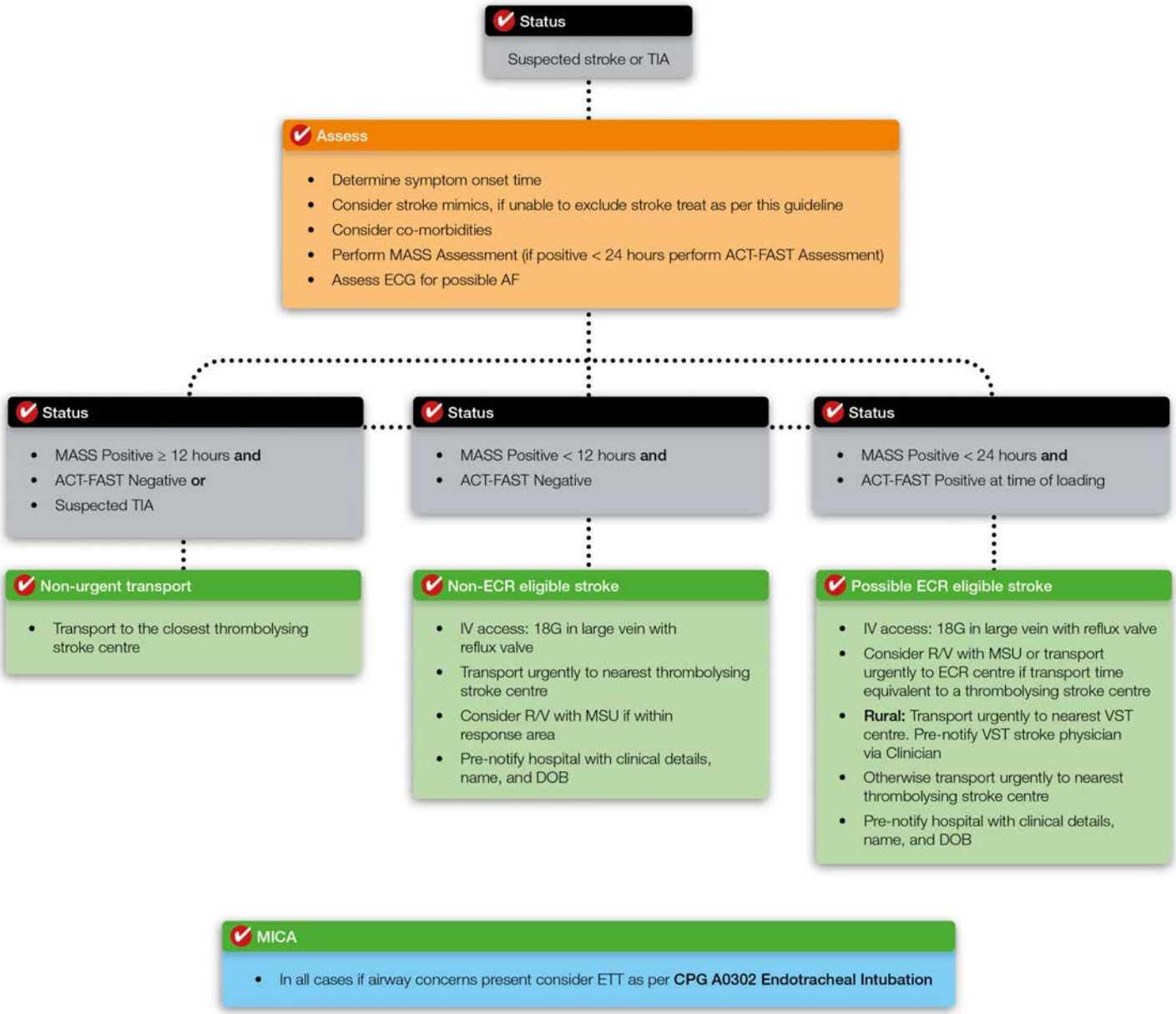
Endotracheal intubation

- 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


Status
Suspected stroke or TIA
Assess
Determine symptom onset time
Consider stroke mimics, if unable to exclude stroke treat as per this guideline
Consider co-morbidities
Perform MASS Assessment (if positive < 24 hours perform ACT-FAST Assessment)
Assess ECG for possible AF
Status
MASS Positive ≥ 12 hours and
ACT-FAST Negative or
Suspected TIA
Non-urgent transport
Transport to the closest thrombolysing stroke centre
Status
MASS Positive < 12 hours and
ACT-FAST Negative
Non-ECR eligible stroke
IV access: 18G in large vein with reflux valve
Transport urgently to nearest thrombolysing stroke centre
Consider R/V with MSU if within response area
Pre-notify hospital with clinical details, name, and DOB
Status
MASS Positive < 24 hours and
ACT-FAST Positive at time of loading
Possible ECR eligible stroke
IV access: 18G in large vein with reflux valve
Consider R/V with MSU or transport urgently to ECR centre if transport time equivalent to a thrombolysing stroke centre
Rural: Transport urgently to nearest VST centre. Pre-notify VST stroke physician via Clinician
Otherwise transport urgently to nearest thrombolysing stroke centre
Pre-notify hospital with clinical details, name, and DOB
MICA
In all cases if airway concerns present consider ETT as per CPG A0302 Endotracheal Intubation

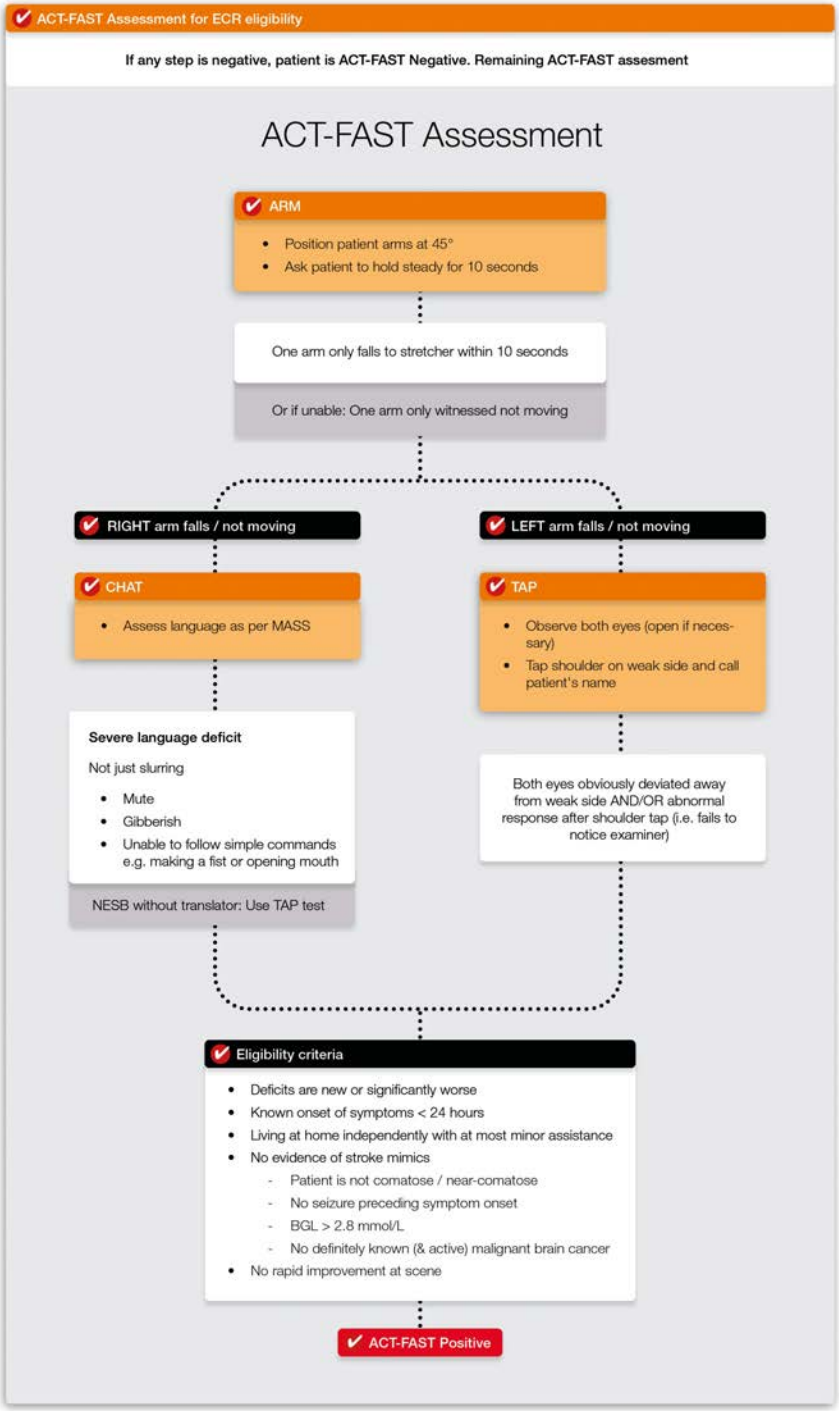
Flowchart – MASS Stroke Assessment

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

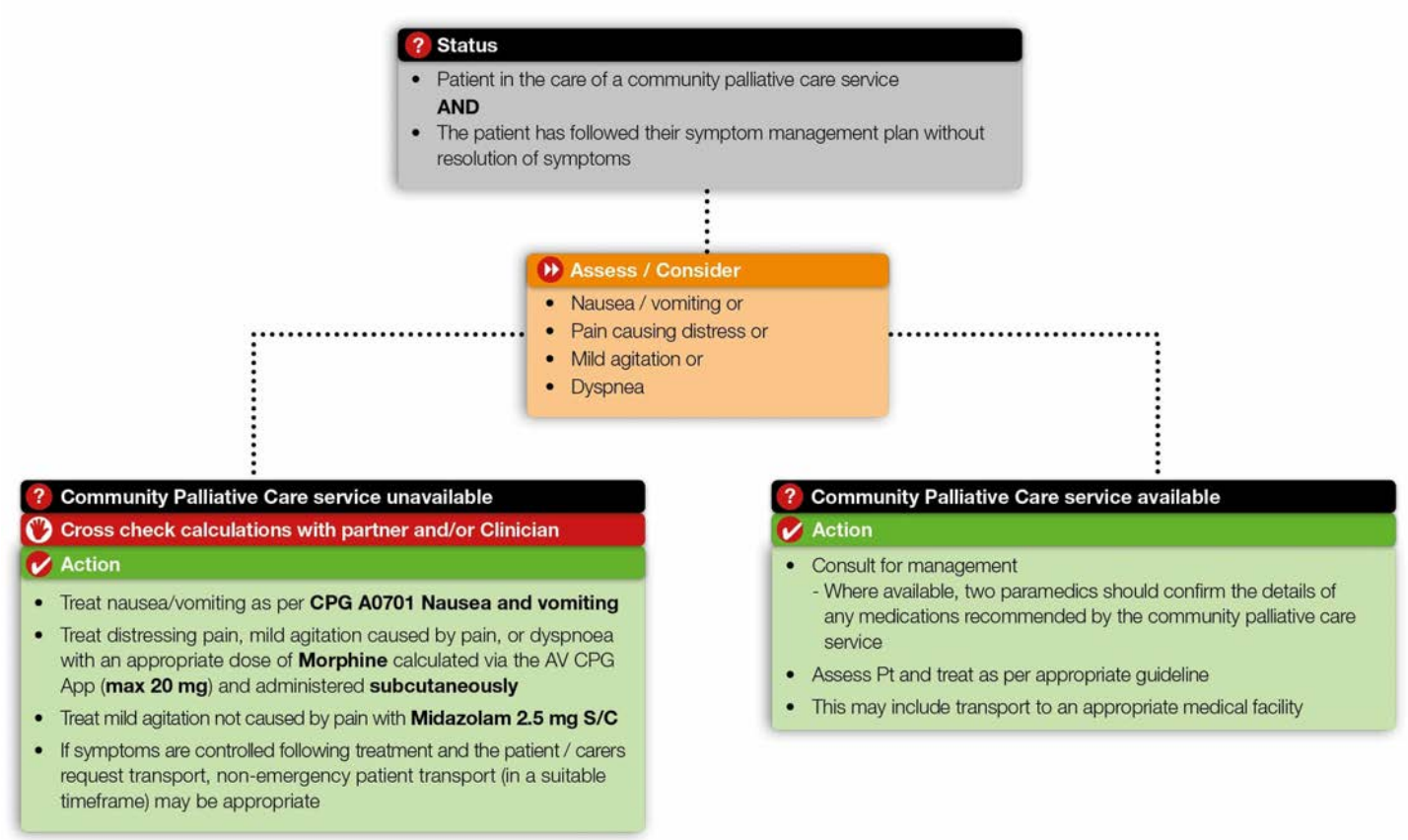
- The purpose of this CPG is to provide paramedics with guidance in managing patients who are currently registered with a community palliative care service and call an ambulance due to new or escalating symptoms. These symptoms are likely to be nausea/vomiting, pain, agitation/anxiety or dyspnoea.
- 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

- For patient care advice and care planning, contact the patient's palliative care team. If the patient's palliative care service is not available, contact the Palliative Care Advice Service (**1800 360 000**, 7am – 10pm, seven days a week)
- 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 ≥ 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.

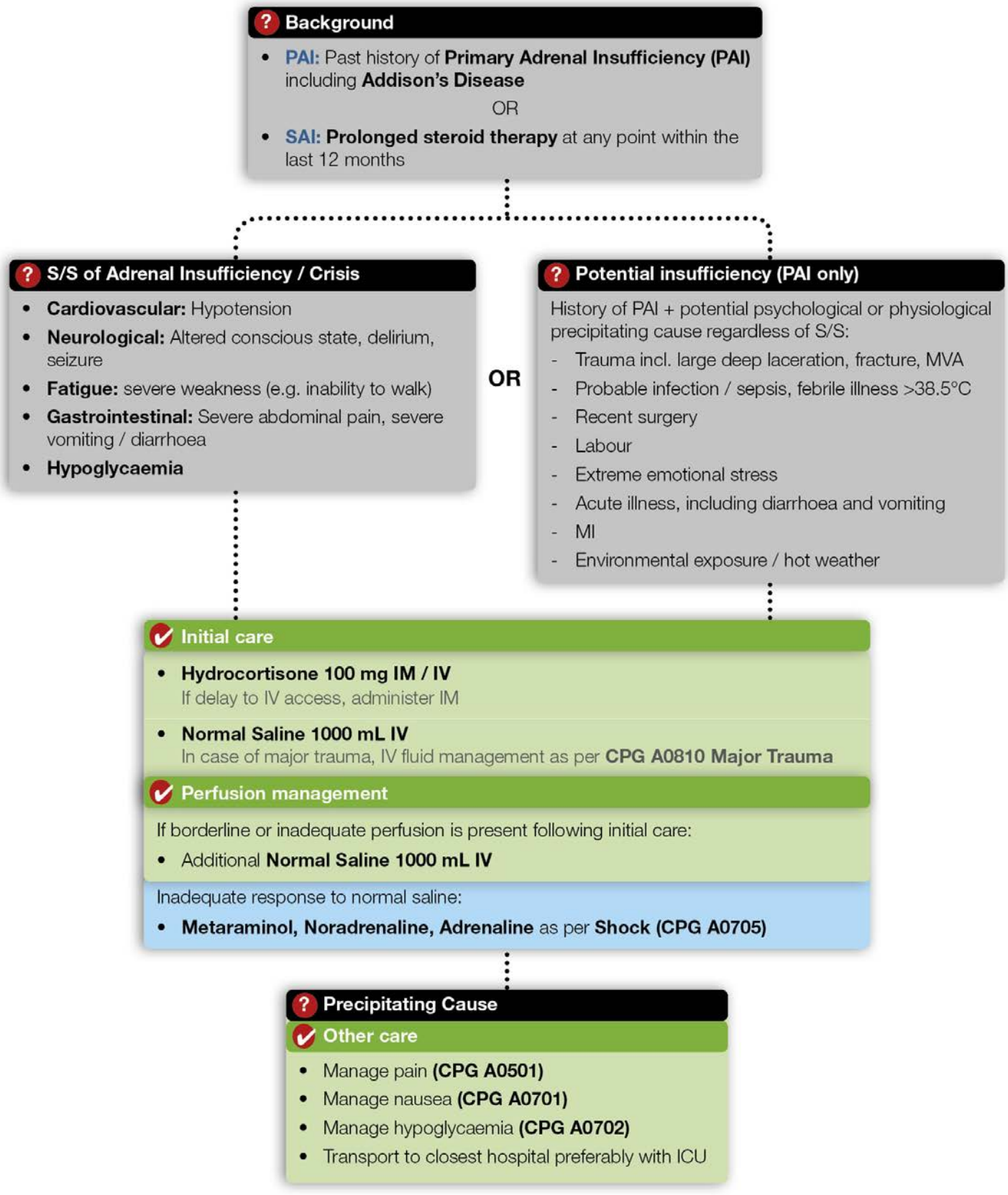
Flowchart



Related Resources

- https://av-digital-cpg.web.app/assets/pdf/CWI/CWI OPS 174 Medication Administration by Subcutaneous Injection.pdf
- https://av-digital-cpg.web.app/assets/pdf/Palliative Care Advice Service.pdf

Flowchart


Background
PAI: Past history of Primary Adrenal Insufficiency (PAI) including Addison's Disease
OR
SAI: Prolonged steroid therapy at any point within the last 12 months
S/S of Adrenal Insufficiency / Crisis
Cardiovascular: Hypotension
Neurological: Altered conscious state, delirium, seizure
Fatigue: severe weakness (e.g. inability to walk)
Gastrointestinal: Severe abdominal pain, severe vomiting / diarrhoea
Hypoglycaemia
OR
Potential insufficiency (PAI only)
History of PAI + potential psychological or physiological precipitating cause regardless of S/S:
- Trauma incl. large deep laceration, fracture, MVA
- Probable infection / sepsis, febrile illness >38.5°C
- Recent surgery
- Labour
- Extreme emotional stress
- Acute illness, including diarrhoea and vomiting
- MI
- Environmental exposure / hot weather
Initial care
Hydrocortisone 100 mg IM / IV
If delay to IV access, administer IM
Normal Saline 1000 mL IV
In case of major trauma, IV fluid management as per CPG A0810 Major Trauma
Perfusion management
If borderline or inadequate perfusion is present following initial care:
Additional Normal Saline 1000 mL IV
Inadequate response to normal saline:
Metaraminol, Noradrenaline, Adrenaline as per Shock (CPG A0705)
Precipitating Cause
Other care
Manage pain (CPG A0501)
Manage nausea (CPG A0701)
Manage hypoglycaemia (CPG A0702)
Transport to closest hospital preferably with ICU

Care Objectives

- Prioritise corticosteroid therapy
- Support perfusion with IV fluid
- Transport to closest hospital preferably with ICU

Intended patient group

- Patients aged ≥ 16 years with suspected adrenal insufficiency

General Notes

Adrenal insufficiency

- An endocrine disorder characterised by inadequate production of the adrenal hormones cortisol +/- aldosterone leading to impaired regulation of glucose levels and cardiovascular function.
- Can lead to an **adrenal crisis**, a severe life-threatening form of adrenal insufficiency.

Types

Primary Adrenal Insufficiency (PAI)

- Includes Addison's Disease and Congenital Adrenal Hyperplasia (CAH)
- Due to adrenal gland destruction or impairment
- Often triggered by physiological or psychological stress

Secondary Adrenal Insufficiency (SAI)

- Occurs where pituitary or hypothalamic impairment reduces production of adrenocorticotropic hormone (ACTH) in turn reducing steroid hormone secretion from adrenal glands
- Can occur following prolonged (glucocorticoid) steroid therapy. If therapy is suddenly ceased or the dose is inadequate for the amount of stress present, the adrenal glands may not be able to produce sufficient cortisol to meet demand, precipitating an adrenal crisis.

Prolonged steroid therapy

- Illnesses managed with steroid therapy include: asthma, COPD, inflammatory bowel diseases, rheumatic diseases, vasculitis and organ transplantation.
- The potency, dose, and duration of steroid therapy can vary. As a guide, patients likely to have SAI in this setting include:
  - > 20 mg of prednisone a day (or equivalent dose of other steroids) for more than 3 weeks
  - An evening/bedtime dose of ≥ 5 mg of prednisone for more than a few weeks
  - Patients with a Cushingoid appearance due to chronic high cortisol (i.e. facial plethora,

obesity, buffalo hump)

- As SAI is also capable of precipitating life-threatening adrenal crisis it must be viewed as comparable in severity to PAI.

Assessment

The assessment items below are of particular relevance in adrenal insufficiency.

- **History:** PAI, corticosteroid pharmacotherapy, physiological or psychological stress
- **ECG:** Due to risk of hyperkalaemia
- **BGL:** Due to risk of hypoglycaemia

Symptoms of adrenal insufficiency may be mild to severe. Early signs may include mood swings, irritability, joint pain, fatigue, difficulty to rouse, and abdominal cramping.

Gender identity

In a small proportion of patients, the mechanisms of PAI (especially CAH) can result in undifferentiated development of sexual organs during in-utero growth. Children may be born with atypical genitalia, and this may or may not have been surgically corrected at some point. Be mindful of gender cues in conversation as a patient may be referred to as they/them.

Management

All patients

- Patients with a history of PAI must be considered for treatment with hydrocortisone where any physiological or psychological stressor is considered moderate or severe in order to avoid potential adrenal crisis.
- Signs and symptoms of adrenal insufficiency are not required to manage this patient group.
- Patients with PAI are generally well educated about their illness and can often identify when they are suffering symptoms of adrenal insufficiency. Accordingly patients may have initiated their ‘sick day management plan’ including administration of their own IM injection of hydrocortisone. Alternatively patients may request Paramedics administer hydrocortisone. Review the patient's care plan as a part of your assessment.
- The patient with a history of PAI may have very poor veins for IV access. Do not delay hydrocortisone while trying to gain IV access. Use the IM route.

Extended travel time > 1 hour

- Consult with the patient’s endocrine specialist or AV Medical Advisor via the AV Clinician to establish ongoing IV fluid management plan and any other care priorities.

Hydrocortisone is unlikely to cause harm but has the potential to be life-saving.
If there is any doubt, initiate Hydrocortisone and IV fluids.

Related Resources

- Adrenal crisis : when to give an emergency injection
- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Adrenal Insufficiency CPG - MAC Sept 2021.pdf

Flowchart

Care Objectives

- Identify patients suffering from syncope
- Symptomatic management if required
- Identify care pathway appropriate to patient's condition and risk profile

Intended patient group

- Patients ≥ 16 years of age with transient loss of consciousness.

Overview

- Syncope is a transient loss of consciousness due to cerebral hypoperfusion, with defining characteristics including a rapid onset, short duration, and spontaneous complete recovery.
- Syncope may be reflex, secondary to orthostatic hypotension, or cardiovascular in nature.
- Approximately 1 in 5 people will experience a syncope within their lifetime.
- Many syncopal episodes will be the result of benign processes; however syncope may be a symptom of a more severe disease process.
- Low-risk syncope presentations can be safely managed within the community with appropriate follow-up in place.
- Patients referred to the Victorian Virtual Emergency Department (VVED) must have a copy of their 12-Lead ECG sent for review by the VVED clinician during clinical handover.

Assessment

History

- The clinical history in patients with suspected syncope can often be sufficient to identify the underlying diagnosis.
- Syncope may present with tonic-clonic motions similar to seizure activity. However, the presence of tongue biting, incontinence, post-ictal phase, and/or absence of autonomic activation (e.g., diaphoresis) prior to collapse are suggestive of seizure.
- Syncope may also present with stroke-like symptoms and reflect a transient ischaemic attack (TIA), which requires urgent investigation in-hospital.

Characteristics associated with syncope classifications

Reflex Syncope (including vasovagal syncope)	**Orthostatic Hypotension**	**Cardiovascular**
• History of recurrent syncope before age 40 • Preceded by unpleasant sight, sound, smell, or pain • Prolonged standing • During meal • Being in crowded and/or hot place • Autonomic symptoms prior to collapse (pallor, sweating, nausea/vomiting) • With head rotation or pressure on carotid sinus (tight collars, shaving)	• While, or immediately following, standing • Prolonged standing • Standing following exertion • Hypotension following a meal • Initiation or modification of vasodepressive medications or diuretics • Presence of autonomic neuropathy or parkinsonism	• During exertion or when supine • Sudden onset palpitations immediately followed by collapse • Familial history of unexplained death at young age • Structural heart or coronary artery disease • Concerning ECG findings

• Absence of pre-existing heart disease		

Physical Examination

- Orthostatic hypotension involves a decrease in systolic blood pressure of at least 20 mmHg or diastolic of at least 10 mmHg following standing and has a broad differential diagnosis which should be investigated. Consider:
  - Fever and infection
  - Significant consumption of alcohol
  - New or modified antihypertensive or diuretic medications
  - Dehydration
  - Significant blood loss
- Where available, consider additional diagnostic measures for selected groups:
  - Pregnancy testing for patients of child-bearing age
  - Lactate testing for patients with a history of possible seizure activity (> 4.75 mmol/L suggests seizure rather than syncope)
- Concerning ECG findings suggestive of cardiovascular syncope include:
  - Bradycardia not explained by conditioning
  - 2nd or 3rd degree AV block
  - Supraventricular tachycardia, or paroxysmal atrial fibrillation
  - Pre-excited QRS complexes on ECG

More information

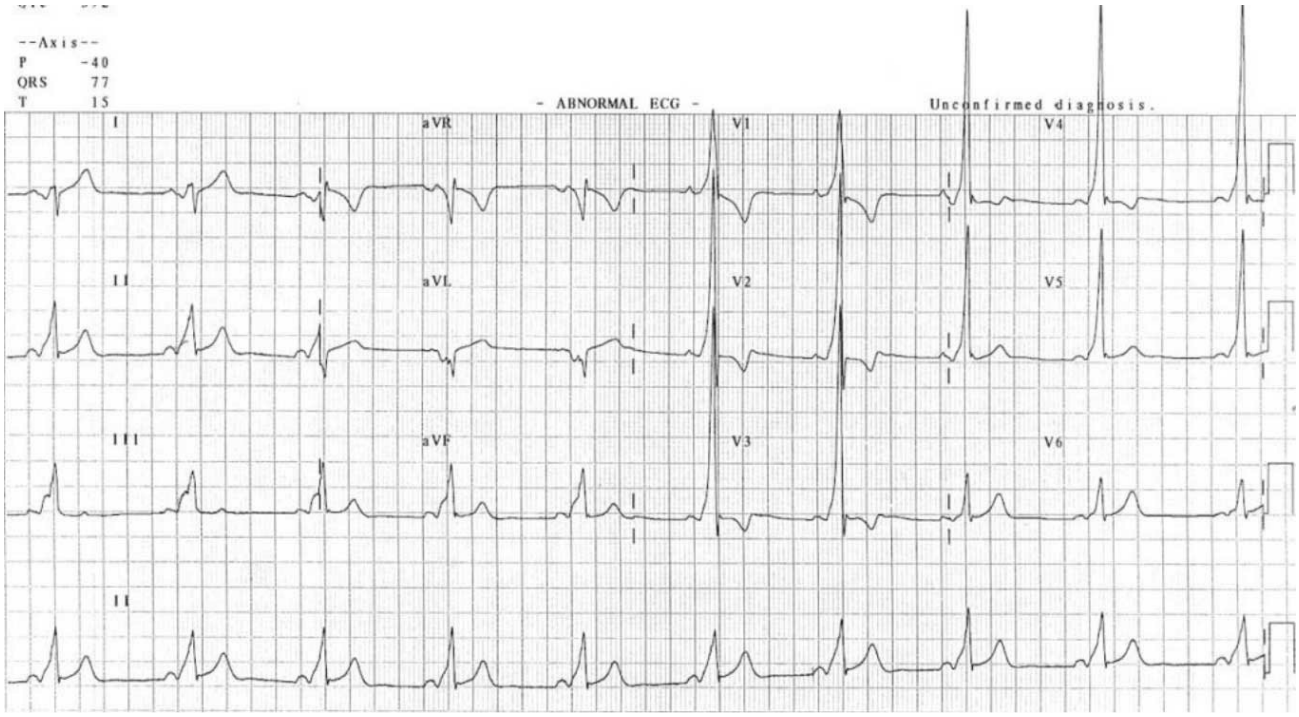


Figure 1 – Broad QRS complexes with slurred upstroke into QRS (pre-excited QRS complexes)

Management

Low-risk syncope

Referral

- Patients with reflex syncope or uncomplicated orthostatic hypotension may be appropriate for management in an outpatient setting.
- If patient has no competing clinical priorities requiring ED care, refer them to the Victorian Virtual Emergency Department (VVED) for consideration of out-patient management.
  - If referring patient to VVED, a copy of the recorded 12-Lead ECG must be sent to the VVED clinician for review during clinical handover.

Self-care advice

- If patient feels faint, lie flat and elevate their feet.
- Fresh air may assist in relieving symptoms.
- Remain flat for 10 minutes. When returning to standing, move slowly and monitor for symptoms.
- Follow advice of VVED clinician regarding suitability to drive.
- Further information is available from Better Health Victoria

Safety netting

- Call 000 if patient develops high-risk symptoms, including:
  - Chest pain
  - Shortness of breath
  - Stroke symptoms
  - Palpitations
  - Severe headache

High-risk syncope

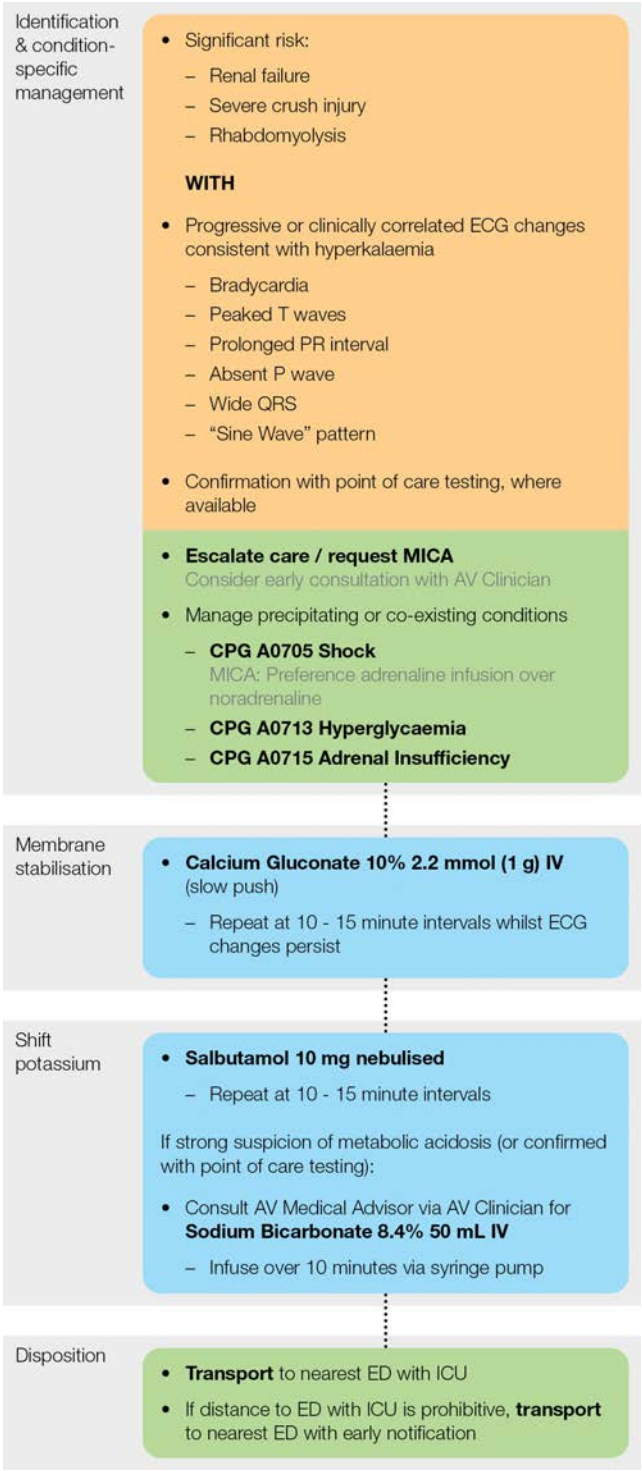
- Patients with high-risk features require prolonged observation, monitoring, and/or definitive care in the ED and are not suitable for outpatient management.
- Transport these patients and manage as per appropriate CPG for condition, where required.

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Syncope.pdf
- Walkthrough video - Syncope

Hyperkalaemia CPG A0724

Flowchart



Care Objectives

- Identification of patients with suspected hyperkalaemia
- Stabilisation of cardiac membrane

- Intracellular shifting of potassium
- Where feasible, transfer to facility with intensive care capability

Intended patient group

- Patients aged ≥ 16 years with clinically suspected or laboratory confirmed hyperkalaemia

Assessment

Historical features

- Symptoms may be vague and non-specific. A presenting complaint of profound weakness or fatigue is common.
- The degree of symptoms experienced relates to the rate of potassium rise, rather than an absolute measured potassium level.
- Patients with known chronic renal disease may present with isolated, not clinically relevant, elevations of their serum potassium. In the absence of ECG changes or a demonstrated rapid rise in serum potassium, these patients should **not** be managed for hyperkalaemia in the out-of-hospital setting.
- Hyperkalaemia can result from severe cellular damage. Suspect hyperkalemia in the following presentations if also presenting with ECG changes:
  - Severe crush injury e.g., prolonged entrapment under large amount of force
  - Rhabdomyolysis e.g., caused by extreme exertional / sports-related fatigue.
- Pseudohyperkalaemia is a false-positive elevation in serum potassium, typically found following a blood collection involving significant trauma or fist clenching.
  - In cases of laboratory-identified hyperkalaemia **without** clinical history or ECG findings consistent with hyperkalaemia, provide conservative management with close observation for deterioration.

More information

Common Causes of Hyperkalaemia	
Physiology	**Historical Features**
Renal Failure	• Known renal failure • Receiving dialysis (peritoneal or haemodialysis) • Known reduced estimated glomerular filtration rate (eGFR)
Cellular Potassium Release	• Rhabdomyolysis • Severe metabolic acidosis

	• Severe crush injury • Severe burns
Drug-Induced	• Potassium-sparing diuretics (*amiloride, spironolactone*) • ACE inhibitors (*enalapril, lisinopril, perindopril, ramipril*) • Angiotensin II blockers (*candesartan, losartan*) • Trimethoprim • Ciclosporin

ECG findings

- The degree of ECG changes does not correlate with specific potassium levels.
- Progression of ECG findings is strongly supportive of hyperkalaemia and should prompt urgent management.
- Isolated ECG findings such as bradycardia and first-degree heart block should be clinically correlated with the patient's history.
  - Consider a period of close observation prior to initiating management.
- Common ECG changes include:
  - Bradyarrhythmia
  - Tall, peaked T waves with a shortened QT interval
  - Prolonged PR interval
  - Absent P wave
  - Widened QRS
  - "Sine Wave" ECG pattern

More information

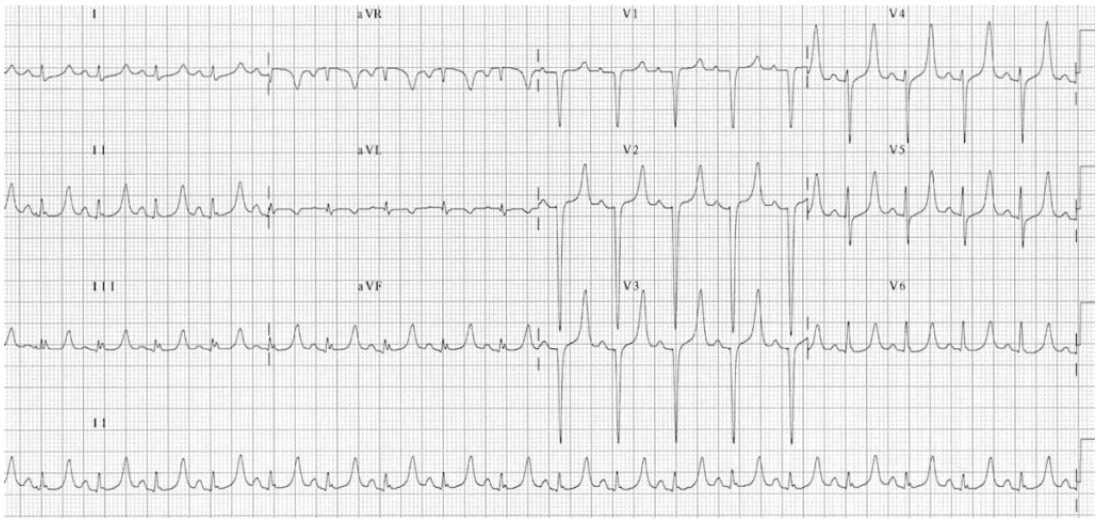


Figure 1: Tall, peaked T waves with shortened QT interval

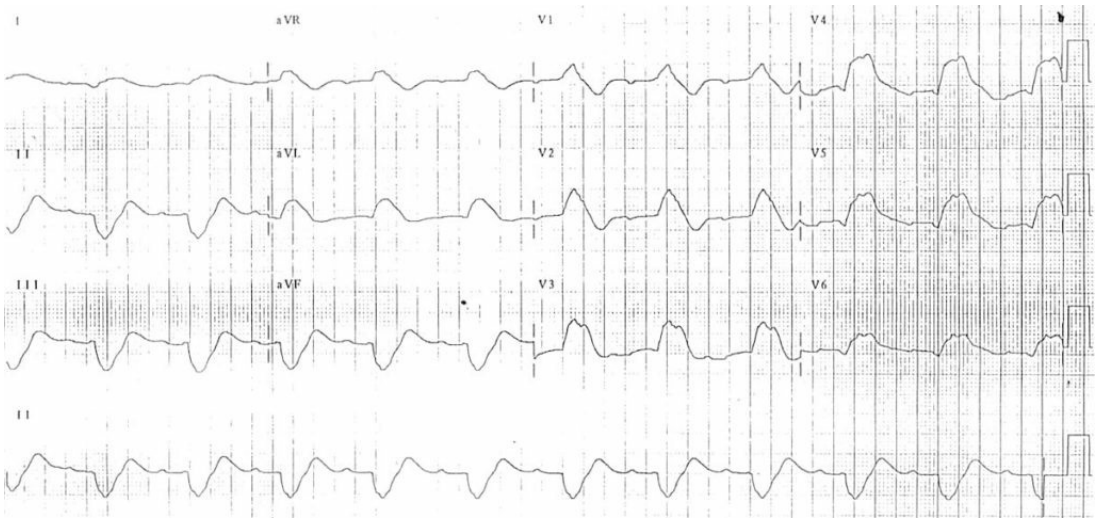


Figure 2: Prolonged PR interval with wide QRS complexes

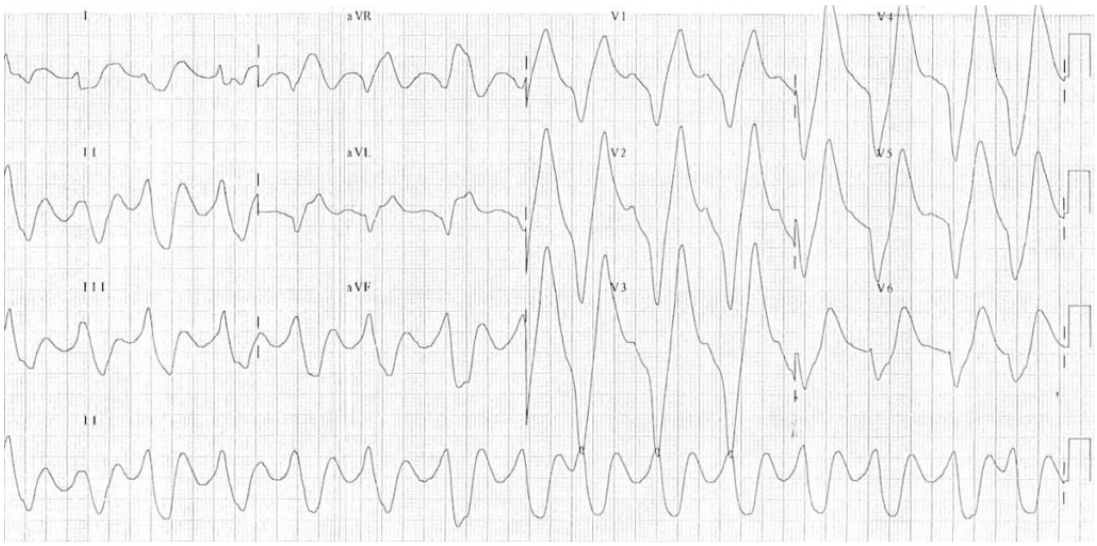


Figure 3: “Sine Wave” ECG pattern

Management

Identification and condition-specific management

- The absence of ECG changes does not exclude hyperkalaemia: maintain a strong index of suspicion in patients at risk.
- Management of specific conditions associated with an increased risk of hyperkalaemia will support maintenance of potassium homeostasis.
  - In patients with hyperkalaemia secondary to an acidosis, correction of the primary cause of acidosis is the primary treatment goal.
- Manage:
  - Hypoperfusion as per **CPG A0705 Shock**
    Preference adrenaline infusion over noradrenaline (see below - Intracellular shifting of potassium)
  - Diabetic ketoacidosis as per **CPG A0713 Hyperglycaemia**
  - Adrenal crisis as per **CPG A0715 Adrenal Insufficiency**

Membrane stabilisation

- Calcium antagonises the effects of potassium on cardiac membranes **without** decreasing plasma potassium levels.
- Administer **Calcium Gluconate** to any patient with a strong clinical history of hyperkalaemia **and** significant or progressive ECG changes prior to confirmation with laboratory sampling.

Intracellular shifting of potassium

- Beta-adrenergic agonists (salbutamol and adrenaline) activate sodium-potassium pumps and cause potassium to shift into cells.
  - This is not a definitive treatment for hyperkalaemia but can assist in temporising patients in the out-of-hospital setting.
  - Adrenaline is the preferred vasoactive agent when shock is present in the setting of hyperkalaemia given its strong beta-adrenergic effects.
- The use of sodium bicarbonate in the management of hyperkalaemia is controversial and generally not supported except in cases of severe metabolic acidosis. Consult the AV Medical Advisor via the AV Clinician in these cases to discuss the risks and benefits of administration.

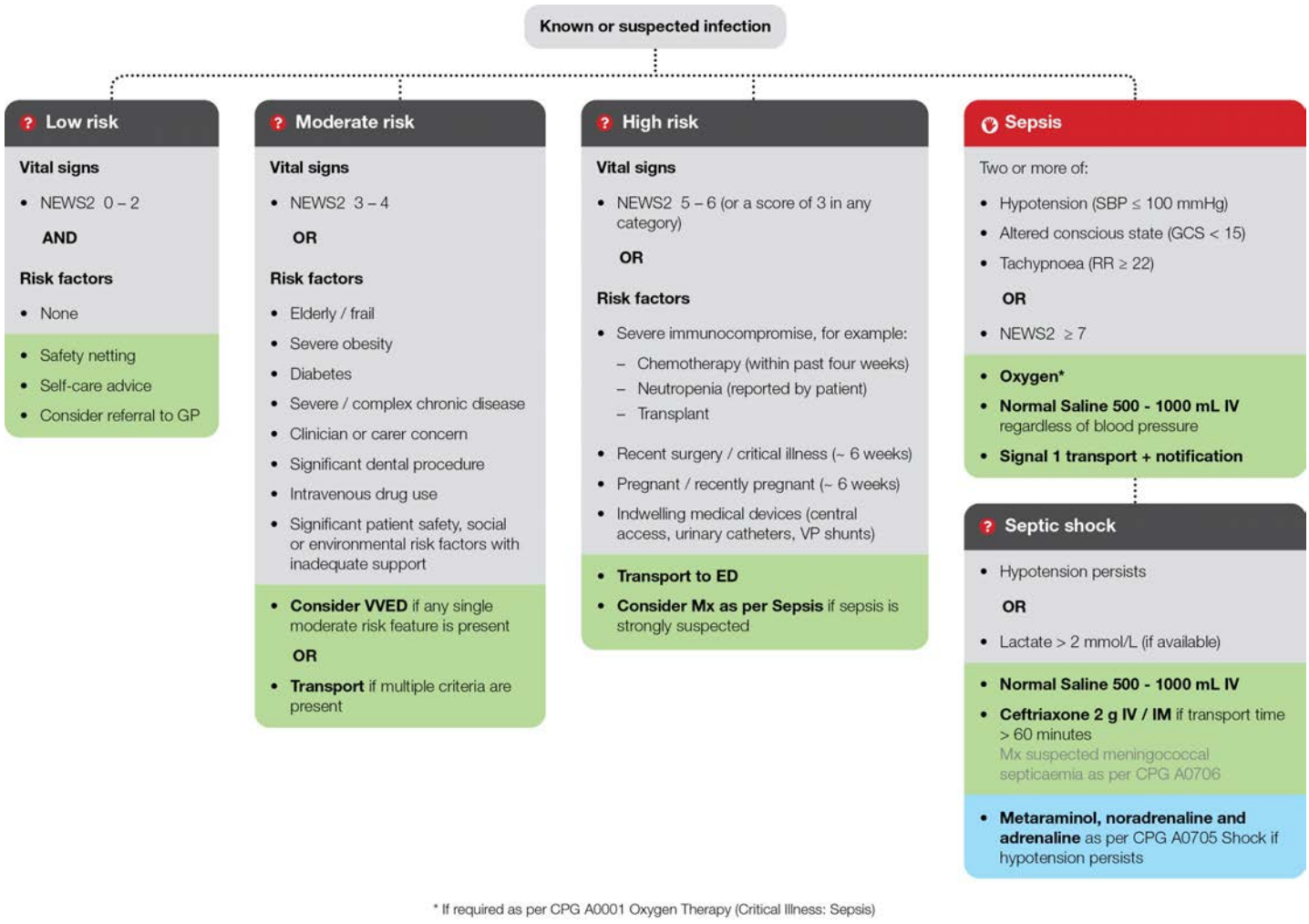
Disposition

- Most patients with hyperkalaemia will require specialist care, including dialysis treatment.
- If transport to a facility with intensive care capabilities is possible within a reasonable time frame (as determined by the criticality of the patient), patients with hyperkalaemia should be preferentially transported to these facilities.
- Where transport to a facility with intensive care capabilities is **not** possible within a reasonable time frame (as determined by the criticality of the patient), provide early notification to the receiving hospital, and consider consulting with the AV Clinician or ARV to facilitate expedited retrieval.

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Hyperkalaemia.pdf
- Walkthrough video - Hyperkalaemia

Flowchart



* If required as per CPG A0001 Oxygen Therapy (Critical Illness: Sepsis)

NEWS2 Calculator

Care Objectives

- Identify and treat patients with clear signs of sepsis
- Risk stratify patients presenting with infection to inform an appropriate disposition

Intended Patient Group

- Patients ≥ 16 years of age with suspected infection or sepsis

Overview

- **Sepsis** is life-threatening organ dysfunction caused by a dysregulated response to infection.[1]
- **Septic shock** is sepsis with circulatory and cellular / metabolic abnormalities significant enough to substantially increase mortality.[1]

More information

Sepsis is defined as life-threatening organ dysfunction caused by a dysregulated response to infection. There is no single diagnostic test or set of criteria that define sepsis.

This guideline combines a clinical suspicion of infection, the Quick Sequential Organ Failure Assessment (qSOFA), the National Early Warning Score 2 (NEWS2) and the consideration of risk factors to inform a clinical judgement regarding the likelihood that the patient has sepsis.

qSOFA
The Quick Sequential Organ Failure Score (qSOFA) is used to identify patients with infection who have increased risk of sepsis, ICU admission and mortality using criteria that are easily available in the out-of-hospital environment.

qSOFA includes:

- Hypotension (SBP $\leq$ 100 mmHg)
- Altered conscious state (GCS < 15 unless normal for the patient)
- Tachypnoea (RR $\geq$ 22)

Evidence suggests the presence of two or more these criteria in the setting of suspected infection is a relatively reliable predictor of sepsis. The pre-existing clinical judgement that an infection is present strongly influences the reliability of qSOFA. It is not a “sepsis test” in isolation. Similarly, the absence of qSOFA criteria does not reliably rule out sepsis.[2-6]

In this guideline, the qSOFA criteria are used as a way of identifying patients who require prompt prehospital resuscitation without the need to calculate more complex scores. There is no requirement to calculate a NEWS2 score prior to treating patients who are critically ill.

NEWS2
NEWS2 is a risk score that combines a range of vital signs abnormalities into a single measure of risk. It is a more reliable measure of the risk of sepsis, deterioration, and death than any single vital sign alone. However, it should always be interpreted in the context of the patient’s presentation, what is normal for the patient and their goals of care.

Points are attributed for abnormal observations across 7 categories. The more deranged the vital sign, the more points attributed. Points across each category are added up to calculate the total NEWS2 score.

SpO_2 Scale 2 should only be used for patients with hypercapnic respiratory failure who are known to have lower target oxygen saturation. This is a narrower group than all patients with an exacerbation of COPD.

Features that may suggest hypercapnic respiratory failure include:

- A diagnosed history of hypercapnic respiratory failure
- The patient has a known target oxygen saturation lower than normal
- Patient reports that they are a CO_2 retainer or require limited oxygen therapy

Physiological parameter	Score						
	3	2	1	0	1	2	3
Respiration rate (per minute)	≤8		9-11	12-20		21-24	≥25
SpO_2 Scale 1 (%)	≤91	92-93	94-95	≥96			
SpO_2 Scale 2 (%)	≤83	84-85	86-87	88-92 ≥93 on air	93-94 on oxygen	95-96 on oxygen	≥97 on oxygen
Air or oxygen?		Oxygen		Air			
Systolic blood pressure (mmHg)	≤90	91-100	101-110	111-219			≥220
Pulse (per minute)	≤40		41-50	51-90	91-110	111-130	≥131
Consciousness				Alert			CVPU
Temperature (°C)	≤35.0		35.1-36.0	36.1-38.0	38.1-39.0	≥39.1	

Fig1: SpO_2 scale 2 is used for patients with hypercapnic respiratory failure. Scale 1 is used for all other patients.

Risk factors
The consensus view during the development of this guideline was that scoring systems like NEWS2 alone are inadequate to judge the overall risk of sepsis. This guideline also includes the consideration of other features that increase risk, independent of the patient's vital signs. In some cases, these features may complicate the interpretation of NEWS2 (e.g. elderly patients may not present with aberrant vital signs). This combination of NEWS2 and risk factors is based on expert advice and is not a validated risk scoring system. Clinical judgement is still required to determine the best treatment and disposition for individual patients.

Septic Shock
Septic shock is sepsis with circulatory and cellular / metabolic abnormalities significant enough to substantially increase mortality.[1] More specifically this is defined as:

- Persistent hypotension requiring vasopressors to maintain MAP > 65 mmHg or BP ≥ 100 mmHg, and

- Serum lactate > 2 mmol/L despite adequate fluid resuscitation

Where these criteria are present, hospital mortality is in excess of 40%.[1]

Assessment

Signs and symptoms of infection

- **General:** fever, chills, rigors, malaise
- **Neurological:** altered mental status or acute deterioration in ADLs, headache, meningism
- **Respiratory:** cough, dyspnoea
- **Abdominal:** pain, rigidity, tenderness, guarding, swelling
- **Genitourinary:** dysuria, urinary frequency or urgency, haematuria
- **Skin:**
  - Cellulitis (erythema, oedema, warmth, pain)
  - Petechial rash
  - Septic arthritis (joint pain, swelling, warmth)
  - Infected wound or abscess (erythema, swelling, pain, purulent discharge)

Risk scores

- Patients with a suspected infection and hypotension should be treated without delay. There is no need to calculate a NEWS2 score prior to treating.
- In the absence of shock, calculate a NEWS2 score and consider risk factors for sepsis:
  - **NEWS2 score ≥ 7** indicates a very high risk of sepsis and deterioration. Patients should generally receive a fluid bolus (even if normotensive) and other sepsis care.
  - **NEWS2 score 5 - 6** indicates a high risk of sepsis. Patients should be transported to hospital. Consider a fluid bolus especially in the presence of other risk factors or cardiovascular instability (e.g. tachycardia).
  - **NEWS2 score 2 - 4** indicates moderate risk of sepsis. Patients require timely emergency department review (through VVED, self-presentation or transport to ED).
  - **NEWS2 score 0 - 2** in the context of no other risk factors for sepsis, indicates a low risk of sepsis. Patients may be appropriate for self-care or GP referral.
- **NEWS2 Calculator**

Risk factors

- **Diabetes** presents a spectrum of risk depending on severity of the diabetes and the source of infection. Uncontrolled diabetes (e.g. HBA1C > 10) with skin or soft tissue infection is associated with elevated risk. Well controlled diabetes in otherwise healthy patients with minor infection (e.g. URTI) does not present substantial additional risk.

- **Elderly / frail:**
  - There is no specific threshold where age and / or frailty become significant. Risk of adverse outcomes increases progressively with age above 65 years.
  - Cachexia (e.g. muscle wasting, fat loss, metabolic derangement, anorexia) and functional impairment is a marker of significant frailty.
  - Many frail patients present with infection as they near end of life. Consider their goals of care when making disposition decisions, as per **CPG A0114 Virtual ED**.
- **Severe obesity** may be associated with a higher risk of sepsis and of complications. Severe obesity refers to body mass index of > 40 although there is no requirement to calculate BMI.
- **Chemotherapy** includes any kind of IV or oral medications to treat cancer that affect the immune system, administered within the past four weeks.
- **Neutropenia** refers to reduced neutrophil count. There is no way to identify neutropenia clinically. Patients may report that they are neutropenic or have a low white blood cell count. Neutropenia is most commonly caused by chemotherapy for cancer but may also be caused some types of infections, cancers and autoimmune diseases.
- **Recent pregnancy** includes birth, miscarriage, or termination of pregnancy within ~6 weeks prior to presentation.

Management

Moderate risk

- **VVED referral is appropriate** for patients with some element of complexity associated with their presentation but with low overall risk and no obvious signs / symptoms that are high-risk for sepsis.
- **Transport is appropriate** where multiple moderate risk features are present, and the overall risk is higher (e.g. NEWS2 of 4 and elderly).

High risk

- Patients who meet two or more criteria of hypotension, altered conscious state, tachypnoea, or have an elevated NEWS2 score indicate an increased risk of sepsis induced organ dysfunction, and death. Patients may benefit from fluid resuscitation regardless of blood pressure (i.e. even if they are normotensive).
  - Patients who presented as normotensive, or whose hypotension resolves, do not require further fluid beyond the initial bolus.
  - Patients who remain hypotensive or who have a lactate > 2 mmol/L (if available) should receive further fluid.
- Reduced fluid doses within the recommended range (e.g. 500 mL) may be appropriate where the patient has a history of congestive heart failure, renal failure or is elderly/frail, especially if they are normotensive.
- Hypotension that persists despite fluid resuscitation should be treated with vasopressors.
- Patients with suspected meningococcal septicaemia should receive ceftriaxone as per **CPG A0706**.

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Sepsis and Infection 2024.pdf
- CPG Walkthrough Video - Sepsis and Infection

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Meningococcal Septicaemia CPG A0706

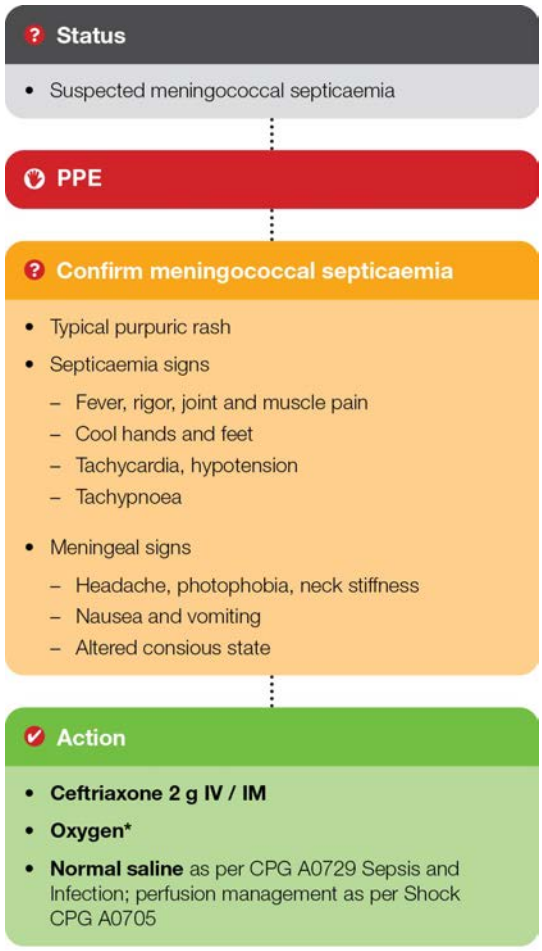
General Notes

- 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

- IV administration
  - 1g vial: Dilute with 9.5 mL water for injection to 10 mL.
  - 2g vial: Dilute with 19 mL water for injection to 20 mL.
  - Administer total dose over 4 minutes.
- IM administration
  - 1g vial: Dilute with 3.5 mL lignocaine 1% to 4 mL.
  - 2g vial: Dilute with 7 mL lignocaine 1% to 8 mL.
  - Administer each 1g dose separately into lateral upper thigh.

Flowchart



* If required as per CPG A0001 Oxygen Therapy (Critical Illness: Sepsis)

Influenza-like illness CPG A0716

Flowchart

- **Perform RAT**
  If positive, manage as per **CPG A0728 COVID-19 Management**

High risk

Vital signs

HR	> 120
RR	≥ 25
BP	< 100
SpO_2	< 92 %

Symptoms

- More concerning / severe chest pain
- More concerning / severe SOB

Risk factors

- Severe immunocompromise, for example:
  - Chemotherapy (within past four weeks)
  - Neutropenia (reported by patient)
  - Transplant

- **Transport to hospital** if any one of VSS, symptoms or risk factors are present.

Moderate risk

Vital signs

HR	110 - 120
RR	20 -24
BP	≥ 100
SpO_2	≥ 92 %

Symptoms

- Less concerning / mild chest pain
- Less concerning / mild SOB
- Purulent sputum (yellow or green)

Risk factors

- Age ≥ 65
- Pregnant
- Severe obesity
- Significant chronic disease:
  - Diabetes
  - Immunocompromise (e.g. steroids)
  - Respiratory illness (e.g. asthma, COPD)
  - Kidney disease
  - Cardiac disease (e.g. IHD)
- Clinician or carer concern
- Significant social or mental health concerns

- **VED Ambulance Referral** if any one of VSS, symptoms or risk factors are present. Transport to hospital if VED is unavailable or if several criteria are met.

Low risk

Vital signs

- Normal or mildly deranged vital signs
  Fever, mild tachycardia (HR 100-110) and mild tachypnoea (RR 16-20) are acceptable.

Symptoms

- Cough
- Fever (≥ 38.0°C)
- Sore throat
- Headache
- Sneezing
- Fatigue
- Myalgia

Risk factors

- No risk factors

- Education on expected course
- Safety netting
- Self-care advice (see below)
- Provide **health information sheet**
- Refer vulnerable close contacts for consideration of anti-viral prophylaxis

Care objective

- Identify patients with influenza-like illness
- Identify severity of disease and risk
- Identify a care pathway appropriate to the patient's condition / risk profile

Intended patient group

- Patients aged ≥ 16 years with influenza-like illness

Overview

Overview of influenza type illness

Influenza-like illness (ILI) refers to patients with an acute respiratory infection with onset of fever (≥ 38°C) and cough within the last 10 days. Influenza is difficult to distinguish from other respiratory infections and can only be confirmed through laboratory testing. ILI is a clinical diagnosis of symptoms that can be caused by several pathogens, but for which risk stratification and care are largely similar.

Mild symptoms are often caused by the common cold (rhinovirus). However, the severity of symptoms alone is not indicative of the underlying pathogen. Elderly patients may present with relatively mild symptoms despite being seriously ill.

Uncomplicated ILI in patient without risk factors for deterioration does not generally require medical intervention. Patients with risk factors for complications or evidence of serious illness should receive a medical review (either via VED or transport to ED depending on severity). Major risk factors for serious illness include extremes of age (infants and elderly), immunosuppression, chronic medical conditions, obesity and pregnancy.

COVID-19 may present with similar symptoms to influenza. Patients who have COVID as determined by a positive test (PCR or RAT), or where it is strongly suspected, should be managed as per **CPG A0728 COVID-19 Management**.

Assessment

Clinical features

Influenza is a viral respiratory illness characterised by:

- Seasonal nature (Australian flu season April to October)
- Abrupt onset, typically longer duration (>36 hours) and greater severity of symptoms by comparison to other common respiratory viruses (e.g. common cold)
- Respiratory symptoms:
  - Cough
  - Nasal congestion
  - Sneezing
  - Sore throat
- Systemic symptoms:
  - Chills
  - Myalgia

  - Malaise
  - Fatigue
  - Headache
  - Loss of appetite

- Fever (≥ 38.0°C)

Expected course

- Systemic systems and fever last approximately 2-5 days in uncomplicated cases.
- Cough, mild fatigue and other respiratory symptoms may persist for several weeks.

Other considerations

- Close contacts with risk factors for complications (see Moderate risk table) should seek advice from their GP as soon as possible to discuss if any preventative treatment required. Recommend that they consult their GP immediately if they develop symptoms.
- Consider paracetamol for muscle aches as per **CPG A0501-1 Pain relief** regardless of transport decision
- **Chemotherapy** includes any kind of IV or oral medications to treat cancer that effect the immune system, administered within the past four weeks.
- **Neutropenia** refers to reduced neutrophil count. There is no way to identify neutropenia clinically. Patient may report that they are neutropenic or have a low white blood cell count. Neutropenia is most commonly caused by chemotherapy for cancer but may also be caused some types of infections, cancers and autoimmune diseases.

Risk stratification

Clinical judgement should override these criteria. If any clinician has concerns despite meeting the *less concerning* criteria, escalate care.

Chest pain

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

Shortness of breath

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

Self-care advice

- Provide a **Health Information Sheet** where possible

- Stay at home if possible
  Influenza is contagious. You may spread it to other people. If you have to leave home, wear a mask, wash or sanitize your hands regularly and physically distance from other people.
- Stay hydrated
  Keep a bottle of water nearby, drink plenty of water and fill it up throughout the day
- Get as much rest as you can
  Good quality rest will help you to recover quicker
- Do a little gentle exercise every day
  Gentle walking around the house or garden
- Try to eat several small regular meals throughout the day
- Consider taking paracetamol or ibuprofen as directed on the packaging for aches and pains, fever or headaches
  Over the counter medicines may help with symptoms but do not take them if you have previously been told by doctor that they may be harmful to you.
- Speak to a pharmacist about other medicines if you want help for a blocked / runny nose, cough or sore throat.
  A range of medicines are available to help with most symptoms of influenza. Speaking with a pharmacist can help you to decide if they are right for you.
-

Take any other medicines as required
As discussed with your doctor or other health professional

Related resources

- MAC Paper
- Walkthrough Video - Influenza

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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 **who have COVID**, as determined by a confirmed positive test (PCR or RAT) or where it is strongly suspected. This is a higher level of suspicion than patients who simply meet PPE / testing criteria.

Overview

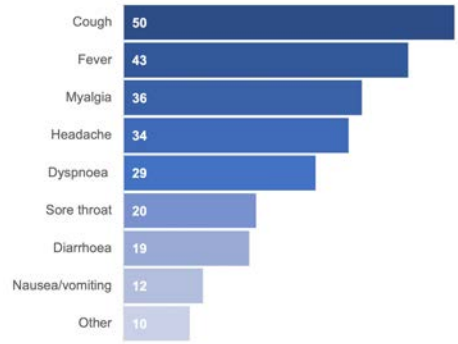
COVID-19 is the illness caused by infection with SARS-CoV2. It has multisystem features, but upper and lower respiratory features are most prominent. Other clinical presentations include gastrointestinal illness, neurological dysfunction and cardiac dysfunction.

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.

The Omicron variant is now the dominant strain of SARS-CoV-2 in Victoria. This strain is characterised by extremely high transmissibility via the airborne route and, in most patients, a milder clinical course than previous variants (although this finding may just reflect the very high vaccination rate in the community).

When there is very high prevalence of an infectious illness in the community, it is important to have a high index of suspicion for non-COVID related causes for a patient's symptoms.

Clinical features (%)



Flowchart

Mild	Moderate		Severe / Critical
Symptoms	Symptoms + **Lung involvement**		Symptoms + Lung involvement + **Hypoxia / Shock**
Cough Fever Myalgia Headache Sore throat Mild GI symptoms	**Low risk** $SpO_2 \geq 92\%$ at rest SOB exertional, not worsening RR 20 - 24 Chest discomfort (mild) Extreme fatigue preventing self-care Dizziness (mild) momentary, self-resolving Moderate GI symptoms likely to cause future severe dehydration	**High risk** $SpO_2 \geq 92\%$ at rest SOB at rest or worsening RR 25 - 29 Exertional hypoxia Borderline hypoxia (92-94%) Chest pain (moderate/severe) Severe dehydration, or likely in future Low / no urine output Syncope / severe dizziness Significant risk	$SpO_2 < 92\%$ Severe SOB $RR \geq 30$ $HR \geq 120$ $BP < 90$ Altered conscious state Confusion / drowsiness Cyanosed / cold / pale / mottled skin Haemoptysis (frank) Respiratory failure

		factors with inadequate support	
Self-care	**Timely medical review**	**Emergency department review**	**Urgent prehospital care**
• **Self-care** advice • Safety netting • Mx symptoms as required (See Moderate - low risk)	• Advise patient to use the following services. In order of preference: 1. **CPPP** 2. **GP Telehealth** 3. **VED Self-referral** 4. **Self-present to ED** 5. **Call 000** **OR** • **VED Ambulance referral** or **Self-present to ED** if CPPP clinician has already advised patient to call 000 • Mx symptoms as required – **Ondansetron PO / IM** – **Salbutamol pMDI** – **Paracetamol PO**	• **VED Ambulance referral** (preferred) **OR** • Transport **ERP – Red Escalation:** • Consider self-present in preference to transport if appropriate and VED not available	• **Oxygen** • **CPAP 10 cmH_2O** for refractory hypoxia (conscious patient only) • **CPAP + prone position** if no improvement (conscious patient only) • **Normal Saline IV** bolus if less than adequate perfusion. – See *Normal Saline Dose Table* below – Repeat once if no improvement in perfusion • **Metaraminol, Noradrenaline, Adrenaline** (MICA) as per **Shock (CPG A0705)** • Transport to ED with ICU* • Consider** **Dexamethasone 6 mg** (1.5 mL) IV / oral

* Signal 1 transport with hospital pre-notification if *Critical*, i.e. refractory hypoxia, hypotension, altered conscious state or otherwise unstable / deteriorating.

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

Normal Saline Dose Table

Risk of fluid overload	All other patients
• Hx of cardiac failure • Chronic renal failure • Elderly	
Consider reduced fluid dose: **250 mL** (Max. 500 mL)	**500 mL** (Max. 1000 mL)

CPPP

COVID Positive Pathway Program (CPPP)

- COVID positive patients should be contacted by the Department of Health and allocated to an appropriate pathway based on the level of risk.
- Patients are generally advised to seek help for their symptoms via primary care services such as their GP or nurse on call.
- More information is available on the COVID Positive Pathways website.

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	Moderate or severe
Only on exertion / intermittent	At rest / persistent
No increased work of breathing	Increased work of breathing
Stable	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	Age > 40
Tightness on inspiration	Constant, at rest
Discomfort when coughing	Consistent with ACS presentation
Normal 12-lead ECG	Abnormal ECG
	PHx same pain of cardiac cause
	PHx PE/thromboembolic events

GI Symptoms

- Many patients with COVID-19 will have typical viral gastrointestinal symptoms such as nausea, vomiting, diarrhoea and abdominal cramping.
- **Vomiting and diarrhoea** are concerning if they result in significant dehydration.
- **Abdominal pain** is often related to diarrhoea and is typically benign. However, maintain a high index of suspicion for a surgical or gynaecological cause co-presenting with COVID-19.

Abdominal pain

Less concerning	More concerning

Male	Female of childbearing age
Young / otherwise healthy	Elderly / frail
Intermittent cramping abdominal pain	Constant abdominal pain
No guarding on abdominal exam	Guarding on abdominal exam

Rapid antigen test (RAT)

- RAT should be used for patients transported to hospital to assist with triage or when establishing an alternative care pathway (e.g. in consultation with VED) to ensure symptoms are due to COVID.
- Perform RAT in open space prior to loading patient. Do not delay transport waiting for test result.
- Performing a RAT should not take priority over other clinical interventions.
- RATs should not be provided to people who call 000 *purely* for testing. Refer these patients to a testing center.
- RAT is not mandatory for transport (e.g. patient refuses RAT, RAT not available).
- If the patient's COVID status is already known, a RAT is not required.
- **INSTRUCTIONS:** See **CWI OPS 197 Nasal Swab – Rapid Antigen Test**

Mild

Mild
Symptoms only

Cough Fever Myalgia Headache Sore throat Mild GI symptoms

- Mild symptoms of upper respiratory tract infection or asymptomatic (especially if vaccinated).
- Normal SpO_2 for patient and no signs of significant 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.
- Patients should be transported to hospital if they present with:
  - Clinical Red Flags as per **CPG A0108 Patient Safety / Clinical Flags**
  - *Severe/Critical* COVID
  - Other clinical need for transport (e.g. acute coronary syndrome)

Referral

- Most patients with mild COVID can be managed in the community.

- Consider referring to the patient's GP or to back to the CPPP (if already enrolled and the patient has contact details) for non-urgent follow up if required.

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, extreme fatigue

  Patient to follow instructions on HIS to arrange for timely medical review (as per *Moderate – Low risk*)

- **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

$SpO_2 \geq 92\%$ Mild SOB Chest discomfort Extreme fatigue Mild dizziness
Moderate GI symptoms

- COVID symptoms (often of greater severity) with signs of lung involvement / lower respiratory tract infection.
- $SpO_2 \geq 92\%$ at rest ($\geq 88\%$ 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:
  - SOB that is exertional, stable and mild
  - RR 20 – 24 per minute
  - Mild chest discomfort (with normal 12-lead ECG) – mild, occurs on inspiration or coughing

- Extreme fatigue (preventing self-care)
- Dizziness (Mild) – momentary, self-resolving, not associated with other concerning symptoms, may be described as “light headed”
- Moderate GI symptoms – not currently severely dehydrated but likely to cause severe dehydration in the future if not treated

Disposition

- **Timely medical assessment within approximately two hours.**
- If the patient is capable and willing to seek further help, ask them to contact the following services. In order of preference:
  1. **CPPP** if the patient has been enrolled and provided with a contact number to escalate care.

     Most patients placed on a *low or moderate risk pathway* by the CPPP are asked to contact their CPPP if they deteriorate. They will be provided with contact details for escalation of care.

  2. **GP Telehealth** if the patient has not been enrolled or hasn’t been provided with a contact number for a CPPP.

     Most patients placed on a *very low risk (self-care) pathway* by their CPPP are asked to contact their GP or Nurse On Call with any concerns about their symptoms. They are not provided with contact details for escalation of care.

  3. **VED Self-referral** if not able or likely to be assessed by the CPPP/GP within 2 hours.

     A GP/CPPP may not be able to assess the patient within two hours due to demand or operating hours.

     Paramedics should provide the patient with the details of *VED Self-referral* in case they are not able to contact their GP/CPPP. A clear plan and timeframe for progressing to VED Self-referral should be established.

     If the GP/CPPP is unlikely to contact the patient (e.g. outside of business hours), it is reasonable to recommend *VED Self-referral* in the first instance.

  4. **Self-present to ED** if not able to be assessed via *VED Self-referral*.

     VED Self-referral may not be available due to demand or because the patient is not eligible.

  5. **Call 000** if not able to self-present.
- Leave a copy of the patient’s vital signs with the patient for CPPP, GP and/or VED clinicians.
- Consider remaining on scene to facilitate a *VED Ambulance Referral* instead of referring a GP/CPPP if there is any additional risk or a need for direct communication with VED staff.

CPPP referral to 000

- If a CPPP clinician has directly advised a patient to call 000 but the patient presents Moderate – Low Risk:

- *VED Ambulance Referral* (preferred)
- Self-presentation to ED if VED not appropriate
- Consider transport if no other options

CPPP clinicians may have identified a reason to escalate care, and this warrants further investigation in most cases.

- In some select cases, the advice to call 000 may reflect a miscommunication of the patient's symptoms. If this is clearly the case, assessment in an ED is not mandatory if the patient does not require it.

Automated notifications generated through CPPP symptom surveys may lead to over triage.

High Risk – Moderate

- Moderate COVID patients presenting with certain signs and symptoms are at higher risk of deterioration to *Severe Disease* and require assessment in an emergency department:
  - Shortness of breath at rest or worsening
  - RR 25-29 per minute
  - Exertional hypoxia (a drop in SpO_2 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 – constant, consistent with acute coronary syndrome, associated with other concerning symptoms, abnormal ECG
  - Severe dehydration
    - 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 / severe dizziness) – actual loss of consciousness or severely dizzy to the point of nearly losing consciousness, dizziness associated with other concerning symptoms such as chest pain, palpitations
  - Significant risk factors with inadequate support (see below)

Disposition

- **Assessment by emergency department staff** either by VED consultation or by transporting the patient.
  - **VED Ambulance Referral** should be considered for all eligible patients in the first instance.
  - **Transport** if *VED Ambulance Referral* is not available, not appropriate or consultation with ED staff indicates the patient should be transported.
- **Red escalation of emergency response plan:** Consider self-presentation to ED if appropriate (e.g. short distance to ED, family able to drive patient, etc.) and VED is not available or appropriate.

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
• Elderly / frail (risk increases with age) • Indigenous • Morbid obesity • History of smoking • Low health literacy • Low digital literacy • Unvaccinated • Pregnant	• **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	• Risk of violence, abuse or neglect • Poor access to care • Remote location

Severe / Critical

Severe / Critical
Symptoms + Lung involvement + Hypoxia / Shock

SpO_2 < 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.
- 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 or RAT is not required.

Oxygen therapy and respiratory support

- **Oxygen therapy:** nasal cannula or non-rebreather mask covered by a surgical mask.
- **CPAP** if hypoxia is refractory to maximal oxygen therapy. If CPAP isn't tolerated, consider prone positioning and supplemental oxygen.
- **CPAP + prone position** if hypoxia is refractory to CPAP alone.
- Dehydration is common and patients may develop mild hypotension following the application of CPAP. This should be treated with IV fluid as per this CPG rather than discontinuing CPAP.

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 or CPAP.
- 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 remove any pillows/blankets commence CPR in the prone position until the patient can be rolled.
  - CPR in a moving ambulance should only be performed with a mechanical CPR device.
  - More information in regards to compression hand placement and defibrillation pad placement for the prone-positioned patient is discussed here.

Virtual Emergency Department

- The Virtual Emergency Department (VED) service provides telehealth assessments via video call.

- Consultations involve an emergency department doctor or may involve a triage nurse (depending on staff availability, time of day, etc.).

VED contact details

VED Self-Referral

- The patient contacts the VED themselves. Paramedics are not required to stay on scene.
- Intended for **lower acuity patients** where transport is not required but a timely medical review is appropriate.
- Paramedics should leave a copy of the patient's vital signs and ECG (if applicable) at scene for the patient to relay to VED staff.
- If there is any uncertainty about lower-acuity patients who would otherwise be eligible for *VED Self-referral*, consider remaining on scene to facilitate a *VED Ambulance Referral*.

VED Ambulance Referral

- Paramedics contact the VED while on scene.
- Intended for **higher acuity patients** who may require transport but who may also be appropriately redirected to an alternative care pathway in consultation with the ED.
- Paramedics are required to provide a handover and may facilitate further management in consultation with VED staff (e.g. anti-emetics).
- AV has priority access to VED. However, wait times up to 30 minutes are possible in some circumstances.

Medication administration and non-transport

- Some medications may be administered by paramedics prior to non-transport if symptoms are suspected to be due to COVID:
  - Any medication already prescribed to the patient and available at scene (e.g. analgesics, asthma medications).
  - **Ondansetron PO or IM** for nausea and vomiting as per **CPG A0701 Nausea and vomiting**
  - **Salbutamol pMDI** for mild bronchospasm / exacerbation of asthma as per **CPG A0601 Asthma**
  - **Paracetamol** for muscle aches as per **CPG A0501-1 Pain relief**
- AV medications **must not** be left with the patient to be self-administered at a later time.
- If medication has been administered at scene, patients will often require referral to GP Telehealth or VED for additional doses (e.g. ondansetron).
- The VED physician may authorise management that exceeds the normal scope of practice such as IV Normal Saline bolus prior to non-transport. This should only occur in direct consultation with the

physician and will involve follow-up medical care for the patient by the VED.

Related Resources

- PPE Requirements
- CWI/OPS/195 Awake prone position
- Vehicle cleaning and decontamination
- CPR on prone position patients
- https://av-digital-cpg.web.app/assets/pdf/My COVID Assessment Plan 1.0.pdf

Walkthrough Videos

- CPG Walkthrough (Jan 2022)

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

Mental Health and Wellbeing Principles

CPG A1101

Summary

- **Dignity and autonomy:** Protect and promote the rights, dignity and autonomy of the person, and support them to exercise those rights.
- **Diversity of care:** Provide a diverse mix of care and support that is determined, as much as possible, by the person's needs and preferences.
- **Least restriction:** Provide care with the least possible restriction of the person's rights, dignity and autonomy to promote their recovery and participation in the community, with the views and preferences of the person to be key determinants.
- **Supported decision making:** Support the person to make their own decisions and be involved in decisions about their assessment, treatment and recovery (including people receiving compulsory treatment), with the views and preferences of the person to be given priority.
- **Family, carers and supporters (including children):** Support families, carers and supporters (including children) in their role in decisions about the person's assessment, treatment and recovery.
- **Lived experience:** The lived experience of the person, and that of their carers, families and supporters, including their experience of the mental health and wellbeing system, is to be recognised and valued.
- **Medical and other health needs:** Identify and respond to the medical and other health needs (both mental and physical) of the person, including those related to the use of alcohol or other drugs.
- **Dignity of risk:** Respect a person's right to take reasonable risks in making decisions about their own assessment, treatment and recovery, even where this may be considered by others to be risky, unwise, or ill-advised. This principle involves balancing the duty of care owed to the person with actions affording them dignity of risk, and is intended to shift the balance of power between medical authority and the person in a way that weighs against a paternalistic or overprotective approach to healthcare.
- **Wellbeing of children and young people:** Support and promote the health, wellbeing and autonomy of children and young people, including providing care and information in age and developmentally appropriate ways to support their autonomy and right to participate in decisions affecting them.
- **Diversity:** Actively consider the diverse experiences and needs of the person, recognising that this may be due to a wide variety of attributes, and provide care that is safe, sensitive and responsive to those experiences and needs including any experience of trauma.
- **Gender safety:** Consider any specific safety needs or concerns relating to the person's gender, and provide care that is safe and responsive to any experience of family violence or trauma.
- **Cultural safety:** Provide care that is culturally safe and responsive to people of all racial, ethnic, faith-based and cultural backgrounds. Care should be appropriate for and consistent with the person's cultural and spiritual beliefs and practices. Regard is to be given to the views of the person's family and, to the extent that it is practicable and appropriate to do so, the views of significant members of the person's community. For Aboriginal and Torres Strait Islander peoples this may include the views of elders, traditional healers and Aboriginal and Torres Strait Islander mental health workers.
- **Wellbeing of dependents:** Protect the needs, wellbeing and safety of children, young people and other dependents of the person.

Notes

The Mental Health and Wellbeing Act 2022 (the Act)[1] provides for the exercise of specified powers by paramedics and other authorised persons in circumstances where:

1. a person appears to have mental illness;* and
2. because of the person's apparent mental illness, it is necessary to take the person into care and control to prevent imminent and serious harm to the person or to another person.

These powers include bodily restraint, chemical restraint, transport of the patient, search, seize and secure, and entering a premises.

In exercising any of these powers, proper consideration must be given to the mental health and wellbeing principles summarised in this guideline; and the power must be exercised in the least restrictive way possible so far as is reasonably practicable in the circumstances.[1]

*Mental illness is defined in the Act as 'a medical condition that is characterised by a significant disturbance of thought, mood, perception or memory'.[1]

1. Dignity and autonomy principle

> The **rights, dignity and autonomy** of a person living with mental illness or psychological distress is to be promoted and protected and the person is to be supported to exercise those rights.
>
> Section 16 of the Act (emphasis added)

- A **right** is a moral or legal entitlement to have or be able to do something.[3]
- **Dignity** is the state or quality of being worthy of honour or respect.[4]
- **Autonomy** is the right to control and determine a person's own life.[5]

2. Diversity of care principle

> A person living with mental illness or psychological distress is to be provided with access to a **diverse mix of care and support services**. This is to be determined, as much as possible, by the needs and preferences of the person living with mental illness or psychological distress including their accessibility requirements, relationships, living situation, any experience of trauma, level of education, financial circumstances and employment status.
>
> Section 17 of the Act (emphasis added)

3. Least restrictive principle

Mental health and wellbeing services are to be provided to a person living with mental illness or psychological distress with the **least possible restriction of their rights, dignity and autonomy** with the aim of promoting their recovery and full participation in community life. The **views and preferences** of the person should be **key determinants** of the nature of this recovery and participation.

Section 18 of the Act (emphasis added)

- This principle recognises that what is experienced as more or less restrictive may vary between persons.[2]

4. Supported decision making principle

Supported decision making practices are to be promoted. Persons receiving mental health and wellbeing services are to be **supported to make decisions and to be involved in decisions about their assessment, treatment and recovery** including when they are receiving compulsory treatment. The **views and preferences** of the person receiving mental health and wellbeing services are **to be given priority**.

Section 19 of the Act (emphasis added)

5. Family and carers principle

Families, carers and supporters (including children) of a person receiving mental health and wellbeing services are **to be supported in their role in decisions** about the person's assessment, treatment and recovery.

Section 20 of the Act (emphasis added)

6. Lived experience principle

The **lived experience** of a person with mental illness or psychological distress and their carers, families and supporters is **to be recognised and valued** as experience that makes them valuable leaders and active partners in the mental health and wellbeing service system.

Section 21 of the Act (emphasis added)

7. Health needs principle

The **medical and other health needs** of people living with mental illness or psychological distress are **to be identified and responded to**, including any medical or health needs that are related to the use of alcohol or other drugs. In doing so, the ways in which a person's physical and mental health needs may intersect should be considered.

Section 22 of the Act (emphasis added)

- This principle reflects the importance of a holistic, integrated approach, and is intended to prevent people who live with substance use or addiction being precluded from accessing treatment, care or support.[2]

8. Dignity of risk principle

A person receiving mental health and wellbeing services has the **right to take reasonable risks** in order to achieve personal growth, self-esteem and overall quality of life. Respecting this right in providing mental health and wellbeing services involves balancing the duty of care owed to all people experiencing mental illness or psychological distress with actions to afford each person the dignity of risk.

Section 23 of the Act (emphasis added)

- This principle affords a person the right to make decisions about their own assessment, treatment and recovery that may be considered to be risky, unwise, or ill-advised.[2]
- While this principle is balanced against a duty of care owed to the person, it is intended to alter the balance of power between medical authority and the person in the direction of respecting their inherent dignity and human rights, and to weigh against a paternalistic or overprotective approach to the provision of services.[2]
- Self-esteem is one’s sense of one’s own worth.[6]
- Quality of life is a state of sufficient physical and mental health to be able to participate in life in an enjoyable and meaningful way.[6]

9. Wellbeing of young people principle

The **health, wellbeing and autonomy of children and young people** receiving mental health and wellbeing services are **to be promoted and supported**, including by providing treatment and support in age and developmentally appropriate settings and ways. It is recognised that their lived experience makes them valuable leaders and active partners in the mental health and wellbeing service system.

Section 24 of the Act (emphasis added)

- Children and young people should be provided information in age and developmentally appropriate ways in order to support their autonomy and right to participate in decisions affecting them.[2]

10. Diversity principle

1. The **diverse needs and experiences** of a person receiving mental health and wellbeing services are **to be actively considered** noting that such diversity may be due to a variety of attributes including any of the following—
    1. gender identity;
    2. sexual orientation;
    3. sex;
    4. ethnicity;
    5. language;
    6. race;
    7. religion, faith or spirituality;
    8. class;
    9. socioeconomic status;
    10. age;
    11. disability;
    12. neurodiversity;
    13. culture;
    14. residency status;
    15. geographic disadvantage.
2. Mental health and wellbeing services are to be provided in a manner that—
    1. is **safe, sensitive and responsive** to the diverse abilities, needs and experiences of the person including any experience of trauma; and
    2. considers how those needs and experiences intersect with each other and with the person's mental health.

Section 25 of the Act (emphasis added)

- Trauma is psychological damage or injury following exposure to a frightening or distressing event. This can affect a person’s ability to cope or function.[7,8], Examples that may cause trauma include:[8,9]
    - Emotional, physical or sexual abuse
    - Physical or emotional neglect as a child or young person

- Bullying, cyberbullying or discrimination
- Witnessing acts of violence
- Exploitation, trafficking, or forced adoption practices
- Cultural dislocation
- Life-threatening illness or injury
- Loss of a loved one, including to suicide, or in violent or unexpected circumstances
- Serious motor vehicle or workplace accident
- Natural disasters such as bushfires, earthquakes or floods

11. Gender safety principle

People receiving mental health and wellbeing services may have **specific safety needs or concerns based on their gender**. Consideration is therefore to be given to these needs and concerns and access is to be provided to services that—

1. are safe; and
2. are responsive to any current experience of family violence and trauma or any history of family violence and trauma; and
3. recognise and respond to the ways gender dynamics may affect service delivery, treatment and recovery; and
4. recognise and respond to the ways in which gender intersects with other types of discrimination and disadvantage.

Section 26 of the Act (emphasis added)

12. Cultural safety principle

1. Mental health and wellbeing services are to be **culturally safe and responsive to** people of **all racial, ethnic, faith-based and cultural backgrounds**.
2. Treatment and care is to be **appropriate for, and consistent with, the cultural and spiritual beliefs and practices** of a person living with mental illness or psychological distress. Regard is to be given to the **views of the person's family** and, to the extent that it is practicable and appropriate to do so, the **views of significant members of the person's community**. Regard is to be given to Aboriginal and Torres Strait Islander people's unique culture and identity, including connections to family and kinship, community, Country and waters.
3. Treatment and care for Aboriginal and Torres Strait Islander peoples is, to the extent that it is practicable and appropriate to do so, to be decided and given having regard to the views of elders, traditional healers and Aboriginal and Torres Strait Islander mental health workers.

Section 27 of the Act (emphasis added)

13. Wellbeing of dependents principle

The **needs, wellbeing and safety of children, young people and other dependents** of people receiving mental health and wellbeing services are **to be protected**.

Section 28 of the Act (emphasis added)

- Parliament acknowledges that the wellbeing of dependents may sometimes be in tension with the views or preferences of a person receiving mental health and wellbeing services.[2]

References

1. Mental Health and Wellbeing Act 2022
2. Mental Health and Wellbeing Bill 2022 – Explanatory Memorandum
3. Parliamentary Education Office – Rights in Australia
4. Oxford Languages
5. Encyclopaedic Australian Legal Dictionary
6. Macquarie Dictionary, Australia.
7. Cascade Behavioural Health Hospital - Symptoms, Signs & Effects of Psychological Trauma
8. Australian Psychological Society - Trauma
9. Blue Knot Foundation - What is Complex Trauma?

General Notes

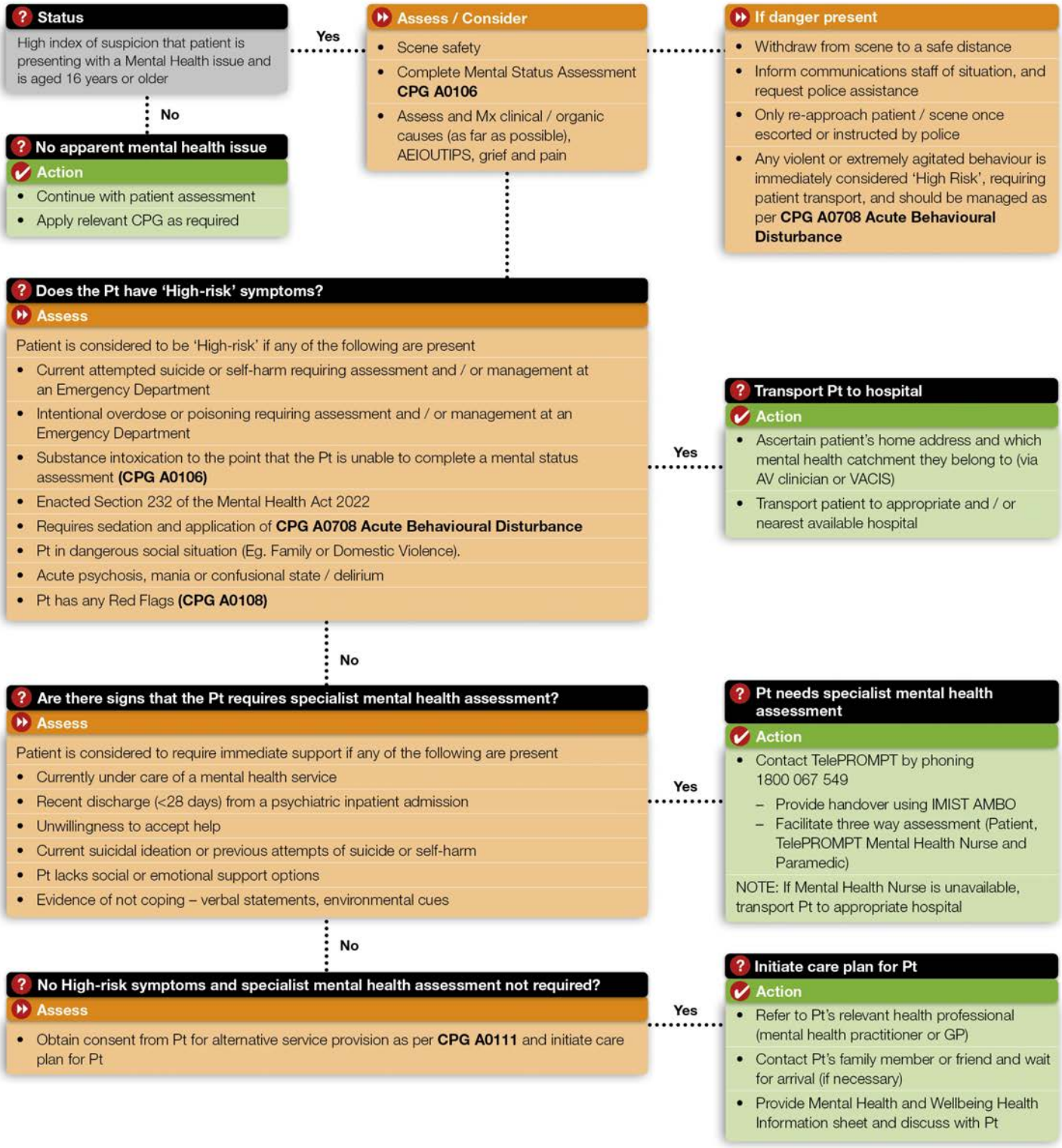
Olanzapine-only sedation

- Patients administered olanzapine may not necessarily require transport to hospital and be suitable for community-based care.
- TelePROMPT are able to advise on the mental health of the patient and whether treatment in the community may be appropriate.
- Physical health concerns and the administration of any medications remain the responsibility of the paramedic.
- Ensure that olanzapine has not caused any adverse reactions in relation to conscious state or vital signs where a patient is not being transported.

Disposition

- Use the **Mental Health Destination Tool**, VACIS or AV Clinician to select appropriate destination if transporting the patient to hospital.

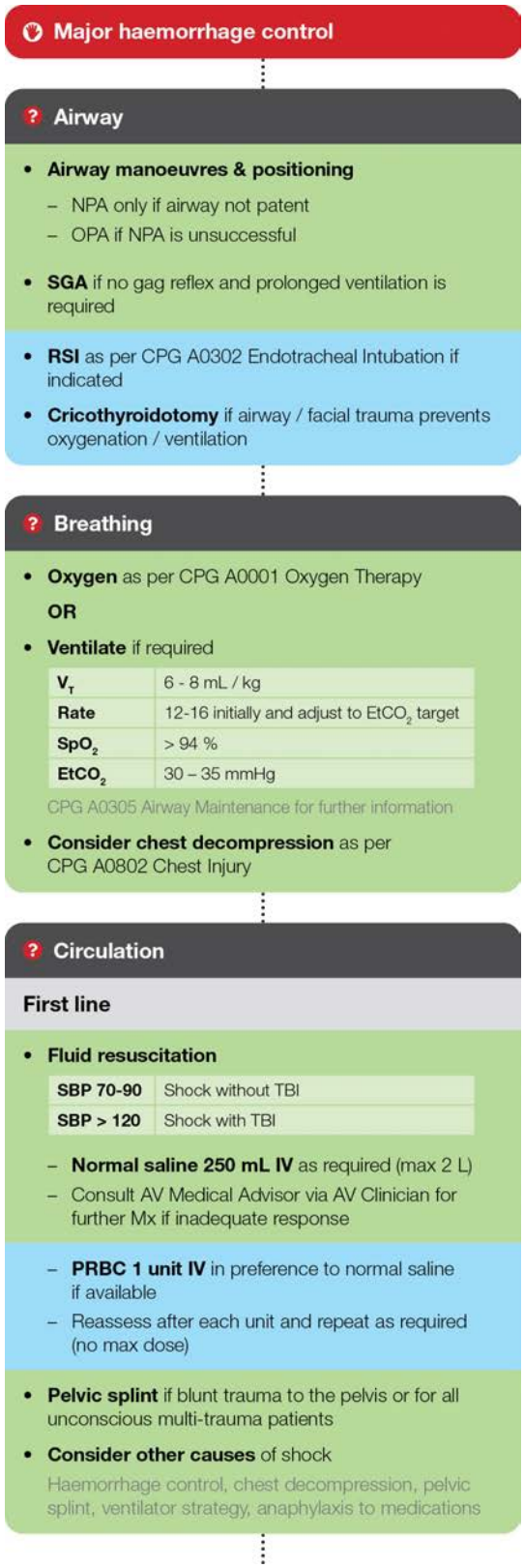
Flowchart



Related Resources

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

Flowchart


Major haemorrhage control
Airway
Airway manoeuvres & positioning
– NPA only if airway not patent
– OPA if NPA is unsuccessful
SGA if no gag reflex and prolonged ventilation is required
RSI as per CPG A0302 Endotracheal Intubation if indicated
Cricothyroidotomy if airway / facial trauma prevents oxygenation / ventilation
Breathing
Oxygen as per CPG A0001 Oxygen Therapy
OR
Ventilate if required
V_T 6 - 8 mL / kg
Rate 12-16 initially and adjust to EtCO2 target
SpO2 > 94 %
EtCO2 30 – 35 mmHg
CPG A0305 Airway Maintenance for further information
Consider chest decompression as per CPG A0802 Chest Injury
Circulation
First line
Fluid resuscitation
SBP 70-90 Shock without TBI
SBP > 120 Shock with TBI
– Normal saline 250 mL IV as required (max 2 L)
– Consult AV Medical Advisor via AV Clinician for further Mx if inadequate response
– PRBC 1 unit IV in preference to normal saline if available
– Reassess after each unit and repeat as required (no max dose)
Pelvic splint if blunt trauma to the pelvis or for all unconscious multi-trauma patients
Consider other causes of shock
Haemorrhage control, chest decompression, pelvic splint, ventilator strategy, anaphylaxis to medications

Second line

TBI Inadequate response following approx. 500 - 1000 mL fluid / PRBC 1 - 2 units

No TBI Inadequate response following approx. 1000 - 2000 mL fluid / PRBC 2 - 4 units

- **Metaraminol 0.5 – 1 mg IV** at 2-minute intervals
- Continued fluid resuscitation

Third line

Inadequate response to 1 - 2 doses of metaraminol

- **Noradrenaline infusion**

Start	5 mcg / min (5 mL / hr)
Increase	5 mcg / min at 2 minute intervals
Max	25 mcg / min

- Consider prior to fourth line:
  - IV patency & infusion pump function
  - Reassess other causes of shock
  - Consult the AV Medical Advisor via AV Clinician

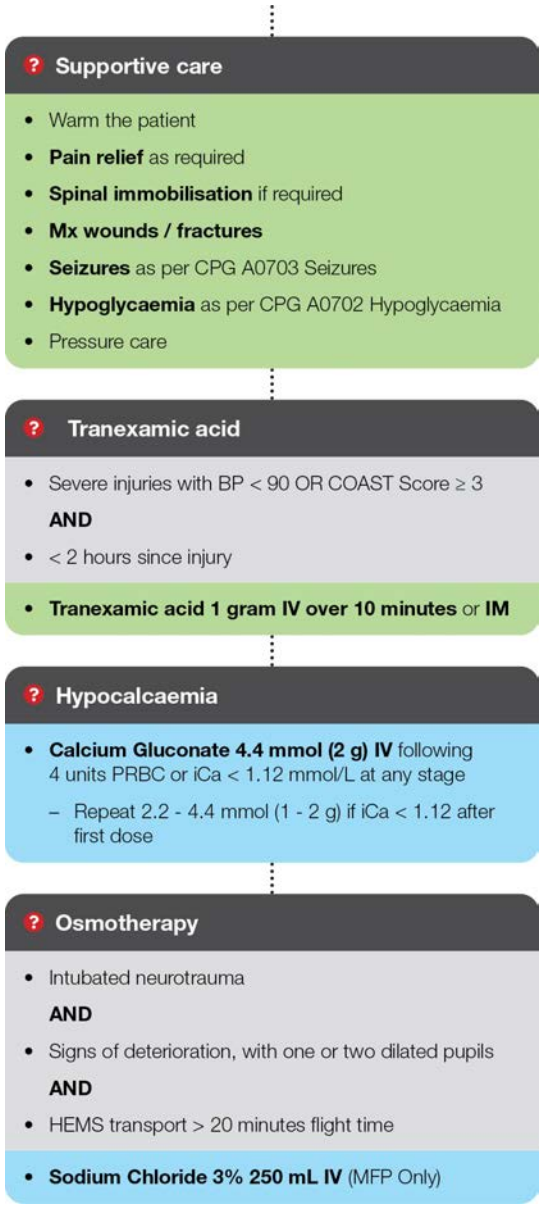
Fourth line

Inadequate response to max. noradrenaline infusion

- **Adrenaline infusion**

Start	5 mcg / min (5 mL / hr)
Increase	5 mcg / min at 2 minute intervals
Max	25 mcg / min

- If a second syringe pump unavailable, **Metaraminol 0.5 - 1 mg IV** at 2-min intervals
- Consult AV Medical Advisor via AV Clinician for further management
- Consider reducing vasopressor infusion if target BP achieved. Vasopressors should be reduced prior to stopping fluid



Care Objectives

- Immediate control of major haemorrhage
- Ensure:
  - Airway patency
  - Breathing (adequate oxygenation and ventilation)
  - Circulation (adequate perfusion for the patient's presentation)
- Prioritise transport
- Supportive care as required

General Notes

Intended patient group

- Patients aged ≥ 16 with traumatic injuries.

Using this guideline

This guideline outlines a hierarchy of priorities. Its purpose is to assist in prioritising care where the patient has multiple needs. It is not intended to be applied in a strictly linear way. In many cases, multiple aspects of this guideline may be applied simultaneously.

This guideline is primarily intended for patients with major trauma. However, it is not strictly limited to patients meeting the criteria in CPG A0105 Trauma Triage. The priorities apply equally to patients with minor injuries, though the majority of management included in this CPG will not be relevant.

Prioritising transport

- **All major trauma:** Minimise scene time for all patients that meet the criteria in **CPG A0105 Trauma Triage**.
- **Shock or penetrating truncal trauma:**
  - Only immediately life-threatening conditions should be treated prior to transport.
  - Pain may be managed concurrently where possible.

More information

The effect of prehospital times on outcomes for trauma patients is controversial. The impact likely depends on the extent and type of injury. Nonetheless, it is important to minimise prehospital time for all trauma patients who are critically ill or who may deteriorate.

This CPG is not intended to be prescriptive regarding exactly when transport should occur in a workflow. Clinical judgement will inform what is prioritised based on the circumstances and patient's presentation.

There is strong consensus that delaying transport to gain IV access is detrimental for shocked trauma patients. IV access for fluid resuscitation is not as important as surgical intervention to definitively treat the cause of shock (e.g. control of bleeding). An improvement in blood pressure following fluid resuscitation does not reduce the urgency of transport.

Evidence suggests that short prehospital times are especially important in penetrating truncal trauma and shock where injuries are likely to require emergency surgical interventions.

Major haemorrhage

- **Major haemorrhage control should be prioritised.** Regularly reassess the patient to ensure the haemorrhage remains controlled.

More information

Haemorrhage control

Control of major haemorrhage is the absolute priority throughout the entire episode of care. These important measures may be neglected if they are not actively considered and reassessed.

The adequacy of haemorrhage control may change over time:

- Dressings and torniquets may become dislodged
- A pelvic splint may be forgotten or improperly positioned
- Bleeding may resume as a patient is resuscitated and their blood pressure increases

This may not be immediately recognized especially if they're obscured (e.g. covered by a blanket). Reassessment is essential to ensure ongoing bleeding is identified.

Airway

- Airway manoeuvres and position as per **CWI/OPS/190**.
- NPAs should be inserted only if required to maintain a patent airway.
- OPAs may provoke the patient's gag reflex and should not be used unless the airway patency cannot be maintained with other measures.
- RSI – identify candidate and initiate the process of RSI early (e.g. planning extrication, role allocation) to minimise scene time.

More information

Airway adjuncts

There have been case reports of nasopharyngeal airways entering the skull in patients with basal skull fracture. If the airway can be adequately managed without an adjunct, it is preferable to avoid the risk of cranial placement. However, if the airway cannot be kept patent with manoeuvres and positioning, the relatively low risk associated with an NPA is preferable to the catastrophic implications of airway occlusion.

OPAs may trigger the patient's gag reflex. Gagging can elevate intracranial pressure which may contribute to secondary brain injury in patients with TBI.

This guideline considers the risk associated with gagging on an OPA to be greater than the risk of cranial placement of an NPA. As such, NPA is the preferred airway adjunct if one is required. An OPA should be used as a last resort if anatomical occlusion of the airway continues despite the use of an NPA. Gagging may increase intracranial pressure, potentially contributing to secondary

brain injury.

RSI

The position of RSI in the airway section of the flowchart reflects its conceptual place in the primary survey. The intent is to identify candidates for RSI and prepare for the procedure in parallel to managing other priorities. Early identification and planning for RSI may assist in minimizing scene time.

RSI in the shocked trauma patient carries considerable risk. Consider prioritising transport if the patient's airway is patent.

Breathing

- Oxygen as per **CPG A0001 Oxygen Therapy** (Critical Illness) or ventilation as required
- Consider nasal $ETCO_2$ in major trauma patients who do not require active airway management.
- Refer to **CPG A0802 Chest Injury** for indications for chest decompression

More information

Oxygen

There is broad consensus that oxygen therapy is appropriate during initial care of any critically ill or unstable patient:

- It may improve oxygen delivery (based on expert opinion)
- Hypoxia may go unrecognized and untreated if pulse oximetry is unreliable or the clinician is task-saturated

However, there is no strong evidence that oxygen improves outcomes for trauma patients without hypoxia and it is not an essential element of care. Once the patient is stable, oxygen saturation is reliably measured and other important elements of patient care have been addressed, oxygen may be titrated down and/or removed.

Capnography

Nasal $ETCO_2$ allows for precise and timely monitoring of respiratory rate and broad trends in ventilation. An increasing respiratory rate indicates deterioration – either emerging/worsening shock or respiratory failure. Increasing CO_2 likely indicates hypoventilation due to head or chest injury (e.g. rib fractures causing pain that impedes ventilation).

Circulation

Shock without TBI

- Target blood pressure 70 – 90 mmHg

- The selection of an adequate blood pressure within the acceptable range (70-90 mmHg) is informed by several factors. There is no specific combination of factors that mandates a particular blood pressure within the recommended range. Clinical judgement is required.
- The presence of a radial pulse and normal mentation may assist in determining that the blood pressure is adequate for that patient, at that time.
- Vasopressors are reserved for extremely shocked states where fluid resuscitation has failed to achieve target blood pressure or there is rapid decline.

Factors influencing blood pressure target

Lower BP target Allowing lower blood pressure is appropriate	**Higher BP** target Targeting higher blood pressure is appropriate
Radial pulse present	No radial pulse
Normal mentation	Abnormal mentation
Penetrating truncal trauma	Blunt truncal trauma
Young, healthy	Older, comorbid (especially Hx HT, IHD)
Active, massive bleeding	Controlled bleeding
Shorter transport times	Longer transport times (1-2 hrs)
Normal saline the only fluid	Blood products available

Shock with TBI

- Target blood pressure 120 mmHg

- Where both TBI and haemorrhagic shock are present, the priority is to prevent secondary brain injury associated with hypotension, rather than permit hypotension.
- Maintain a high index of suspicion for TBI in any multi-trauma patient with an altered conscious state, agitation or a pattern of injury/MOI that suggests the possibility of head injuries. If any doubt exists, target higher blood pressure as per this care pathway rather than permitting hypotension.
- Progression to vasopressors may be indicated for hypotension refractory to initial fluid resuscitation (e.g. 500 – 1000 mL normal saline or 1-2 units PRBC). The priority remains adequate fluid resuscitation. If BP targets are met or exceeded, vasopressors should be titrated down or discontinued in preference to reducing the rate of fluid resuscitation.

More information

Fluid resuscitation may be required to maintain vital organ perfusion. However, resuscitation with large volumes of saline is associated with poorer outcomes in some trauma patients. Blood pressure targets vary depending on the relative risks and benefits for the particular patient's presentation.

Permissive hypotension

Untreated shock leads to organ dysfunction and death. However, administering large volumes of fluid (especially crystalloids) to treat shock may contribute to:

- Dilutional coagulopathy
- Increased bleeding (through the disruption of blood clots by increasing intravascular hydrostatic pressure)
- Hypothermia (where ambient temperature fluids are administered)
- Resuscitation related complications (e.g. ALI/ARDS, abdominal compartment syndrome)

Permissive hypotension involves balancing these risks by withholding fluids and allowing a moderate degree of hypotension prior to definitive control of the haemorrhage. Fluids are only administered if shock is too severe to tolerate.

Permissive hypotension is intended for patients with active, poorly controlled or massive bleeding. There is no benefit for patients with bleeding that is controlled, slow/chronic or minor.

The harm associated with hypotension likely increases with time. For longer periods of time, the harm caused by permissive hypotension may outweigh the benefits. This guideline considers one to two hours to be the approximate maximum duration. However, this may vary depending on the patient's injuries, age and co-morbidities. Paramedics should consult the AV Medical Advisor on call when prehospital time is likely to be extended or the patient is critically ill, complex or not responding to treatment.

Age

Older patients or those with co-morbidities may not be able to tolerate hypotension for long periods. This is particularly true of patients with a history of hypertension or ischaemic heart disease (where hypotension may cause myocardial ischaemia). Higher blood pressures may be warranted. Young healthy patients can likely tolerate hypotension for longer periods of time without serious complications.

Penetrating vs blunt trauma

The evidence supporting permissive hypotension is stronger for penetrating trauma than for blunt trauma. One RCT demonstrated reduction in mortality from permissive hypotension in young, healthy patients with penetrating trauma and short transport times. There are no RCTs demonstrating improved outcomes in blunt trauma. Observational evidence and expert consensus support its use. However, higher blood pressures may reflect a better balance of risk given that bleeding from blunt trauma is more likely to be partially controlled. For the purposes of this guideline, BPs closer to the lower end of the range (e.g. 70 mmHg) may be appropriate for penetrating trauma. Blood pressures towards the upper end of the range (e.g. 80-90 mmHg) may be more appropriate for blunt trauma, especially if other aspects of the case support a higher blood pressure (e.g. older age, longer transport times).

Blood pressure

BP is a poor measure of the adequacy of perfusion in many trauma patients and it can be difficult to ascertain accurately. Additionally, the exact blood pressure at which perfusion is adequate will vary between patients. Despite this, blood pressure is the main indication for fluid resuscitation in this CPG as it is an objective and clear threshold.

The presence of a radial pulse and/or a normal level of alertness are generally considered to be better indications of the adequacy of perfusion. However, they are more subjective, difficult to assess and easily confounded (e.g. drugs and alcohol). If circumstances permit, it may be appropriate to combine these assessments with the use of BP to judge the adequacy of perfusion, especially where BP is thought to be inaccurate or cannot be taken.

Other considerations

- **Extreme tachycardia:** Consider fluid resuscitation regardless of blood pressure if prolonged transport times or prior to intubation.
- Hypotension from isolated SCI should be treated as per **CPG A0804 Spinal Injury**

More information

Some patients may present with extreme tachycardia and borderline or adequate blood pressure. They may be able to tolerate this state for short periods of time. However, they are likely to deteriorate rapidly if prehospital times are prolonged or they receive large doses of sedatives (e.g. induction for RSI).

Blood components

- **MICA paramedics credentialed** in blood component administration may administer PRBC.
- Blood components are the preferred resuscitation fluid and, where possible, should be considered in preference to normal saline (e.g. interhospital transfer, HEMS).
- Indications for fluid resuscitation with blood components differ from those of normal saline given the greater potential benefits. There is no single combination of indications.
- **Legal minor:** Packed Red Blood Cells (PRBC) must only be administered to a child < 18 years if:
  - A parent / legal guardian can be contacted and the parent / legal guardian consents to the administration of a blood transfusion.

  OR

  - A medical doctor approves administration (preferably AV Medical Advisor via the AV Clinician or RCH)
- **Religious objection:** PRBC must not be administered to a patient with a known religious objection to blood transfusion (e.g. Jehovah's Witness) and refuses consent.

Delivering blood components to scene

- If HEMS is significantly delayed or unavailable, consider blood component access:
  - Metropolitan Melbourne: contact the Metro Clinician.
  - Regional Victoria: contact the Adult Retrieval Victoria Clinical Co-ordinator. If ARV is unable to be contacted within 10 minutes, contact the AV Clinician.
- The initial attending MICA unit should not delay arrival at the scene to obtain PRBC.
- Scene time should not be prolonged waiting for PRBC.
- ARV should be notified of any patient requiring PRBC that is not transported to a Major Trauma Centre. This facilitates early support of Regional Trauma Centres and arrangement of secondary transfer where appropriate.

Vasopressors

- Consider other causes of persistent hypotension prior to progressing to vasopressors.
  - Haemorrhage control: Ensure dressings / devices used to control haemorrhage are still in place and effective. Consider missed causes of haemorrhage. Strongly consider a pelvic splint if not already applied.
  - Consider ventilation strategy:
    - reducing PEEP
    - mean airway pressure (reduced tidal volume, increased RR)
  - Strongly consider chest decompression.
- Inadequate response to fluid should be confirmed prior to progressing to vasopressors:
  - Hypotension is persistent
  - High degree of confidence in the accuracy of the reading (e.g. manual BP, stationary)
  - Consistent with other clinical signs of shock (e.g. altered mentation, absent radial pulses, cold peripheries, worsening tachycardia)
- Vasopressors should not be administered prior to fluid resuscitation.
- Fluid resuscitation should continue in parallel to vasopressors.
- If the target blood pressure is met or exceeded, vasopressors should be titrated down first while fluid administration continues.

Supportive care

- Supportive care should occur in parallel to other aspects of care in the primary survey if possible.

Warm the patient

- Prevent heat loss and actively warm the patient if possible.
  - Ambulance heater
  - Removing wet clothes / drying the patient
  - Blankets
  - Chemical warming blankets (if shocked, intubated or hypothermic)
  - Blood / fluid warmer if available

More information

Warmth and the prevention of hypothermia

Hypothermia is an independent predictor of mortality in major trauma patients and is thought to worsen coagulopathy. While hypothermia may be a marker of shock rather than the cause of increased mortality, there is broad consensus that it should be prevented.

Basic measures to prevent heat loss should be considered for all trauma patients regardless of their injuries, vital signs, body temperature or the environmental conditions.

Consider heating the ambulance, removing wet clothes, drying the patient, and applying blankets. Preventing heat loss may be particularly important for trapped patients during extrication.

There is no strong evidence to support chemical warming blankets for all trauma patients. Their use should be limited to patients with particularly high risk of coagulopathy and death:

- Shock
- Intubation
- Hypothermia

Spinal immobilisation

- Consider spinal immobilisation as per **CPG A0804 Spinal Injury**. If intubation is required, apply cervical collar after intubation. Attempt to minimise jugular vein compression.
- Consider sitting the patient up by 10-15 degrees if TBI / chest injury.

Tranexamic acid (TXA)

- The administration of TXA is time sensitive but not urgent. DO NOT delay immediately life-saving interventions or transport to administer TXA.
- TXA may be administered if the time from injury is less 2 hours and either:
  - Any trauma patient with a COAST score of ≥ 3
  - Suspected severe injuries and hypotension
- **COAST Calculator**

More information

TXA reduces mortality in bleeding patients at risk of coagulopathy if administered within the first 2 hours of injury [1, 2]. Outside this timeframe it has no benefit and may be harmful.

It is most beneficial when administered as soon as possible after the time of injury. Evidence indicates that the benefit associated with TXA is reduced by 10% for every 15 minute delay to administration[3]. However, it is important to emphasize that administration should not delay immediately life saving care or transport.

TXA is likely to benefit any patient with significant haemorrhage who is at risk of further bleeding due to fibrinolysis. This guideline present two methods of identifying at-risk patients:

- COAST Score $\geq$ 3: The COAST score was derived to identify patients specifically at-risk of trauma induced coagulopathy.[4]
- Strong suspicion of severe injuries and hypotension: The intent is to streamline the administration in clearly critically ill patients who would have a COAST score $\geq$ 3 but for whom requiring the explicit calculation may cause delays to administration.

Hypocalcaemia

- If point-of-care pathology is available, iCa should be measured as early as practicable in patients with haemorrhagic shock.
- Calcium Gluconate 10% may be administered empirically following 4 units of PRBC or where hypocalcaemia is identified (regardless of the number of units of PRBC administered).
- If hypocalcaemia is present following the initial dose for either indication, a repeat dose may be administered.

Agitation

Mild/moderate

- Pain relief as per **CPG A0501-1 Pain relief**

Severe agitation

- Ketamine as per **CPG A0708 Acute behavioural disturbance**
- Consider half dose if shocked

Agitation preventing pre-oxygenation

- Prepare for RSI
- Ketamine 20-40 mg IV to enable preoxygenation.

More information

Mild/moderate agitation

Manage agitation with pain relief. Agitation may be due to, or exacerbated by, painful injuries.

Midazolam should not be used to control combativeness prior to RSI in head injury due to the risk

of hypotension and respiratory depression.

Severe agitation

Shock patients: Where severe agitation is preventing immediately lifesaving care (e.g. haemorrhage control) in the peri-arrest/shocked patient, manage with **half the dose** of ketamine normally recommended in CPG A0708 Acute behavioural disturbance (< 60kg: 100 mg, 60 - 90 kg: 150 mg, > 90kg: 200 mg). This is expected to be very rare.

All other patients: Manage with standard ketamine dose as per CPG A0708 Acute behavioural disturbance.

Agitation preventing pre-oxygenation: In the circumstance where combativeness is preventing preoxygenation, then all other preparations for the RSI should be undertaken and a small bolus of ketamine may be given to enable preoxygenation.

Non-traumatic causes of bleeding

- **AAA or massive GIT haemorrhage:**
  - Fluid resuscitation and vasopressors as per this guideline.
  - TXA is not indicated.
- **Post-partum haemorrhage:** Manage as per **CPG M0401 Primary Postpartum Haemorrhage**.

More information

- The principles of permissive hypotension are relevant to suspected ruptured AAA and massive GIT haemorrhage. In the absence of dedicated guidelines, the approach to fluid resuscitation and vasopressors in this CPG is appropriate.
- There is high quality evidence suggesting TXA does not improve outcomes following GIT haemorrhage.[17] There is little direct evidence to guide the use of TXA for dissecting aortic aneurysm.[18] These topics will be reviewed in the future and standalone guidelines considered.
- Care for patients with post-partum haemorrhage includes unique elements and is informed by a different body of literature. As such, PPH should be managed as per **CPG M0401 Primary Postpartum Haemorrhage**.

Pregnant patients

- This guideline can be applied to pregnant patients with major trauma. Consult the AV Medical Advisor via the AV Clinician at the earliest possible opportunity.
- **APH and major trauma:** consult PIPER via the AV Clinician.
- **APH and minor trauma:** Manage as per **CPG M0201 Antepartum Haemorrhage**.

Related resources

- Metropolitan region blood component access: WIN OPS 404 Blood Component Access from Air Ambulance Airbase: Essendon Fields
- Regional Victoria blood component access: WIN OPS 405 Blood Component Access from a Health Service
- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC paper - Major trauma.pdf
- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - TXA.pdf
- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Hypertonic Saline 3.pdf
- Walkthrough video - Major trauma

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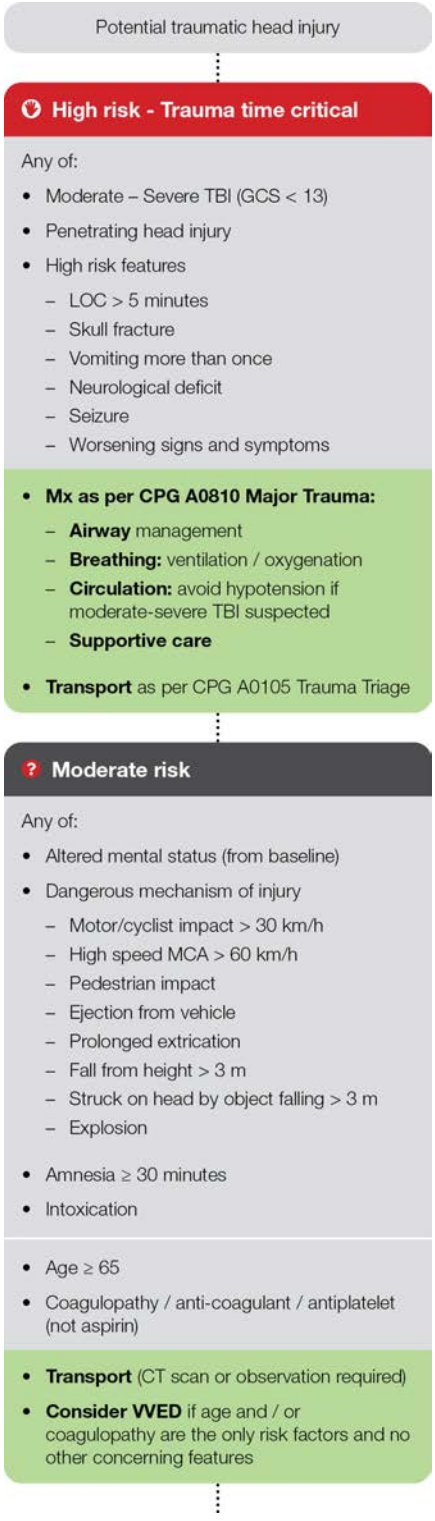
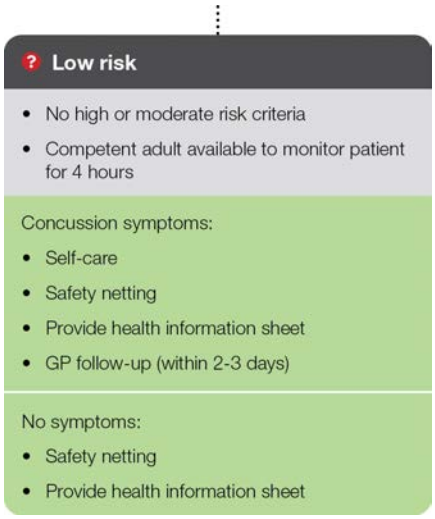
Flowchart


Potential traumatic head injury
High risk - Trauma time critical
Any of:
• Moderate – Severe TBI (GCS < 13)
• Penetrating head injury
• High risk features
– LOC > 5 minutes
– Skull fracture
– Vomiting more than once
– Neurological deficit
– Seizure
– Worsening signs and symptoms
• Mx as per CPG A0810 Major Trauma:
– Airway management
– Breathing: ventilation / oxygenation
– Circulation: avoid hypotension if moderate-severe TBI suspected
– Supportive care
• Transport as per CPG A0105 Trauma Triage
Moderate risk
Any of:
• Altered mental status (from baseline)
• Dangerous mechanism of injury
– Motor/cyclist impact > 30 km/h
– High speed MCA > 60 km/h
– Pedestrian impact
– Ejection from vehicle
– Prolonged extrication
– Fall from height > 3 m
– Struck on head by object falling > 3 m
– Explosion
• Amnesia ≥ 30 minutes
• Intoxication
• Age ≥ 65
• Coagulopathy / anti-coagulant / antiplatelet (not aspirin)
• Transport (CT scan or observation required)
• Consider VVED if age and / or coagulopathy are the only risk factors and no other concerning features



Care Objectives

- Moderate-Severe TBI: Optimise airway patency, oxygenation, ventilation, and cerebral perfusion pressure to prevent secondary brain injury
- Mild TBI / other head injuries:
  - Identify high risk patients and triage to neurosurgical facility where possible
  - Identify moderate risk patients and transport to ED for CT or observation
  - Identify low risk patients and refer into the community with self-care advice

Intended patient group

- Patients aged ≥ 16 with potential traumatic head injury.

High risk – trauma time critical

Moderate – Severe TBI

- Treatment is focused on maintaining normal physiology and reducing the likelihood of secondary brain injury.
- Specific management is included in **CPG A0810 Major Trauma**.

Airway

- Maintain airway patency with manoeuvres and positioning initially
- Progress to more definitive control of the airway with RSI if indicated
- Only use airway adjuncts (OPA / NPA) if necessary to maintain airway patency

Breathing

- Target normal oxygen saturation and $ETCO_2$ levels

Circulation

- Target normal or supranormal blood pressure to maintain perfusion to the brain

Supportive care

- Consider raising the head of the stretcher by 10-15 degrees to aid venous drainage

Learn more

Primary and secondary brain injury

Primary brain injury refers to damage that occurs at the time of the incident and little can be done to treat it.

Secondary brain injury refers to further injury caused by abnormal physiological conditions that affect the delivery of oxygen to the brain. Prehospital management is largely focused on optimising the patient's physiology (e.g. avoid hypoxia and hypercapnia) to prevent secondary brain injury.

Cerebral perfusion pressure

Cerebral perfusion pressure (CPP) refers to pressure required for blood to flow through the vessels in the brain - the difference between the pressure flowing in (mean arterial pressure – MAP) and the pressure flowing out (intracranial pressure – ICP).

The normal range for MAP is approximately 70 – 100 mmHg while the normal ICP in healthy individuals is approximately 5 – 10 mmHg, leading to a normal CPP of 60-90 mmHg.

CPP can drop below the level required to perfuse the brain if ICP increases (e.g. brain injury) or MAP decreases substantially (e.g. haemorrhagic shock). Most concerning is when both occur simultaneously.

In the prehospital environment, raised ICP cannot be measured or treated. In moderate to severe brain injury, it should be assumed that ICP is elevated. In these cases, it is important that management focuses on maintaining a normal or supranormal MAP in order to counteract increased ICP and maintain as normal a CPP as possible.

Normal

CPP = MAP – ICP

80 = 90 – 10

Raised ICP (brain injury) and low MAP (haemorrhagic shock)

CPP = MAP – ICP

30 = 60 - 30

Patients with a suspected injury to the head and a significantly altered conscious state should be assumed to have a moderate to severe underlying TBI. While there are other potential causes of altered conscious state such as alcohol and drugs, the patient should be assumed to have a

significant brain injury until proven otherwise.

In general, a reduction of > 2 points on the GCS is significant. For most patients this means a GCS of < 13. For patients who normally have a reduced level of consciousness, any reduction in conscious state should be measured against what is normal for them.

Penetrating injury

- Maintain a high index of suspicion for any patient with an MOI that could cause a penetrating brain injury.

More information

Significant penetrating injuries can occur without altered conscious state or obviously serious wounds. Patients with seemingly mild injuries and normal mentation can go on to significantly and rapidly deteriorate.

High risk features

- Indicate high risk of serious underlying injury or deterioration.

More information

Normal GCS alone does not rule out more severe injury.[1] Deterioration from normal or near-normal conscious state can subsequently occur, sometimes rapidly. The high risk features outlined in this CPG are associated with increased risk of underlying severe injuries that can lead to rapid deterioration.

Base of Skull fracture

- Signs include:
  - Haemotympanum (the presence of blood leaking from the middle ear)
  - CSF leaking from the ears or nose
  - Battle sign (bruising over the mastoid process)
  - Racoon eyes (bruising under the eyes)
- An absence of these signs does not exclude basal skull fracture as some may take up to three days to become apparent.

More information

Base of skull fractures

- Base of skull fractures (also known as basal or basilar skull fractures) are usually caused by significant blunt head trauma from a high energy mechanism of injury such as an MVA, fall from height or assault with a weapon.
- Base of skull fractures are commonly associated with serious facial injuries, cervical spine injury and intracranial haemorrhage.
- The classic signs and symptoms of basal skull fracture are highly predictive if they are identified. However, they are limited in several ways, especially in the prehospital context. Battle sign and raccoon eyes can take up to three days to develop. Haemotympanum and CSF leakage can be subtle and easily confounded by blood and fluid from other sources.

Disposition

- Where possible, these patients should be transported as per **CPG A0105 Trauma Triage** with preference for a neurosurgical centre if transport times are similar.

Moderate risk

Altered mental status

- Includes:
  - Agitation
  - Drowsiness
  - Repeated questioning
  - Slow response to verbal communication
- Reductions in conscious state should be measured against the patient's baseline mental status.

More information

- Altered mental status can be a cause for concern requiring assessment in hospital. There is a greater degree of concern for prolonged altered mental status.
- Altered mental status describes changes in cognition, mood, behaviour and level of arousal. It is a more general concept than the "confusion" referred to in the GCS, which is specific to person, place and time. Patients with a GCS 15 (whom are orientated to person, place and time) may simultaneously have an altered mental status.

Age and / or Coagulopathy

- Older age and coagulopathy are associated with increased risk of a head / brain injury requiring treatment. However, where they are the only risk factors and there are no other concerning features (e.g. LOC, amnesia), the absolute risk is very low.
- Decision making regarding disposition may be shared between VVED, the patient (or medical treatment decision maker) and paramedics at the scene.

More information

- Standing height falls are a leading cause of major trauma in the elderly. This cohort must not be underestimated. Older patients require substantially less force to cause a brain injury.
- Atrophy of the brain as people age allows more movement of internal structures inside the skull. This can lead to increased greater space for coup/countrecoup motion as well as increased shearing forces on blood vessels. Older patients can also take longer to show signs and symptoms of intracranial haemorrhage due to the increased space inside the skull that may take time to fill with blood. However, in patients showing no other signs and symptoms of a brain injury, the absolute risk is still relatively small.[2]
- Patients on anti-coagulants and anti-platelet medications (not including aspirin) have increased bleeding time which may result in an apparently minor head injury causing serious intracranial bleeding. These patients likely have a greater relative risk of brain injury requiring treatment. However, in patients showing no other signs and symptoms of a brain injury, the absolute risk is still relatively small.[2]
- Aspirin does not increase risk as much as other anti-platelet agents. As such, patients on aspirin alone are excluded from the moderate risk category. Other anti-platelet agents such as clopidogrel, prasugrel or ticagrelor are likely associated with increased risk.
- In patients where age and coagulopathy are the only risk factors, the mechanism is low energy, there are no signs/symptoms of head injury, and they meet the criteria for cervical spinal clearance (other than age), the patient may be comfortable to accept the small degree of risk and be monitored at home. The patient's circumstances and goals of care may also mean more risk is acceptable, even with higher energy mechanisms of injury. Alternatively, a non-urgent CT scan may be appropriate.
- Disposition depends on an individual's circumstances and personal risk tolerance. Consider a shared decision in consultation with VVED and the patient.
- The role of VVED is to offer:
  - Additional detailed assessment if required
  - Greater clinical experience and expertise in assessing the risk associated with the specific presentation
  - The facilitation of nuanced shared decision making
- It is important that the patient's decision is fully informed by information regarding risk. Discouraging patients from attending an emergency department by emphasising wait times is coercion.

Disposition

- Indicates an increased risk of an injury requiring immediate treatment.
- May require a CT scan or at least four hours of observation depending on the judgement of the emergency physician and hospital policy.
- Where possible, transport these patients to a CT-capable hospital. If this is not feasible, the patient will require at least four hours of observation in hospital.

Low risk

Disposition

- The absence of high or moderate risk criteria indicates the patient has a very low risk of having a clinically significant injury requiring emergency treatment.
- Self-care may be appropriate.
- Ongoing symptoms indicate mild brain injury (concussion). The patient requires advice on the care of mild brain injury and follow up with a GP for ongoing management.

More information

> "Concussion symptoms" refers to any minor symptoms typical of minor TBI (e.g. mild headache, nausea or fatigue) but not included in high or moderate risk criteria.

Self-care advice

- For patients with concussion symptoms:
  - Rest: limit physical and cognitive activity, including screen time (e.g. mobile phones, TV) until symptoms resolve
  - Paracetamol for headaches
  - Do not drive, drink alcohol or take sedatives for 24 hours
  - A competent adult should be available to monitor the patient for at least 4 hours and ideally up to 24 hours.

Safety netting

- Advise patients to seek immediate help if they experience:
  - Severe or increasing headache
  - Repeated vomiting
  - Increasing confusion / agitation
  - Altered conscious state, "black outs" or cannot be woken
  - Seizures
  - Weakness or altered sensation in limbs
- Provide Heath information Sheet

Referral

Concussion symptoms

- Non-urgent follow up with a GP is required (2-3 days) as patient may require further advice and care for chronic symptoms of mild brain injury.

No concussion symptoms

- No referral is required for low risk patients with no symptoms.

Monitoring

- Pupil exam: 15 minutely in patients being transported.
  In addition to baseline monitoring requirements outlined in CPG A0101 Clinical Approach.

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Traumatic head injury.pdf
- Walkthrough video - Traumatic head injury

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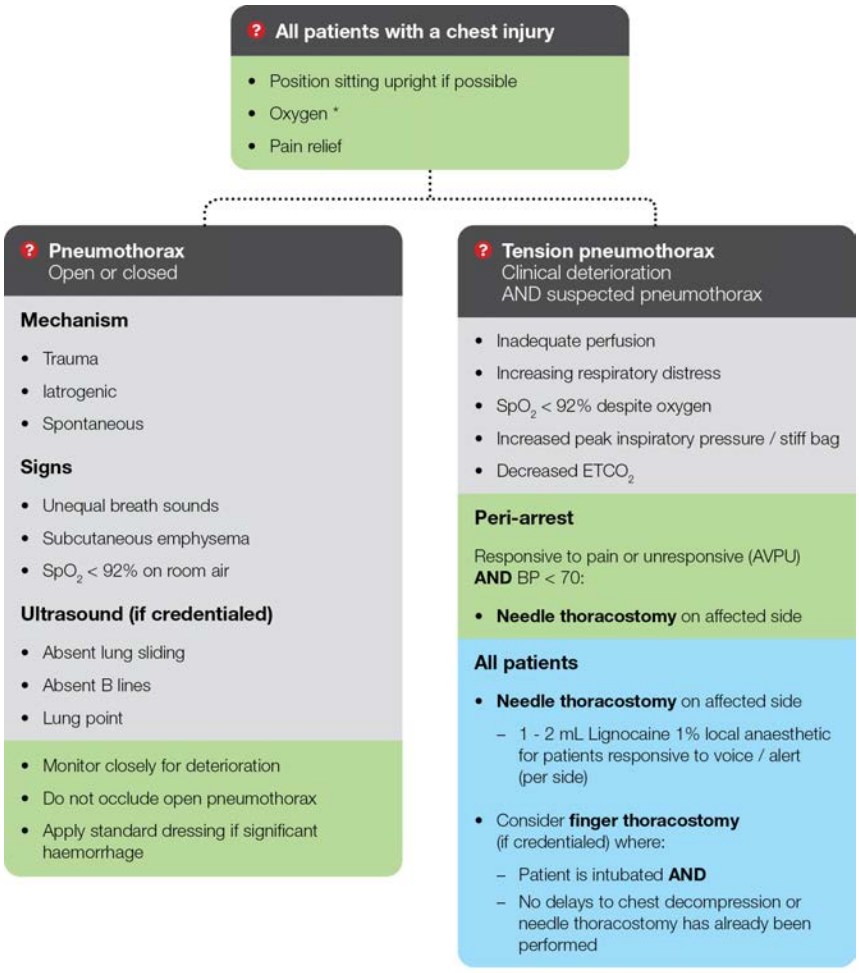
Flowchart



* If required as per CPG A0001 Oxygen Therapy

Care Objectives

- Adequate oxygenation
- Effective pain relief to assist in maintaining adequate ventilation
- Early identification and management of tension pneumothorax

Intended patient group

- Patients aged ≥ 16 with a chest injury

Overview

Chest injury includes a range of pathologies that affect the chest wall and underlying organs. Several of

these have specific prehospital management considerations.

More information

- **Rib fractures** – Fractures to one or more ribs, leads to pain and may impair ventilation and gas exchange. More than 3 fractures to the chest wall is associated with higher rates of complications. **Flail segment** may occur where multiple ribs are fractured in more than one location each, creating a segment that can move independently of the rib cage leading to significant ventilatory impairment. On inspiration the flail segment may be seen to move inward while the rest of the chest wall is expanding.
- **Pneumothorax** - Infiltration of air into the pleural cavity leading to a partial collapse of the lung on the affected side. May be **open** (external wound allowing air into pleural space) or **closed** (wound to visceral pleura allowing air to enter pleural space). A pneumothorax that does not impact on other structures within the chest may also be known as a **simple pneumothorax**.
- **Haemothorax** – Infiltration of blood into the pleural cavity leading to a partial collapse of the lung on the affected side. Massive hemothorax (>1500mL) can lead to complications of tension pneumothorax and hypovolaemia.
- **Tension pneumothorax** - A pneumothorax where a segment of damaged tissue creates a valve that allows air to enter the pleural space but inhibits its escape, creating progressive expansion and impairing ventilatory function. This pressure can shift the mediastinal structures laterally away from the affected side leading to compression or kinking of the large vessels, obstructive shock and cardiac arrest.

Assessment

Respiratory

- Perform a respiratory status assessment
- Monitor SpO_2
- Consider nasal capnography for monitoring of respiratory rate and trends in ventilation

Secondary Survey

- Expose the chest
- Observe
  - Bruising, deformity, abnormal chest movements.
  - Open / penetrating wounds. Assess areas not easily visualised including the axilla and back.
- Palpate

- Tenderness, crepitus, subcutaneous emphysema.

Pneumothorax

- Pneumothorax is challenging to diagnose in the prehospital environment.
- Closely monitor any patient with suspected pneumothorax for progression to tension pneumothorax.
- Isolated symptoms should not be used to diagnose or exclude pneumothorax. Consider diagnosis in the context of mechanism of injury and presence of other signs / symptoms.
- Consider mechanism of injury
  - Traumatic
  - Spontaneous
  - Iatrogenic

More information

Mechanism of injury

- Traumatic
  - Blunt
  - Penetrating
- Spontaneous
  - Primary spontaneous pneumothorax presents in patients without a precipitating event in the absence of lung disease, often caused by an unrecognised lung abnormality (e.g. a bleb). Most commonly occurs in older adolescent and young adult males. Other risk factors include smoking, tall and slim build, family history or genetic predisposition including connective tissue diseases.
  - Secondary spontaneous pneumothorax occurs as complication of existing lung disease (e.g. COPD).
- Iatrogenic
  - Barotrauma (i.e. secondary to positive pressure ventilation)
  - Medical procedure (e.g. CPR, lung biopsy)

- Signs and symptoms may include:
  - Unequal breath sounds
  - Subcutaneous emphysema
  - SpO_2 < 92% on room air

More information

- Equal air entry on chest auscultation does not exclude pneumothorax as referred noises may be heard, particularly in ventilated patients.
- Subcutaneous emphysema is the presence of air beneath the skin, however it is not always present in pneumothorax.

- Ultrasound is reliable and accurate for detection of pneumothorax when performed effectively. Ultrasound signs for pneumothorax include:
  - Absent lung sliding
  - Absent B lines
  - Lung point

Tension Pneumothorax

- Tension pneumothorax should be suspected in the patient with a likely mechanism for pneumothorax and clinical deterioration, with or without signs of pneumothorax. They may present with:
  - Inadequate perfusion
  - Increasing respiratory distress
  - SpO_2 < 92% despite oxygen
  - Distended neck veins and tracheal deviation (these are unreliable and late signs).
- There are differences in the respiratory mechanics of spontaneously breathing and ventilated patients which can influence how tension pneumothorax develops. Below are commonly seen trends but do not reflect all presentations of tension pneumothorax.

Spontaneously breathing

- Tends to progressively worsen over time.
- Presents predominantly with hypoxaemia and increasing respiratory distress.
- Inadequate perfusion is usually a late sign.

Ventilated

- High risk of developing tension pneumothorax in major trauma, particularly where there is evidence of chest injury.
- Tends to develop rapidly (seconds to minutes).
- Presents predominantly with haemodynamic compromise and hypoxaemia.
- Increased peak inspiratory pressure / stiff bag (difficulty squeezing the BVM).
- Decreased $ETCO_2$.
- Consider in ventilated cardiac arrest patients who have received vigorous CPR where there is a sudden deterioration in SpO_2 and $ETCO_2$.

More information

The mechanics of spontaneous ventilation and positive pressure ventilation are different, which influences some aspects of the clinical presentation of tension pneumothorax. However these differences do not occur in the same way for every patient.

The proposed pathophysiology for spontaneously breathing patients suggests that a one-way valve allows for pneumothorax volumes to progressively increase, while compensatory mechanisms such as increasing respiratory rates and tidal volumes prevent sudden haemodynamic compromise. This leads to a slower progression of symptoms, presenting with hypoxaemia and increasing respiratory distress first.

Ventilated patients may be less likely to compensate due to increased inspiratory pressures and sedation / unconsciousness. Positive pressure ventilation causes a faster accumulation of intrapleural gas leading to earlier compressive effects on the heart or vessels. This can lead to a sudden (seconds to minutes) deterioration presenting predominantly with haemodynamic compromise.

There are no standard diagnostic criteria for tension pneumothorax and the presentation may vary from the broad categories listed in this guideline. Diagnosis is subjective and should consider the mechanism and all signs and symptoms in context.

Management

Positioning

- Sitting upright (awake and spontaneously ventilating patients)
  Optimises respiratory mechanics
- Lie supine / 10-15 degrees head-up: where patient is hypo perfused or requires spinal precautions

Oxygenation

- Consider the need for oxygen in any patient with chest injury or impaired ventilation as per **CPG A0001 Oxygen Therapy**.
- Consider oxygen regardless of SpO_2 in anyone with suspected or diagnosed pneumothorax.

Pain relief

- Early and effective analgesia is essential
  Pain associated with rib fractures can lead to hypoventilation.
  Methoxyflurane may be less effective if pain on inspiration impedes administration.
- Do not splint chest injury
  This is not effective and may increase pain.

Open chest wounds

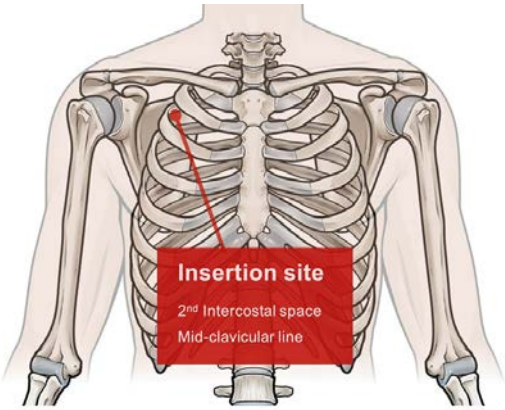
- Do not cover open chest wounds unless there is significant haemorrhage
  Covering will seal the wound and may worsen or cause a tension pneumothorax.
- Leave the wound open and monitor the patient closely

Vented Chest seals

- Chest seals may have already been applied to open chest wounds by other agencies such as the police special operations group
- Remove chest seal if there is evidence of tension pneumothorax

Needle thoracostomy

- Chest decompression by needle thoracostomy is the primary management for tension pneumothorax.
  - ARS or IV Cannula: **CWI/OPS/169**
  - Arrow® Pneumothorax Kit: **CWI/OPS/073**



- Local anaesthetic with lignocaine is required prior to needle thoracostomy for patients with awareness (responsive to voice or alert).
  - The maximum dose of lignocaine 1% (to avoid onset of side effects) is 3 mg / kg.
- Do not perform needle thoracostomy unless there is evidence of tension pneumothorax.
- An uncomplicated pneumothorax does not routinely require decompression for flight.

More information

Previous clinical practice has included decompression of pneumothorax without signs of tension in preparation for flight, due to the perceived high likelihood of deteriorating due to changes in pressure.

Recent practice has shown these patients are frequently able to be managed without decompression and this procedure should not be routinely performed prior to flight without clear signs of tension pneumothorax.

Finger thoracostomy

- Chest decompression by finger thoracostomy (where accredited) is recommended for intubated patients only.
- Finger thoracostomy is a sterile procedure. Consider potential delays due to preparation.
- Where there is any delay to chest decompression, needle thoracostomy should be performed first as a bridging procedure.

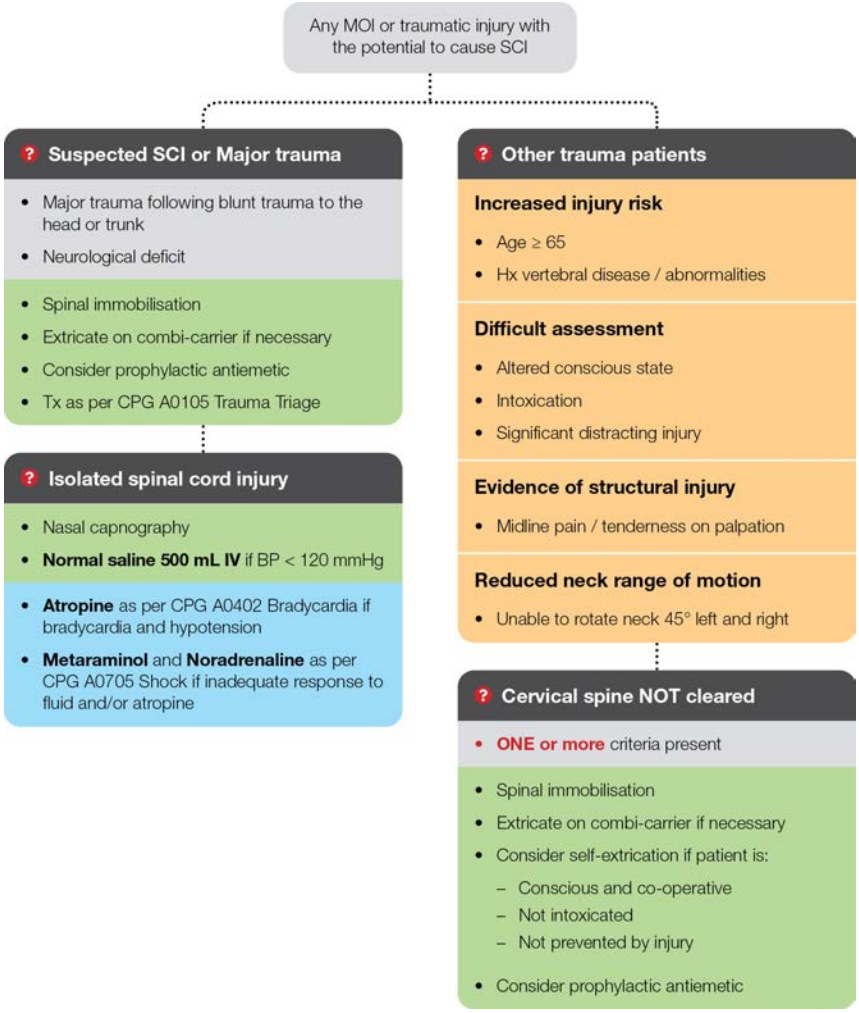
Shock

- Concurrently manage shock as per **CPG 0810 Major Trauma**

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Chest Injury.pdf
- Walkthrough video - Chest injury

Flowchart



Neurological examination

Motor function

Any weakness when asked to:

- **Arms:** grasp / pull / push.
- **Legs:** push / plantar flex, pull / dorsiflex, leg raise.

Sensory function

Reduced or no sensation when applying light touch to the following:

- **Arms:** Light touch across the palm and back of hand (C6-8)
- **Legs:** Light touch lateral side of calcaneus (S1)

- The patient should be questioned regarding 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 a neurological deficit and CANNOT be spinally cleared.
- The left and right sides should be tested simultaneously to compare strength between sides of the body.

Neck range of motion

Test for pain or restricted range of motion by asking the patient to:

- turn their own head slowly,
- to the left and the right,
- approximately 45 degrees each way,
- stopping if they feel any pain or resistance.

Do not turn the patient's head for them.

Care Objectives

- 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.

Intended patient group

- Patients ≥ 16 years of age with a MOI capable of causing injury to the spinal column

Overview

Pathophysiology

- **Spinal cord injury:** Injury to the cord itself causing neurological deficits.
- **Unstable vertebral injury:** Injury to the vertebrae that protect and support the spinal cord. Neurological deficits are not present but other indicators of injury such as pain may be present unless obscured by difficult assessment.

Learn more

Spinal cord injury

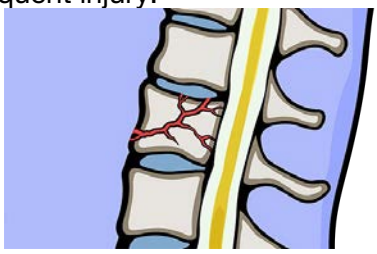
- Injury to spinal cord itself, usually in addition to unstable injury of the vertebrae.

- Causes neurological deficit
- Primary vs secondary injury:
  - Primary cord injury: result of the initial insult to the cord which may cause an irreversible injury with permanent neurological deficits
  - Secondary cord injury: subsequent injury caused by hypoxia, hypotension, oedema/haemorrhage causing compression, and ischaemia. Similar to secondary brain injury, optimizing ventilation, oxygen and perfusion may reduce the extent of secondary cord injury.
- Complete vs incomplete:
  - Complete injury involves the loss of all motor and sensory functions below the level of the injury.
  - Incomplete injury involves the preservation of some sensory or motor function. The patient's presentation may vary depending on the location and type of injury.

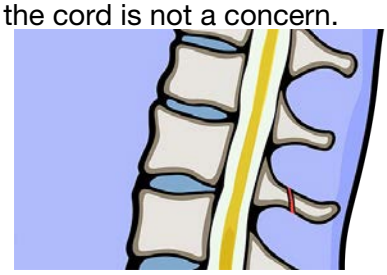
Central cord syndrome	Caused by striking the chin/face and extending the neck. Common type of SCI in elderly patients following standing height fall. Greater deficits in the arms than in the legs.
Brown Sequard syndrome	Characterised by dysfunction differing between the patient's left and right sides. Motor function is affected on one side, while sensation is affected on the other.
Anterior cord syndrome	Bilateral motor dysfunction below the level of the injury Varying degrees of sensory dysfunction. Pain and temperature sensation may be altered. Touch and proprioception may remain normal.
Conus medullaris and cauda equina syndrome	Affects the distal end of the spinal cord which may impact bladder, bowel and lower limb function and sensation.

Vertebral injury

- Fracture or dislocation of the vertebrae or surrounding supportive ligaments. These injuries are further classified as:
  - Unstable: The spinal column has lost its integrity and is not supporting and protecting the cord adequately. The cord is more vulnerable to subsequent injury. Spinal immobilisation supports the unstable spinal column and theoretically protects the vulnerable cord from subsequent injury.



  - Stable: While fractures and other injuries may be present, the column still protects the cord. Subsequent injury to the cord is not a concern.



Shock

Neurogenic shock

Sympathetic nervous system pathways travel via the spinal cord. Parasympathetic nervous system pathways travel via the vagus nerve. Spinal cord injury can cause a loss of sympathetic tone, resulting in unopposed parasympathetic nervous system activity.

Signs:

- Hypotension
- Bradycardia
- Flushed warm skin
- Hypothermia

Spinal shock

Transient loss of the usual neurological activity at and below the level of injury including motor, sensory and autonomic function.

Symptoms may present from hours to weeks after the incident, dependent on the level and extent of the cord injury.

Spinal shock is not generally a relevant consideration in the prehospital environment.

Assessment

Mechanism of injury

- **Concerning MOIs** include those with the potential for hyper-flexion, hyper-extension, hyper-rotation or axial loading of the spinal column.
- **Young / healthy patients:** A significant amount of force is required to damage healthy vertebrae. Patients with higher energy mechanisms such as a car rollover/ejection, pedestrian impact, or diving accident should be treated and assessed carefully.
- **Older / frail patients:** Far less force is required to damage the vertebrae of older or frail patients:
  - Older patients (Generally considered to be age $\geq$ 65)
  - Vertebral disease (ankylosing spondylitis, spinal stenosis rheumatoid arthritis)
  - Previous spinal abnormalities (spinal fusion, previous c-spine injury or surgery)
- Penetrating trauma:
  - Do not routinely spinally immobilise. Immobilisation of patients with penetrating trauma is associated with higher mortality.
  - Spinal immobilisation should only be applied if the patient has a neurological deficit.

SCI and Major Trauma

- **SCI or major trauma:** Patients with neurological deficit or other major trauma criteria should receive spinal immobilisation and expedited transport. They are not candidates for spinal clearance.

Learn more

SCI - Neurological deficit

Neurological deficits indicate spinal cord injury. The patient meets the major trauma criteria and should be transported accordingly.

Neurological deficits are included in the NEXUS criteria. However, in this guideline, neurological deficit is included in a separate pathway as it indicates actual cord injury and leads to an urgent and unique care pathway.

The other NEXUS criteria indicate a higher risk of unstable vertebral or ligamentous injury. These injuries are serious and management less urgent.

Major trauma

The modified NEXUS criteria used in this guideline are not intended to be used for severely injured trauma patients. The treatment of life-threatening injuries and expediting transport are the priorities. These patients also have a higher likelihood of spinal column injury and more distracting factors, increasing the chances of erroneous spinal clearance.

AV guidelines recommend against attempting spinal clearance in any patient meeting the criteria in **CPG A0105 Trauma Triage** following blunt trauma to the head, neck or trunk (chest / back / abdomen). Spinal clearance may be appropriate in some cases as not all patients meeting these criteria will be severely injured. However, the guideline recommends against attempting spinal

clearance for the sake of simplicity.

Other trauma patients - spinal clearance

- Spinal clearance involves clinically excluding spinal cord injury and unstable vertebral injury. Spinal immobilisation is not required once the patient has been spinally cleared.
- A patient can be spinally cleared if there are:
  - No neurological deficit
  - No evidence of vertebral injury in the form of pain or tenderness on palpation
  - No factors increasing the difficulty of patient assessment (altered conscious state, distracting injury)
  - No increased risk of injury (e.g. ankylosing spondylitis)
  - Normal neck range of motion
- **Altered conscious state** includes any presentation which may confound the results of a physical examination (e.g. GCS < 15 for any reason, concussion, dementia).
- **Distracting injury:** injuries that cause significant pain or distress to the extent that they may distract the patient from the pain caused by vertebral injury, making the physical exam unreliable. Generally these are very painful injuries such as fractures or burns. Small haematomas or lacerations are not usually considered distracting.
- **Intoxication:** the use of any alcohol, drugs or medications that conceal the pain of a vertebral fracture or distract the patient from reporting neurological deficits, making the physical examination unreliable.
- **Age:** Consider consultation with VVED if age is the only concerning feature. This consideration should be used in combination with **CPG A0803 Traumatic Head Injury** and is aimed at supporting the referral of older patients with standing height falls where the patient's presentation and details of the mechanism are not otherwise concerning.

More information

Spinal clearance

- Spinal clearance is the process of excluding spinal cord injury and unstable vertebral or ligamentous injury based on clinical exam, without the need for imaging such as a CT scan.
- The concept of spinal clearance is based on the principle that cord injury causes neurological deficits and vertebral fractures cause pain. Both of these features can be assessed as part of a physical exam.
- If the patient does not have neurological deficits or pain and the physical examination is reliable (e.g. they are not intoxicated, distracted or in an altered conscious state), then cord injury or unstable vertebral injury are very unlikely.
- The National X-ray utilization study (NEXUS) found this approach is extremely reliable.[1-4] However, there have been cases where these criteria alone missed unstable vertebral injuries.[2, 5-7]

- The modified NEXUS criteria used by AV includes additional components aimed at further reducing the likelihood of missed unstable injury.
  - Age ≥ 65: the risk of injury is higher and examinations may be more difficult due cognitive impairment
  - Hx of bone or muscle weakening diseases: the risk of injury is higher.
  - Assessing passive neck range of motion at the end of the examination.

Care

Spinal immobilisation

- Spinal immobilisation techniques are included in **CWI/OPS/188 Soft Cervical Collar**.
- 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. Techniques 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).
- Maintain neutral alignment of the cervical spine by providing head elevation. A pillow or folded towel may be appropriate depending on the patient's anatomy.
- The head MUST NOT be restrained to the stretcher.
- 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 which may include elevating the head of the stretcher to approximately 15 degrees.
- The CombiCarrier extrication board should only be used as an extrication device. Patients should NOT be immobilized on the board for transport to hospital.
- Manual In-Line Stabilisation (MILS) as per **CWI/OPS/205** should be used when transferring the patient or during intubation.
- During extrication, all movements should be planned and coordinated as a team to minimise unnecessary handling of the patient and potential for manual handling injuries.
- Consider prophylactic antiemetic as per **CPG A0701 Nausea and Vomiting** in all awake spinally immobilised patients.

Monitoring for suspected SCI

- Vital signs, neurological observation (strength and sensation in limbs): 15 minutely
- Cardiac monitoring, SpO_2, nasal capnography: continuous.

More information

- Patients with suspected spinal cord injury should be monitored using nasal capnography.
- Elevated or increasing $ETCO_2$ indicates hypoventilation. The patient may require ventilation and escalation of care.

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC paper - Spinal injury.pdf
- Walkthrough video - Spinal Injury

References

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8. American college of surgeons. Best practice guidelines: spinal injury 2022 [Available from: https://www.facs.org/media/k45gikqv/spine_injury_guidelines.pdf.
9. Saadeh YS, Smith BW, Joseph JR, Jaffer SY, Buckingham MJ, Oppenlander ME, et al. The impact of blood pressure management after spinal cord injury: a systematic review of the literature. Neurosurg Focus. 2017;43(5):E20.

Burns CPG A0805

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, suspected airway burns, > 1000 volt electrical burns) should be transported either to the Alfred Hospital as a preference, if within 60 minutes transport time. If transport time > 60 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 – Consult AV Medical Advisor via the AV Clinician 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

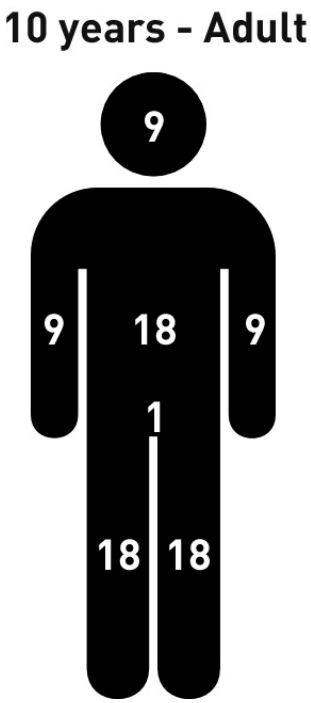
- If clinically appropriate, elevation of the affected area during transport will minimise swelling and oedema, especially in circumferential burns.

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
9
9
18
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1
18
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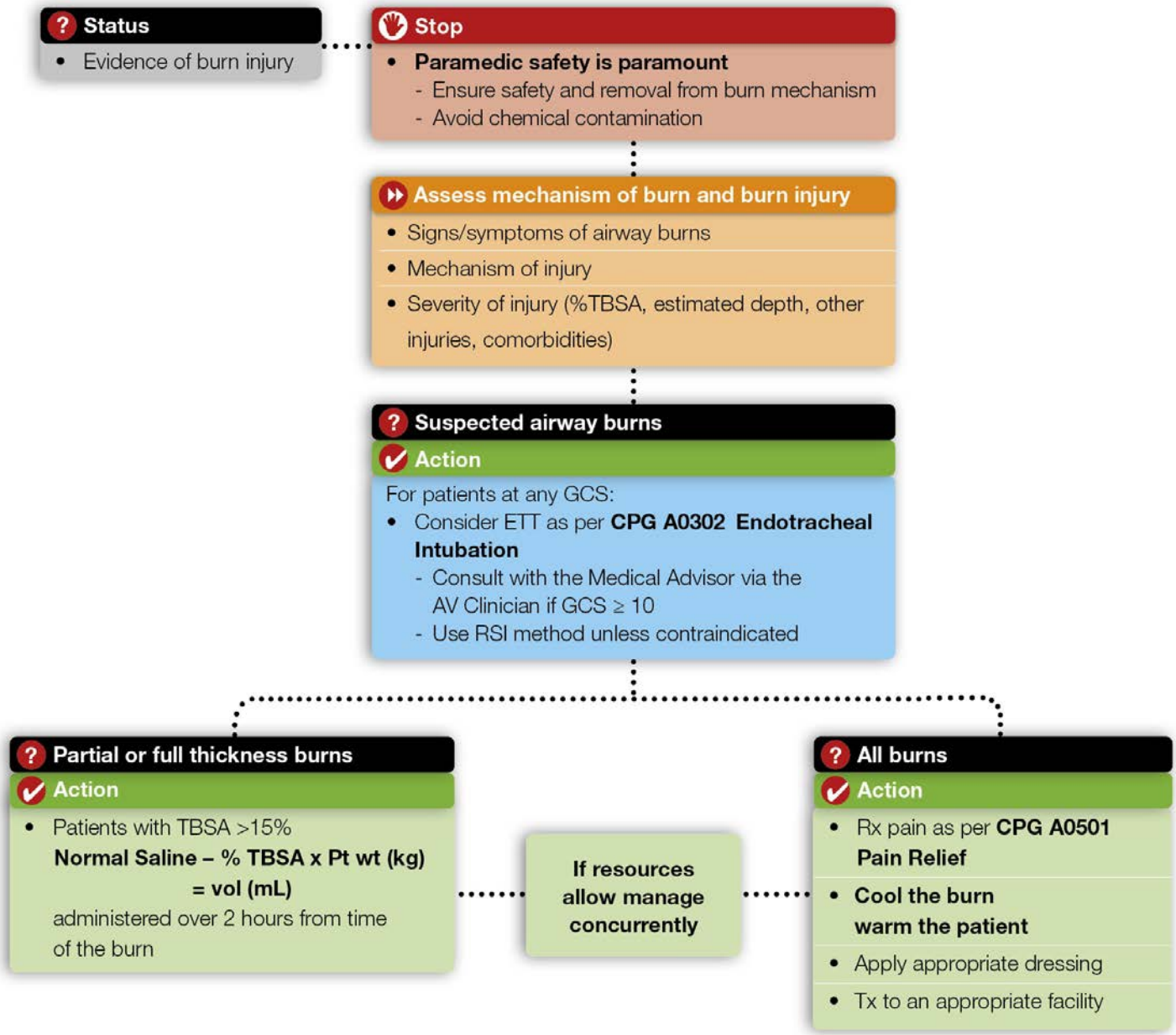
Flowchart



Related Resources

- https://av-digital-cpg.web.app/assets/pdf/CWI/MAC CPG A0805 Burns and P0803 Burns paediatric.pdf

Elderly / Frail Non-Injury Fall CPG A0808

General Notes

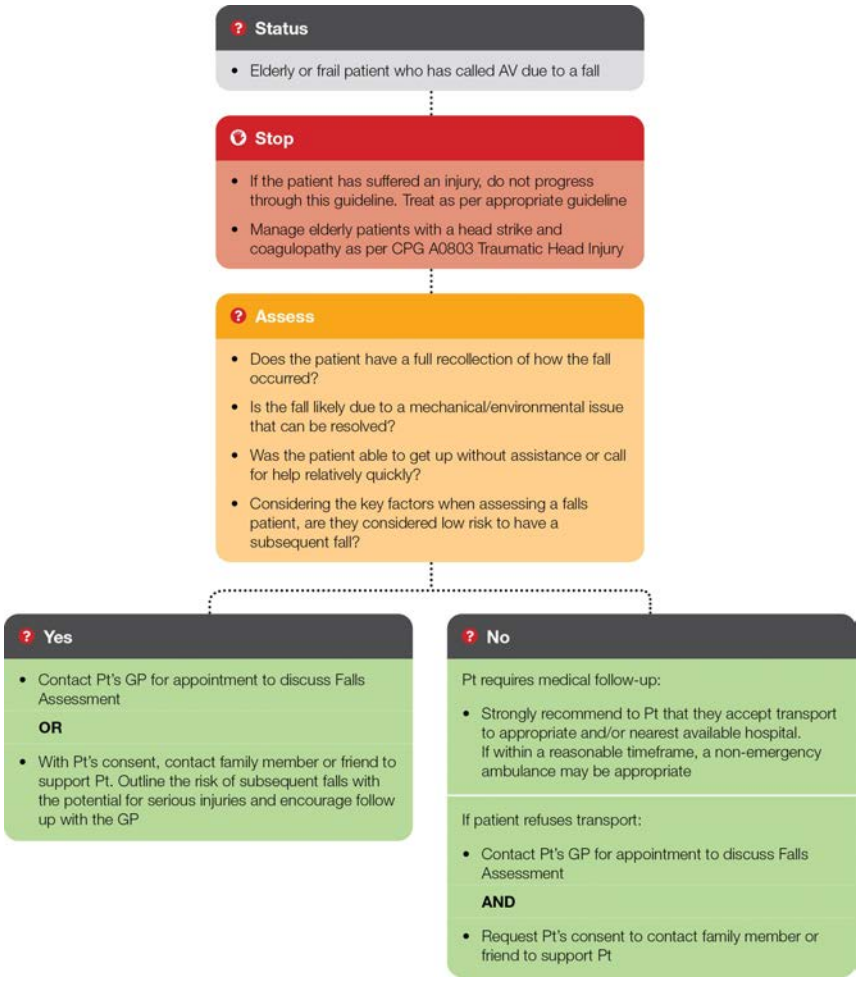
- The purpose of this CPG is to provide Paramedics with guidance when managing an elderly or frail patient who has fallen but has no apparent injury.
- The cause of a fall can be broadly placed into one of three categories:
  - Environmental/mechanical – e.g. events related to uneven ground, poor lighting, 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.

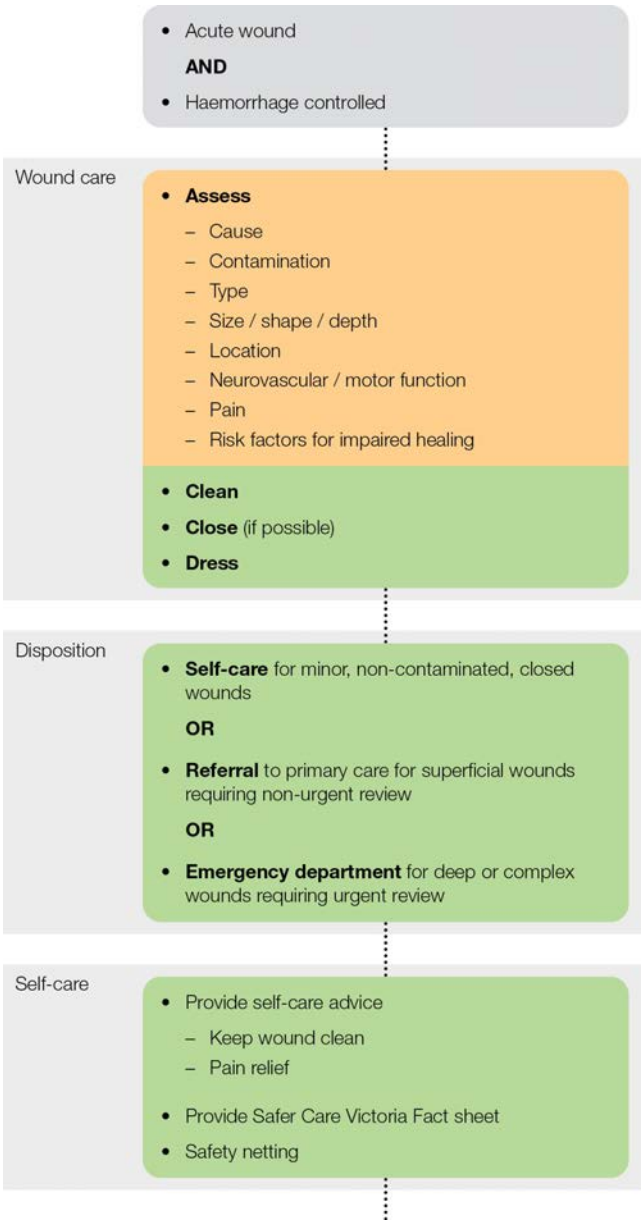
Flowchart

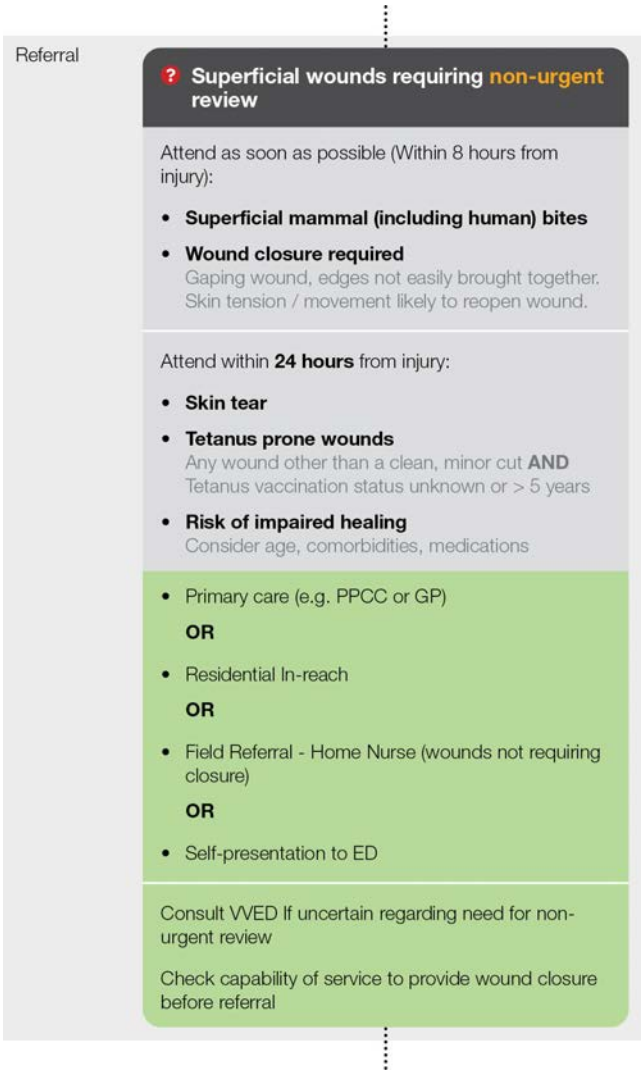


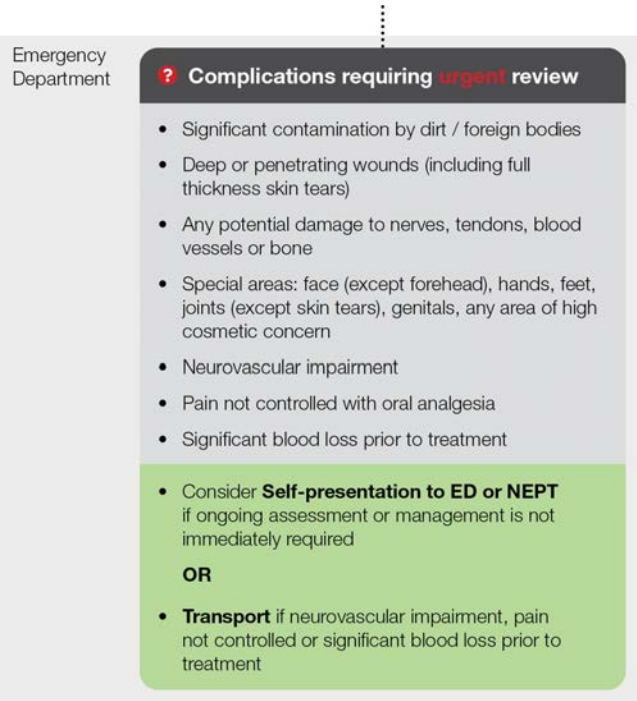
Related Resources

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

Flowchart


Acute wound
AND
Haemorrhage controlled
Wound care
Assess
Cause
Contamination
Type
Size / shape / depth
Location
Neurovascular / motor function
Pain
Risk factors for impaired healing
Clean
Close (if possible)
Dress
Disposition
Self-care for minor, non-contaminated, closed wounds
OR
Referral to primary care for superficial wounds requiring non-urgent review
OR
Emergency department for deep or complex wounds requiring urgent review
Self-care
Provide self-care advice
Keep wound clean
Pain relief
Provide Safer Care Victoria Fact sheet
Safety netting


Referral
Superficial wounds requiring non-urgent review
Attend as soon as possible (Within 8 hours from injury):
Superficial mammal (including human) bites
Wound closure required
Gaping wound, edges not easily brought together. Skin tension / movement likely to reopen wound.
Attend within 24 hours from injury:
Skin tear
Tetanus prone wounds
Any wound other than a clean, minor cut AND Tetanus vaccination status unknown or > 5 years
Risk of impaired healing
Consider age, comorbidities, medications
Primary care (e.g. PPCC or GP)
OR
Residential In-reach
OR
Field Referral - Home Nurse (wounds not requiring closure)
OR
Self-presentation to ED
Consult VVED If uncertain regarding need for non-urgent review
Check capability of service to provide wound closure before referral



Care Objectives

- Clean, close (where possible) and dress acute wounds
- Identify appropriate disposition:
  - Self-care for superficial non-contaminated closed wounds
  - Referral to primary care for superficial wounds requiring non-urgent review
  - Transport / self-present to ED for deep or complex wounds requiring urgent review

Intended patient group

- Patients with acute wounds such as skin tears, lacerations and abrasions where haemorrhage has been controlled.

Overview

- Paramedic management of acute wounds focuses on providing initial assessment and basic aseptic wound care with referral or transport for definitive management.
- Early gentle cleaning and dressing of the wound significantly reduces the risk of complications and promotes healing.
- Comprehensive wound care may not be appropriate in some circumstances and basic dressing application will be preferable.
  - Do not delay transport to attend to minor wound care needs in patients who require urgent emergency department care related to more significant injuries.

  - Neurodiverse patients and young children may not tolerate wound care procedures.

- Chronic wounds are not included in this guideline and are usually best managed in the primary care setting. Chronic wounds that appear infected will require more urgent management in primary care or ED.

Wound care procedure

Assess the wound

- Cause
  - Mechanism, e.g. blunt or penetrating, bite
  - Infection risk
  - Time since injury
  - Consider the possibility of undisclosed self-harm

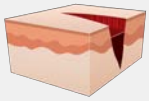
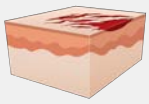
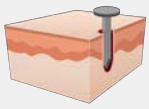
- Paediatric patients: Consider the possibility of non-accidental injury and need for safeguarding care.

- Contamination
  - Dirt, chemicals or foreign bodies

- Wound type: abrasion, avulsion (including skin tear), incision, laceration, puncture.

More information

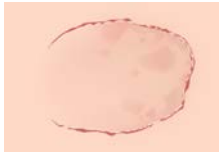
Laceration: Split to the skin caused by blunt force. Edges are rugged or rough.	
Incision: Wound caused by cutting with a sharp object. Edges are regular and clean.	

	
Avulsion: Tearing away of skin from tissue beneath. Includes skin tears and degloving injuries.	
Abrasion: Surface layer of skin has been rubbed off (e.g. road rash).	 
Puncture: A small opening which penetrates to underlying tissues (e.g. a bite).	

Accurate documentation of wounds is important, particularly in cases where a criminal investigation may occur.

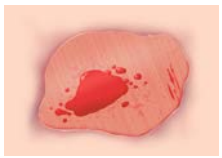
- Skin tear ISTAP classification: no skin loss (type 1), partial flap loss (type 2) or total flap loss (type 3).
  More information

  - Skin tears occur due to friction / shearing forces resulting in the separation of skin layers.
  - They are categorized based on the level of skin loss (ISTAP Classification):



Type 1: No skin loss

Type 2: Partial flap loss



Type 3: Total flap loss

- Size / shape / depth
  - Length of wound
  - Edges separated or gaping, straight or jagged
  - Superficial or deep. Consider damage to underlying structures such as bone, tendons, vessels or nerves.
- Location
  - Consider risk to areas that may cause scarring or cosmetic issues such as face, hands, joints, genitals.
- Neurovascular status (**CPG A0115**) and motor function
  - Functional damage to joints
  - Neurovascular impairment distal to the wound
  - Tissue next to the wound that appears dusky or poorly perfused
- Pain
  - Significant pain may indicate a more severe injury and require further care.
- Risk factors for impaired healing
  - Risk factors include elderly / frail, comorbidities and medications which affect the immune or circulatory systems.

More information

Age	Comorbidities	Medications
Elderly / frail	Diabetes	Steroids
	Renal failure	Immunosuppressants
	Peripheral vascular disease	Antiplatelets
	Obesity	Anticoagulants
	Immunocompromise	

	Connective tissue disorders Poor nutrition Poor mobility	

- Wound Photography
  - Where appropriate, take a photo of the wound with the patient's phone, ideally with an item in the frame for size reference.

More information

- This assists in determining the progression of healing and response to treatment for clinicians managing the patient in the future.

Clean the wound

- Ensure haemorrhage has been controlled before attempting cleaning
- Remove any dressings already applied
- Irrigate and clean the wound using aseptic no touch technique where possible

Full procedure: Wound cleaning

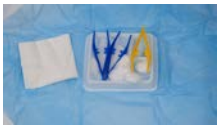
1. Explain procedure and gain consent.
2. Position the patient in an appropriate place to clean the wound (e.g. sitting at a table).
3. Remove and dispose of any dressings currently in place.
   If dressing is adhered to skin, soak the dressing in normal saline prior to removal to prevent secondary trauma to the skin.
4. Perform hand hygiene and apply clean gloves.
5. Apply other PPE as appropriate (protective eyewear if performing irrigation).
6. If the wound is obviously contaminated, irrigate thoroughly with saline (preferred) or clean tap water at low pressure.
   Irrigation may not be required if there is no obvious contamination.

   Irrigation volumes of 50 – 100 mL per cm of wound length are recommended in contaminated wounds.

Irrigation methods include:

- Normal Saline
  - Using a 50 mL syringe, hold just above the top of the wound and flush with continuous gentle pressure
  - Directly from a 30 mL ampoule
- Clean running tap water

7. Perform hand hygiene and apply clean gloves.
8. Open the dressing pack using an aseptic technique.
   - Choose a clean surface, away from contaminants
     e.g. clean a kitchen table with disinfectant wipes rather than using a bed.
   - Attempt to keep the dressing pack free from contamination.
   - Use no touch technique to place saline and dressings onto the aseptic field.
     - Use one set of tweezers to set up the field, then discard.
     - Use one set of tweezers in non-dominant hand to prepare items in aseptic field and pass to tweezers in dominant hand.
       Take care not to contaminate the aseptic field by re-touching it once these tweezers have been used outside of the aseptic field
     - Use the other set of tweezers in dominant hand to clean wound.



9. Gently clean wound and wipe away debris with a saline soaked gauze/cotton ball.
   - Use a clean piece of gauze or cotton ball each time. Do not reintroduce contaminated material.
   - Always wipe from the centre of the wound towards the outside.
     - For an open wound, wipe in concentric circles from the inside out.

     - For a linear wound, wipe from the centre of the wound to each end.

10. Allow the wound to air dry. Pat the surrounding skin dry with gauze.

Practice points

- Glove changes in the field may be difficult and take time.
  - After irrigation, remove gloves and perform hand hygiene, then set up the dressing pack with bare hands using aseptic technique to allow additional time before reapplying new gloves.
  - Where 2 paramedics are available, the first paramedic may irrigate the wound while the other sets up the aseptic field and then cleans the wound.
  - Glove change and hand hygiene is required after irrigation due to the increased risk of contamination from aerosols.
- Where the patient requires urgent emergency department care, a thorough wound cleaning procedure may not be practical and the most appropriate management should be prioritised.

Close the wound (if possible)

- Wounds with separated edges require closure to heal effectively.
- Most wounds will require closure with sutures, staples or glue in primary care or ED.
- Sutures or staples are used for closure when:
  - The wound is gaping and the edges are jagged or not easily brought together.
  - There is skin tension around the wound which could cause it to reopen (e.g. near a joint where there is movement).

Adhesive wound strips (commonly known as Steri-Strips™)

- Superficial, non-contaminated wounds may be considered for closure with adhesive wound strips.
- Refer the patient to primary care for follow up wound care if not transported.

- Thoroughly clean the wound.
- Bring each side of the wound together and secure with adhesive strips to improve healing.
- Cover with a non-adherent dressing.

Full procedure: Adhesive wound strips

Indications

Superficial lacerations where:

- < 4 cm length
- Edges are easily brought together

- Strips can adhere easily (e.g. not impacted by hair, moisture).

Precautions

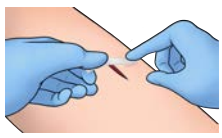
- Adhesive wound strips have limited utility in young children.
  Application may cause distress and children are more likely to touch or remove them. They may be appropriate in older children if it is determined they will tolerate application and leave the strips in place.

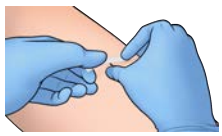
Contraindications

- Tension or movement around wound that may cause it to re-open
- Contamination
  Closing a wound that is contaminated will likely cause infection.
- Wound complications
- Skin tears, bites or abrasions.

Procedure

1. Explain procedure and gain consent.
2. Clean the wound as per procedure.
3. Bring the edges of wound together and place a strip across wound.





4. Repeat process with as many strips as necessary.
   Space strips approximately 3 mm apart.

5. Consider adding additional strips parallel to the wound.
   This can reduce force on strips.
6. Reassess wound. If not adequately closed, reapply adhesive strips or remove and apply dressing.
7. Cover the wound and adhesive strips with a non-adherent dressing.

Dress the wound

- Apply a dressing to protect from infection and maintain a moist wound healing environment.
- Check for allergies to adhesive dressings.
- Avoid the use of tapes on fragile skin – use a bandage instead.
- Open the dressing onto the aseptic field when preparing for wound cleaning.
- No dressing may be appropriate for minor superficial cuts and abrasions.

Select an appropriate dressing for the wound:

Dressing type	Indication
Low-adherent dressing (e.g. Melolin)	• Most acute wounds with minor fluid leakage – Apply non-stick "shiny" side to the wound – Consider adding a combine and wrap with a bandage for padding and protection. – Multiple low-adherent dressings may be applied alongside each other for larger wounds. – Use sterile scissors to cut to size if required.
Combine	• Larger wounds for haemorrhage control and where absorption of greater amounts of fluid / blood is required. • If a non-adherent dressing is not available, a moistened saline combine can be used for open wounds, however: – Moistened dressings dry out and will not maintain a moist wound healing environment. – If the dressing is too wet, it will macerate surrounding skin.
Silicone foam dressing (e.g. Biatain)	• Skin tears – Safe for use on fragile skin.

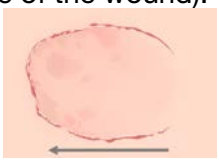
Skin tears

- Skin tears which are full thickness or have ongoing haemorrhage require care in ED.
- Early and effective management of skin tears can significantly decrease long term complications.

- Assess and classify the skin tear.
- Clean the wound and attempt to realign the skin flap.
- Apply a silicone foam dressing, noting the direction for removal and time of application.

Full procedure: Care of skin tears

1. Explain procedure and obtain consent.
2. Assess and classify skin tear as per ISTAP category 1, 2 or 3.
3. Clean the wound as per procedure.
4. Attempt to realign skin flap over wound to its anatomical location by using tweezers or saline moistened gauze.
   Do not stretch the skin as this will impair wound healing.
   The skin flap may be partially missing or not fold back easily to its original location. If unable to realign, continue to next step.
5. Apply silicone foam dressing (e.g. Biatain).
   Ensure the dressing overlaps intact skin by 2 cm.
   This secures the skin flap in place.
6. Draw arrow over dressing in the direction the dressing should be removed to protect the flap (from the base of the wound to the edge of the wound).



7. Write date and time of application on dressing.

Disposition

Self-care

- Keep the wound clean.
- Take simple pain relief such as paracetamol if required.
- Follow up with a GP if any signs of infection.
- More information is available in the Safer Care Victoria Fact Sheet.

Referral to primary care

- The timeframes for referral are the maximum time from injury for primary care to provide an optimal

outcome.

- Management can still be provided outside of these timeframes but there is a higher risk of complications or infection.
- Earlier care is preferable to minimise the risk of infection.

- Consult VVED for advice if uncertain about whether the wound is suitable for referral to primary care.
- Ensure the patient understands the importance of attendance within the specified timeframe.
- The capability and availability of primary care providers can vary. Contact the service or check the capability prior to referral.

More information

The ability of a GP to provide wound closure is dependent upon the capacity of the clinic and level of experience / training of the provider.

Some Residential In-Reach services provide suturing and staples.

Field referral to the home nursing service is available in some regions to manage minor acute wounds that do not require suturing or staples, including post-surgery incisions and skin tears.

Paediatric considerations:

Young children are more likely to require analgesia and / or sedation for wound cleaning and closure. Consider Priority Primary Care Centre (PPCC) or Emergency Department attendance in this patient group.

Attend as soon as possible (maximum 8 hours from injury)

Superficial mammal bites

- Mammal bites include those caused by an animal or human and carry a high risk of infection.

More information

Human bites include clenched fist injury, which occurs when a person’s closed fist strikes the teeth of another person, usually during a fight, causing a wound to the hand.

- Bite wounds that are deep or > 8 hours old will require antibiotics and often need surgical irrigation (washout).
- If unsure about depth of wound, recommend ED.

Superficial wound closure

- Many wounds are suitable for closure up to 8 hours from injury.
  - A shorter referral timeframe is preferred for wounds with a higher risk of infection.

More information

- Increased infection risk may be due to contamination, difficulty in providing adequate wound cleansing / dressing or patient factors that impair healing.
- Wound closure greater than 8 hours after injury may be appropriate in primary care if there is minimal infection risk and good vascularity to the wound area. Consult VVED or the provider to discuss suitability.

Attend within 24 hours from injury

Tetanus prone wounds

- Any wound other than a clean, minor wound may present a risk of tetanus.
- Tetanus prophylaxis may be required where the patient has not had a tetanus vaccine in the previous 5 years or immunisation status is unknown.

More information

- Tetanus may be a risk, even in small wounds when they are:
  - Infected or contaminated (e.g. by soil or caused by dirty implement)
  - Contain foreign bodies (e.g. splinters)
  - Wounds with extensive tissue damage (e.g. contusions)
  - Bite wounds
- Tetanus vaccine is recommended as soon as possible after the injury, however larger doses can still be administered > 24 hours later.

Risk of impaired wound healing

- Patients at risk of impaired wound healing require referral to primary care to manage the wound and other health issues.

Skin tears

- Skin tears require timely management in primary care to provide further cleaning and debridement if required, redressing and a general health assessment.

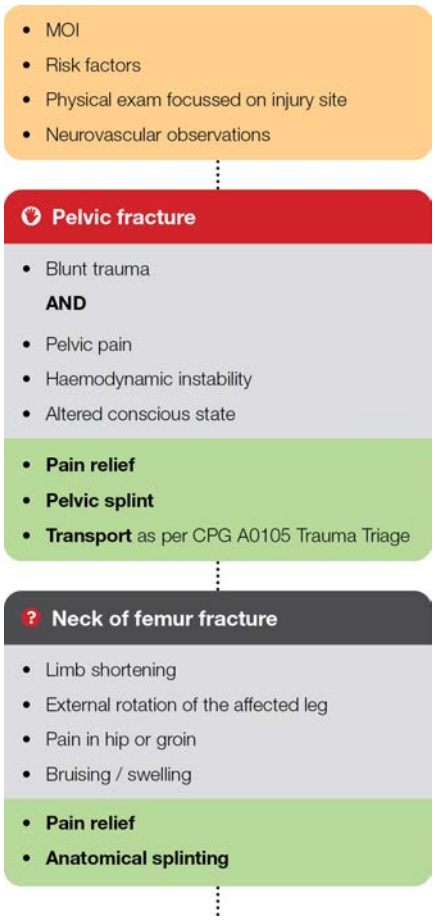
Emergency department

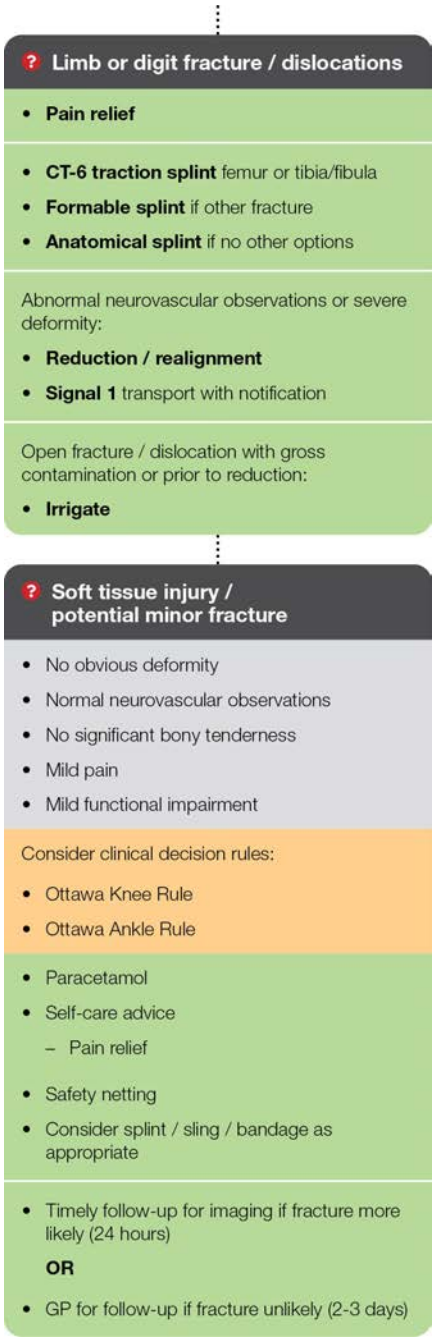
- Wound complications may require further investigation and surgery to adequately explore, clean, debride and repair the wound.
  - Significant contamination by dirt / foreign bodies may occur in large amounts, is obviously visible, can be difficult to remove and will likely require exploration of wound.
  - Deep wounds with actual or potential damage to underlying structures require further exploration in ED.
- Wounds to some body areas will require management in ED or referral to specialists.
  - Areas of high cosmetic concern may vary depending on the patient's perception.
  - In some cases, wounds to special areas may be able to be managed outside of ED (e.g. fingertip wounds to hands). Consult VVED to assist with assessment and care plan if uncertain about whether the wound requires emergency department care.

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Wound Care.pdf
- Walkthrough video - Wound care
- Video - Cleaning linear wound
- Video - Cleaning open wound
- Video - Care of skin tear

Flowchart


MOI
Risk factors
Physical exam focussed on injury site
Neurovascular observations
Pelvic fracture
Blunt trauma
AND
Pelvic pain
Haemodynamic instability
Altered conscious state
Pain relief
Pelvic splint
Transport as per CPG A0105 Trauma Triage
Neck of femur fracture
Limb shortening
External rotation of the affected leg
Pain in hip or groin
Bruising / swelling
Pain relief
Anatomical splinting



Care Objectives

- Haemorrhage control
- Analgesia
- Realignment if gross deformity or neurological / vascular compromise
- Splinting

Intended patient group

- Age ≥ 16 with potential fractures, dislocation or soft-tissue injury

Assessment

History

- Mechanism of injury
- **Risk factors:** Consider preexisting increased risk of fracture due to poor bone health:
  - Elderly
  - Osteoporosis / rheumatoid arthritis
  - Chronic renal impairment
  - Diabetes
  - Malnutrition
  - Endocrine disorders
  - Chronic use of steroids
- **Safeguarding care:** consider non-accidental causes especially in at-risk groups such as the elderly and / or disabled.

Physical exam

- Observation for obvious injury (wounds, deformity, swelling)
- Palpation (unless prevented by pain or obvious injury) looking to identify and localize pain/tenderness.
- Range of motion (unless prevented by pain or obvious injury)
- Neurovascular observations as per **CPG A0115** should be performed:
  - Regularly throughout the episode of care
  - Before and after any manipulation of the limb

Care

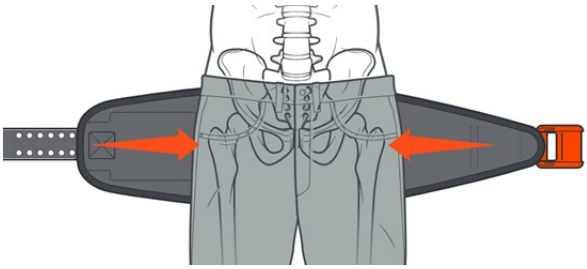
Pelvic fracture

- **Pelvic splints are a haemorrhage control device.** If there is suspicion of a pelvic injury, a pelvic splint should be applied as a priority.
- Pelvic fracture should be suspected in patients with:
  - Blunt trauma with the potential to cause pelvic injury (generally this includes any form of blunt trauma other than clearly isolated injuries to the head or limbs)

AND

  - Pelvic pain, or
  - Haemodynamic instability, or
  - Altered conscious state

- A pelvic splint and traction splint (e.g. CT-6) can be applied if they are both indicated. Pelvic splinting is the priority.
- Avoid log-rolling the patient as it may disrupt blood clots.



- **CWI/OPS/177 Pelvic splint**

More information

- Pelvic splints are frequently placed in an incorrect position. The most common error is placing the splint over the ilium (approximately the position of a belt). Misplacement is associated with inadequate reduction of pelvic fractures and possibly less adequate haemorrhage control.[1] The correct location over the greater trochanter may be as much as 10 – 20 cm below this level. It is important to identify the specific location of the greater trochanter prior to placing the splint to ensure correct placement.
- As for all trauma cases, examine for other injuries. Pelvic fractures are associated with significant abdominal injuries.

Compound fracture

- Irrigate with a large volume of normal saline or clean water (e.g. 250 – 1000 mL) if:
  - Obvious compound fractures with gross contamination (e.g. mud, pond water, faeces, high risk environments such as farms)
  - Any compound fracture prior to reduction / realignment
- Apply saline soaked dressing and cover.

More information

- A compound fracture should be suspected anytime there is a wound close to a suspected fracture.

Irrigation

- Irrigation is aimed at removing gross contaminants as much as is reasonably possible while also not significantly prolonging scene time. More thorough decontamination will always be performed in ED and it is not crucial that wounds be cleaned perfectly. Thorough cleaning involves larger volumes of saline and longer periods of time than is reasonably possible in the out-of-hospital environment.

Dressing

- There is little good quality evidence to guide the most appropriate dressing for compound fracture. The consensus view adopted by this guideline is that saline soaked dressings may be effective in preventing dessication of the wound.[2]
- The wound should be covered as much as reasonably possible to prevent further contamination.

Neck of femur fracture

- Shortening and rotation are only present for significantly displaced fractures. The absence of shortening / rotation does not exclude NOF.

Limb/digit fractures

- Limb or digit fractures / dislocations should generally receive an attempt at reduction / straightening if there is:
  - Neurovascular compromise, or
  - Significant deformity / angulation
- Substantial analgesia, including ketamine, will likely be required.
- Middle third femur or upper two-thirds tibia fractures: **https://av-digital-cpg.web.app/assets/pdf/CWI/CWI OPS 156 Application of CT-6 Traction Splint.pdf**

Reduction / re-alignment

1. Procedural analgesia
2. Irrigate with large volume of saline or clear water (e.g. 250 mL – 1000 mL) prior to reduction if the fracture is compound (this should not significantly delay transport).
3. Apply traction and gentle counter-traction in line with the limb (usually requires an assistant).
4. If required, further manipulation should be done whilst the limb is still under traction.
5. Splint following reduction

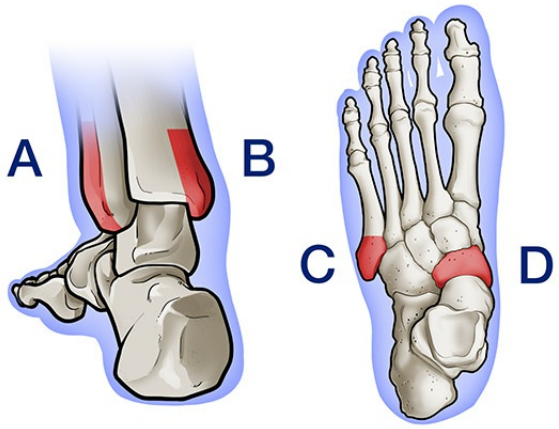
Soft tissue injury

Clinical decision rules

Ottawa Ankle Rule

Imaging is indicated if there is either bony tenderness in one of four locations or the patient is unable to weight bear.[7, 8]

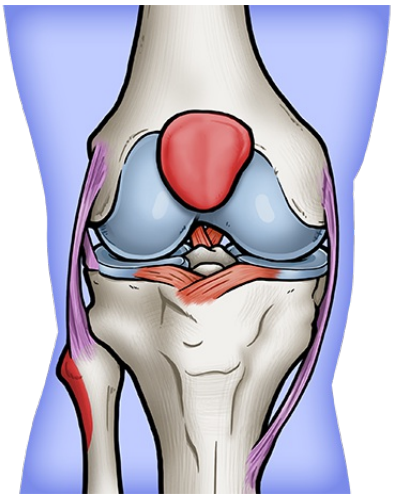
1. **Weightbearing:** unable to walk a short distance (approximately 4 consecutive steps)
2. **Bony tenderness** on palpation of:
    1. Posterior aspect of the lateral malleolus
    2. Posterior aspect of the medial malleolus
    3. Base of the 5th metatarsal
    4. Navicular



Ottawa Knee Rule

Imaging is indicated if the patient presents with a knee injury and any of the following[9, 10]:

1. Aged 55 years or over
2. Tenderness at the head of the fibula
3. Isolated patella tenderness
4. Inability to flex knee to 90 degrees
5. Inability to bear weight immediately after injury and at presentation



Fracture possible

- Timely imaging and medical review is required (24 hours).
- Appropriate dispositions may include:
  - VVED
  - GP if available within the required timeframe
  - PPCC
  - Self-presentation or NETCOM
  - Transport to ED where other options are not appropriate or not available

Fracture unlikely

- Non urgent follow-up is required (2-3 days)
- Refer to GP

More information

The soft tissue injury pathway is appropriate for patients who are suspected to have a soft tissue injury but who may also have a minor fracture. In general, these are patients in whom:

- Mild soft-tissue injury is probable (e.g. sprains / strains)
- There are no signs of significant fracture (e.g. deformity, moderate or severe pain)
- Pain can be controlled with simple oral analgesia (e.g. paracetamol / ibuprofen)
- There is mild functional impairment (e.g. can weight bear, move limb)

The appropriate disposition will depend on:

- The likelihood of fracture: well localized bony tenderness on palpation, significant pain on movement and older age may all increase the risk of fracture. Clinical decision rules may

also inform the need for imaging.

- Availability and proximity to services
- The ability of the patient to access these services (e.g. to drive with injured foot, proximity to PPCC)

Fracture more likely

If clinical judgement or a clinical decision rule indicates that a minor fracture is possible, timely imaging is required.

A number of dispositions may be appropriate to achieve this depending on the circumstances:

- VVED is the preferred option as it does not require transport but facilitates all of the appropriate care in the timeliest way.
- GP follow-up may be appropriate if both the consultation and imaging is likely to be available within the required timeframe.
- Priority primary care centers (PPCCs) are appropriate for minor injuries. Either transport or self-presentation may be appropriate.
- If none of these options are possible, the patient should be seen in an emergency department. Self-presentation may be appropriate if the patient is mobile, and a competent adult is available to assist them if required. Consider NETCOM availability if this is not appropriate.
- Transport via emergency ambulance may be required if there are no alternatives.

Fracture unlikely

If a fracture is considered unlikely, timely imaging is not required. The patient should be referred to see a GP within 2-3 days to ensure they are improving as expected and to advise on any further care that may be required. In some circumstances, referral back to an existing specialist or physiotherapist may be appropriate.

Safety netting

- Advise patient to seek immediate help if:
  - Abnormal distal neurovascular signs or symptoms develop in the subsequent days following reduction (numbness, changing colour)
  - Severe pain returns

Self-care advice

- Rest: limit mobilization of the injured body part.
- Ice: consider icing injury. 10-15 minutes, four times a day. May reduce pain but may delay healing.
- Paracetamol or ibuprofen for subsequent pain.

- Provide **Health information sheet**

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC paper - Fracture-dislocation.pdf
- Walkthrough video - Fracture dislocation

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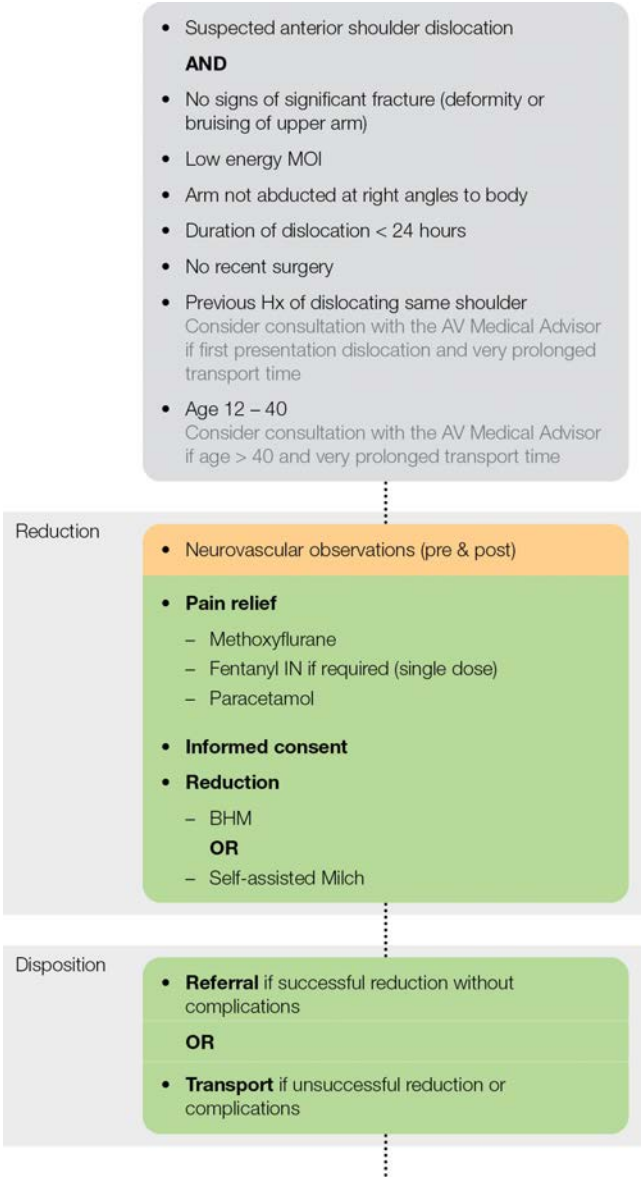
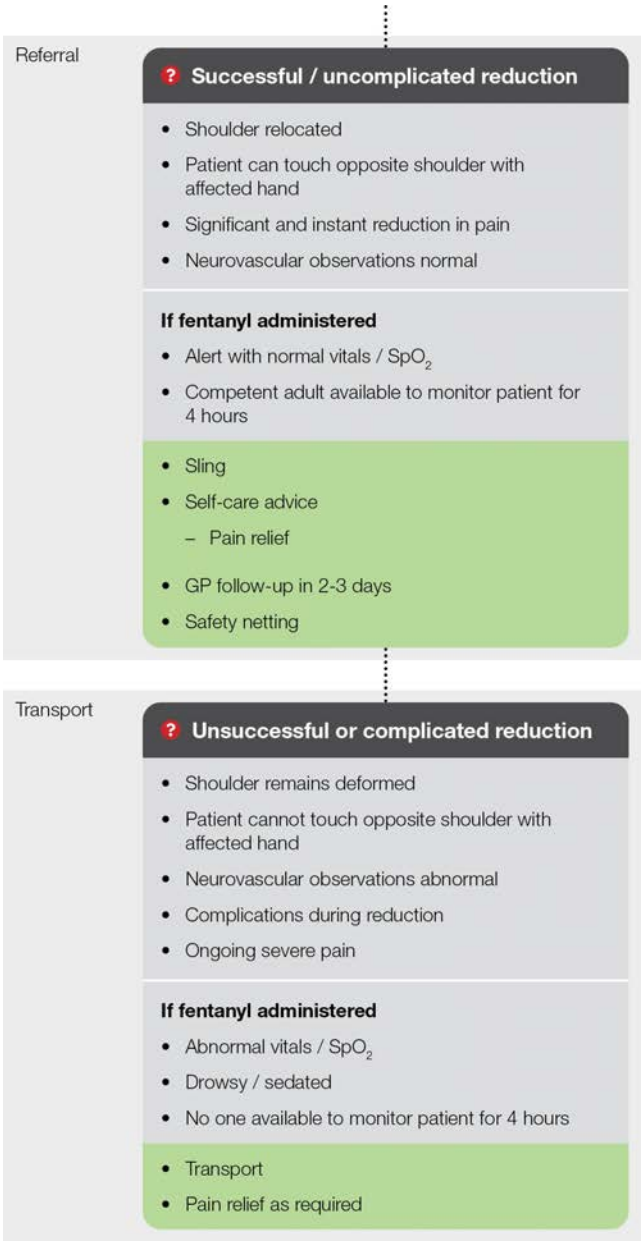
11. SAM Pelvic Sling II Training. SAM® Medical. 2023. https://www.sammedical.com/products/pelvic-binder?variant=17074974916697.

Flowchart


Suspected anterior shoulder dislocation
AND
No signs of significant fracture (deformity or bruising of upper arm)
Low energy MOI
Arm not abducted at right angles to body
Duration of dislocation < 24 hours
No recent surgery
Previous Hx of dislocating same shoulder
Consider consultation with the AV Medical Advisor if first presentation dislocation and very prolonged transport time
Age 12 – 40
Consider consultation with the AV Medical Advisor if age > 40 and very prolonged transport time
Reduction
Neurovascular observations (pre & post)
Pain relief
Methoxyflurane
Fentanyl IN if required (single dose)
Paracetamol
Informed consent
Reduction
BHM
OR
Self-assisted Milch
Disposition
Referral if successful reduction without complications
OR
Transport if unsuccessful reduction or complications



Care Objectives

- Identify uncomplicated anterior shoulder dislocations
- Reduce the dislocation if appropriate
- Identify appropriate disposition:
  - Referral if uncomplicated, successful reduction
  - Transport if unsuccessful reduction or complications

Intended patient group

- Patients aged 12 - 40 with suspected anterior shoulder dislocation

Overview

- Anterior dislocation is the most common type of shoulder dislocation (approximately 95% of cases).[1, 2]
- Prehospital reduction may be appropriate in some patients with uncomplicated anterior dislocation and a low risk of fracture-dislocations.

Assessment

History

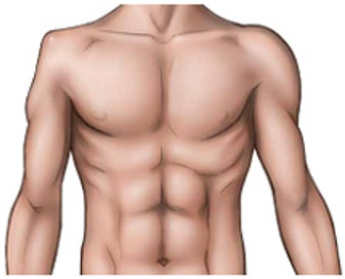
- **Mechanism of injury:**
  - Blow to abducted, externally rotated, extended arm (most common)
  - Blow to the posterior humerus (less common)

Examples

- Blow to arm in a “high five position”
- Blocking a basketball
- Fall onto hand with arm externally rotated
- Throwing ball

Physical exam

- Shoulder pain
- Head of the humerus displaced anteriorly
- Shoulder squaring



Squared shoulder appearance

- Apprehensive / resists movement
- Holding forearm in towards their chest (internal rotated)

Neurovascular assessment

- Neurovascular assessment as per **CPG A0115** distal to the injury should occur before and after an attempt at reduction to identify complications from the injury and/or reduction attempt
- Motor function:
  - Thumb and index finger touching ("OK" position)
  - Finger abduction (spreading fingers out)
  - Wrist and finger extension
- Sensation:
  - Deltoid - altered sensation in the deltoid indicates axillary nerve damage
- Abnormal findings over the deltoid are not uncommon following dislocation and usually resolve following reduction. However, abnormal findings at any stage still warrant transport to hospital.

Differential diagnosis

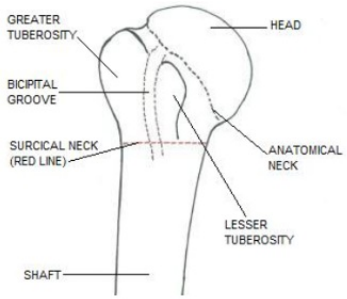
- Fracture-dislocation
- Posterior dislocation
- Inferior dislocation
- Fractured clavicle
- Acromioclavicular joint injury

More information

- **Fracture-dislocation**
  - Fractures are more common in patients over the age of 40 and especially over the age of 65; on the first episode of dislocation; or with higher energy mechanism of injury (e.g. fall from height [e.g. >1 m], assault, MVA).[3, 4] This CPG does not recommend reductions for these patients due to the increased risk of iatrogenic complications and serious co-presenting fracture.

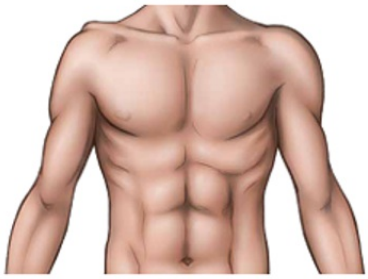
Risk of significant humerus fracture	
Lower risk	**Higher risk**
Age < 40	Age ≥ 40
Previous dislocation (same joint)	First presentation
Non-traumatic MOI (e.g. throwing)	Direct impact or significant fall onto hands
Low energy MOI	Higher energy MOI (MVA, fall from height, severe assault)

- Most fractures are relatively minor and do not change the decision to attempt a reduction. However, they may mean reduction is more likely to fail or they may need further specialist management following reduction.
- Fractures of the humeral shaft or the surgical neck are more serious and require expert advice on reduction. They should not be reduced in the pre-hospital environment unless there is another indication such as neurovascular compromise (under consult). Traction or movement of arm/shoulder may cause displacement of the fracture leading to vascular injury.
- Significant fractures are more common amongst older patients who experience standing height falls or any patient with a high energy impact to the upper arm.[5] Caution is warranted in patients close to the age cut off, especially if they are frail or have other risk factors for fracture as outlined above.
- Signs and symptoms of more severe fractures include ecchymosis (bruising), localised pain and crepitus. Angulation or deformity may be present if the fracture is significantly displaced but the absence of these findings does not rule out serious fractures.



- **Posterior dislocations** (approximately 5% of cases)
  - Usually caused by a blow to the front or axial load through the humerus
  - Shoulder appears posteriorly displaced
  - Should not be reduced prehospitally
- **Inferior dislocation** (rare)
  - Arm will be abducted at right angles to the body (chicken wing position)

- **Fractured clavicle**
  - Usually caused by a fall onto the shoulder (87%) or less commonly, a direct blow to the clavicle (7%) or fall onto an outstretched hand (6%).[5]
  - Pain and tenderness on palpation
  - Deformity of the clavicle
- **Acromioclavicular joint injury**
  - Outer end of clavicle is prominent
  - AC joint tenderness



Acromioclavicular joint dislocation

Management

Analgesia prior to reduction

- Pain relief as per **CPG A0501-1 Pain Relief**
- A combination of methoxyflurane, fentanyl and paracetamol is recommended
  More information

  - Adequate analgesia is generally considered to assist in relieving pain-related tightening of the muscles around the shoulder. Relaxation is thought to be an important factor in successful reduction.

  Methoxyflurane

  - Sufficient to facilitate reduction in some cases.

  Fentanyl IN

  - The techniques included in this guideline can be performed without pain relief. However, a single dose of fentanyl is generally recommended to assist in muscle relaxation and reduce the discomfort associated with the procedure.
  - IN route is preferred if non-transport is expected.

- Non-transport following IN fentanyl may be appropriate if the patient is alert with normal vitals (when assessed at least 15 minutes after administration), has a competent adult to monitor them for 4 hours and is comfortable with the care plan.

Paracetamol

- Paracetamol should always be administered (unless contraindicated) for post-procedural pain relief.
- Administer prior to reduction if possible, to reduce the time to onset.

Reduction

- Informed consent is required prior to reduction.

Principles of reduction

- **Relaxation of the muscles:** general reassurance, coaching to relax the shoulders & pain relief.
- **Sustained pressure:** continuous traction (BHM technique) or attempts at abduction/external rotation (Self-assisted Milch), allowing time for sufficient relaxation (approximately 5 minutes).
- **Slow application:** should be slow, involve constant reassurance and be controlled by the patient. Pause if there is muscle spasm or increased pain.
- One attempt.
- 10 minute maximum duration.
- Use the technique most similar to what has worked previously:
  - BHM – traction
  - Self-assisted Milch – external rotation and abduction

More information

- Successful reduction relies on the relaxation of the muscles around the shoulder including the biceps. This can be achieved with analgesia, reassurance, and slow application of the technique over a prolonged period of time.
- Reduction should be generally limited to one attempt unless there is a correctable cause of the first attempt failing. For example, an attempt may discontinue early because there is difficulty performing the technique or the patient is too distressed. Attempting an alternative technique may be appropriate if there is a reasonable likelihood of success.
- Failure of the initial attempt may be due to underlying fractures or other complications. Repeated attempts in these circumstances are unlikely to be successful, may cause complications and will delay transport to hospital.
- Most successful reductions will occur within 10 minutes. Success is unlikely for longer

attempts.

Technique selection

- Ideally, the technique that has previously successfully reduced the patient's shoulder should be selected. However, there are many types of technique, and the patient may not be able to describe them adequately.
  - BHM works through traction. If the patient describes techniques that involve pulling the arm or shoulder, BHM may be appropriate.
  - Self-assisted Milch works through external rotation and abduction. If the patient describes techniques that involve twisting, lifting or rotating the arms or shoulder, self-assisted Milch may be appropriate.
- Technique may also be selected based on clinical judgement and patient preference. For example, if difficulty is encountered in describing or executing one technique, another may be selected.

Boss-Holzach-Matter (BHM) technique

Shoulder traction applied by:

- Gripping the knee, tucking the elbows towards the knees and relaxing the shoulders

AND

- Leaning the chest, head and neck back as much as possible

Full Procedure: CWI/OPS/202 Shoulder reduction - BHM

Self-assisted Milch technique

- Supine

AND

- Use unaffected arm to raise the effected arm to above the head

Full Procedure: CWI/OPS/203 Shoulder reduction – Self-assisted Milch

Following reduction

- Successful reduction is indicated by:
  - Sudden reduction in pain
  - Change in shoulder shape (indicating the return of the humeral head to a normal position)
  - Improved range of motion: the reduction is successful if the patient can touch their opposite shoulder with the hand of the affected shoulder
- Support the shoulder with a sling

Uncomplicated / successful reduction

Self-care advice

- Rest: limit use of the arm, especially any movement involving raising it
- Ice: consider icing the shoulder if pain persists. 10-15 minutes, four times a day. May reduce pain but may delay healing.
- Paracetamol or ibuprofen for subsequent pain

Safety netting

- Advise patient to seek immediate help if:
  - Abnormal distal neurovascular signs or symptoms in the subsequent days following reduction (numbness, changing colour)
  - Severe pain returns
- Provide Health Information Sheet

Referral

- Non urgent follow-up is required (2-3 days)

- Appropriate dispositions may include:
  - GP
  - Existing physiotherapist / specialist

Unsuccessful or complicated reduction

- Require transport to hospital.
- Neurovascular abnormalities at any stage should be considered a complication.
- Consider transport if other factors increasing the likelihood of complications are present:
  - Presence of patient safety risk factors.
  - Abnormally long dislocation duration close to the 24 hour cut off
  - Any uncertainty regarding the procedure (e.g. unexpected sounds, pain, etc)

Documentation

- Case nature
- Secondary survey
  - Dislocation: site, time, mechanism of injury, history (initial/recurrent)
  - Neurovascular observations: Add two sets of entries with two different times (pre and post-reduction)
- Management:
  - Analgesia
  - VED (if utilized): consultation > Virtual ED
  - Reduction attempt > Shoulder reduction (technique), spontaneous (if the joint spontaneously relocates while in attendance), withheld, or refused.
- Final diagnosis: select the type of dislocation that applies
- Transport:
  - Referred to LMO/Locum: Use this for successful reductions where patient is referred to a GP. If VED is also consulted. Include “Virtual ED” in the management.
  - Referred to other provider: Use if referring the patient to physiotherapy or other specialist such as an orthopaedic surgeon.

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC paper - Shoulder dislocation .pdf
- Walkthrough video - Shoulder dislocation

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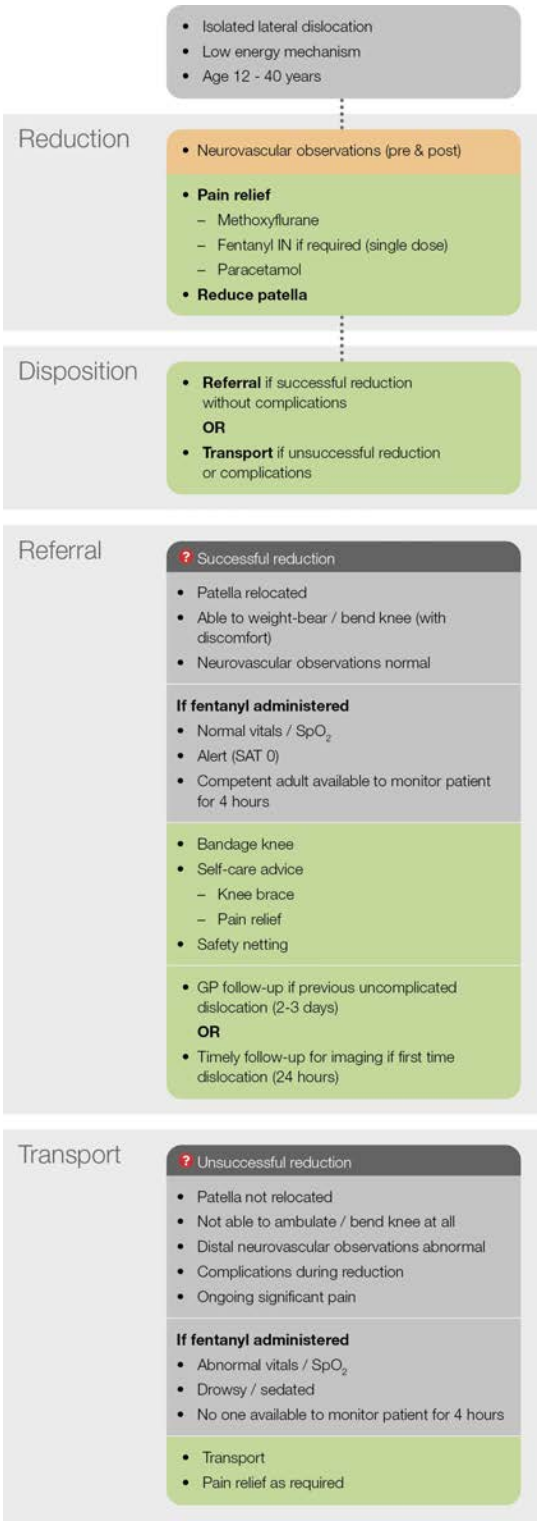
Patella Dislocation CPG A0809

Flowchart



Care Objectives

- Identify uncomplicated, isolated patella dislocation

- Reduce the dislocation if appropriate
- Identify appropriate disposition:
  - Referral if uncomplicated, successful reduction
  - Transport if unsuccessful reduction or complications

Intended patient group

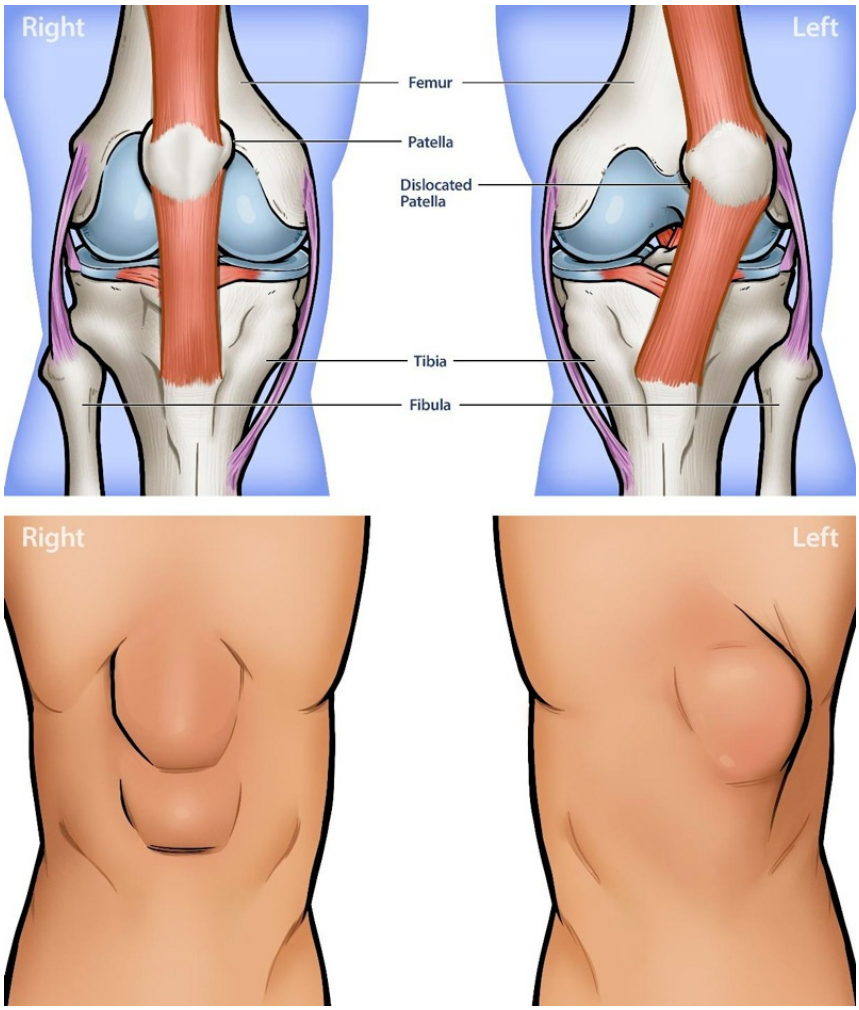
- Patients with suspected isolated lateral patella dislocation

Overview

- Uncomplicated lateral patella dislocations occur in adolescents / younger adults (approximately 12 - 40 years of age) with low energy mechanisms of injury. They can generally be reduced, and the patient referred, without transport to an emergency department.

Learn more

- **Adolescents / young adults:**
  - Uncomplicated dislocation is common amongst younger people, especially playing sport.
  - This cohort is the focus of this guideline.
  - Lateral dislocation is the most common type of patella dislocation.
  - Easily reduced without complications in most cases.
- **Middle aged / older patients or frailty** (regardless of age): Uncomplicated dislocation is rarer. Complicated dislocations with fractures and other injuries are more common amongst older or frail patients (e.g. severe disability, bone weakening disease) as the result of standing height falls or other forms of direct trauma.
- **Younger patients:** Dislocation does not occur prior to complete ossification of the patella (e.g. children < 12 years of age). Deformity is usually indicative of other injuries.



Assessment

History

- **Mechanism of injury:**
  - Knee twisting inwards, while weight-bearing with knee flexed (most common)
  - Direct impact to the patella (less common, more likely to lead to other injuries)

More information

Injuries are sometimes described as knee “giving out” from under them followed by sudden pain.

- Examples of common low energy MOI involved in patella dislocation:
  - Changing directions suddenly while running (especially laterally)
  - Rotating the body while swinging a bat
  - Spinning or twirling (e.g. gymnastics)
  - Being tackled around legs

High energy mechanisms of injury such as pedestrian impact are more likely to involve other injuries.

Reductions should not generally be attempted in these cases.

Physical exam

- Knee pain
- Patella displaced laterally
- Knee in a flexed position with pain and apprehension if attempting to move the leg

Neurovascular assessment

- Neurovascular assessment as per **CPG A0115** distal to the injury must occur before and after attempts at reduction.
- Abnormal findings at any stage suggest potentially limb-threatening injury.

Differential diagnosis

- Superior, medial and intra-articular dislocations
- Fractures
- Dislocated knee

More information

- **Superior, medial and intra-articular dislocations** are rare and more likely to be associated with complications. They require assessment in an emergency department.
- **Fractures** are more common with higher energy mechanisms, direct trauma to the knee and in older patients. Fracture may co-present with dislocations, complicating management. They require assessment in an emergency department.
- **Dislocated knee** is a serious injury usually resulting from more serious mechanisms of injury. Significant pain, deformity, swelling and instability are usually present.

Care

Analgesia prior to reduction

- Pain relief as per **CPG A0501-1 Pain relief**.
- Methoxyflurane and paracetamol are recommended. A single dose of IN fentanyl may be administered but is rarely required.

More information

Methoxyflurane

- Sufficient to facilitate reduction in most cases.
- Advise the patient to take several large breaths on the inhaler just prior to reduction.

Fentanyl IN

- Consider for more significant pain following discussion of the risks and benefit with the patient (i.e. drowsiness, nausea, need for subsequent monitoring, increased likelihood of the need for transport versus improved pain relief).
- IN route is preferred if non-transport is expected.
- Non-transport following IN fentanyl may be appropriate if the patient is alert with normal vitals (when assessed at least 15 minutes after administration), has a competent adult to monitor them for 4 hours and is comfortable with the care plan.

Paracetamol

- Paracetamol should always be administered (unless contraindicated) for post-procedural pain relief.
- Administer prior to reduction if possible, to reduce the time to onset.

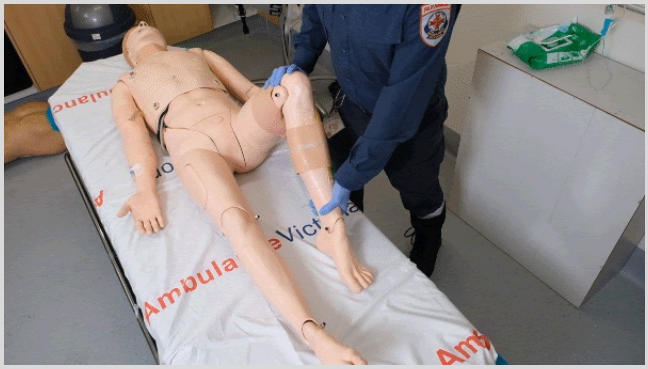
Reduction

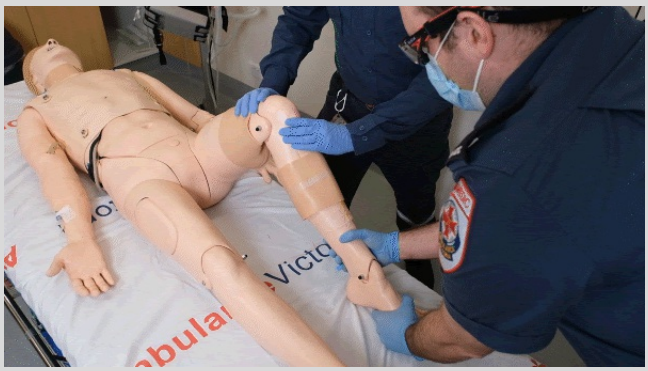
Simultaneously:

- Straighten the knee gently and slowly

AND

- Push the patella medially





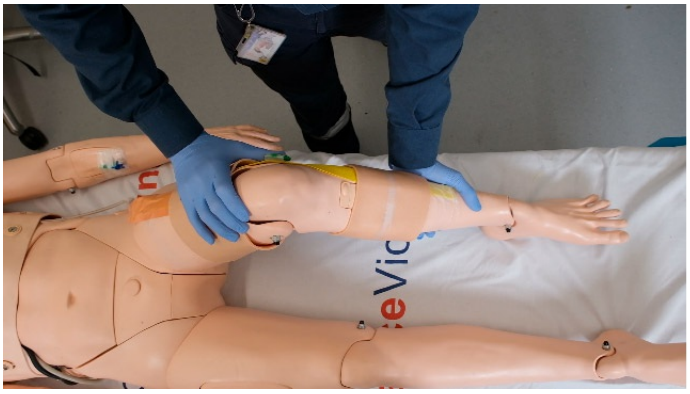
Full procedure: Patella reduction

Position

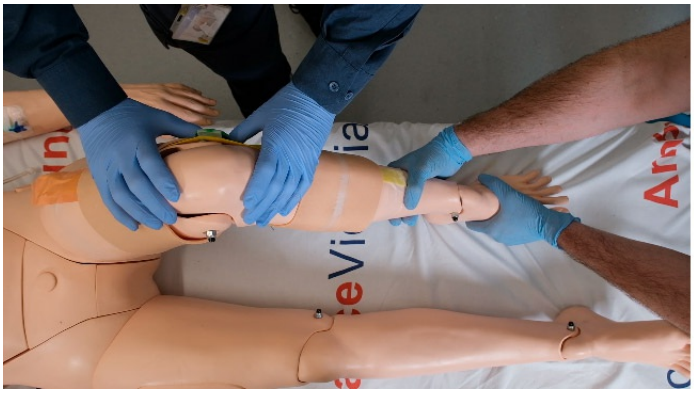
1. **Clinician:** Position yourself on the patient's affected side.
    - If an assistant is helping to grip the ankle and extend the knee, they should position themselves towards the foot end of the patient.
2. **Patient:** Position of comfort with the hip flexed.
    - Usually supine or semi-recumbent.
    - Hip flexion reduces tension on the quadricep tendon, allowing more "slack" in the tendon and less pressure holding the patella in a dislocated position.

Preparation

3. **Patella:** Place one hand on the patella.
    - The palm or thumbs can be used to place pressure on the lateral aspect of the patella.
    - Alternatively, it may be easier to use both hands or thumbs while an assistant grips the ankle.
4. **Ankle:** Grip the ankle in the other hand, taking the weight of the patient's leg.
    - This may be performed by an assistant if available.
    - Taking the weight of the patient's leg helps to reduce tension on the quadricep.



One person technique



Two person technique with leg straightening delegated to an assistant

Procedure

5. Simultaneously:
    1. Straighten the knee gently and slowly

       AND

    2. Push the patella medially

Notes

- In addition to reducing general discomfort, reassurance and pain relief are important to assist with relaxing the quadricep and improving the likelihood of successful reduction.
- Generally, limit reductions to one attempt unless there is an easily correctable issue with the first attempt (e.g. incorrect technique). Difficulty in reducing the patella may be caused by complications such as fractures and repeated attempts may cause further harm.
- Successful reduction indicated by:
    - Sudden reduction in pain
    - Normal knee shape (return of patella to normal position)
    - Improved range motion of the knee joint (some discomfort when moving is normal)
    - Able to weight bear and bend knee (with some discomfort)
- Stabilise patella using a crepe bandage until patient can obtain a patella-stabilising brace.

Uncomplicated / successful reduction

Self-care advice

- Rest: limit walking, standing and bending of the knee.
- Ice: consider icing knee if pain persists. 10-15 minutes, four times a day. May reduce pain but may delay healing.
- Paracetamol or ibuprofen for subsequent pain.
- Recommend knee brace and crutches until follow up.

More information

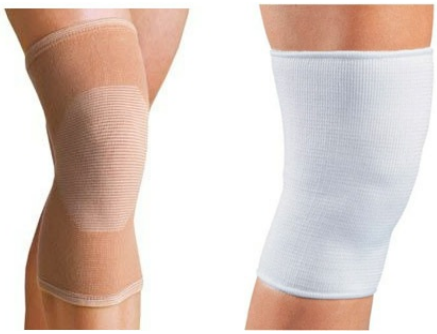
The brace / bandage may be removed for sleep, showering or when resting the knee.

The availability of braces varies:

- A knee brace that limits knee flexion, lateral motion and stabilises the patella is preferred (e.g. Zimmer splint) if available. However, these are often expensive and not always available at pharmacies.

- Any patella stabilising brace is acceptable (e.g. one is already available at scene, pharmacy does not stock rigid knee splint)

- A tubular compression bandage (e.g. tubigrip) or knee sleeve is also acceptable if other options are not available



Safety netting

- Advise patient to seek immediate help if:
  - Abnormal distal neurovascular signs or symptoms develop in the subsequent days following reduction (numbness, changing colour)
  - Severe pain returns

- Provide **Health Information sheet**

Referral

First presentation

- Timely imaging and further specialist advice is required (24 hours).
- Appropriate dispositions may include:
  - VED
  - GP if available within the required timeframe
  - Self-presentation or NETCOM
  - Transport to ED where other options are not appropriate or not available

Recurrent dislocation

- Non urgent follow-up is required (2-3 days).
- Appropriate dispositions may include:
  - GP
  - Existing physiotherapist / specialist

More information

First presentation

Fractures, osteochondral fragments and other complications are more common in first presentation dislocations. X-rays are generally required. MRI and consultation with an orthopaedic surgeon may also be needed. A number of dispositions may be appropriate to achieve this depending on the circumstances:

- VED is the preferred option as it does not require transport but facilitates all of the appropriate care in the timeliest way.
- GP follow-up may be appropriate if both the consultation and imaging is likely to be available within the required timeframe.
- If neither VED or GP follow-up are possible, the patient should be seen in an emergency department. Self-presentation may be appropriate if the patient is mobile, and a competent adult is available to assist them.
- Consider NETCOM availability if this is not appropriate.
- Transport via emergency ambulance may be required if there are no alternatives.

Recurrent dislocation

Fractures and complications are less common. As such, patients generally do not require imaging if the reduction is successful and uncomplicated.

Follow up with a GP in 2-3 days facilitates:

- Consideration of specialist care for recurrent dislocations
- Reassessment to ensure the patient has not suffered complications and is following the expected course

If the patient is already under the care of a physiotherapist or other specialist, it is reasonable to refer the patient directly to that provider if they are available in the required timeframe.

Documentation

- Case nature
- Secondary survey:
  - Dislocation: site, time, mechanism of injury, history (initial/recurrent)
  - Neurovascular observations: Add two sets of entries with two different times (pre and post-reduction)
- Management:
  - Analgesia
  - VED (if utilised): Consultation > Virtual ED
  - Reduction attempt > patella reduction, spontaneous (if the joint spontaneously relocates while in attendance), withheld, or refused.
- Final Dx: select the type of dislocation that applies.
- Transport
  - Referred to LMO/Locum: Use this for successful reductions where patient is referred to a GP. If VED is also consulted, include “Virtual ED” in management.
  - Referred to other provider: Use if referring the patient to physiotherapy or other specialist such as an orthopaedic surgeon.

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/Patella dislocations MAC paper AUG 2022.pdf
- Walkthrough video - Patella dislocation

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Diving Related Emergencies CPG A0807

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 A0810 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**.

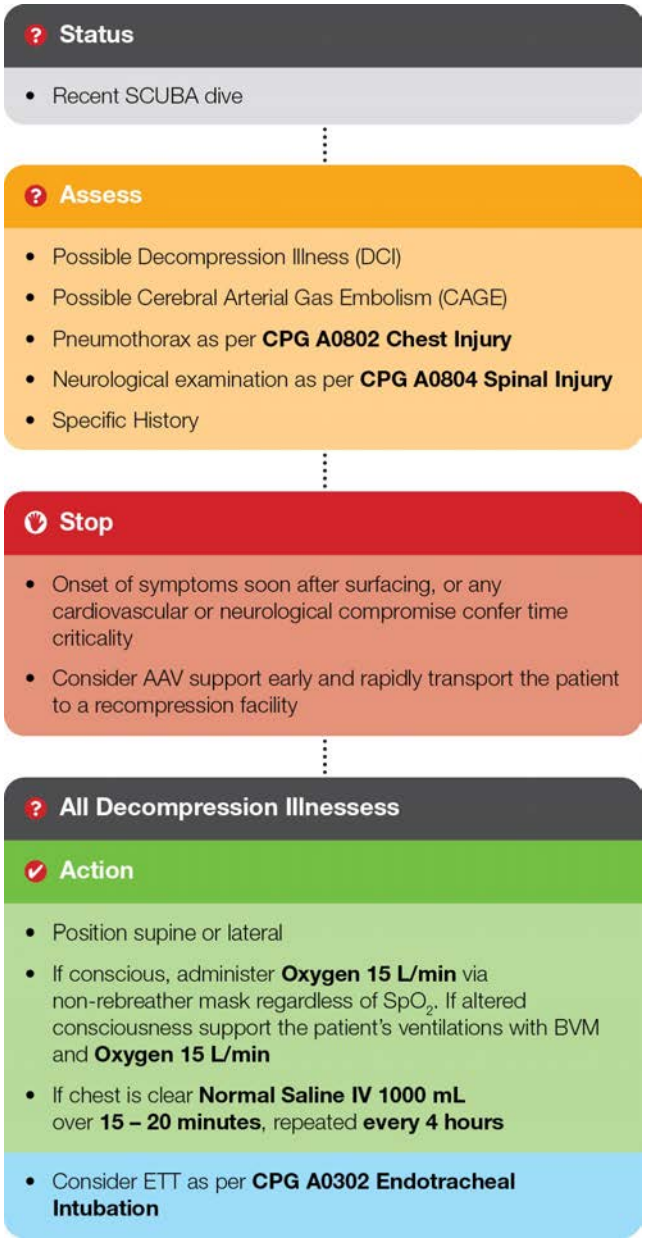
Non-recent dive (> 12 hours)

- 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

Hypothermia / Cold Exposure CPG A0901

Care Objectives

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

General Notes

Intended patient group

- Patients aged ≥ 16 years with hypothermia

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.

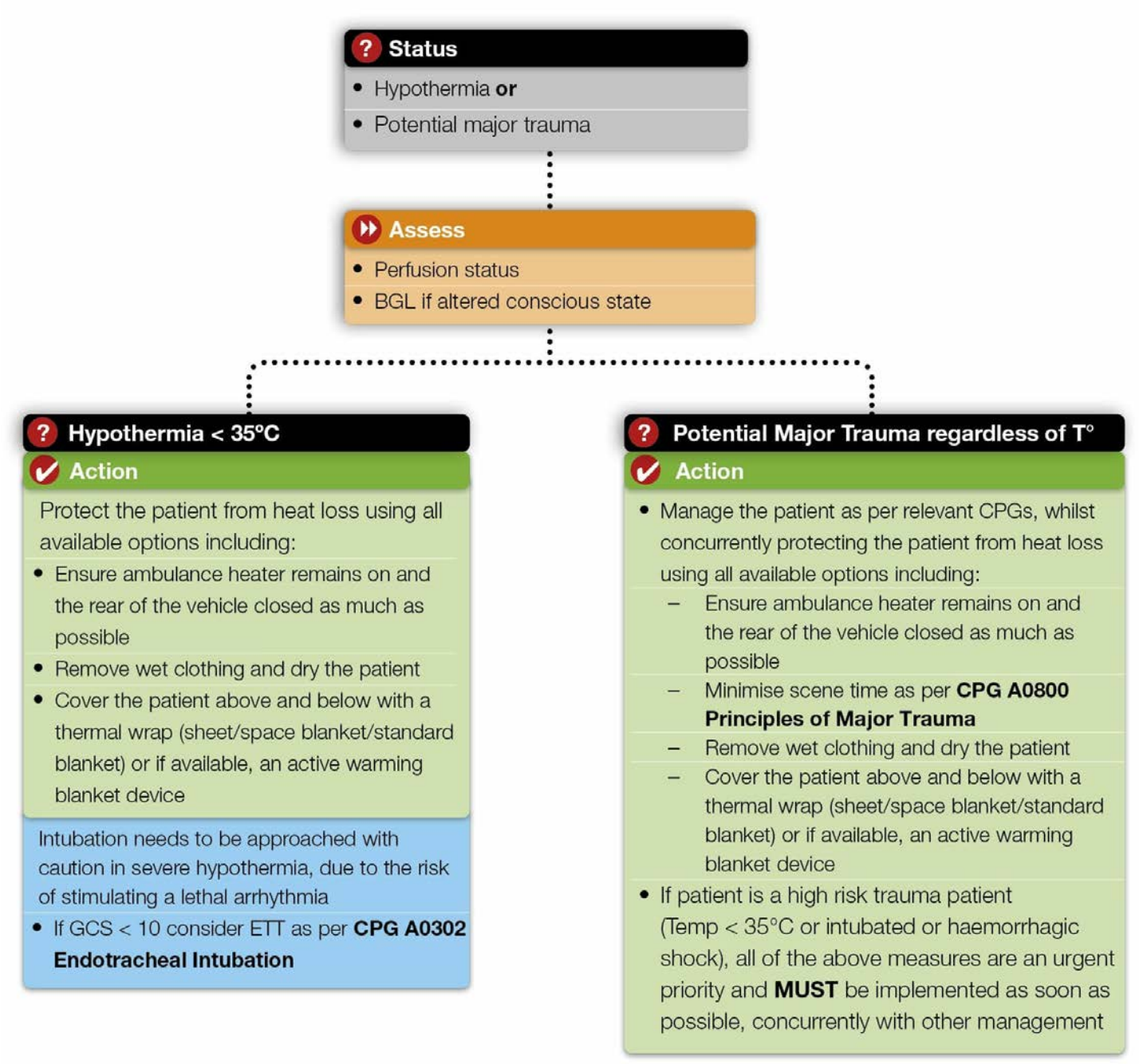
Cardiac arrest

- The onset and duration of medications is prolonged during hypothermia. In cardiac arrest if the patient has a temperature < 30°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

Hyperthermia / Heat Stress CPG A0902

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°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°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.

See CPG A0719 Drug Induced Hyperthermia

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.

See CPG A0719 Drug Induced Hyperthermia

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

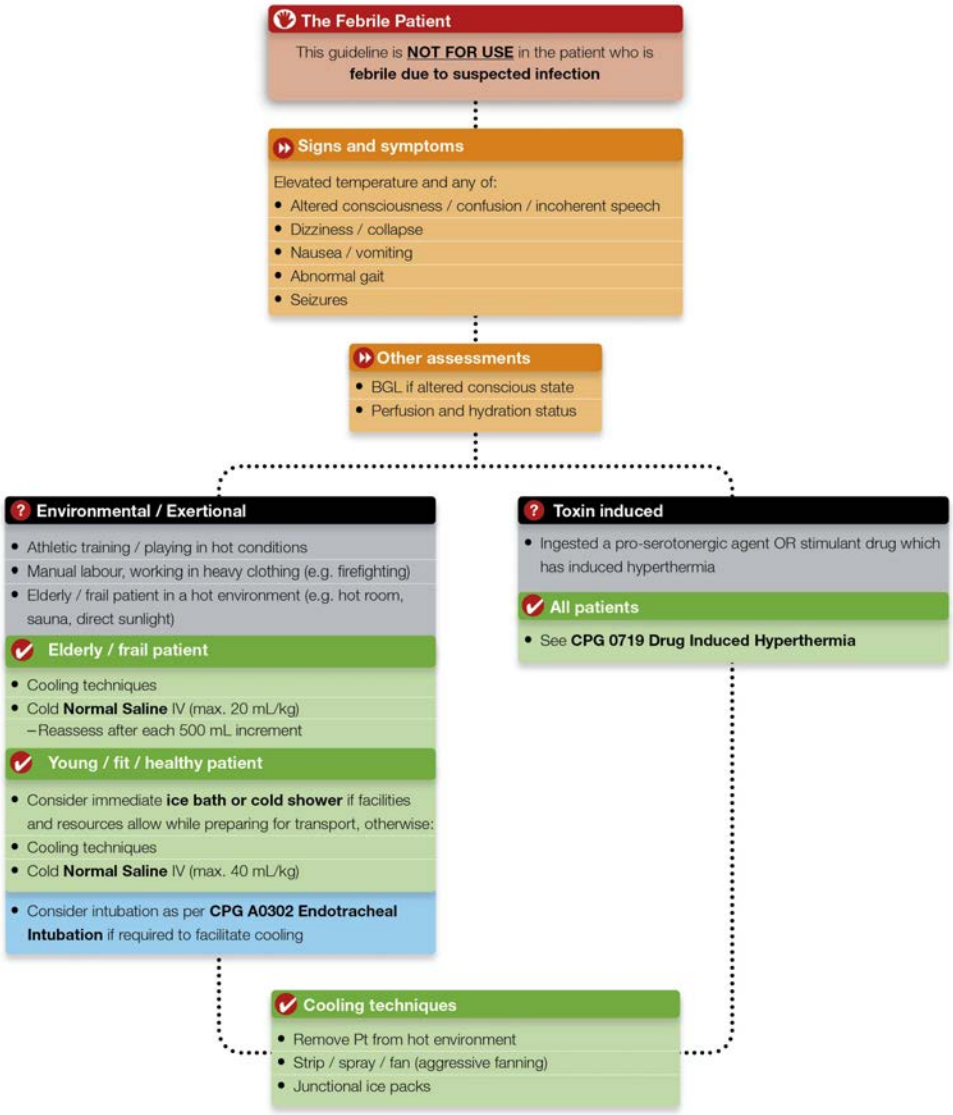
Frail patients are at increased risk of environmental hyperthermia, particularly during heat wave conditions. There should be a low threshold for transport, even if it is purely so they can be monitored in an air conditioned environment.

Age ≥ 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

See CPG A0719 Drug Induced Hyperthermia

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

Principles of Toxicology CPG A0707

Care Objectives

- Supportive care based on presenting symptoms
- Identify poison, toxin and / or toxidrome to guide specific management
- Consult relevant services to access specialist treatments
- Minimise the time from exposure to definitive care

Notes

- A patient presentation following toxic exposure may occur in almost any setting and can vary from mild symptoms to life threatening. The toxic agent is not always known and accordingly a considered approach using these principles will assist in the assessment and care for the patient who is at risk of toxic exposure.

Scene safety

- Assess risk of exposure to gases and other toxins by completing a dynamic risk assessment
- Consider the need for enhanced PPE. See WIN/OPS/198 Transport of Patients Exposed to Toxic Substances
- Consider the potential that this may be a deliberate event
- Do not enter scene where there is a threat of chemical, biological, radiological (CBR) exposure
  - Protect scene and prevent further exposure to others
  - Notify other emergency service agencies e.g. fire, rescue, police
  - Escalate response through the DM to the Regional Health Commander
  - Prepare for the potential for multi casualty event (e.g. Triage/Transport Officer, ETHANE SitRep)
  - Prepare to manage the patients who have been exposed
- Liaise with incident controller regarding appropriate decontamination

Assessment

Risk Assessment

- Conducting a thorough patient assessment is vital for managing poisonings and will direct management of the patient. Gather as much information as possible about the patient and exposure from relatives, friends, and witnesses. If information is not available, assume the worst-case scenario.

Agent	Identify each agent / medication / substance involved
	Total dose for each agent

Dose	Consider formulation: immediate release / slow release Collect packaging (e.g. empty pill bottles, webster packs) and transport with patient
Route	Identify the route of each exposure (e.g. oral, IV, inhalation)
Time	Time since each exposure
Intent	Intentional self-harm, accidental, or recreational misadventure
Clinical features / trajectory	Symptoms since exposure Timing and change in symptom progression
Consider risk of undisclosed agent and co-ingestants	

Environment

- Consider the setting to determine potential agent types and risks (home, industrial, occupational, recreational, natural disaster, chemical warfare, criminal acts / terrorism)

Paediatric specific considerations

- Paediatric presentations and adult patients with an intellectual disability are more likely to include foreign bodies and household chemicals.

Pharmacological agents

- Ingestion of **adult medicines** by paediatrics are potentially harmful and can be fatal even with as little as one tablet.

List of potentially harmful medicines

- **Please note:** This list is representative of the most common potentially harmful medicines. It does not include every potentially harmful medicine and may not include new or trial medicines which are also harmful. Always check with VPIC where you are not certain of the presenting agent.
- **Potentially harmful 1-3 tablet ingestions / small exposures**
  - Antidiarrheals e.g. loperamide and diphenoxylate - arrhythmias, cardiac arrest
  - Baclofen (25 mg) - coma
  - Camphor - rapid decrease in conscious state, seizures, hypotension
  - Carbamazepine (400 mg) - coma
  - Centrally acting alpha adrenergic agonists eg clonidine - like opiate but more hypotension and bradycardia
  - Clozapine 100mg / 200 mg - coma
  - Colchicine – multi-organ failure
  - Corrosives - strong alkali or acid - gastroesophageal injury
  - Hydrocarbon solvents/ kerosene / essential oils - decreased level of consciousness, seizures, aspiration pneumonia

  - Illicit/street drugs, e.g. amphetamine
  - Naphthalene - methaemoglobinaemia, haemolysis
  - Organophosphates - cholinergic syndrome, seizures, coma
  - Podophyllin - altered mental status, peripheral neuropathy
  - Salicylates – seizures, coma, cerebral oedema, cardiovascular failure, renal failure
  - Strychnine - muscle spasm and respiratory arrest
  - Venlafaxine 150 mg - seizures

- **Potentially lethal 1-3 tablet ingestions**
  - Beta blockers e.g. propranolol - coma, seizures, ventricular tachycardia, hypoglycaemia
  - Calcium channel blockers - delayed onset bradycardia, hypotension, conduction defects
  - Chloroquine / hydroxychloroquine - rapid onset coma, seizures, cardiovascular collapse
  - Ecstasy and other amphetamines - agitation, hypertension, hyperthermia
  - Opiates – respiratory depression, coma
  - Oral hypoglycaemics e.g. sulphonylureas - hypoglycaemia may be delayed 8 hours
  - Paraquat - oesophageal burns, multi-organ failure
  - Tricyclic antidepressants - coma, seizures, hypotension, ventricular tachycardia
  - Theophylline - seizures, SVT, tachycardia, vomiting

REFERENCE: Royal Children's Hospital Melbourne Australia.

Button battery

- Button battery ingestions require further investigation as they can erode mucosal surfaces if lodged in the oesophagus.
- Patients may present as asymptomatic or with non-specific symptoms such as pain, nausea, and vomiting. If there is any possibility of button battery ingestion, patients require further medical assessment and imaging.
- If honey is available, give 10 mLs every 10 mins (child aged > 1 year), however **do not delay transport** to ED.

Household cleaners

- Household cleaners are the most common exposures seen in small children. They are usually benign but can be serious if in stronger concentrations.
- In most cases household cleaners are relatively benign and do not require hospital assessment. VPIC can provide advice on whether patients require transport or further assessment. Caustic or corrosive substances (highly alkaline or acidic) can be life threatening in stronger concentrations due to airway, oral mucosal or GI injuries and the risk of gastric perforation. Dilute household bleach, detergents or ammonia are less likely to cause major effects.
  - Decontaminate by irrigating skin and / or eyes if exposed
  - Adult and older paediatric patients: decontaminate mouth; rinse out mouth with water (not to be swallowed)
  - Younger paediatric patients: do not attempt to decontaminate mouth as they usually drink the

contaminated water

Other household chemicals

- Other chemicals found around the home can cause varying and serious effects. The following are of particular risk:
  - Essential oils
  - Nicotine: e-liquid (higher risk), patch or gum / lozenge
  - Hydrocarbons (e.g. lighter fluid, solvents, mineral turpentine)
- These chemicals may have significant effects affecting the respiratory, GI, cardiovascular (arrhythmias) and CNS (seizures, coma) systems. Essential oils may be toxic to children with exposures as little as 2 - 3 mL. Nicotine e-liquid concentrations may vary significantly.

In the garden

- Poisons in and around the garden include pesticides, baits and fertilisers. The risks associated with these poisons vary significantly. VPIC will be able to advise on the agent and preferred management.
- Slugs and snails host larvae from Angiostrongylus cantonensis also known as 'rat lung worm'. If ingested, the larvae migrate to the brain causing eosinophilic meningitis which may lead to disability or death. The parasite maybe found on the Eastern Queensland and NSW coastal regions. Prophylactic treatment is effective.

Child safety – consider intentional / unintentional exposure

- Assess if poisoning is consistent with developmental age, involves unusual substances (e.g. illicit drugs) or history is inconsistent with presentation. Unintentional poisoning is more common in younger children than in older children or adults.
- Consider age:
  - Children under 1 do not self-administer medication
  - Children aged 1-6 are more likely to have unintentional exposure
  - Children aged over 10 are more likely to have an intentional exposure
- Transport the patient to hospital if there are any child safety concerns. Mandatory notification is required to Child Protection Services or to AV Safeguarding Care. See **Child Safety CPG P1001**

Clinical assessment

- Current clinical status – a complete assessment is essential
  - BGL – may be affected by alcohol and non-diabetic medications
  - Temperature – consider drug-associated hyperthermia, pneumonitis
  - ECG – assess for arrhythmias, QRS widening and / or prolonged QT interval (adult patients)
- SpO_2 and nasal capnography for patients in altered conscious state
- Identify toxidromes*
- Consider mimics and other pathologies (e.g. hypoglycaemia, stroke, trauma, seizures)
- Consult **Victorian Poisons Information Centre** for complex presentations, diagnosis support or management advice.

Identification	Yourself: Name and role (e.g. ALS, MICA). Patient: age and sex.
Mechanism	Agent.
Illness	Dose, route, timing for each agent. Intent (if relevant).
Signs / Symptoms	Clinical findings, vital signs, and trajectory.
Treatment	Care provided prior to consultation.
Consider risk of undisclosed agent and co-ingestants	

Management

- Minimise the time from exposure to definitive care
  - Definitive care may include access to specialist medicines and advanced interventions such as antidotes and antivenom, or intubation and ECMO. These may not be available at the closest hospital. Consider this in your decision making in cooperation with the AV Clinician, VPIC, and ARV / PIPER.
- Airway
  - Consider risk of aspiration or airway obstruction
- Breathing
  - Respiratory depression causing hypoventilation is common in agents that cause sedation and coma
  - Hyperventilation is the body's respiratory compensatory mechanism for metabolic acidosis which is common in toxic ingestions.
- Circulation
  - May require management of shock including IV fluid and vasopressors where poor perfusion continues
  - Arrhythmias - approach will depend on the toxic agent. Consider VPIC consultation for administration of sodium bicarbonate in any patient with possible sodium channel blockade (e.g. wide QRS, arrythmias). In addition to tricyclic antidepressants, sodium channel blockade may occur in toxicity due to anaesthetics (including cocaine) and other cardiac sodium channel blocking agents such as propranolol.
- Cardiac Arrest
  - Follow cardiac arrest guidelines
  - Prolonged CPR and consideration of ECMO or hospital-based therapies should occur in all cases of witnessed cardiac arrest.
  - Some patients may benefit from early transport with mCPR to receive an antidote at hospital.
  - Consult **early** with VPIC and the AV Medical Advisor via the AV Clinician
- Consider the potential for delayed toxic effects of extended release (ER) formulation in assessment and care planning. Some extended-release formulations will produce immediate effects when the tablet is broken.

Note: As well as extended-release formulation (ER or XR), other formulations include sustained release (SR), controlled release (CR), and enteric coated (EC) which is a type of delayed release (DR). These can all be considered modified release (MR) medicines. The terms do mean slightly different things but a cautious approach remains for all.

- Prolonged unconsciousness may lead to pressure related complications such as rhabdomyolysis which can cause hyperkalaemia. Consider clinical management in consultation with VPIC.

Patient decontamination

- Decontamination using the fire service is ideal however not always required. If unsure about decontamination requirements, consult VPIC for advice.
- Decontamination should always be undertaken by fire services when:
  - The agent is unknown
  - The agent poses significant risk to others should decontamination be undertaken incorrectly (e.g. industrial chemicals)
  - Inadequate decontamination infrastructure is available on site.
- It is important that even when a patient is time critical that correct decontamination is undertaken as the transport of these patients pose a significant risk to staff and hospitals
- Decontamination required will depend on the agent and route of exposure
- Staff safety / prevent ongoing exposure
  - Move patient to safe location to minimise risk of staff exposure / further exposure to patient, e.g. move patient to well ventilated area / upwind / uphill.
  - Consider simple dry decontamination techniques such as removal of first layer of clothing and wipe down with paper towel.
- Gastrointestinal
  - Avoid inducing vomiting
  - Instruct patient not to eat or drink
  - Isolate contaminated vomit in clinical waste (if chemical exposure)
  - Hospital management may involve administration of activated charcoal for some ingestions.
- Eye exposure
  - Irrigate affected eye(s) for 15 minutes
- Skin exposure
  - Remove clothing and place in plastic bag
  - Wash skin / rinse mouth
  - If caustic / corrosive exposure, rinse skin with copious amounts of water or saline (consider using a shower if available)

Antidotes / Antivenom

- Access to definitive care often means early access to an antidote or antivenom as soon as possible after exposure.

- If the antidote or antivenom is available in the out of hospital care environment, urgent administration by paramedics may be required and is permissible. Consult VPIC via the AV Clinician in these circumstances.

Other management

- Provide supportive care as required (e.g. pain relief, anti-emetic).
- Patients presenting with withdrawal of drugs of dependance (including alcohol) may present with sweating, tremors, nausea / vomiting, agitation, mydriasis, lacrimation and/or convulsions.
- Benzodiazepines are considered first-line agents for symptoms of withdrawal. Consult VPIC for management advice.

Monitoring

- Ongoing monitoring will be required for patients presenting with actual or potential toxic exposure.
- Cardiac monitoring and a minimum of 15 minutely observations will be required for most patients including:
  - BP, HR, resp rate, temp
  - SpO_2 +/- capnography

Clinical advice and support

- The Victoria Poisons Information Centre (VPIC) is staffed by specialist pharmacist and toxicologists to assist in the assessment and care of patients who have potentially been exposed to toxic agents.
- Ambulance Victoria has a **priority line to access VPIC services**.
- Consult VPIC for:
  - Complex cases
  - High acuity (or high likelihood of deterioration in AV care)
  - Unfamiliar agents
  - Longer transport times for ongoing management advice such as IV fluid, medication, and ventilation advice.
- Consult VPIC directly or via the AV Clinician. Consider the following:
  - Consult VPIC directly – basic enquiry. e.g. unknown agent, unknown toxic potential.
  - Consult VPIC via the AV Clinician – More complex, high acuity. As well as needing VPIC expertise, these cases may need support from the AV Clinician such as destination advice, scope of practice variation, ARV, PIPER, and or AV Medical Advisor support.
- Illicit drug exposure is commonly experienced at events such as music festivals. These events are frequently supported by first aid facilities which may be staffed by skilled paramedics, nurses and medical specialists who may have access to life saving equipment (e.g. ice baths). Working in cooperation with these experts and their resources will optimise patient outcomes.

Disposition

- Transport will be required for many patients who have had an intentional overdose for assessment and monitoring. Emergency department care usually includes screening via a blood test to assess for potentially harmful levels of ingested substances. This is particularly important where there is any risk that paracetamol has been ingested.
- Alternate pathways and mental health support may be considered in some circumstances including telehealth (TelePROMPT), community mental health teams and specialist mental health facilities.

Further Information

Toxidromes

- A toxidrome is a grouping of symptoms and clinical features in relation to toxic agents. When assessing the presentation, the history of drug or toxin exposure is often unclear, however identifying the toxidrome can direct the care pathway. This process may be complicated by the ingestion involving multiple toxidromes.
- Toxidromes are classified into the following groupings:
  - Anticholinergic
  - Cholinergic
  - Neuroleptic malignant syndrome / antidopaminergic
  - Opioid
  - Sedative-hypnotic
  - Serotonergic
  - Sympathomimetic
  - Methaemoglobinaemia

Toxidrome table

Description of toxidromes and the common clinical features:

Toxidrome	Agents	Clinical features	Treatment approach
Anticholinergic	Atropine, TCAs, antipsychotics, antihistamines.	Delirium, confusion, agitation, mumbling, hallucination, tachycardia, dry mouth, hyperthermia, seizures	Sedation, cooling, may need intubation.
Cholinergic	Organophosphate, chemical warfare nerve agents, donepezil and rivastigmine,	Altered conscious state, weakness, bradycardia and is ‘wet’ (ie has symptoms of lacrimation, salivation, bronchorrhoea and	Atropine, sedation (agitation), specific antidote

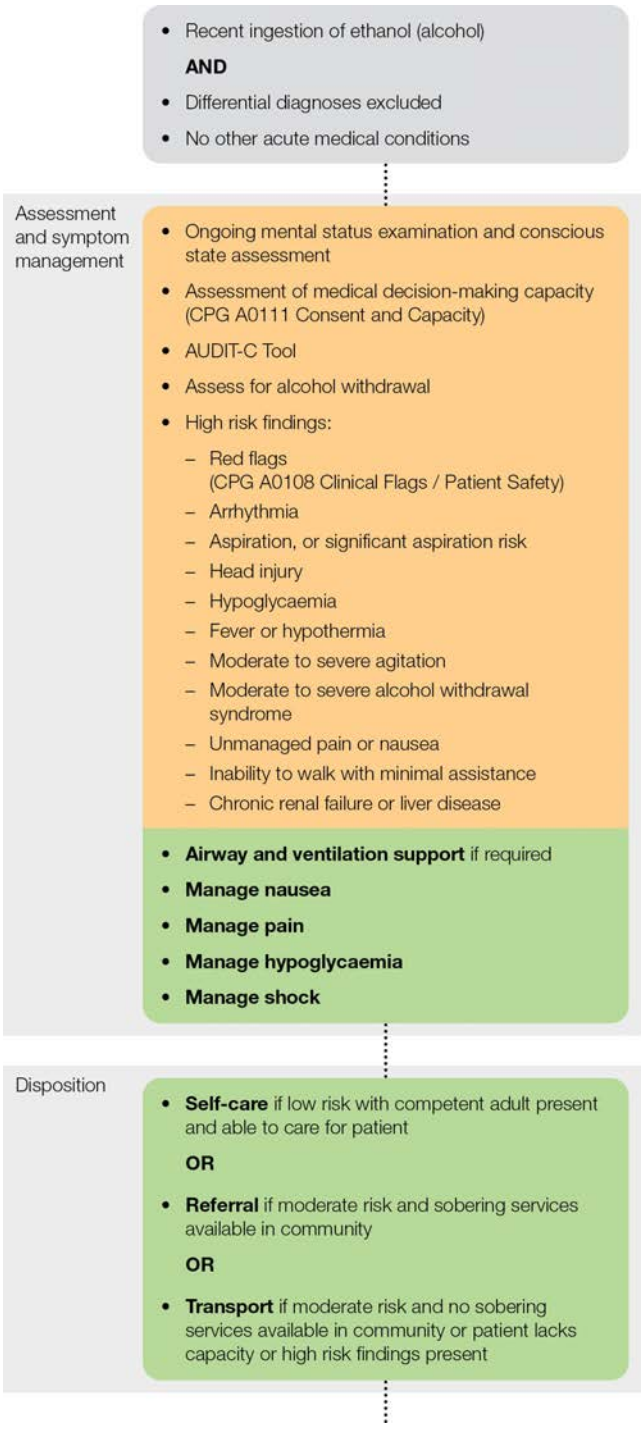
	neostigmine and pyridostigmine. Nicotine products	sweating	(where relevant for the toxin).
Neuroleptic malignant syndrome / antidopaminergic	Antipsychotics: e.g. droperidol, haloperidol, clozapine, olanzapine, quetiapine.	Rigidity, akinesia dystonia, dysphasia, tremor. Hyperthermia, tachycardia, hypertension, sweating, tachypnoea. Drowsy, confusion, coma, mutism, incontinence.	Cool patient. Sedation midazolam. Sedation and paralysis / intubation.
Opioid	Opioids (eg, heroin, morphine, methadone, oxycodone, hydromorphone), diphenoxylate	CNS depression, coma, miosis, hypothermia, bradycardia, hypotension, hyporeflexia, pulmonary edema, needle marks	Supportive care, naloxone.
Sedative-hypnotic	Benzodiazepines, barbiturates, carisoprodol, meprobamate, glutethimide, alcohols, zolpidem	CNS depression, confusion, stupor, coma. Vital signs may be normal, but may develop: hypothermia, bradycardia, hypotension, apnoea, bradypnea, Hyporeflexia.	Supportive care.
Serotonergic (serotonin syndrome)	SSRIs, SNRIs, TCAs (clomipramine, imipramine), opioids, stimulants	Neuromuscular excitation—hyperreflexia, clonus, ocular clonus, myoclonus, shivering, tremor, rigidity autonomic effects—hyperthermia, sweating, flushing, dilated pupils, tachycardia CNS - agitation, anxiety, confusion, altered conscious state.	Midazolam, rapid cooling, intubate.
Sympathomimetic	Medications: salbutamol, adrenaline, dopamine, noradrenaline, MAOIs, SNRIs. Illicit stimulants: amphetamines, eg. MDMA.ecstasy, cocaine	Adrenergic excess causing cardiovascular (tachy, hypertension, ACS, MI), CNS (anxiety, agitation, delirium, seizure, stroke), Other: hyperthermia, tremor, flushing, rhabdomyolysis.	Sedation, cooling, GTN, seizure management. May need intubation
Methaemoglobinaemia	Nitrites and nitrates, local anaesthetics, pesticides, herbicides (paraquat,	Reduced oxygen-carrying capacity of haemoglobin, functional anaemia and impaired delivery of oxygen to the tissues. NB. Pulse oximetry and arterial blood	Stop exposure, oxygen therapy. (NB. Reduced O2 therapy for

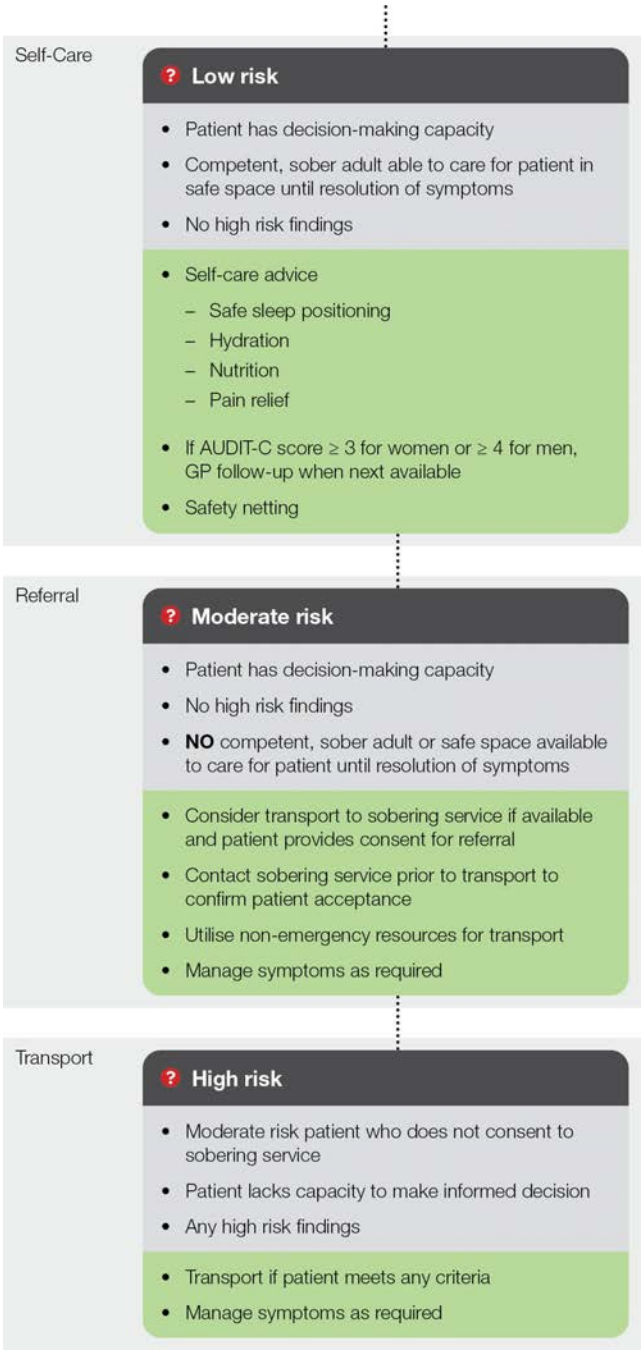
	propanil), fertilisers, naphthalene.	gas analysis may be only slightly abnormal in methaemoglobinaemia	paraquat) Antidote: methylene blue.

Other

- Principles of toxicology MAC paper
- Walkthrough video – Principles of Toxicology
- Video - Victoria Poisons Information Centre overview
- Video - Paracetamol Poisoning

Flowchart


Recent ingestion of ethanol (alcohol)
AND
Differential diagnoses excluded
No other acute medical conditions
Assessment and symptom management
Ongoing mental status examination and conscious state assessment
Assessment of medical decision-making capacity (CPG A0111 Consent and Capacity)
AUDIT-C Tool
Assess for alcohol withdrawal
High risk findings:
Red flags (CPG A0108 Clinical Flags / Patient Safety)
Arrhythmia
Aspiration, or significant aspiration risk
Head injury
Hypoglycaemia
Fever or hypothermia
Moderate to severe agitation
Moderate to severe alcohol withdrawal syndrome
Unmanaged pain or nausea
Inability to walk with minimal assistance
Chronic renal failure or liver disease
Airway and ventilation support if required
Manage nausea
Manage pain
Manage hypoglycaemia
Manage shock
Disposition
Self-care if low risk with competent adult present and able to care for patient
OR
Referral if moderate risk and sobering services available in community
OR
Transport if moderate risk and no sobering services available in community or patient lacks capacity or high risk findings present



Care Objectives

- Identify patients experiencing ethanol toxicity (acute alcohol intoxication) and the severity.
- Protect and support patient dignity.
- Manage symptoms as required.
- Identify appropriate disposition.
  - Low-moderate risk: Self-care or transport to sobering services (where available)
  - High risk: Transport to ED

Intended patient group

- Patients ≥ 16 years of age with suspected acute alcohol intoxication secondary to ethanol ingestion and no other acute medical conditions.

Overview

- Acute alcohol intoxication causes rapid-onset, dose-related central nervous system (CNS) depression.
- Ingestion of large quantities may be life threatening due to aspiration and/or respiratory depression, especially if co-ingested with other substances that cause CNS depression.
- People who use alcohol, and particularly Aboriginal and Torres Strait Islander people who use alcohol, are at a high risk of unconscious bias, stigma, and discrimination, from healthcare professionals.
- Many patients who present with acute alcohol intoxication may be appropriate for alternative care pathways, however, it is crucial to complete a comprehensive examination to exclude undetected critical illness masked by intoxication.
- The ingestion of other toxic alcohols, including methanol, ethylene glycol, and isopropyl alcohol, will cause significant poisoning and should **not** be managed under this guideline. Consider consultation with VPIC.

Assessment

History

- **Acute alcohol consumption:**
  - Amount and type of alcohol consumed.
  - Speed at which alcohol was consumed.
  - Co-ingestion with other substances and interactions with patient's own medications.
  - History of previous alcohol consumption.
- **Chronic alcohol consumption:**
  - Screen patients for possible hazardous alcohol use, particularly in cases of referral and non-transport.
  - Patients who chronically consume alcohol may be at risk of alcohol withdrawal syndrome, despite appearing clinically intoxicated, which increases their likelihood of requiring a critical care admission. Refer to **CPG A0727 Alcohol Withdrawal Syndrome** for assessment and management of these patients.
- The **Alcohol Use Disorders Identification Test** (AUDIT-C) is an effective screening tool for detecting potentially harmful drinking patterns and should be utilised for any patient presenting with alcohol use as a component of their presentation.

Go to AUDIT-C calculator

More information

Alcohol Use Disorders Identification Test (AUDIT-C)						
Questions	**0**	**1**	**2**	**3**	**4**	**Score**
1. How often did you have a drink containing alcohol in the past year?	Never	Monthly or less	2-4 times a month	2-3 times a week	4+ times a week	
2. How many drinks containing alcohol did you have on a typical day when you were drinking in the past year?	1 or 2	3 or 4	5 or 6	7 to 9	10 or more	
3. How often did you have six or more standard drinks on one occasion in the past year?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
Males: Scores ≥ 4 suggest alcohol misuse / **Females:** Scores ≥ 3 suggest alcohol misuse						

Physical exam

- High risk findings predict patients more likely to require management in the emergency department and/or critical care.
- Signs and symptoms associated with acute alcohol intoxication are unreliably correlated with blood alcohol concentration (BAC).

Differential diagnosis

- In the setting of acute ethanol intoxication all reasonable attempts should be made to exclude other causes of altered mental status.
  - Seizure activity or post-ictal phase
  - Hypoglycaemia or other metabolic problem
  - Hypoxia
  - Co-ingestion
  - Acute withdrawal syndromes
  - Head trauma
  - Infection/sepsis
  - Psychiatric conditions
  - Stroke or TIA
  - Wernicke encephalopathy

More information

- Wernicke encephalopathy is an acute neurological condition and medical emergency caused by severe thiamine deficiency.
- People who chronically use alcohol in significant quantities are at risk of thiamine deficiency due to

impaired absorption from the intestine, reduced storage in the liver, and an inadequate diet.

- Wernicke encephalopathy should be suspected in patients with chronic alcohol use and any of the following features:
  - Acute altered mental status or memory deficit
  - Disordered eye movements (nystagmus, paralysis of eye muscles/reduced movement of eyes)
  - Ataxic gait or gait disturbance

Management

Airway management and ventilation

- Patients with ethanol intoxication may require basic airway support or lateral positioning to aid oxygenation and ventilation, while minimising the risk of aspiration.
- Advanced airway management is rarely required unless their airway patency or breathing is so compromised that simple manoeuvres are unable to address this.

Circulation

- Hypotension may occur in patients with ethanol intoxication due to vasodilation but usually responds to fluid administration.
- Manage inadequate perfusion as per **CPG A0705 Shock**

Nausea and Vomiting

- Antiemetic as per **CPG A0701 Nausea and Vomiting**
- Avoid IV medication in low or moderate risk patients who are not being transported to hospital unless unable to tolerate oral medications.

Analgesia

- Pain relief as per **CPG A0501-1 Pain Relief**
- Patients with moderate to severe pain from co-occurring injuries requiring intravenous or intranasal opioids require further investigation in the emergency department and are unsuitable for referral or a sobering service.

Hypoglycaemia

- Manage as per **CPG A0702 Hypoglycaemia**
- Patients presenting with hypoglycaemia in the setting of alcohol use are likely to require care in the emergency department and are unsuitable for referral or a sobering service.
- Where possible, avoid glucagon in patients who use alcohol chronically. Alcohol may suppress gluconeogenesis and chronic use depletes liver glycogen stores.

Disposition

Low risk patients

Self-care advice

- Do not drink any more alcohol until fully recovered from symptoms.
- Avoid mobilising unless necessary and have a competent, sober, adult to assist with any mobilisation to prevent injury.
- Sleep on side and keep warm in a low stimulus environment.
- Maintain hydration with water and nutrition with simple foods.
- Use paracetamol for mild pain as required.

Safety Netting

- Ensure a competent adult is present and is sufficiently sober and able to care for patient until resolution of symptoms.
- Advise patient and/or competent adult to call 000 or attend ED if:
  - There is no improvement in conscious state over 2-4 hours.
  - Mental status deteriorates at any time.
  - Patient vomits when laying supine and does not clear their own airway.
  - Patient sustains significant injury when mobilising.
  - Severe pain develops.

Referral

- If patient has an AUDIT-C score greater than or equal to 3 in women or 4 in men, or expresses concerns about their use of alcohol, recommend a non-urgent follow-up with the patient's own GP.
  - If the patient does not have a regular GP, provide information regarding DirectLine (1800 888 236), which provides free counselling, information, and referrals.

Moderate risk patients

- Moderate risk patients who do not have support from a sober, competent adult, or a safe space for sobering are not suitable for home-based care. However, they do not necessarily require emergency department care.
- If available, consider contact with local dedicated outreach team or transport of patient to a sobering service (Public Intoxication Centralised Service – see Phone Numbers section**Phone Numbers section**) rather than an emergency department for monitoring until safe for independent mobilisation. Paramedics must contact the sobering service prior to transport to confirm patient acceptance.
- Consider transport of these patients to an emergency department if any doubt exists regarding differential diagnosis, or if there is no sobering service available in the community.

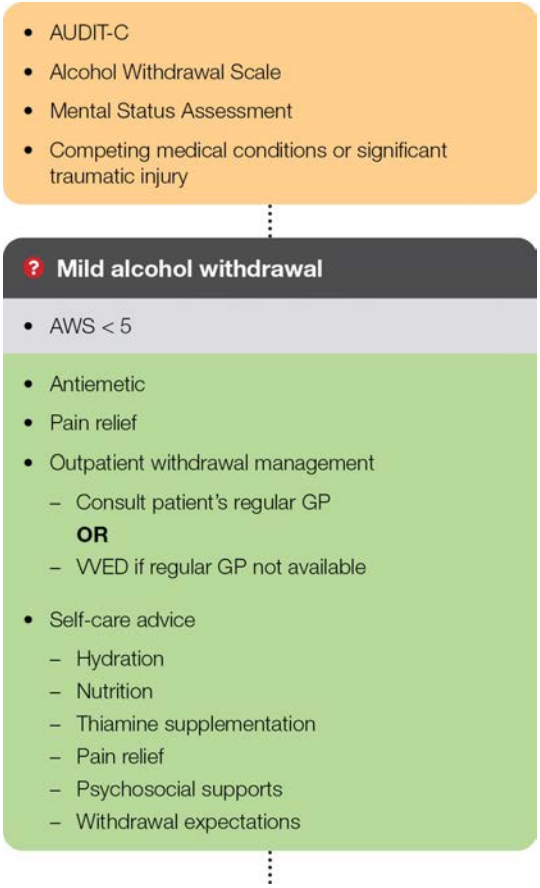
High risk patients

- Require transport to hospital.
- Provide ongoing symptom management and escalate care as required.

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Acute Alcohol Intoxication.pdf

Flowchart


AUDIT-C
Alcohol Withdrawal Scale
Mental Status Assessment
Competing medical conditions or significant traumatic injury
Mild alcohol withdrawal
AWS < 5
Antiemetic
Pain relief
Outpatient withdrawal management
Consult patient's regular GP
OR
VVED if regular GP not available
Self-care advice
Hydration
Nutrition
Thiamine supplementation
Pain relief
Psychosocial supports
Withdrawal expectations

Moderate alcohol withdrawal

- AWS 5 - 14

Assess for features that increase the likelihood of complex withdrawal:

- History of alcohol withdrawal delirium or alcohol withdrawal seizure
- Previous withdrawal episodes in patient's lifetime
- Age > 65
- Comorbid illness (particularly traumatic brain injury)
- Long duration of heavy & regular alcohol consumption
- Seizure during current withdrawal episode
- Concomitant use of other addictive substances
- Signs & symptoms of co-occurring psychiatric disorder of moderate, or greater, severity

- Antiemetic
- Pain relief
- Consult with VVED for care planning

If patient is commenced on outpatient withdrawal management:

- Self-care advice
  - Hydration
  - Nutrition
  - Thiamine supplementation
  - Pain relief
  - Psychosocial supports
  - Withdrawal expectations

FOLLOWING CONSULT WITH VVED / DACAS, if patient transported for inpatient management and symptoms causing significant discomfort or agitation

- **Midazolam 2.5-5 mg IV**
  - Repeat **Midazolam 2.5-5 mg IV after 5 minutes (max. 20 mg)** titrated to patient response, aiming for SAT score 0 or -1

Severe alcohol withdrawal

- AWS > 14

- Delirium Tremens
- Withdrawal seizures

- Antiemetic
- Pain relief
- If symptoms causing significant distress or agitation, **Midazolam 2.5 - 5 mg IV**
  - Repeat **Midazolam 2.5 - 5 mg IV after 5 minutes (max. 20 mg)** titrated to patient response, aiming for SAT of 0 or -1
  - If unable to gain IV access, **Midazolam IM** (IM same dose as IV)

Patient refractory to initial doses of **Midazolam**

- Escalate care / request MICA
  Consider early consultation with DACAS via AV Clinician

- If symptoms causing significant distress or agitation, **Midazolam 2.5-5 mg IV**
  - Repeat **Midazolam 2.5-5 mg IV after 5 minutes (total max. 30 mg)** titrated to patient response, aiming for rousable drowsiness (SAT of 0 to -1)
  - Consult DACAS via AV Clinician if approaching 30 mg

Other care

Seizures

- Mx as per CPG A0703 Seizures

Shock

- Mx as per CPG A0705 Shock

Care Objectives

- Identify patients experiencing, and assess the severity of, alcohol withdrawal syndrome
- Symptomatic management
- Reduce risk of progression to severe alcohol withdrawal
- Identify appropriate disposition:
  - Mild and moderate alcohol withdrawal, without features associated with complex withdrawal: community-based withdrawal management

- Moderate alcohol withdrawal with features associated with complex withdrawal or severe alcohol withdrawal: paramedic transport to ED

Intended Patient Group

- Patients aged ≥ 16 years with presentation consistent with alcohol withdrawal syndrome

Overview

- Up to half of all patients living with alcohol use disorder will experience some level of alcohol withdrawal when they stop, or reduce, their alcohol consumption
- Alcohol withdrawal syndrome typically occurs 6-24 hours after a patient's last alcoholic drink, or following a severe reduction in consumption
  - A patient may experience alcohol withdrawal syndrome despite being clinically intoxicated if their regular alcohol consumption is high
- Symptoms peak over 36-72 hours, subsiding within 5-7 days aside from cases of severe withdrawal
- Early identification and management of moderate and severe withdrawal can reduce length of hospital stay, morbidity, and mortality in patients

Assessment

History

- The Alcohol Use Disorders Identification Test (**AUDIT-C**) tool should be used to screen for detection of harmful drinking patterns
- If harmful drinking patterns are identified, they should be quantified by assessing the daily quantity and frequency of use, as well as the potency of alcohol consumed
  - Screen for substance use in addition to alcohol, to identify any concurrent other substance withdrawal or intoxication management needs
- The experience of alcohol withdrawal syndrome can be complicated by a variety of mental health conditions, so it is important to screen for underlying mental health concerns which may impact the treatment setting as per **CPG A0106 Mental Status Assessment** and **CPG A0107 Mental Health Conditions**
- Alcohol use is influenced by a number of psychosocial factors, which should be assessed to evaluate patient safety and appropriate setting for withdrawal management. Particular attention should be paid to:
  - Family violence (**CPG F0012**)
  - Parenting and child protection issues (**CPG P1001**)
  - Geographic isolation
  - Driving status

  - Legal and financial issues
  - Appropriate accommodation
  - Support network (family, friends, workers, etc.)
  - Aboriginal and Torres Strait Islander status

- Historical features which increase the likelihood of a complex alcohol withdrawal episode include:
  - Seizure during current withdrawal episode
  - History of alcohol withdrawal delirium or alcohol withdrawal seizure
  - Previous withdrawal episodes in patient's lifetime
  - Age > 65
  - Co-occurring illness (particularly traumatic brain injury)
  - Long duration of heavy & regular alcohol consumption
  - Concomitant use of other addictive substances
  - Signs & symptoms of co-occurring psychiatric disorder of moderate, or greater, severity

Physical Exam

- Signs and symptoms of alcohol withdrawal syndrome mimic many other critical illnesses, and a thorough physical assessment is required to ensure the correct diagnosis is identified
- Differential diagnoses which should be sought on physical examination include:
  - Infections (particularly in the presence of fever)
  - Hyperthyroidism (usually associated with a longer time course than alcohol withdrawal syndrome)
  - Withdrawal from other sedating substances
- The Alcohol Withdrawal Scale (AWS) can be used to quantify the degree of withdrawal the patient is experiencing and should be measured and recorded regularly during patient care

Go to Alcohol Withdrawal Scale Calculator

More information

Alcohol Withdrawal Scale (AWS)						
Questions	**0**	**1**	**2**	**3**	**4**	**Score**
1. Perspiration	None	Moist skin	Localised beads of sweat	Whole body wet from perspiration	Profuse	
2. Tremor	None	Slight	Constant, slight, in upper extremities	Constant, marked, in extremities		
3. Anxiety	None	Slight	Apprehension or understandable fear	Anxiety, occasional panic	Constant panic	
4. Agitation	None	Cannot sit or lie still	Moves constantly, looks tense	Constantly restless	Maximally restless, aggressive.	

5. Temperature	< 37.0	37.1-37.5	37.6-38.0	38.1-38.5	> 38.5	
6. Hallucinations	None	Distortions of real objects, but aware not real	Appearance of new objects, but aware not real	Believes hallucinations real but still oriented to place & person	Believes themselves to be in totally non-existent environment, preoccupied, cannot be diverted or reassured	
7. Orientation	Full	Oriented to person but unsure of time or place	Oriented to person but disoriented of time or place	Doubtful personal orientation, disoriented to time & place	Disoriented in time, place & person	
Mild Withdrawal: < 5 **Moderate Withdrawal:** 5 – 14 **Severe Withdrawal:** > 14						

Management

Antiemetic

- Antiemetic as per **CPG A0701 – Nausea and Vomiting**

Analgesia

- Pain relief as per **CPG A0501-1 Pain Relief**

Benzodiazepines

- Benzodiazepines are the preferred option in managing significant distress and/or agitation caused by alcohol withdrawal syndrome.
  - The goal of benzodiazepine therapy is rousable drowsiness (SAT of 0 or -1) to facilitate safe transport with control of psychomotor agitation as required. Heavy sedation (SAT of -2 or -3) should be avoided.
- A symptom-based dosing strategy minimises the required dose of benzodiazepines and reduces the risk of respiratory depression.
- Intravenous dosing of midazolam is strongly preferred, however, in cases of severe withdrawal and Delirium Tremens where IV access is challenging, an initial intramuscular dose may be appropriate. IM dose same as IV.
- A small subset of patients suffering from alcohol withdrawal syndrome may be resistant to benzodiazepines – although this is exceedingly rare. In patients who do not respond to initial doses

of benzodiazepines, consider alternative diagnoses, and escalate care early.

- Benzodiazepines should only be commenced in patients with moderate alcohol withdrawal syndrome following consultation with the Victorian Virtual Emergency Department (VVED) and/or Drug and Alcohol Clinical Advisory Service (DACAS)
- Paramedics should feel empowered to commence benzodiazepine therapy in patients with established, severe, alcohol withdrawal syndrome, but if any doubt exists, they should contact DACAS for discussion of appropriate dosing.

Mild Alcohol Withdrawal Syndrome

Referral

- If patient consents to outpatient management of alcohol withdrawal syndrome, consult with patient's regular GP to organise care plan.
- If patient does not have a GP, or GP is unavailable, consult VVED to discuss care plan.
- If patient declines outpatient management of alcohol withdrawal syndrome and is not transported to hospital, provide DirectLine contact information (1800 888 236).

Self-care advice

- Create a low stimulation, reassuring, environment, as this will support successful withdrawal management should anxiety and agitation increase.
- Consume non-caffeinated fluids regularly to reduce the risk of significant dehydration.
- Maintain a normal diet and consider addition of a daily multivitamin and oral thiamine (vitamin B1) 100 mg PO three times per day.
- Use oral paracetamol as required for management of mild pain. If pain is related to abdominal cramping, use hyoscine butylbromide (commonly known as Buscopan ®) 10 mg up to four times per day.
- If experiencing significant diarrhoea, use 4 mg loperamide initially and then 2 mg loperamide as required.

Safety Netting

- It is preferrable the patient has another responsible adult present for the duration of withdrawal who can assist in symptom management and monitoring for worsening. At the very least, recommend having a family member or friend check in with the patient throughout the day.
- The patient should be advised to call 000 or attend ED if:
  - Agitation or severe tremor has not resolved or is worsening despite medications.
  - More severe signs or symptoms develop, such as intractable vomiting, syncope, severe agitation, hallucinations, confusion, or seizures.
  - Existing medical or psychiatric conditions worsen (particularly worsening suicidal ideations).
  - Patient appears over-sedated.

Moderate Alcohol Withdrawal Syndrome

- Some patients with moderate alcohol withdrawal syndrome may prefer, and may be suitable, for management within the community.

- Features which increase the risk of management within the community include:
  - Seizure during current withdrawal episode
  - History of alcohol withdrawal delirium or alcohol withdrawal seizure
  - Previous withdrawal episodes in patient's lifetime
  - Age > 65
  - Comorbid illness (particularly traumatic brain injury)
  - Long duration of heavy & regular alcohol consumption
  - Concomitant use of other addictive substances
  - Signs & symptoms of co-occurring psychiatric disorder of moderate, or greater, severity
- Consult with VVED to discuss the most appropriate setting for withdrawal management.
- If patient is commenced on out-patient management, provide advice as per Mild Alcohol Withdrawal Syndrome.
- If patient is recommended for in-patient management, discuss requirement for IV Midazolam for symptom management with VVED / DACAS.

Severe Alcohol Withdrawal Syndrome

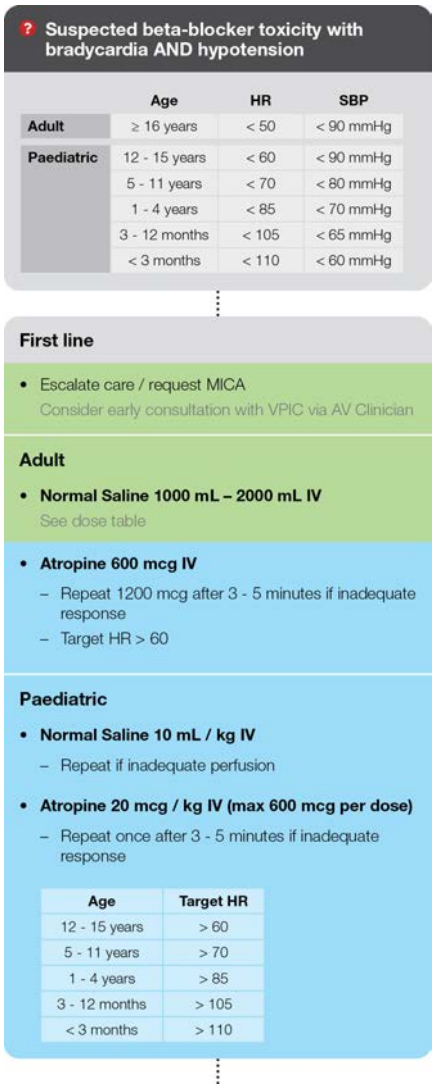
- Require urgent care in an in-patient setting.
- Provide early doses of midazolam for symptom control and consider early escalation to DACAS and / or MICA for dosing advice and more intensive management strategies.

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Alcohol Withdrawal Syndrome.pdf

Beta-Blocker Toxicity CPG A0717

Flowchart



Second line

Bradycardia and hypotension remain following IV fluid and atropine

Adult

- **Adrenaline infusion**

Start	5 mcg / min (5 mL / hr)
Increase	5 mcg / min at 2-minute intervals
Target	MAP ≥ 65 **OR** SBP > 100
Max	10 mcg / min

If syringe pump unavailable:

- **Adrenaline 10 - 20 mcg IV** at 2 minutes intervals

Paediatric

- **Adrenaline infusion**

Start	0.05 mcg / kg / min (0.5 mL / kg / hour)
Increase	0.05 mcg / kg / min at 2-minute intervals
Target	**Age** / **SBP** 12 - 15 years / > 90 mmHg 5 - 11 years / > 80 mmHg 1 - 4 years / > 70 mmHg 3 - 12 months / > 65 mmHg < 3 months / > 60 mmHg
Max	1.0 mcg / kg / min (max 10 mcg / min)
Preparation: 300 mcg / 50 mL	

- **Adrenaline 0.1 mcg / kg IV** at 2 minutes intervals

Third line

Patient remains Extremely poorly perfused

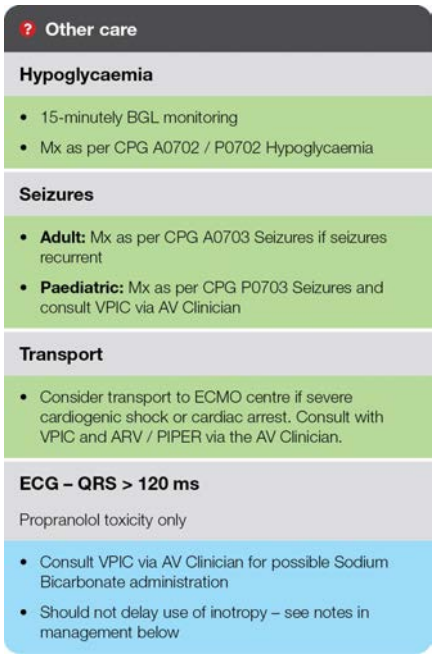
- Altered conscious state / unconscious **AND**
- HR < 50 **AND**
- SBP < 60

Adult

- **Transthoracic pacing** as per CPG A0402 Bradycardia
  - Capture may be difficult

Paediatric

- Consult VPIC via AV Clinician



Normal Saline Dose (adult)

Risk of fluid overload	All other patients
• Cardiac failure • Elderly	
• Titrate to response – **Max. 1000 mL**	• Titrate to response – **Max. 2000 mL**

Care Objectives

- Targeted management of bradycardia and inadequate perfusion
- Early consultation with VPIC, particularly if co-ingestion with other medications, refractory hypotension, or arrhythmias
- Supportive management of hypoglycaemia and seizures

Intended Patient Group

- Patients with suspected beta-blocker toxicity

Notes

Pathophysiology

- Beta-blockers are commonly prescribed medications that primarily act on the beta1 and beta 2 adrenoreceptors to reduce the heart rate and force of myocardial contraction. Toxicity can lead to bradyarrhythmias and severe cardiovascular compromise.
- Some beta-blockers are more toxic than others due to their additional effects – propranolol has sodium channel effects and causes QRS widening; sotalol has potassium channel effects and causes QT prolongation.
- A wide range of effects may occur in toxic amounts due to a loss of selectivity for specific beta receptors.

Assessment

- There are several Beta blockers available in Australia

Generic name	Trade name
Atenolol	Lotenol Nator Noten Tenormin TENSIG
Bisoprolol	BEPROL Bicard Bicor Biso Bispro
Carvedilol	Dicarz Dilatrend Vedilol VOLIROP
Esmolol	Brevibloc
Labetalol	Presolol Trandate
Metoprolol	Betaloc Metrol Minax Mistrom
Nebivolol	Nepiten Nebilet
Propranolol	Deralin Inderal

Sotalol	Cardol Solavert Sotacor

- Most are only available in immediate release formulation. Metoprolol is available in modified release.

Toxicity and risk assessment

- Beta blocker toxicity is potentially life-threatening – consult VPIC early.
- Onset of symptoms: Usually within 1 - 2 hours but may be delayed in modified release preparations.
- Elderly patients, those with underlying cardiac disease and co-ingestion with other cardiovascular medicines are at greater risk, even with small doses.
- Propranolol and sotalol are more toxic than other beta blockers.
- Consider transport to ECMO center if severe cardiogenic shock or cardiac arrest. VPIC will be able to advise on patient suitability.

Clinical Features

All beta blockers (including sotalol and propranolol)

- CVS: Bradycardia, hypotension, pulmonary oedema, 1st, 2nd and 3rd degree heart block.
- Metabolic: Hypoglycaemia.

Sotalol

- Prolonged QT interval, Torsade des Pointes.

Propranolol

- Widened QRS complex, ventricular arrhythmias, delirium, coma, seizures.

Management

- Beta blocker toxicity is potentially life-threatening, and management can be complex – consult VPIC early.
- Bradycardia associated with inadequate perfusion is treated with IV fluids and atropine. If symptoms persist, commence adrenaline.
- Administer atropine through a free running IV line for best effect.
- An adequate response to atropine is not common in beta-blocker toxicity and further doses of atropine may delay progression to other care.
- Where the patient initially responds adequately to two doses of atropine, but the effect is not sustained, repeat atropine 600 mcg as required (total maximum of 3000 mcg).
- Pacing may be required if pharmacological chronotropy fails.
- The role of sodium bicarbonate in propranolol toxicity induced QRS widening is unclear. It should not

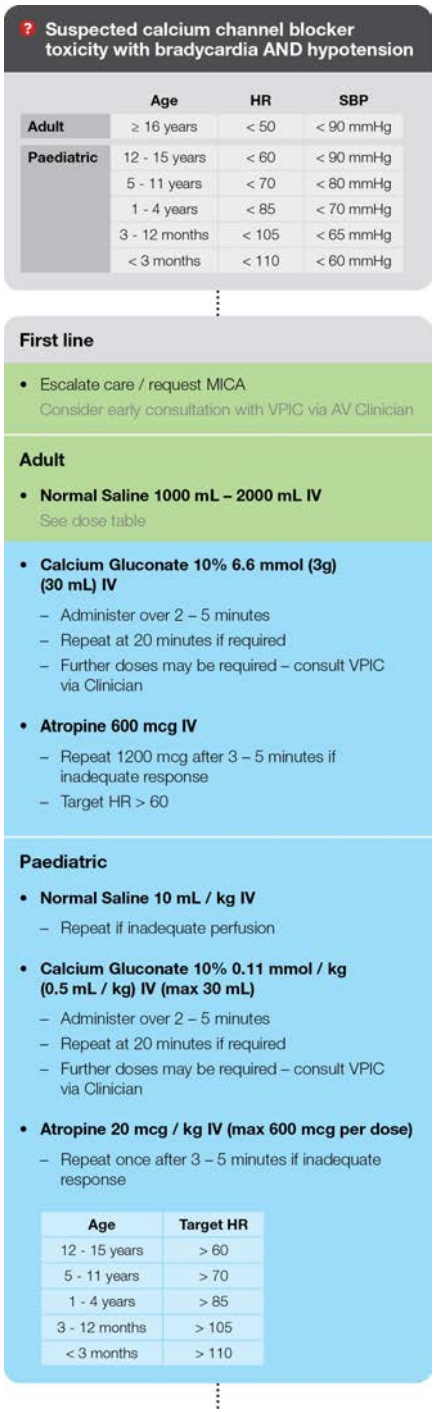
be the focus or delay the use of inotropes. Consult VPIC first.

Further Information

- Beta blocker toxicity MAC paper

Calcium Channel Blocker Toxicity CPG A0718

Flowchart



Second line

Bradycardia and hypotension remain following IV fluid and atropine

Adult

- **Metaraminol 0.5 mg IV** at 2 minutes intervals

Paediatric

- Consult VPIC via the AV Clinician
- Where approved: **Adrenaline 0.1 mcg / kg IV** at 2 minutes intervals

Third line

Inadequate response to 1 - 2 doses of metaraminol

Adult

- **Noradrenaline infusion** for dihydropyridines
  Amlodipine, Felodipine, Lercanidipine, Nifedipine, Nimodipine

Start	5 mcg / min (5 mL / hr)
Increase	5 mcg / min at 2-minute intervals
Target	MAP ≥ 65 **OR** SBP > 100
Max	25 mcg / min

OR

- **Adrenaline infusion** for non-dihydropyridines
  Verapamil, Diltiazem

Start	5 mcg / min (5 mL / hr)
Increase	5 mcg / min at 2-minute intervals
Target	MAP ≥ 65 **OR** SBP > 100
Max	25 mcg / min

If syringe pump unavailable:

- **Adrenaline 10 - 20 mcg IV** at 2 minutes intervals

Fourth line

Patient remains extremely poorly perfused

- Altered conscious state / unconscious **AND**
- HR < 50 **AND**
- SBP < 60

Adult

- **Transthoracic pacing** as per CPG A0402 Bradycardia
  - Capture may be difficult

Paediatric

- Consult VPIC via the AV Clinician

? Other care

Transport

- Consider transport to ECMO centre if severe cardiogenic shock or cardiac arrest. Consult with VPIC and ARV / PIPER via the AV Clinician.

Normal Saline Dose (adult)

Risk of fluid overload	All other patients
• Cardiac failure • Elderly	
• Titrate to response – **Max. 1000 mL**	• Titrate to response – **Max. 2000 mL**

Care Objectives

- Targeted management of bradycardia and inadequate perfusion.
- Early administration of calcium gluconate.
- Early consultation with VPIC to guide management.

Intended Patient Group

- Patients with suspected calcium channel blocker toxicity

Notes

Pathophysiology

- Calcium channel blockers (CCBs) are commonly prescribed medications for conditions including hypertension and coronary artery disease. They block calcium channels leading to negative inotropy, negative chronotropy and vasodilation. They are classified into groups of dihydropyridine (vasoselective) and non-dihydropyridine (cardioselective) CCBs. In addition to haemodynamic compromise from a combination of myocardial dysfunction, bradycardia and vasodilatation, actions of CCBs also include inhibition of insulin secretion, leading to hyperglycaemia.

Assessment

- There are several CCBs available in Australia.
  - Non-dihydropyridine (verapamil and diltiazem)
  - Dihydropyridine (Amlodipine, Felodipine, Lercanidipine, Nifedipine, Nimodipine)
- CCBs are available in immediate release or modified release formulations.

- Some formulations are combined with other antihypertensives or statins.

Toxicity and risk assessment

- Ingestion of 2 - 3 times the usual dose may cause serious toxicity. More than 10 tablets can be life threatening.
- One tablet of diltiazem or verapamil SR preparation can be fatal for children. Prompt recognition and time-critical management is essential.
- Older age, co-existing medical conditions (e.g. heart disease), and co-ingestion with other cardiovascular medications increase the risk of toxicity.
- Non-dihydropyridine CCBs (Diltiazem and Verapamil) are generally more toxic because they are more cardio-selective.
- Onset of symptoms: Usually within 1 - 2 hours but may be delayed in modified release preparations up to 12 hours.

Clinical Features

- All calcium channel blockers
  - CVS: Hypotension, vasoplegia, shock
  - CNS: Altered conscious state secondary to inadequate perfusion
  - Metabolic: Hyperglycaemia, lactic acidosis
  - GI: Nausea, vomiting
- Verapamil and Diltiazem (non-dihydropyridine CCBs)
  - CVS: Bradycardia / bradyarrhythmias, first degree heart block, pulmonary oedema

Management

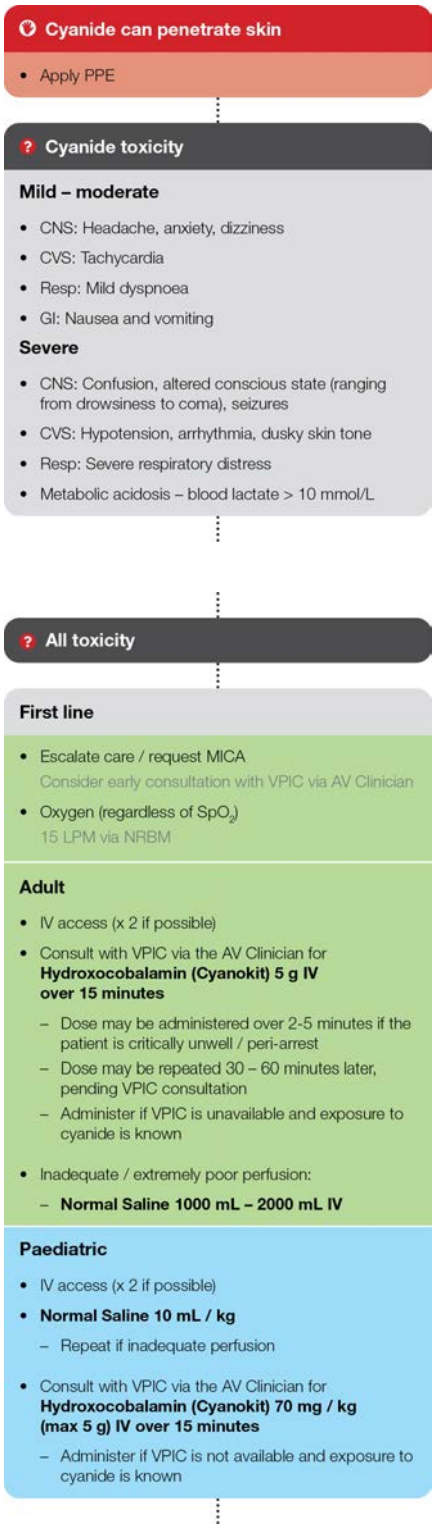
- CCB toxicity is potentially life-threatening and management can be complex – consult Victorian Poisons Information Centre early.
- Some CCB preparations are slow release. Symptoms may be delayed up to 12 hours.
- Inadequate and extremely poor perfusion requires a graduated approach which includes calcium, IV fluids and vasopressors / inotropes.
- An adequate response to atropine is not common in calcium channel blocker toxicity and further doses of atropine may delay progression to other care.
- Where the patient initially responds adequately to two doses of atropine, but the effect is not sustained, repeat atropine 600 mcg as required (total maximum of 3000 mcg).
- For witnessed cardiac arrest, consult VPIC via the AV Clinician to consider mechanical CPR to closest emergency department.
- See **CPG A0705 Shock** for precautions related to IV access for the patient receiving vasopressor management.

Further Information

- Calcium channel blocker toxicity MAC paper

Cyanide Toxicity CPG A0720

Flowchart



Second line

Inadequate response to IV fluid and hydroxocobalamin (if available)

Adult

- Metaraminol, Noradrenaline and Adrenaline as per CPG A0705 Shock
- Consider ETT

Paediatric

- **Adrenaline infusion**

Start	0.05 mcg / kg / min (0.5 mL / kg / hr)
Increase	0.05 mcg / kg / min at 2-minute intervals
Target	**Age** / **SBP** 12 - 15 years / > 90 mmHg 5 - 11 years / > 80 mmHg 1 - 4 years / > 70 mmHg 3 - 12 months / > 65 mmHg < 3 months / > 60 mmHg
Max	1.0 mcg / kg / min (max 25 mcg / min)
Preparation: 300 mcg / 50 mL	

If syringe pump unavailable / until infusion is prepared:

- **Adrenaline 0.1 mcg / kg IV** every 2 minutes as required

Normal Saline Dose (adult)

Risk of fluid overload	All other patients
• Cardiac failure • Elderly	
• Titrate to response – **Max. 1000 mL**	• Titrate to response – **Max. 2000 mL**

Care Objectives

- Recognise cyanide toxicity
- Early administration of antidote (hydroxocobalamin)
- Provide perfusion support if necessary
- Transport to the nearest emergency department

Intended patient group

- All patients with suspected cyanide toxicity

Notes

Scene Safety

- Complete a dynamic risk assessment
- Apply PPE
- Consider the potential of the event being a deliberate act
- Assess potential for a multi casualty event.

Pathophysiology

Cyanide blocks the use of oxygen at the cellular level. This leads to intracellular hypoxia and shifts metabolism to anaerobic pathways that produce lactate resulting in intracellular acidosis. This may eventually lead to widespread cellular hypoxia, respiratory arrest, and/or cardiac arrest.

Cyanide is highly toxic: Ingestions of 1 mg/kg may be lethal.

Onset of symptoms can begin within 30 minutes and patients can rapidly deteriorate thereafter.

Epidemiology

Incidence in Victoria

The settings in which cyanide poisoning is mostly reported include:

- Industrial: Inhalation of combustion vapours or contaminated dust (e.g. mining or plastic manufacturing).
- Scientific: Electroplating, photography.
- House fires: Inhalation of combustion vapours (e.g. plastics, polyurethane).

Cyanide is also present in stone fruit seeds such as apricots, cherries, plums and peaches. Accidental ingestion of small amounts of stone fruit seeds is not likely to cause poisoning. Ingestion of crushed seeds or larger quantities is a risk and may present in the context of self-poisoning using a blender or in stone fruit ‘smoothies’. Incorrect preparation of the cassava root may also pose a risk.

Specific circumstances

House fires

- Consider and manage concurrent carbon monoxide poisoning.

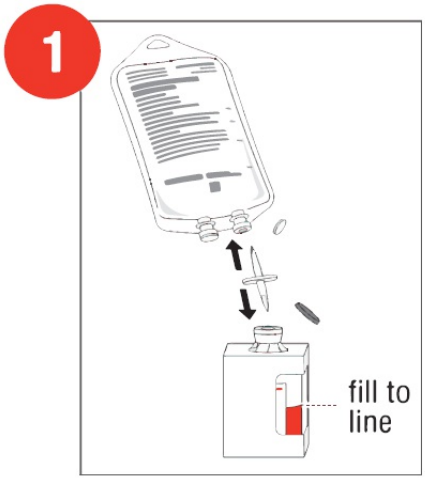
Hydroxocobalamin (Cyanokit)

- Hydroxocobalamin (Vitamin B12), binds to free cyanide ions, inactivating them and allowing them to be excreted in urine.
- This medicine is not supplied by AV. It may be available in high-risk environments such as mining sites where cyanide is used in industrial processes.

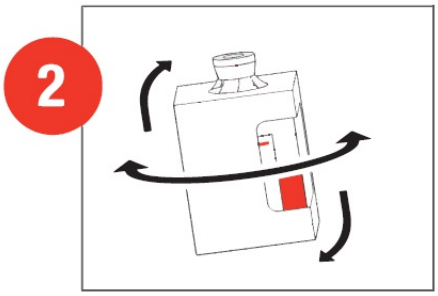
- It is always given as an IV preparation.
- Early administration is essential due to potential for rapid deterioration.
- Other antidotes, such as sodium nitrite are rarely used. They must not be used without consultation with VPIC.
- Presentation and equipment
  - 5 g in glass vial (reconstituted with 200 mL normal saline)
  - Sterile transfer spike
  - Infusion set
- Contraindications: None
- Adverse effects:
  - Anaphylaxis (rare)
  - Hypertension (possible)
  - Renal injury (possible)
  - Red or orange discolouration of body fluids and skin (may last 2 – 3 days)

Preparation

1. Add 200 mL of Normal Saline to the vial using the transfer spike (filling to the line).



2. Remove the infusion spike and gently invert or rock (do not shake) the vial for at least 60 seconds. The solution will become dark red.



- Discard if particulate matter is present or solution is not dark red.

3. Use infusion set to administer intravenously.

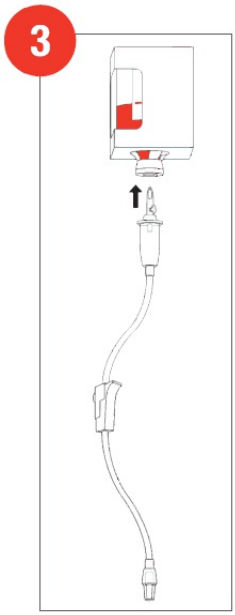


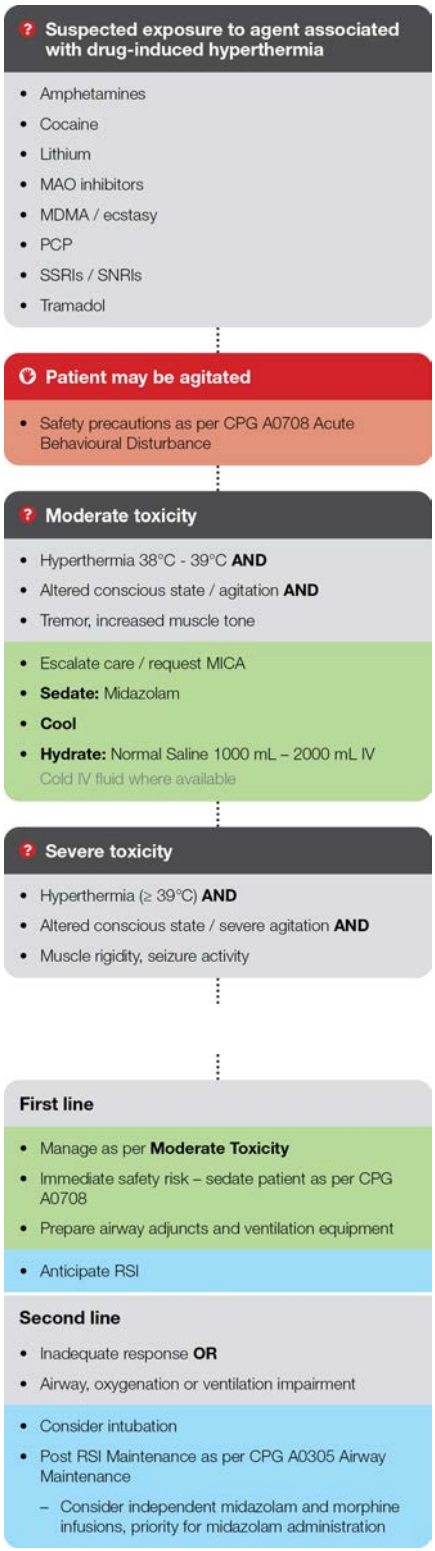
Fig. 1. Cyanokit components.

Further Information

- Cyanide Toxicity MAC paper

Drug Induced Hyperthermia CPG A0719

Flowchart



Dose Table

Midazolam dose (Adult)

IM (IV access not available)

- **5 – 10 mg**
  - Repeat 5 – 10 mg after 10 minutes if required (once only)

OR

- **2.5 – 5 mg** (< 60 kg / frail / elderly / SBP < 100 mmHg)
  - Repeat 2.5 – 5 mg after 10 minutes if required (once only)

IV

- **2.5 – 5 mg**
  - Repeat 2.5 – 5 mg at 5-minute intervals if required

OR

- **1 – 2 mg** (< 60 kg / frail / elderly / SBP < 100 mmHg)
  - Repeat 1 – 2 mg at 5-minute intervals if required

Notes

- Maximum total dose 20 mg (IM and IV)
- Consult VPIC via AV Clinician for further doses if required

Normal Saline Dose (adult)

Risk of fluid overload	All other patients
• Cardiac failure • Elderly	
• Titrate to response – **Max. 1000 mL**	• Titrate to response – **Max. 2000 mL**

Care Objectives

- Early identification
- Control temperature - sedate, cool, hydrate
- Supportive care

Intended patient group

- Patients aged ≥ 16 years with suspected drug induced hyperthermia

Overview

- The key features are:
  - Hyperthermia
  - Altered mental status
  - Neuromuscular excitation such as tremor and increased tone

Medications associated with serotonin toxicity

- Hyperthermia in these severe cases is influenced by environmental factors (heat and humidity), exertion (dancing), as well as a genetic predisposition.

Agents associated with drug induced hyperthermia

- Amphetamines – Ice, speed
- Cocaine
- Lithium
- MAO inhibitors
- MDMA – XTC, X, Uppers, Disco Biscuit, Beans, Adam.
- PCP
- SNRIs
- SSRIs
- Tramadol

Assessment

- Illicit drug induced hyperthermia is associated with a spectrum of symptoms including agitation, dehydration, loss of behavioural control, adrenaline / noradrenaline and dopamine excess and serotonin excess.
- It can vary in its severity from mild through to life threatening.
  - **Mild:** tremor, tachycardia, anxiety, hyperreflexia, dilated pupils, dry mouth, flushed skin
  - **Moderate:** agitation, increased muscle tone, tachycardia, hyperthermia (< 39°C)
  - **Severe:** hyperthermia ≥ 39°C, muscle rigidity, seizures, confusion, severe agitation

- Clonus may be present, either inducible or sustained. Clonus is a type of involuntary rhythmic muscle contraction.

Management

- Consultation with **Victorian Poisons Information Centre** for complex presentations, diagnosis support or management advice.

Mild serotonin toxicity

- Monitor for deterioration, transport
- Reduce stimulus – calming environment

Moderate toxicity

Sedate

- Sedation with midazolam has two purposes:
  - Reduce physical activity associated with agitation, muscle tremor and clonus that contributes to dangerously increased body temperature.
  - Treat acute behavioural disturbance that threatens the safety of the patient and others at scene.
- Physical restraints should not be applied without sedation. The physical exertion involved in resisting restraint may cause further elevation of body temperature.
- Occasionally ketamine may be required for patients displaying severe agitation as per the Acute Behavioural Disturbance CPG. Ketamine does not treat serotonin toxicity. Midazolam should be administered once agitation is controlled. Combined therapies are likely to lead to the need for airway management and the need for escalation of care.
- Reducing environmental stimulation may assist in symptom management.

Cool

- Active and passive cooling is extremely important (e.g. air conditioning, removal of clothing including shoes and socks) to assist in reducing body temperature.
- Use cold IV fluids where IV hydration is indicated.

Hydrate

- Administer cold IV fluid where available.

Severe toxicity

- More severe serotonin toxicity with symptoms of progressive hyperthermia, rigidity and seizures is life-threatening. Sedation and rapid cooling are the care priorities. Intubation may be required to assist in cooling the patient or due to airway/ventilation/oxygenation compromise.
- Cool in an ice bath where available (e.g. music festivals) – this form of treatment is a priority

Co-presenting conditions

- Treat associated signs and symptoms in parallel to management in this CPG:
  - Inadequate perfusion: **CPG A0705 Shock**
  - Seizures: CPG **A0703** / **P0703** Seizures
  - Agitation: CPG **A0708** / **P0708** Acute Behavioural Disturbance
  - Nausea/vomiting: CPG **A0701** / **P0701** Nausea/Vomiting
  - Hypoglycaemia: CPG **A0702** / **P0702** Hypoglycaemia

References

- VPIC

Further Information

- Drug induced hyperthermia MAC paper

Envenomation CPG A0714

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.

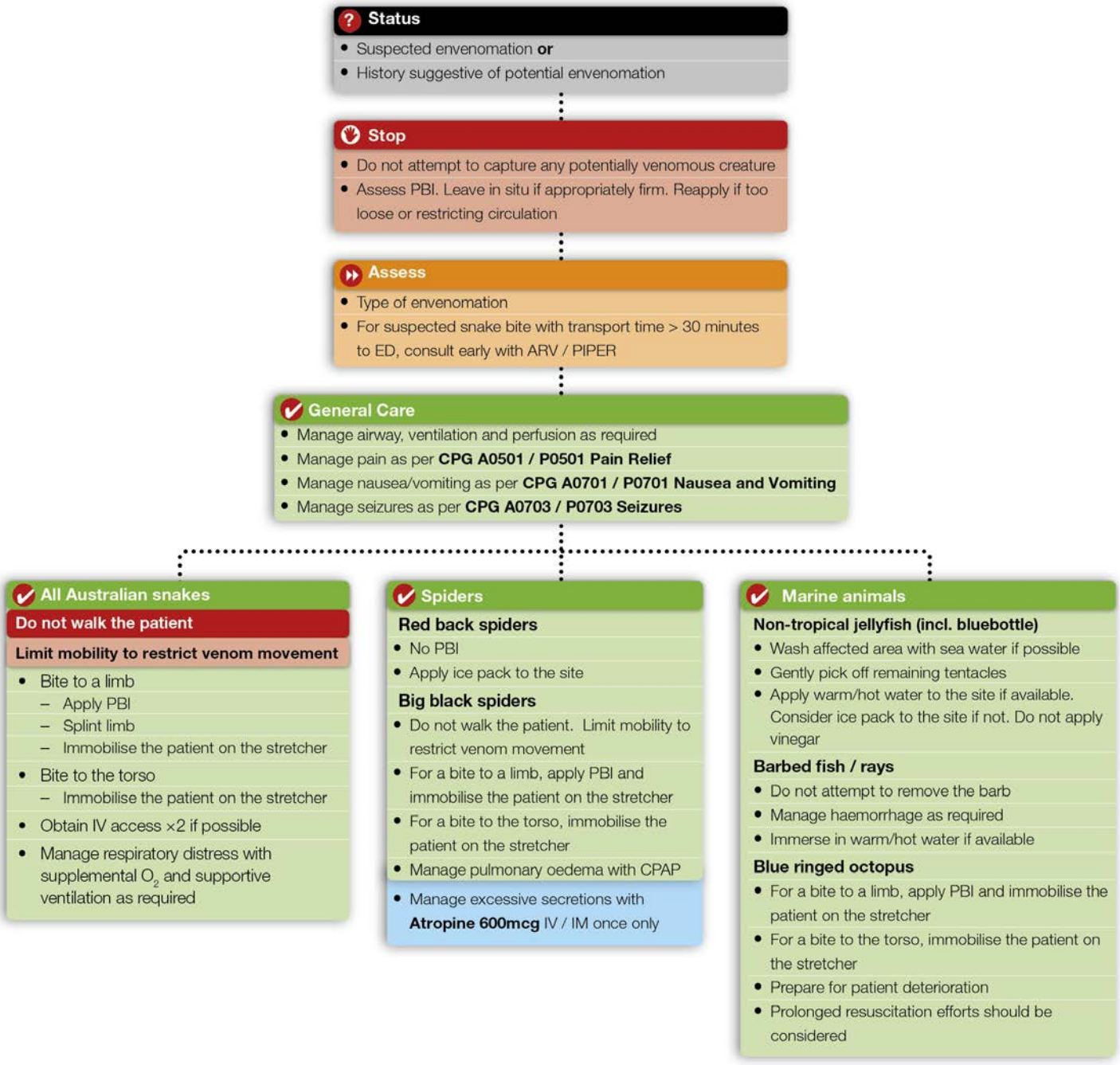
Paediatrics

- 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

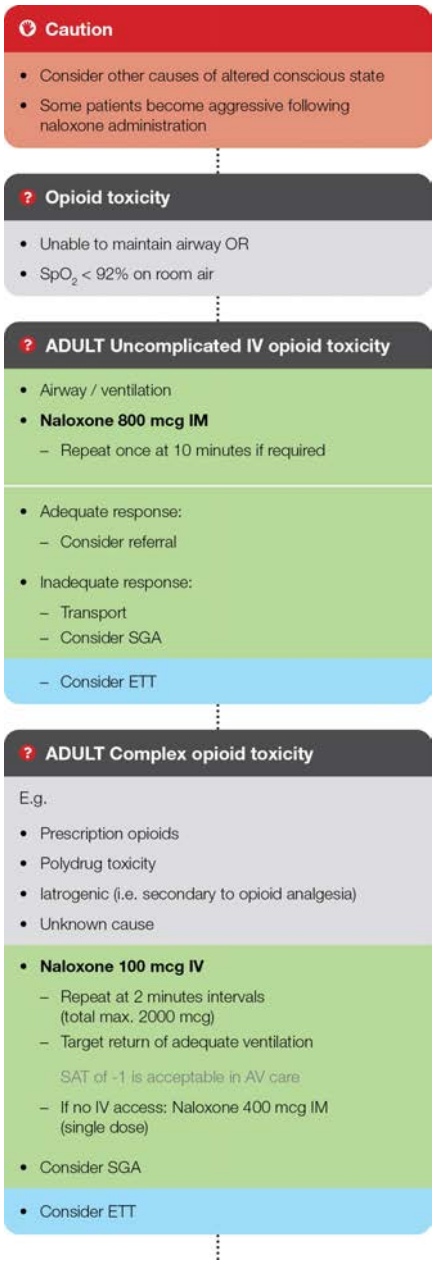
Flowchart



Related Resources

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

Flowchart


Caution
Consider other causes of altered conscious state
Some patients become aggressive following naloxone administration
Opioid toxicity
Unable to maintain airway OR
SpO2 < 92% on room air
ADULT Uncomplicated IV opioid toxicity
Airway / ventilation
Naloxone 800 mcg IM
Repeat once at 10 minutes if required
Adequate response:
Consider referral
Inadequate response:
Transport
Consider SGA
Consider ETT
ADULT Complex opioid toxicity
E.g.
Prescription opioids
Polydrug toxicity
Iatrogenic (i.e. secondary to opioid analgesia)
Unknown cause
Naloxone 100 mcg IV
Repeat at 2 minutes intervals (total max. 2000 mcg)
Target return of adequate ventilation
SAT of -1 is acceptable in AV care
If no IV access: Naloxone 400 mcg IM (single dose)
Consider SGA
Consider ETT

PAEDIATRIC patients

Opioid-naïve

- **Naloxone 10 mcg / kg IM** (max. 800 mcg)
  - Repeat once at 10 minutes if required
- **Naloxone 10 mcg / kg IV** (max. 100 mcg)
  - Repeat at 2 minutes intervals

Opioid-dependent

- **Naloxone 1 - 2 mcg / kg IM** (max. 100 mcg)
  - Repeat once at 10 minutes if required
- **Naloxone 1 - 2 mcg / kg IV** (max. 100 mcg)
  - Repeat at 2 minutes intervals

Transport

ANY of:

- Unable to maintain airway
- SpO_2 < 92% on room air
- Age < 16 **OR** > 65
- Suspected aspiration
- APO
- Incomplete response to two doses of naloxone
- Suspected opioid other than heroin including synthetic opioids
- Pregnancy

- Transport
- Monitor
  - Vital signs
  - SpO_2

  Nasal capnography may be used with borderline respiratory values

OR

Referral

ALL of:

- IV opioid only
- Normal vital signs including GCS 15
- SpO_2 ≥ 92% on room air
- Chest clear on auscultation
- Competent adult available to supervise for 4 hours

- Non-transport may be appropriate
- Supply intranasal naloxone to family / friends where community pack available
- Consider referral to drug support service
- Safety netting
  - Avoid other sedating agents e.g. alcohol, benzodiazepines
  - Local resources
  - Provide opioid health information sheet

Care Objective

- Airway patency and adequate ventilation

- Reverse opioid action sufficiently to permit adequate spontaneous respiration without causing opioid withdrawal

Intended patient group

- All patients with suspected opioid toxicity

Notes

Scene Safety

- Scene risks may include used uncapped sharps at scene or on the patient
- Complete a dynamic risk assessment
- Apply PPE
- Assess potential for a multi casualty event

Opioids

- Immediate, delayed and extended-release preparations exist.
- Toxicity is more likely when:
  - The patient is opioid naïve, elderly, or frail
  - A sedative is co-ingested
  - High-potency synthetic opioids are taken

Signs of opioid toxicity

- Respiratory depression (SpO_2 < 92% on room air) / apnoea
- Unable to maintain airway
- CNS depression (ranging from drowsiness to coma)
- Miosis
  - Common but not always present
  - Other substances that enlarge pupils (e.g. amphetamines) may have also been taken. Many non-opioid substances also cause miosis and may be mistaken for opioid poisoning.
- Prolonged QT interval (possible in methadone, oxycodone, loperamide)

Complications of opioid toxicity

- Aspiration pneumonitis
- Pressure injury / rhabdomyolysis
- Cardiac arrest due to prolonged hypoxia

Differential diagnosis

- Consider other causes of altered conscious state: i.e. AEIOUTIPS
  - **A** Alcohol / drug intoxication
  - **E** Epilepsy (post-ictal)
  - **I** Insulin or other metabolic cause – hypoglycaemia
  - **O** Overdose / oxygen (hypoxia)
  - **U** Underdose (including alcohol / drug withdrawal)
  - **T** Trauma (head trauma)
  - **I** Infection / sepsis
  - **P** Pain / psychiatric condition
  - **S** Stroke / TIA

Isolated heroin toxicity

- Rebound toxicity and other complications are less likely.
- If there is a complete reversal of opioid effects, many patients in this group may be able to be safely left with family, friends, or a carer with advice to:
  - Observe the patient for at least 4 hours
  - Administer take-home naloxone (if available) and call 000 if re-sedation occurs
- There may be a group of patients with opioid overdose who are 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.
- Risk of toxicity is increased where heroin is co-administered with a sedative (e.g. a benzodiazepine) or diphenhydramine (an antihistamine).

'Other opioid' toxicity

- Refers to forms of opioid toxicity other than from isolated IV opioid administration e.g.:
  - Prescription opioid use (e.g. oxycodone, morphine, codeine, transdermal fentanyl, buprenorphine, methadone)
  - Polydrug toxicity involving any opioid including heroin (e.g. fentanyl and methamphetamine)
  - Iatrogenic opioid toxicity (i.e. secondary to opioid analgesia)
  - Unknown cause of opioid toxicity (i.e. heroin not suspected)
- Rebound toxicity and other complications are rare, but possible, due to the relatively short half-life of naloxone compared to many opioids
- Smaller, titrated doses of naloxone are recommended in this group to manage respiratory depression and avoid acute opioid withdrawal

List of opioids commonly prescribed in Australia

Substance	Description	Prep	Duration	Relevant complications*
Tramadol • Tramal	Synthetic, weak opioid agonist	Capsules (immediate-release)	3 – 6 hours 12 hours	Seizure which may be delayed > 6 hrs post

• Zydol • Zaldiar • Tramedo		Tablets (extended-release)		ingestion and up to 24 hrs with slow-release preparation Nausea/vomiting, etc. Serotonin toxicity with co-ingestions of other serotonergic agents or MAOI
Oxycodone Trade name: • Endone • OxyNorm • Proladone	Opioid analgesic	Tablet (standard or sustained release) Capsule Liquid Suppository Solution for injection or infusion	3 - 4 hrs	Prolonged QT
Codeine Trade name: • Aspalgin • Mersyndol • Nurofen Plus • Painstop • Panadeine Forte NB. Available in combination with other agents such as paracetamol, aspirin, ibuprofen.	Opioid analgesic	Tablet – standard release Tablet – soluble Liquid Linctus	3 – 4 hrs	Nausea, vomiting.
Buprenorphine Trade name: • Norspan	Opioid partial agonist Toxicity may occur from ingestion of SL	Sublingual (film or tablet) Tablet Patches Solution for	Long acting	May require much larger naloxone doses.

• Suboxone • Sublocade	tablets or patches, application of multiple patches, or diversion for illicit IV use.	injection – modified release		
Hydromorphone Trade name: • Hydromorphone • Dilaudid	Opioid analgesic	Solution for injection Tablets Oral solution	2 – 4 hrs	Nausea, vomiting.
Methadone Trade name: • Biodone Forte • Physeptone	Opioid analgesic	Liquid / syrup Tablet Solution for injection	8–24 hrs (chronic dosing)	Nausea, vomiting. Prolonged QT.
Morphine Trade name: • Anamorph • Kapanol • MS Contin	Opioid analgesic	Solution for injection Tablet / capsules – standard and modified release Suspension	Varies considerably depending on route and presentation	Nausea, vomiting.
Loperamide Trade names: • Imodium • Harmonise • Stop-it • Gastrex	Opioid antidiarrhoeal	Tablet Capsule	4 hrs	QT interval prolongation, torsades de pointes, ventricular arrhythmias, cardiac arrest
Fentanyl Trade names: • Abstral	Opioid analgesic	Solution for injection (SC, IV, IM, IN) Tablet	Varies considerably depending on route and presentation	Nausea, vomiting.

• Fentora • Actiq • Denpax • Durogesic • Fenpatch		(ODT, sublingual) Suspension Lozenge Patch		
Tapentadol	stronger opioid, reduces norepinephrine reuptake	tablet	4 - 6 hrs; 12 hrs with slow-release preparation	Toxic dose is poorly defined and children more susceptible Seizure which may be delayed > 6 hrs post ingestion and up to 24 hrs with slow-release preparation Nausea/vomiting Serotonin toxicity with co-ingestions of other serotonergic agents or MAOI

Synthetic opioids

- May require higher doses of naloxone
- May be at greater risk of rebound toxicity depending on duration of action
- Fentanyl analogues may be particularly potent

Naloxone

Prior administered doses

- Where naloxone has already been administered (e.g. injecting rooms, patient's own prescription – IM/IN), administer further naloxone up to prescribed AV dose.

Patient responsiveness to naloxone

- Variable depending on amount and type taken, and existing tolerance.
- Other factors include pre-existing hypercapnoea, concurrent sedative use, and presence of hypoxic brain injury
- The patient's respiratory depression may return following naloxone if they have taken a long-acting opioid or an illicit high-potency synthetic opioid. Consult VPIC via the AV Clinician in these cases.

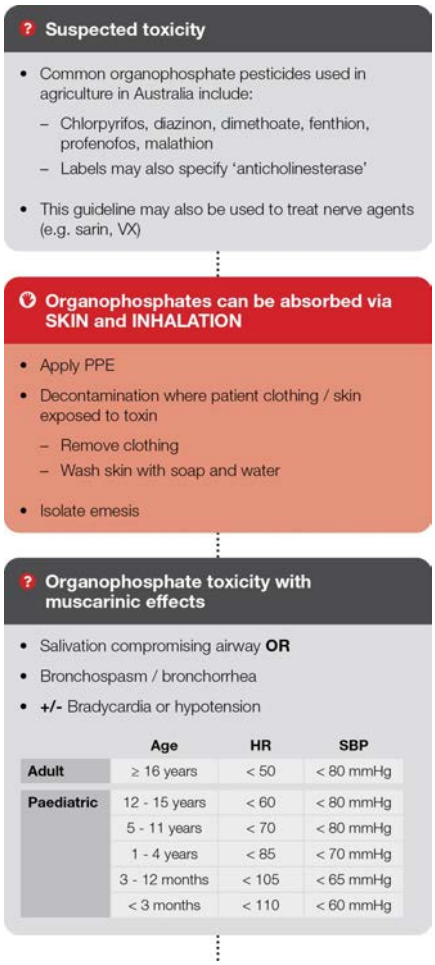
Paediatrics

- Case types of paediatric opioid toxicity include accidental overdosing (e.g. carer forgetting first dose or not telling partner of the dose given) or dose confusion with multiple medicines.
- Some cases of opioid toxicity include paediatric patients accessing adult preparations which are not appropriately stored e.g. codeine, buprenorphine, methadone.
- A single tablet or a small quantity of a liquid opioid preparation (methadone, oxycodone) from an adult preparation ingested by a child can lead to toxic effects.

Further Information

- Opioid Toxicity MAC paper

Flowchart


Suspected toxicity
Common organophosphate pesticides used in agriculture in Australia include:
– Chlorpyrifos, diazinon, dimethoate, fenthion, profenofos, malathion
– Labels may also specify 'anticholinesterase'
This guideline may also be used to treat nerve agents (e.g. sarin, VX)
Organophosphates can be absorbed via SKIN and INHALATION
Apply PPE
Decontamination where patient clothing / skin exposed to toxin
– Remove clothing
– Wash skin with soap and water
Isolate emesis
Organophosphate toxicity with muscarinic effects
Salivation compromising airway OR
Bronchospasm / bronchorrhea
+/- Bradycardia or hypotension
Age HR SBP
Adult ≥ 16 years < 50 < 80 mmHg
Paediatric 12 - 15 years < 60 < 80 mmHg
5 - 11 years < 70 < 80 mmHg
1 - 4 years < 85 < 70 mmHg
3 - 12 months < 105 < 65 mmHg
< 3 months < 110 < 60 mmHg

First line

- Escalate care / request MICA
  Consider early consultation with VPIC via AV Clinician
- Request further atropine supply

Adult

- IV access

- **Atropine 1200 mcg IV**
  - Repeat double the previous dose at 5-minute intervals
  - Target clear chest, no wheeze, HR > 80, BP > 80

Paediatric

- **Atropine 50 mcg / kg IV** (max. 1200 mcg)
  - Repeat double the previous dose at 5-minute intervals
  - Target SBP / HR and clear chest with no wheeze:

Age	Target HR	Target SBP
12 - 15 years	> 60	> 80 mmHg
5 - 11 years	> 70	> 80 mmHg
1 - 4 years	> 85	> 70 mmHg
3 - 12 months	> 105	> 65 mmHg
< 3 months	> 110	> 60 mmHg

- Inadequate response: Consult VPIC via the AV Clinician
- Consider ETT as per CPG A0302 / P0301

? Other care

Seizures

- As per Seizures CPG A0703 / P0703

Shock

Adult

- **Normal Saline IV** As per Shock CPG A0705

- Metaraminol, noradrenaline and adrenaline as per Shock CPG A0705 if hypotension persists

Paediatric

- **Normal Saline 10mL / kg IV**
  - Repeat if inadequate perfusion

- Consult VPIC via AV Clinician

Care Objectives

- Recognise organophosphate toxicity / cholinergic toxidrome
- Ensure scene safety and provide decontamination where required
- Administer atropine and ensure sufficient supply

Notes

Intended patient group

- All patients with suspected organophosphate toxicity

Scene Safety

- Complete a dynamic risk assessment
- Apply PPE
- Consider the potential of the event being a deliberate act
- Assess potential for a multi casualty event.

Pathophysiology

- Organophosphate compounds inhibit the enzyme acetylcholinesterase, increasing the level of the neurotransmitter acetylcholine in the body, leading to a cholinergic toxidrome.

Cholinergic toxidrome

- Nicotinic effects: Tachycardia, hypertension, muscle fasciculations, muscle weakness, paralysis.
- Muscarinic effects: SLUDGE (salivation, lacrimation, urination, defecation, GI distress, and emesis), bronchorrhea (excessive bronchial secretions), bronchospasm, bradycardia, hypotension, miosis, diaphoresis.
- CNS effects: Confusion, agitation, seizures, coma.

Management

General management of organophosphate poisoning includes resuscitation and antidote therapy with atropine.

Decontamination

- If patient clothing is exposed to the agent, remove contaminated clothing and place into a plastic bag.
- Wash contaminated skin with soap and water if possible.
- Isolate emesis in a clinical waste bag.
- Ensure adequate environmental ventilation if possible.
- If the smell of an agent is identified from a patient, it usually indicates a solvent and does not represent a risk of secondary organophosphate poisoning.

Antidote – Atropine

- Indicated when any muscarinic effects of cholinergic toxidrome are present
- Atropine IV every 5 minutes. Double previous dose every 5 minutes.

e.g. 1200 mcg, 2400 mcg, 4800 mcg, etc. Large doses may be required (up to 25 mg).

- Paediatric patients: same approach e.g. 50 mcg/kg, 100 mcg/kg, 200 mcg/kg etc.

- Request support early to source further Atropine supply.
- Consult with VPIC via AV Clinician if inadequate response – larger doses may be required.
- An atropine infusion is usually required following adequate atropinisation at a dose of 10 - 20% of total atropine used, per hour. Consult VPIC via the AV Clinician to establish appropriate infusion regimen.

Antidote - Other

- Pralidoxime or Obidoxime may be available in some locations. Not routinely used. Consult VPIC.

Airway

- Monitor closely. If symptoms deteriorate beyond mild, ETT will be required.
- Administer atropine prior to intubation.

Inadequate Perfusion

- Administer IV fluid concurrently with atropine.
- Vasopressors as per **CPG A0705 Shock**.

Seizures

- Ensure adequate atropinisation and oxygenation.
- If seizures persistent or recurrent, treat as per CPG **A0703** / **P0703** Seizures.

Disposition

- All patients with organophosphate exposure require transport to an emergency department.

References

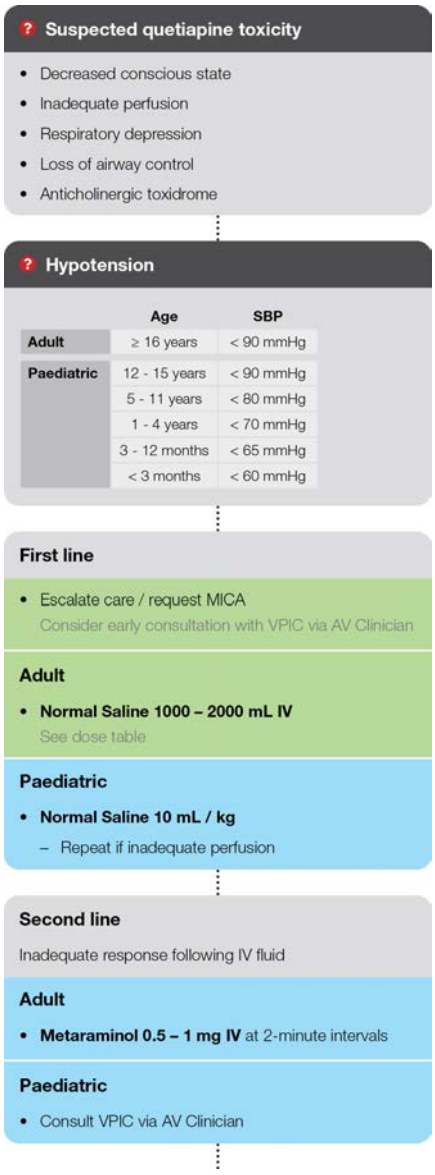
1. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2493390/

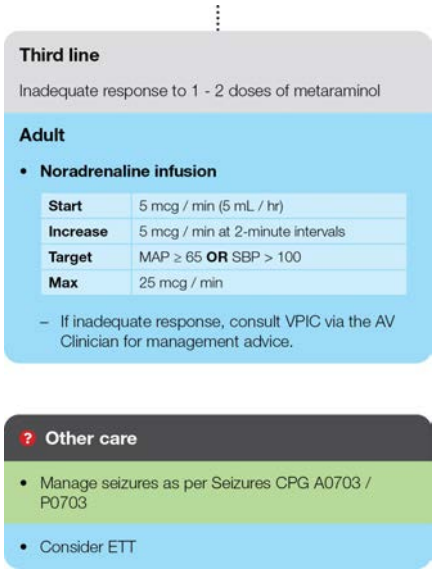
Further Information

- Organophosphate MAC paper

Quetiapine Toxicity CPG A0721

Flowchart





Normal Saline Dose (adult)

Risk of fluid overload	All other patients
• Cardiac failure • Elderly	
• Titrate to response – **Max. 1000 mL**	• Titrate to response – **Max. 2000 mL**

Care Objectives

- Airway management
- Management of inadequate perfusion

Intended patient group

- Patients with suspected quetiapine toxicity.

Notes

Pathophysiology

- Quetiapine is a second-generation antipsychotic medication prescribed in Australia for the treatment of schizophrenia and bipolar disorder but also commonly used for anxiety. It has anticholinergic properties and may cause CNS depression and cardiovascular instability in large doses.
- Quetiapine is available as an immediate-release and extended-release (XR) preparation.
- The most common brand of quetiapine in Australia is Seroquel.
- Other brands include: Kaptan, Quetia, Syquet, Quepine XR, Quetia XR, Tevatiapine XR

Assessment

Toxicity and risk assessment

- Clinical toxicity is dose dependent
- **Onset of symptoms:** within 4 hours for standard release and up to 12 hours following modified release exposure
- **Adult:** Exposures > 3 grams are associated with a greater risk of severe CNS depression and hypotension but this can occur at lower doses particularly in naïve patients
- **Paediatric:** Exposures > 100 mg may be associated with severe toxicity
- Coma may last > 72 hours following large ingestions

Clinical features

- CVS: tachycardia, peripheral vasodilation/hypotension
- CNS: sedation ranging from drowsiness to coma; seizures (rare)
- Resp: respiratory depression and/or loss of airway protection from CNS depression
- Anticholinergic effects – in particular delirium and urinary retention

Management

- Supportive care is the mainstay of management.
- Escalate care and notify receiving hospital early where toxic doses have been ingested, even when symptoms may not (yet) be severe.

Inadequate perfusion

- IV fluids are first line.
- Metaraminol or noradrenaline can be used as first-line vasopressors if hypotension persists.
- Adrenaline is listed as a precaution as it may worsen hypotension due to possible β-receptor mediated vasodilation and should only be considered in consultation with VPIC when other therapies have been unsuccessful.

- If the patient deteriorates into cardiac arrest, administer adrenaline as per **CPG A0201-1 Medical Cardiac Arrest**.
- See **CPG A0705 Shock** for complete details of management regime.
- Consult AV Medical Advisor and VPIC via the AV Clinician for paediatric patients with poor perfusion.

Seizures

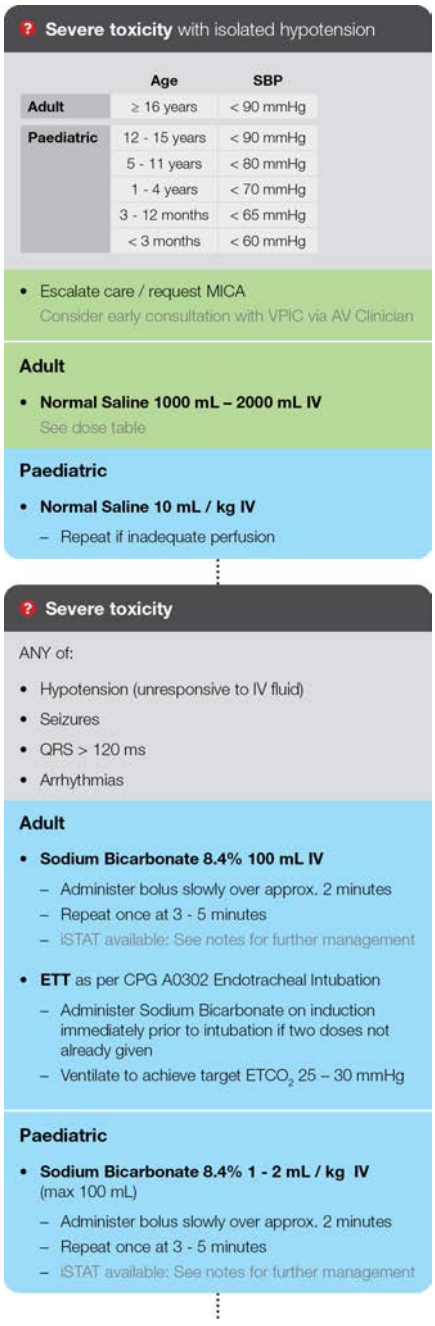
- Usually self-limiting
- Manage as per CPG **A0703** / **P0703** Seizures

Further Information

- Quetiapine MAC paper

Tricyclic Antidepressant Toxicity CPG A0723

Flowchart



Shock persists

Second line

Inadequate response following IV fluid **AND** sodium bicarbonate

Adult

- **Metaraminol 0.5 mg IV** at 2-minute intervals

Paediatric

- Consult VPIC via AV Clinician

Third line

Inadequate response to 1 - 2 doses of metaraminol

Adult

- **Noradrenaline infusion**

Start	5 mcg / min (5 mL / hr)
Increase	5 mcg / min at 2-minute intervals
Target	MAP ≥ 65 **OR** SBP > 100
Max	25 mcg / min

Fourth line

Inadequate response to noradrenaline

Adult

- **Adrenaline infusion**

Start	5 mcg / min (5 mL / hr)
Increase	5 mcg / min at 2-minute intervals
Target	MAP ≥ 65 **OR** SBP > 100
Max	25 mcg / min

If syringe pump unavailable:

- **Adrenaline 10 - 20 mcg IV** at 2 minutes intervals
- If inadequate response consult VPIC via the AV Clinician for management advice.

Other care

Seizures

- As per Seizures CPG A0703 / P0703

Normal Saline Dose (adult)

Risk of fluid overload	All other patients
• Cardiac failure • Elderly	
• Titrate to response – **Max. 1000 mL**	• Titrate to response – **Max. 2000 mL**

Care Objectives

- Management of tricyclic antidepressant (TCA) toxicity with Sodium Bicarbonate.
- Supportive management of airway, perfusion, and seizures.

Notes

Intended Patient Group

- All patients with suspected TCA toxicity

Pathophysiology

- TCAs are commonly prescribed for depression but have other uses such as pain management and migraine prophylaxis. TCAs block cardiac sodium channels leading to QRS interval prolongation. The toxic effects are caused by several actions:
  - Sodium channel blockade leading to myocardial dysfunction and dysrhythmias
  - Alpha adrenergic blocking leading to hypotension
  - Anti-cholinergic effects

Assessment

Presentation

- Amitriptyline is the most prescribed TCA.

Other presentations

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

Toxicity and risk assessment

- Clinical toxicity is dose dependent.
- Ingestions > 10 mg/kg are potentially toxic with severe toxicity occurring at doses of > 20 mg/kg.
- In small children, tricyclic antidepressants can be lethal with ingestions of only a few tablets.
- Onset of clinical symptoms is within 30-90 minutes.

Clinical Features

- Coma, seizures, and cardiovascular compromise occur rapidly and are the hallmark of serious TCA toxicity

Mild – Moderate Toxicity

- CNS: Sedation
- CVS: Tachycardia
- Anticholinergic toxidrome: sedation, mydriasis, warm dry skin, dry mouth, urinary retention, delirium, agitation

Severe Toxicity

- **CNS:** Rapid sedation leading to coma, seizures
- **CVS:**
  - Early: QRS widening and tachycardia. The wider the QRS interval, the greater the risk of ventricular dysrhythmias and seizures.
  - Late or in large overdose: progressive QRS widening and bradycardia, ventricular arrhythmias, hypotension
- **Resp:** Respiratory depression and / or loss of airway protection secondary to coma
- Metabolic acidosis

Management

Antidote

- A total of two doses of Sodium Bicarbonate is permitted. Consult for further management if patient remains symptomatic. Where pH can be measured, further doses may be initiated.
- **iSTAT available:** Sodium Bicarbonate 8.4% 1 – 2 mL/kg up to 100 mL (1 – 2 mmol/kg up to 100 mmol) IV, every 3 – 5 min, to maximum total dose 6 mmol/kg (6 mL/kg of 8.4% sodium bicarbonate) and gently hyperventilate patient (aim for pCO2 30–35) until pH target range of 7.50–7.55 is reached on blood gases.
- QT prolongation is not clinically significant and is not an indication for Sodium Bicarbonate.

Airway

- Consider ETT as per CPG **A0302** / **P0301** where patient is unable to support own airway and signs of severe toxicity persist despite management.

- Sodium Bicarbonate 8.4% 100 mL (1 - 2 mL/kg for paediatrics, 100 mL max) IV should be given over 2 minutes just prior to intubation to limit acidosis if two doses not already given.
- Metabolic acidosis worsens TCA toxicity. In patients with severe TCA toxicity who are intubated and ventilated, hyperventilation with a $ETCO_2$ target of 25 - 30 mmHg is recommended.

Seizure control

- Usually self-limiting.
- Manage as per CPG **A0703** / **P0703** Seizures AND administer Sodium Bicarbonate 8.4% 100 mL IV over 2 minutes to limit seizure-induced acidosis.
- Prepare for intubation.

Cardiac arrest

- For witnessed cardiac arrest, mechanical CPR to closest emergency department is likely to be needed. A facility with ECMO capability should be chosen in preference if travel times are similar. Consult VPIC / ARV via the AV Clinician for complex logistical and clinical situations.

IV access

- See **CPG A0705 Shock** for the appropriate precautions related to IV access for the patient receiving vasopressor management.

Inadequate perfusion

- IV Normal Saline concurrently with Sodium Bicarbonate (maximum total dose of 6 mmol/kg).
- Metaraminol and / or Noradrenaline if inadequate perfusion persists (adult patients only).
- Amiodarone is contraindicated to manage arrhythmias in TCA toxicity.
- Consult with VPIC via the AV Clinician for vasopressor approach for patients aged < 16.

Normal saline

- Reassess the patient following approximately 500 - 1000 mL of normal saline or earlier if the patient is profoundly hypotensive or deteriorating.
  - Improvement: consider further fluid
  - Inadequate response / deterioration: consider metaraminol AND further fluid
- Continue administering normal saline up to the maximum dose if required in parallel to the escalation of vasopressor / inotropes.

Metaraminol

- There is no requirement to wait for a particular volume of fluid to be infused prior to administering metaraminol. See **CPG A0705 Shock**.
- Metaraminol boluses may be continued if there is a delay to noradrenaline infusion or adequate infusion pumps are not available.

Noradrenaline

- **Do not bolus noradrenaline** under any circumstance.

Adrenaline

- Adrenaline is indicated as a third line vasopressor/inotrope where the patient remains hypotensive despite IV fluid, sodium bicarbonate (2 doses), metaraminol and noradrenaline management. See **CPG A0705 Shock**.

Further Information

- TCA MAC paper

Care Objectives

A paediatric patient is defined as any patient with an age < 16 years (i.e. up to and including 15 years), for the purpose of assessment and management under these guidelines.

General Notes

- In the majority of guidelines, the separation between adult and paediatric management is defined by the age threshold of < 16 years. There are limited exceptions to this, outlined in table 1.

Table 1: Summary of age thresholds

Age	← 10	11	12	13	14	15	16	17	18 →
Most CPGs / CPPs	Paediatric CPGs / CPPs						Adult CPGs / CPPs		
Airway CPGs	Paediatric Airway / ETT CPGs		Adult Airway / ETT CPGs						
Emergency Department	Paediatric						Adult		
Major Trauma Destination	Royal Children's Hospital						RMH / Alfred		

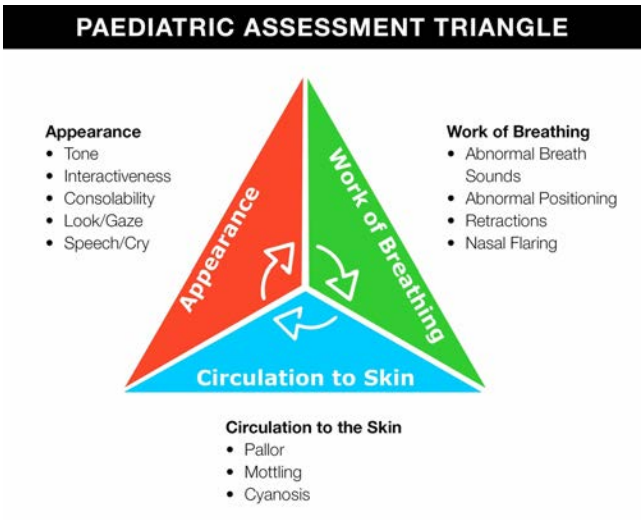
- Paediatric drug doses are calculated by weight to adjust for anatomical and physiological changes in a developing child.
- For specific management of the newborn, refer to appropriate newborn guidelines.
- Caregiver level of concern is a valid symptom when assessing a child and it should not be discounted. 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, consult the AV 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 or pain insufficiently managed by a palliative care program. The following adult CPGs contain information relevant to these patients and may be

applied to paediatric patients following consultation with AV Clinician:

- **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.



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 Paper - Paediatric Age Realignment 2023.pdf

Age and Weight Definitions CPG P0101-1

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
Adolescent	12 - 15 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
12 - 15 years	Estimate based on patient size

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
Adolescent (12-15 yrs)	60 - 120 bpm	>90 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: https://education-hub.rch.org.au/education-programs-and-resources/victor/

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 (↓ air entry = ↑ 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: https://education-hub.rch.org.au/education-programs-and-resources/victor/

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
Adolescent (12-15 yrs)	14 - 26 breaths/minute

Abnormal Medical Values

Repiratory 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

Pain Assessment CPG P0101-5

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,	Squirming, shifting back and forth, tense	Arched, rigid or jerking

	moves easily		
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

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.

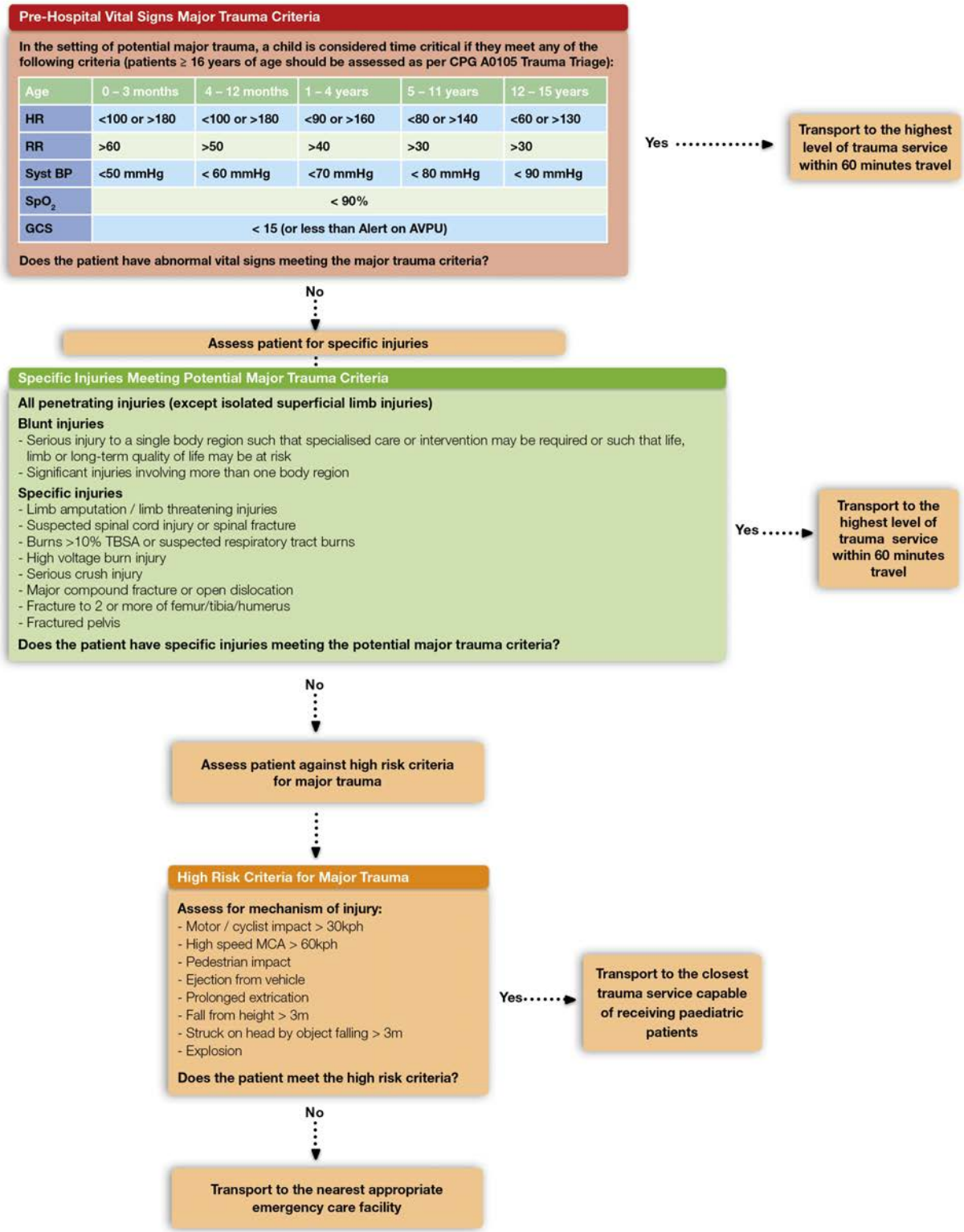
Verbal Numerical Scale

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.

Time Critical Guidelines (Trauma Triage)

CPG P0105

Flowchart



Clinical Flags / Patient Safety CPG P0108

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 < 16 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 to an ED in most circumstances. Exceptions include:
  - **Virtual emergency department:** For patients who are otherwise eligible, VED Ambulance Referral may be appropriate if the patient presents with borderline abnormal vital signs. Paediatric patients must be reviewed by a VED paediatric emergency physician. VED is not appropriate for patients with red flag specific conditions.
  - **Transient or treatable vital signs:** 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.
  - **Paramedic judgement or patient refusal:** Contact the AV Clinician prior to leaving the scene to discuss the case. This may include them speaking with the patient.
- 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.
- **Clinician concern:** 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.
- **MICA:** 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.

Yellow Flags

- Mandate medical review within two hours if transport is not required. Options include:
  - VED Ambulance referral
  - Emergency department self-presentation
  - GP (if an appointment can be made within the required timeframe)
  - 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).

Small infants

- Where no other red or yellow flags are met and paramedics are considering non-transport:
  - ≤ **28 days old:** Consultation with VVED is mandatory for all patients if considering non-transport
  - **29 days - 3 months old:** Consultation with VVED is strongly recommended, especially for premature infants
  - **Homebirths:** VVED is not mandatory in cases of homebirth where the birth is associated with a hospital health service; where AV is called but birth is uncomplicated, and AV staff, midwives and the patient all agree transport is not required. If the midwives have left the scene, and AV

is subsequently called, VVED should be contacted.

More information

The principle underlying this recommendation is that young infants present special challenges in assessment and risk stratification. Risk is highest in the youngest patients. The presentation of life-threatening conditions can be extremely subtle in some cases. In most health services across Victoria, decisions regarding the discharge of young infants from emergency departments is limited to senior physicians with expertise in their assessment.

These recommendations mirror that principle.

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
Adolescent (12 - 15 years)	< 60 or > 120	< 14 or > 26	< 90

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

- **GCS** < 15 or not alert (as per AVPU)
- **SpO_2** < 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

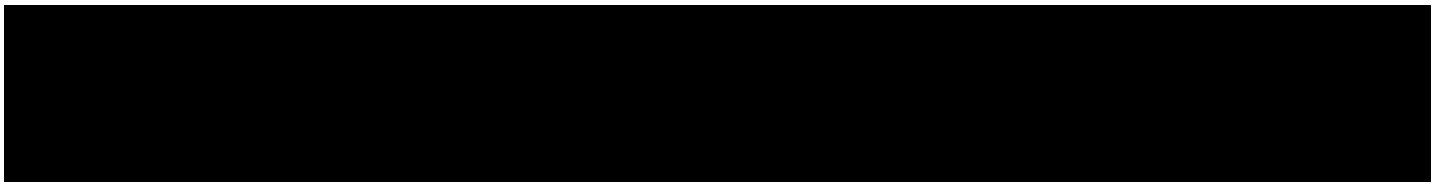
Specific Conditions:

- Febrile > 38°C in small infant (< 3 months old)
- Stridor
  Intermittent stridor is not considered a clinical red flag in the context of mild/moderate croup treated

with dexamethasone and meeting criteria for self-care/VVED as per the Croup guideline

- 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. For some patients with borderline red flag vital signs, non-transport may be appropriate following VED Ambulance referral.**



- 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 (if VED is not available or appropriate)

"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.

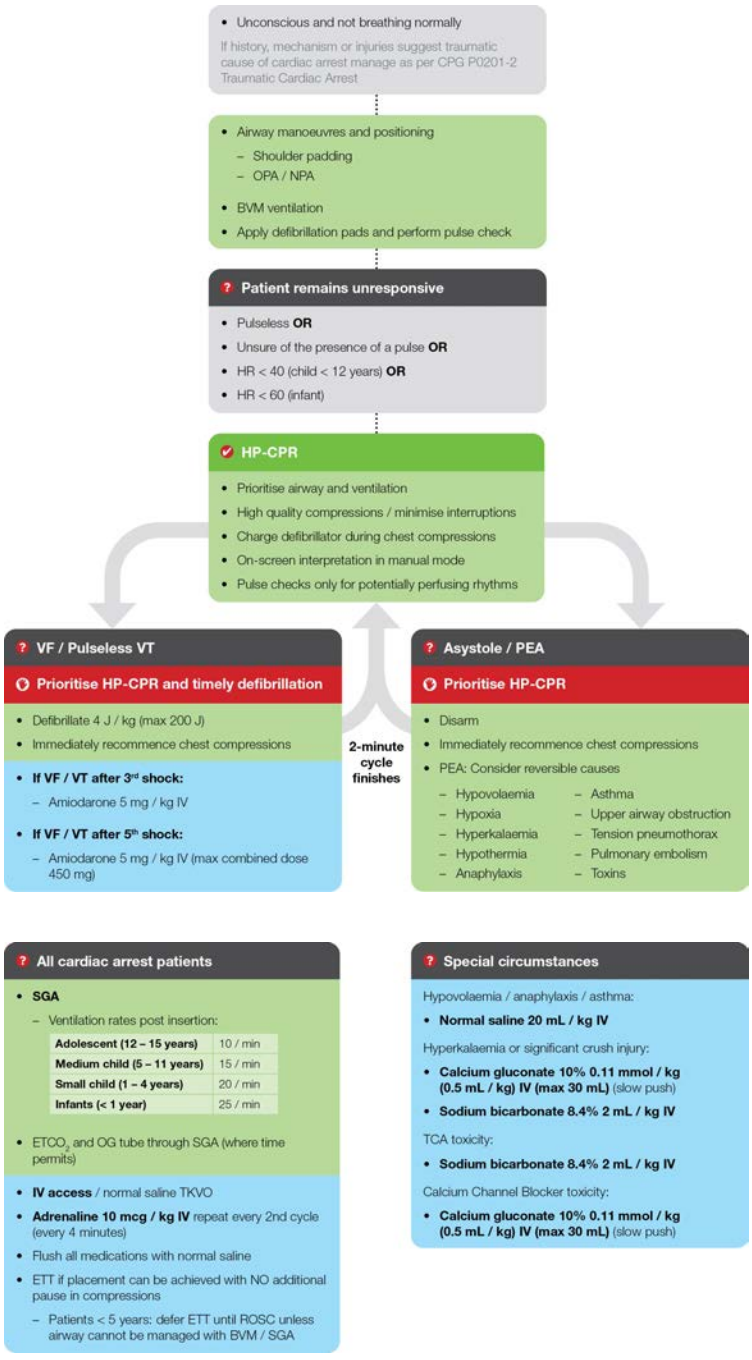
No flag criteria met

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

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC250414_Mandatory Disposition for Young Infants.pdf

Flowchart



Care Objectives

- Prioritise effective airway control and adequate ventilation and oxygenation
- High quality chest compressions with minimal interruptions
- Rapid defibrillation of VF / Pulseless VT (if in doubt, shock)
- Advanced care (e.g. adrenaline, antiarrhythmics, intubation) where it does not interrupt high-quality

compressions / defibrillation

- Address correctable causes where possible

Intended patient group

- Patients < 16 years of age in cardiac arrest (excluding newborns)

Assessment

- **If any doubt exists as to the presence of a pulse** where the patient is unconscious and not breathing normally, chest compressions must be commenced.
- **Trauma vs medical cause:** If the history, mechanism or pattern of injury are strongly suggestive of a traumatic cause of arrest, treat as per **CPG P0201-2 Traumatic Cardiac Arrest**. If there is any doubt as to the cause of the arrest, default to using the Medical Cardiac Arrest CPG.
- Carotid pulse checks are only required for a potentially perfusing rhythm (e.g. the presence of QRS complexes which may be accompanied by a rise in $ETCO_2$).
- Where clear signs of prolonged cardiac arrest are present, or continued resuscitation may be futile, consider **CPG P0203 Withholding or Ceasing Resuscitation**.

Capnography

- **$ETCO_2$** can be used as a surrogate marker of cardiac output and therefore, compression quality. It may approach physiological values with high-quality CPR.
- **A gradual fall** in $ETCO_2$ suggests CPR fatigue.
- **A sudden rise** in $ETCO_2$ suggests ROSC.

Management

Airway / Ventilation

- Position airway, insert OPA / NPA if required, commence BVM ventilation and then apply defibrillation pads.
  - Airway positioning appropriate for patient's age as per **CWI/OPS/190 Airway Manoeuvres & Positioning**.
- Cardiac arrest in children and infants is most commonly due to respiratory (e.g. hypoxia) or circulatory (e.g. hypovolaemia) causes. Cardiac arrest following a respiratory arrest may be corrected with ventilation prior to commencing chest compressions.

More information

The epidemiology of cardiac arrest in paediatric patients varies depending on patient age. Asystole and PEA are the most common initial rhythms in the vast majority of cardiac arrests in paediatric patients of all ages. Shockable rhythms do occur more commonly in older children however and may be due to cardiac causes such as congenital heart conditions, long QT syndrome or cardiomyopathy.

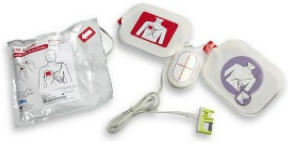
- An **SGA** is an appropriate option to manage the airway initially and to facilitate continuous compressions. When **ETT** is attempted, it should not interrupt compressions.
- In patients < 5 years of age:
  - Defer intubation during cardiac arrest until ROSC unless the airway cannot be adequately managed with a BVM or SGA alone.
  - Prioritise management with a BVM or SGA until ROSC is achieved.

Vascular access

- Proceed directly to IO access if IV access cannot be achieved within 60 seconds.
- **Fluid administration** in shockable rhythms may be detrimental and should be limited to medication flush and TKVO only.

Defibrillation pads

- The Zoll branded Pedi-padz defibrillation pads are designed for patients aged 8 years and younger (< 25 kg).

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Adult
< 25 kg									≥ 25 kg							
Paediatric Pads									Adult Feedback Pads							
																

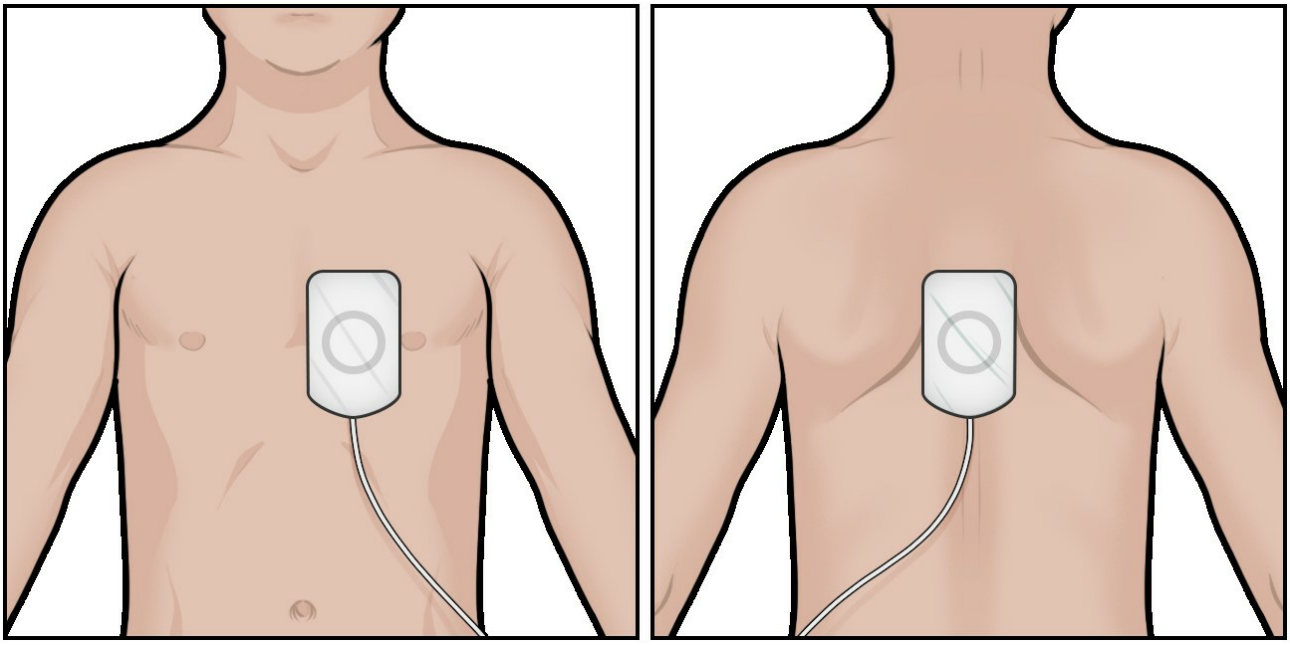
Pad position

- Use the **anterior / lateral** position when applying **adult** pads
- Use the **anterior / posterior** position when applying **paediatric** pads

More information

Anterior posterior placement (paediatric):

- The anterior pad is placed mid-chest immediately left to the sternum
- The posterior pad is placed in the middle of the back between the scapulae



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 ≤ 3 seconds**
  - Focus on team performance and communication
  - Charge defibrillator during compressions
  - On-screen rhythm interpretation
  - Hover hands over chest and resume compressions immediately after defibrillation or disarm
- **Utilise Team Leader and checklist**
- Pause CPR briefly to interpret the rhythm before delivering a shock. A decision to defibrillate should not be made on the basis of 'See-Thru CPR' as it is often misleading.
- Defibrillation using shock advisory mode is not compatible with high-performance CPR and should not be combined.

Compression technique

Infant

- Two rescuers: Two-thumb technique
  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 to minimise transition time between compressions and ventilations.

Small child

- One-hand technique

Medium child, adolescent

- Two-hand technique (as for adults)

Compression / Ventilation ratios

No ETT / SGA in situ	• 15 compressions : 2 ventilations (two rescuers) • 30 compressions : 2 ventilations (single rescuer) • **Pause for ventilations**
ETT / SGA in situ	• Infants: 25 ventilations / min • Small child: 20 ventilations / min • Medium child: 15 ventilations / min • Adolescent: 10 ventilations / min • **No pause for ventilations**

Antiarrhythmics

- HP-CPR should always be prioritised over medication administration. Antiarrhythmics should not be considered until there are sufficient resources to continue uninterrupted HP-CPR in parallel to medication administration.
- Antiarrhythmics should be administered for VF / VT refractory to 3 shocks including shocks delivered prior to AV arrival.

Consultation

- Consider consultation with the AV Medical Advisor via the AV Clinician once initial management has

been provided. This may include advice around:

- Complex patients
- Management of reversible causes
- Cessation of resuscitation
- Cases suitable for prolonged resuscitation

Mechanical CPR (mCPR)

- The Corpuls mCPR device may be applied to patients aged ≥ 8 years.
  - The long stamp should be used routinely in paediatric patients.
  - Assess position of the stamp on the chest at each rhythm check. Small children are more likely to move under the device and be at risk of organ injury.
- mCPR should not be used routinely in paediatric patients except for transport in consultation with AV Medical Advisor via the AV Clinician.

Transport

- Continue adrenaline 10 mcg / kg IV every 4 minutes
- Perform rhythm check every 2 minutes. If a potentially perfusing rhythm is present, check for pulse. Do not stop vehicle for confirmation of shockable rhythm or pulse check.

More information

Artefact caused by movement of the ambulance could potentially be interpreted as VF, leading to defibrillation that is not indicated.

However, the risk of significantly delaying ECPR for all mCPR patients is greater than the low risk of an erroneous defibrillation (which is unlikely to lead to a worse outcome should it occur).

Exhaustion

- Consider mCPR as a last resort if:
  - Limited resources at scene (e.g. 1 - 2 staff)
  - All staff are extremely fatigued
  - There are no other options to provide effective HP-CPR with manual chest compressions
- mCPR should not routinely be applied to patients outside of these circumstances. It should never be applied to facilitate other interventions such as IV access.

Special Circumstances

Cardiac arrest secondary to hypothermia < 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.
- ROSC is unlikely to be achieved if more than 3 shocks are required while the patient remains severely hypothermic - consider AAV or 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. Consult the AV Medical Advisor via the AV Clinician for management advice.

Tension pneumothorax

- Where tension pneumothorax is considered to be the cause of cardiac arrest, in either medical or traumatic arrest, decompress the chest bilaterally.
- Chest decompression should not be routine in medical cardiac arrest.

Hyperkalaemia

- Indiscriminate use of calcium in cardiac arrest is associated with harm.[1]
- A hyperkalaemic cause of arrest should only be considered if:
  - The potassium level has been measured and is known to be elevated (>6 mmol/L) or
  - Hyperkalaemia is very strongly suspected (typically only patients with renal failure / dialysis or following a significant crush injury).
- Outside of these settings, the use of calcium will cause more harm than any benefit obtained.
- Flush with 10 mL normal saline between administration of calcium gluconate and sodium bicarbonate.

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

- Measure BGL after all other management is established. Manage hypoglycaemia as per **CPG A0702 Hypoglycaemia**.

More information

Hypoglycaemia in cardiac arrest is rare. However, BGL should be measured and hypoglycaemia treated. It is important that measurement of BGL does not interrupt other more important management in any way.

Related Resources

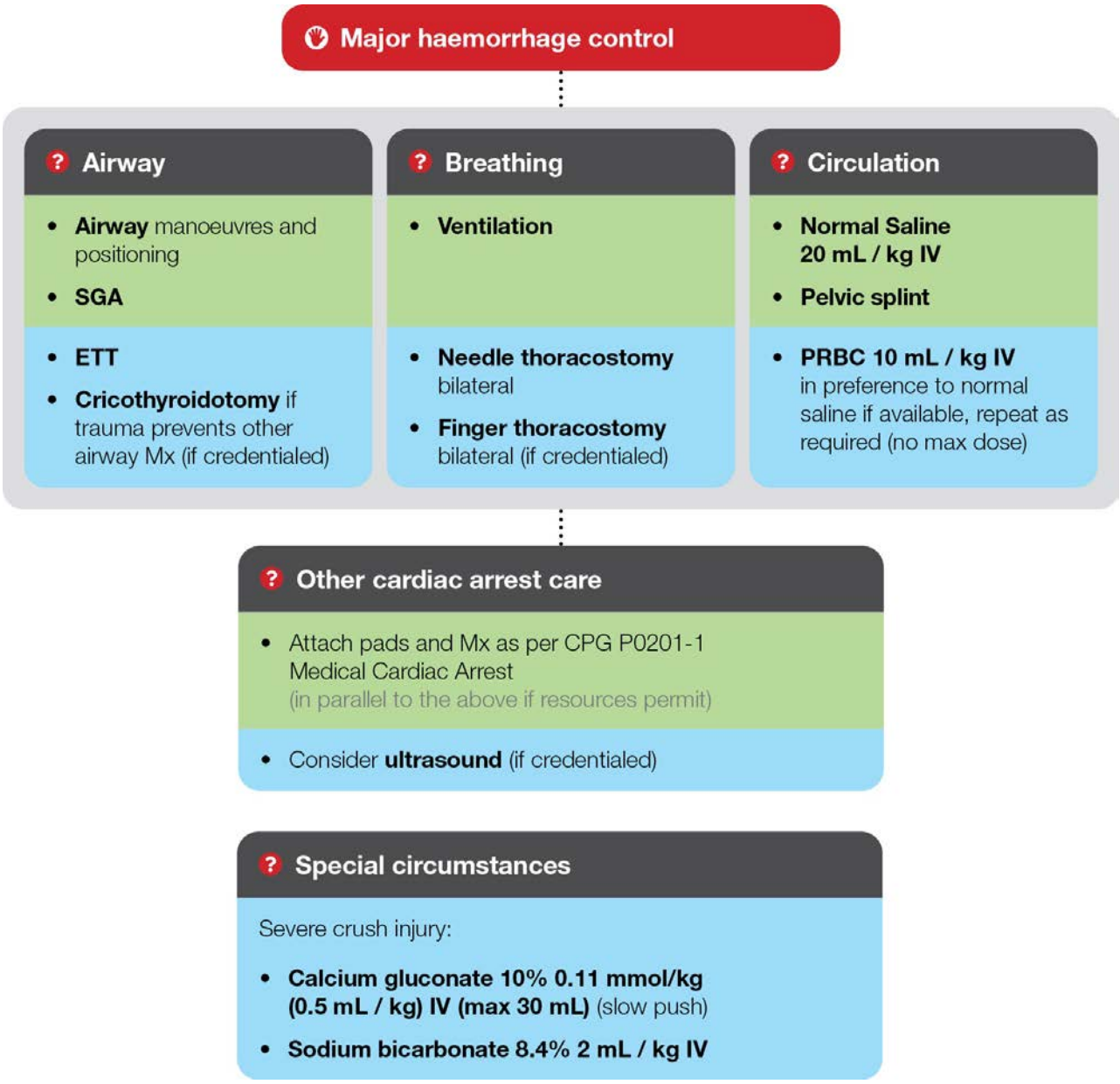
- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Medical Cardiac Arrest (Paed) 2024.pdf

References

1. Cashen K, Sutton RM, Reeder RW, Ahmed T, Bell MJ, Berg RA, et al. Calcium use during paediatric in-hospital cardiac arrest is associated with worse outcomes. Resuscitation. 2023;185:109673.

Traumatic Cardiac Arrest CPG P0201-2

Flowchart



Care Objectives

- Major haemorrhage control over all other interventions
- Management of correctable causes in order of clinical need:
  - Hypoxia
  - Tension pneumothorax
  - Hypovolaemia
- Standard cardiac arrest management concurrent to addressing correctable causes (if resources permit)

General Notes

Intended patient group

- Patients aged < 16 years in traumatic cardiac arrest
- **Consider medical cause** in cases where the history, mechanism or injuries are inconsistent with traumatic cardiac arrest, or the patient is in VF / VT. If any doubt exists as to the cause of arrest, treat as per **CPG P0201-1 Medical Cardiac Arrest**.

More information

The Traumatic Cardiac Arrest CPG should be applied only when the cause of cardiac arrest is clearly traumatic. Medical cardiac arrest may lead to incidents with the potential to cause injury (e.g. slow speed MVA, standing height fall). If these patients receive traumatic cardiac arrest care, it may delay defibrillation and chest compressions. Strongly suspect a medical cause of arrest where the MOI and history do not suggest the potential for severe injuries.

Management

- The potential causes of cardiac arrest should be managed in order of clinical need.
- Treating correctable causes should be prioritised over standard cardiac arrest care (chest compressions and adrenaline).

More information

Undifferentiated trauma vs obvious cause

- Uncertain cause: in the absence of a clear cause, or where it is probable there are multiple causes, it is reasonable to apply all interventions in the CPG in the order presented (i.e. haemorrhage control, airway, breathing, circulation). This is likely to be the most common type of traumatic arrest. If resources permit, multiple interventions should be performed concurrently including standard cardiac arrest care.
- Obvious causes: Where there is a clear etiology (e.g. amputation), it is not mandatory to provide all interventions in this CPG (e.g. chest decompression). In cases of witnessed traumatic arrest, prioritise treatment to address the most likely cause first. If there is any doubt as to the cause, all interventions should be provided.

Standard medical arrest

Shockable rhythms are extremely rare in paediatric traumatic arrest and chest compressions are not likely to be effective in the setting of hypoxia, tension pneumothorax and severe hypovolaemia.

As such they are not the priority. However, there is no requirement that standard cardiac arrest care be delayed until correctable causes have been addressed. Ideally, haemorrhage control, airway management, chest decompression, fluid resuscitation, application of defibrillation pads, chest compressions and adrenaline should be delivered simultaneously.

- Where clear signs of prolonged cardiac arrest are present or continued resuscitation may be futile, consider **CPG P0203 Withholding or Ceasing Resuscitation**.

Major haemorrhage

- Control of major haemorrhage is the absolute priority in all circumstances. It can be achieved with:
  - Arterial tourniquets
  - Haemostatic dressings / wound packing
  - 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.

Blood components

- Where available, Packed Red Blood Cells (PRBC) are preferred for fluid resuscitation over normal saline.
- MICA paramedics credentialed in blood component administration may administer PRBC.
- Legal minor: PRBC must only be administered to a child < 18 years if:
  - A parent / legal guardian can be contacted and the parent / legal guardian consents to the administration of a blood transfusion.

  OR
  - A medical doctor approves administration (preferably AV Medical Advisor via the AV Clinician or RCH)
- Religious objection: PRBC must not be administered to a patient with a known religious objection to blood transfusion (e.g. Jehovah's Witness) and who refuses consent.

Chest decompression

- Finger thoracostomy is the preferred method for chest decompression (where credentialed).
- Perform needle thoracostomy if finger thoracostomy is delayed or not available.

Ultrasound

- Where all correctible causes have been addressed, focused assessment with sonography for trauma may be considered (where credentialled) to:
  - Assess cardiac wall motion and identify patients with a low flow state (low cardiac output).
  - Assess for cardiac tamponade.
  - Ensure correctible causes have been adequately managed (e.g. tension pneumothorax).

Perfusion assessment

- $ETCO_2$ can be used as a surrogate marker for cardiac output and may assist in identifying patients with a low flow state.

Return of Spontaneous Circulation

- Where ROSC is achieved, manage the patient as per **CPG P0806 Major Trauma**.

Special circumstances

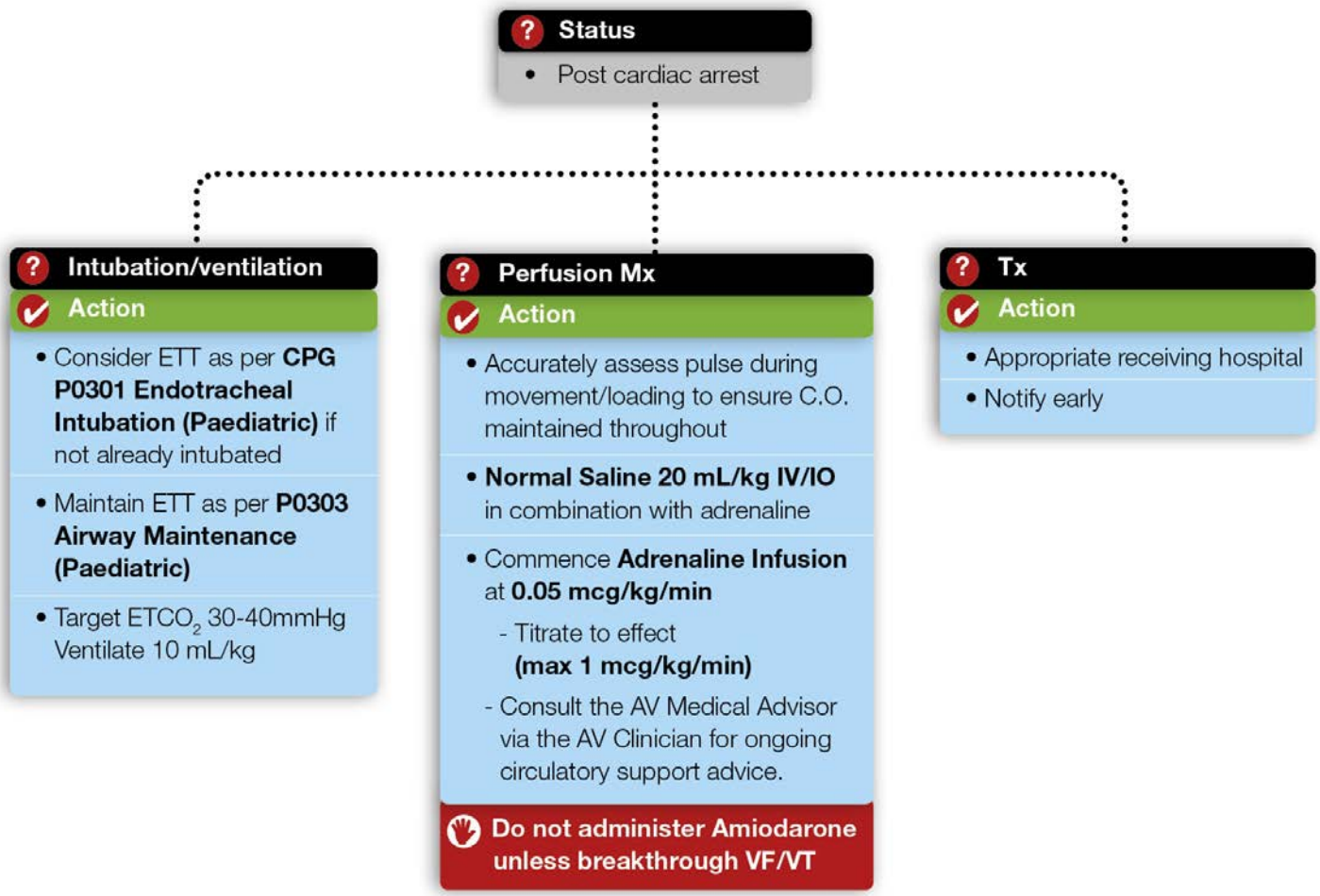
Severe crush injury

- Cardiac arrest in the setting of severe crush injury should be managed as per **CPG P0201-1 Medical Cardiac Arrest**:
  - Calcium gluconate 10% 0.11 mmol / kg (0.5 mL / kg) IV (slow push)
  - Sodium bicarbonate 8.4% 2 mL / kg IV

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Traumatic Cardiac Arrest 2024.pdf

Flowchart


Status
Post cardiac arrest
Intubation/ventilation
Action
Consider ETT as per CPG P0301 Endotracheal Intubation (Paediatric) if not already intubated
Maintain ETT as per P0303 Airway Maintenance (Paediatric)
Target ETCO2 30-40mmHg
Ventilate 10 mL/kg
Perfusion Mx
Action
Accurately assess pulse during movement/loading to ensure C.O. maintained throughout
Normal Saline 20 mL/kg IV/IO in combination with adrenaline
Commence Adrenaline Infusion at 0.05 mcg/kg/min
- Titrate to effect (max 1 mcg/kg/min)
- Consult the AV Medical Advisor via the AV Clinician for ongoing circulatory support advice.
Do not administer Amiodarone unless breakthrough VF/VT
Tx
Action
Appropriate receiving hospital
Notify early

Flowchart

Withholding resuscitation

- Obvious death
  - Injuries where survival is impossible
  - Rigor mortis
  - Postmortem lividity
  - Putrefaction / decomposition
  - Death that has been declared by a doctor who is or was at the scene

OR

- Resuscitation is not consistent with the patient's wishes as indicated by:
  - Advance Care Directive, or
  - Medical Treatment Decision Maker

OR

- Newborn with confirmed gestation < 22 weeks

- **Withhold resuscitation**
  If unable to immediately confirm details, commence resuscitation while continuing to gather information
- Consult the AV Clinician if there is any uncertainty
- Confirm determinants of death and consider Verification of Death form
- Provide initial bereavement support and referral if required

Cessation of resuscitation

- Consultation with the AV Medical Advisor advises further resuscitation is futile

OR

- Patient has received ≥ 45 minutes of ALS resuscitation

AND

- No compelling reasons to continue including:
  - CPR induced consciousness
  - Spontaneous respiratory efforts
  - POCUS (where credentialed) indicates cardiac contractility
  - Periods of ROSC
  - Witnessed arrests with defibrillation prior to ambulance arrival
  - Normal or near-normal $ETCO_2$ readings
  - Persistent narrow complex PEA

- **Cease resuscitation**
- Confirm determinants of death and consider Verification of Death form
- Provide initial bereavement support and referral if required

Care Objectives

- Identify patients who will not benefit from resuscitation or where there is a legal requirement to withhold resuscitation
- Provide guidance for the cessation of resuscitation following an unsuccessful resuscitation attempt

Intended patient group

- Patients aged < 16 years presenting in medical or traumatic cardiac arrest.

General Notes

Withholding resuscitation

- Where it is unclear whether to withhold resuscitation, commence resuscitation while continuing to gather information through history taking, reviewing medical documentation (if available), and visual observations.

Obvious death

- Obvious death is characterised by any of the following:
  - Injuries where survival is impossible (e.g. decapitation, incineration, cranial destruction, hemicorporectomy)
  - Rigor mortis
  - Postmortem lividity
  - Putrefaction / decomposition
  - Death that has been declared by a doctor who is or was at the scene

Advance Care Directives

- Paramedics have a legal obligation and duty of care to act in accordance with an Advance Care Directive (ACD) or the decisions of a medical treatment decision maker.
- A paramedic may provide or withhold treatment based upon the patient's wishes as recorded on an ACD 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 ACD 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.
- Please note: The law permits provision of medical treatment in an emergency (e.g. resuscitation), without consent, to a person who does not have decision-making capacity. Emergency treatment should not be delayed while searching for an ACD (or a medical treatment decision maker), but a health practitioner must comply with a known ACD.
  Except in circumstances where:
  - The ACD instructs a health care professional to provide medically futile or unethical treatment,

or

- The ACD instructs a health care professional to take action(s) that would go against their code of conduct,

or

- The ACD cannot be readily and confidently understood and applied by the health care professional.

For more information, see The Victorian Office of the Public Advocate's A clinicians guide to medical decision making and **CPG A0111 Consent and Capacity**

Medical treatment decision maker

The medical treatment decision maker should be determined as per **CPG A0111 Consent and Capacity**.

Palliative care patients

- In most cases, paediatric palliative care patients will have a Special Patient (SPPT) alert. These patients will have an advance care directive in place. Consult the patient's palliative care team or the AV Clinician if there is uncertainty around the decision to withhold resuscitation in this group.

Newborn with confirmed gestation < 22 weeks

- Resuscitative efforts should be withheld in newborns < 22 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.

Mass casualty incidents

- 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 guidance (**CPG F0026**) for patient assessment that may differ significantly from guidelines used in other situations.

Aeromedical

- Resuscitation efforts may be ceased during Air Ambulance transport when cardiac arrest occurs in the setting of severe injury, a quickly reversible cause for the cardiac arrest has been excluded (i.e. pneumothorax, cardiac arrhythmia) and it is not practical to continue chest compressions to hospital.

Communicating death, dying and comfort care

- If it is safe and appropriate to do so, you may offer to support a family member in viewing resuscitation efforts before they are discontinued.

More information

- Studies have shown that some people benefit from witnessing resuscitative efforts on their loved one. If someone elects to watch the resuscitation efforts, it is essential to pre-brief them and outline the expectation of how the scene looks, how the patient looks (they will not look like themself, they will appear deceased, they may have tubes and machinery attached to them) prior to them witnessing the resuscitation. Ensure all team members are aware that a family member will be viewing the resuscitation.
- Once the decision to withhold or cease resuscitation is made, the priority should be providing comfort care to the patient and their family. Paramedics should consult with relevant stakeholders such as family, palliative care services, VVED, and/or the AV Medical Advisor regarding further steps in providing comfort care through the dying process.

- Principles that can be used to communicate when a death has occurred include:
  - Speak slowly, clearly and concisely.
  - Clump information together in 1-3 sentences and leave a pause in between to help the receiver process the news.
  - Use the D- words to convey death “Death” “Dying” “Die” “Dead”. Avoid phrases such as “passed away” or “your loss”.
  - Content may need to be repeated several times
  - Use a non-judgemental approach as people may respond with a range of reactions.
  - Provide practical guidance on next steps
- AV staff can use the Palliative Care Advice Service (PCAS) for advice and support in navigating both expected and unexpected deaths. PCAS can also provide grief counselling to the family both whilst AV is on scene and at a later time.
- The SPIKES communication framework provides a helpful approach to conversations around death and dying.

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Withholding or Ceasing Resuscitation (Paediatric) 2.0.pdf
- CPG Walkthrough Video - Withholding or Ceasing Resuscitation

Endotracheal Intubation CPG P0301

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 cmH_20.
- To estimate required ETT size where device packaging does not include size information, use the following formula:
  - Cuffed: age/4 + 3.5
  - Uncuffed: age/4 + 4

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**.
- The Zoll and EMMA capnograph device are to be used to confirm tube placement. The EMMA Infant airway adaptor must be used for patients younger than 1 year of age.

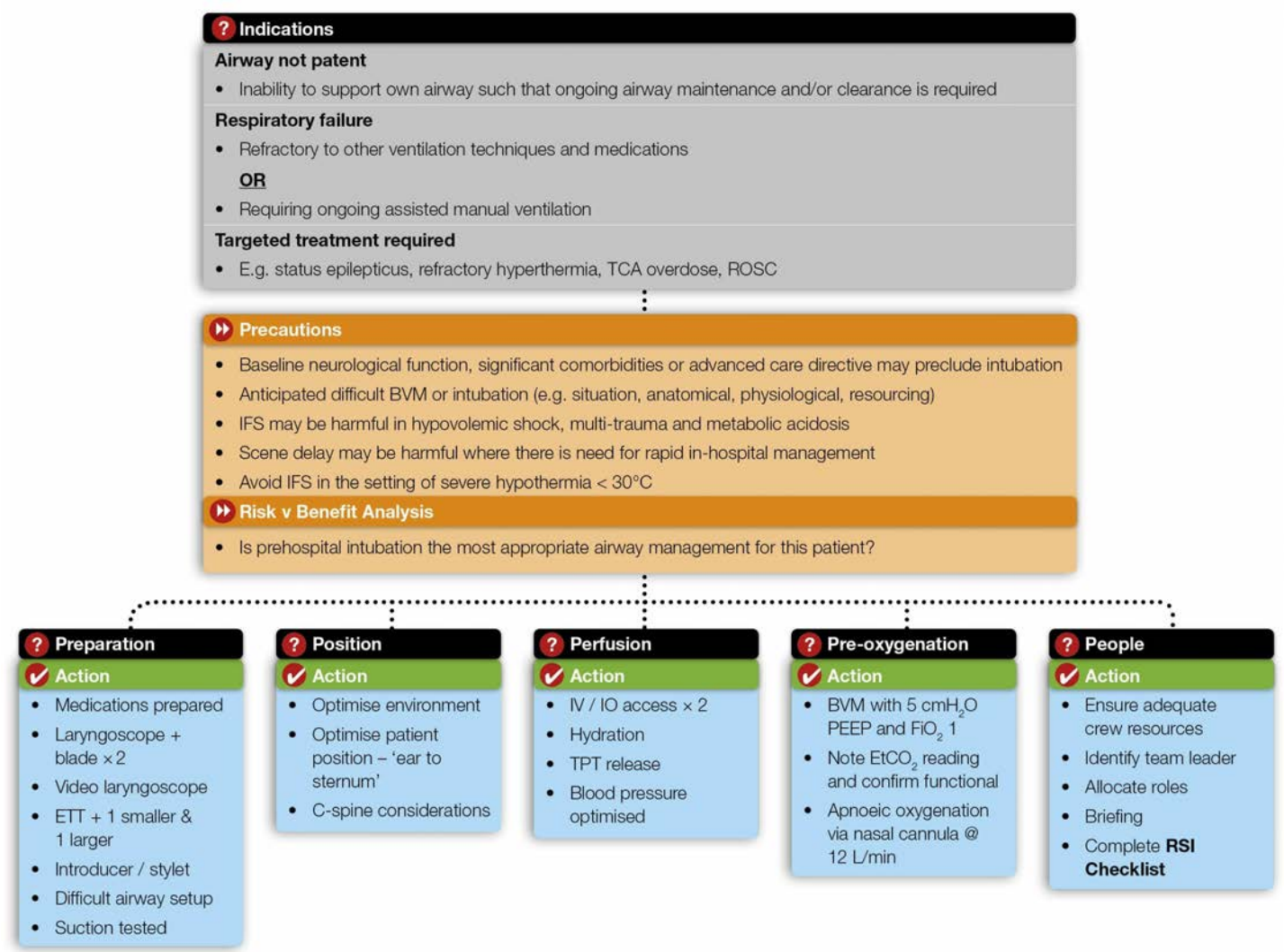
Unassisted intubation

- 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.

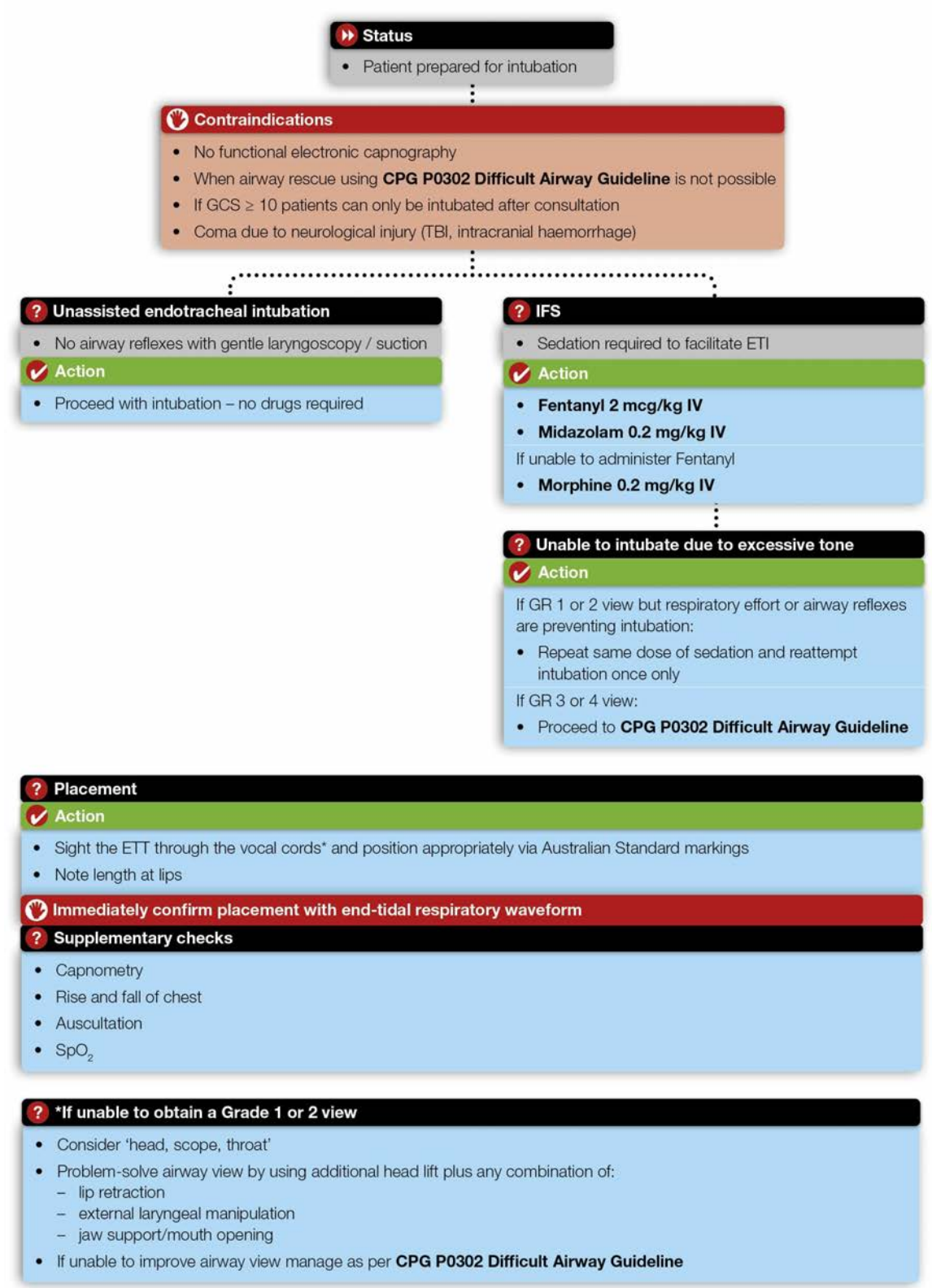
Preparing and support

- When attending a critical paediatric case, consider contacting the AV Clinician for clinical advice. The AV Clinician may extend the call to include the AV Medical Advisor or PIPER to assist.
- 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

Difficult Airway Guideline CPG P0302

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 Cant 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


Status
Patient requiring Intubation
Action
OPTIMISED first pass intubation
Assess
Confirmation of tracheal placement by ETCO2?
Yes
Action
Mx as per CPG P0303 Airway maintenance
No
Plan A
First Pass Intubation
Action
ALTERNATIVE second pass intubation
Assess
Confirmation of tracheal placement by ETCO2?
Yes
Action
Mx as per CPG P0303 Airway maintenance
No
Plan B
Second Pass Intubation
VERBALISE!
"Unable to Intubate, moving to rescue airway strategy"
Action
Insert SGA, with BVM as alternative
Assess
Able to oxygenate?
Yes
Action
Allow sedation/paralysis medications to wear off
No
Plan C
Airway Rescue Strategy
Action
Cricothyroidotomy (MFP only)
Mx as per CPG P0303 Airway maintenance
Plan D
Can't Intubate, Can't Oxygenate

Airway Maintenance CPG P0303

Care Objectives

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

General notes

Intended patient group

- Patients < 12 years of age.

Procedural 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.
- Monitor $ETCO_2$ using both the Zoll waveform capnography and EMMA capnograph. In smaller paediatric or neonatal patients, consider removing the EMMA to reduce strain on the tube but keep the adapter in place in case trouble shooting is required.
- Position patient in a 30° head-up semi-recumbent position if clinically appropriate
- Check cuff pressure and ensure 20 – 30 cmH_20.
- Maintain normothermia.

Ventilation

- Settings:
  - Ventilate using 100% O_2
  - Tidal Volume of 5 - 10 mL/ kg
- Maintain:
  - SpO_2 > 95%
  - $ETCO_2$ at 30 - 35 mmHg
- $ETCO_2$ target may vary in the following patient cohorts:

- **Asthma** - higher $ETCO_2$ may be appropriate permitted
- **TCA Toxicity** - maintain 25 - 30 mmHg
- **DKA** - $ETCO_2$ 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 opioid 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 AV Medical Advisor via the AV Clinician.
- All patients who are paralysed require ongoing sedation.

Infusions

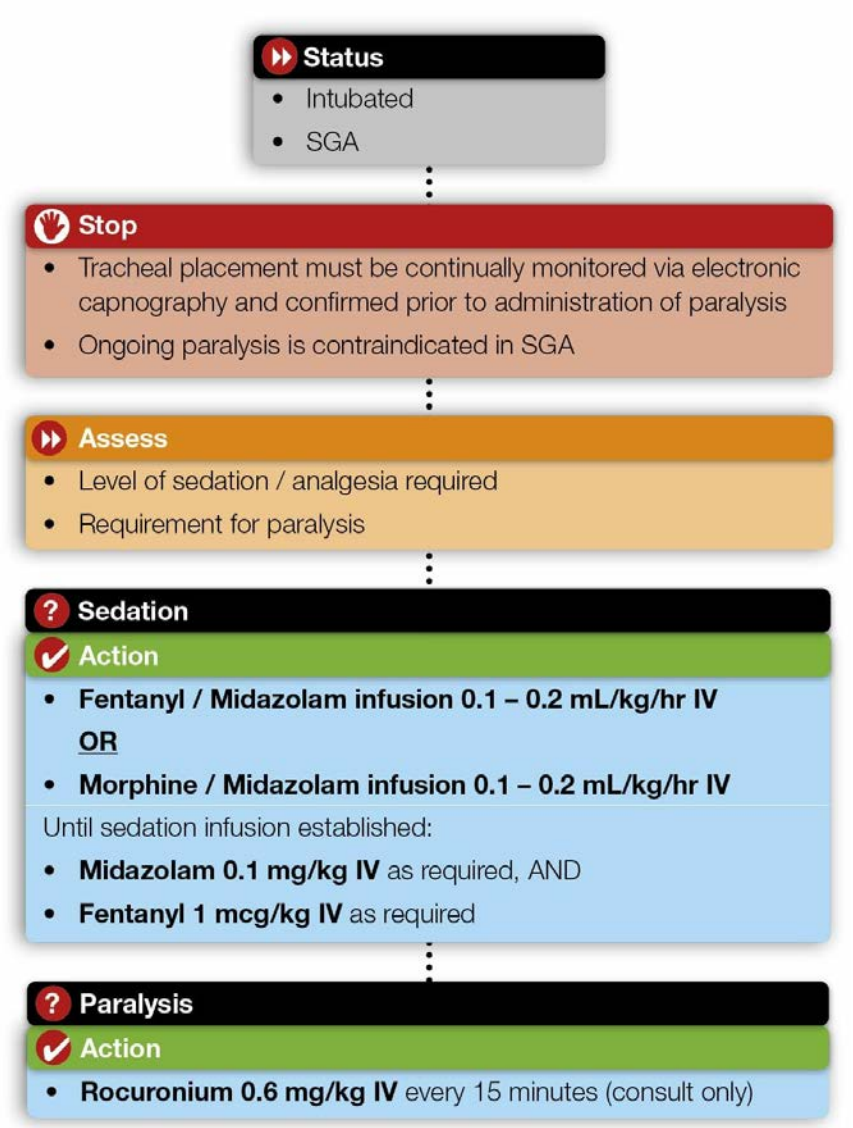
Fentanyl + Midazolam Infusion (preferred)

- **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


Status
Intubated
SGA
Stop
Tracheal placement must be continually monitored via electronic capnography and confirmed prior to administration of paralysis
Ongoing paralysis is contraindicated in SGA
Assess
Level of sedation / analgesia required
Requirement for paralysis
Sedation
Action
Fentanyl / Midazolam infusion 0.1 – 0.2 mL/kg/hr IV
OR
Morphine / Midazolam infusion 0.1 – 0.2 mL/kg/hr IV
Until sedation infusion established:
Midazolam 0.1 mg/kg IV as required, AND
Fentanyl 1 mcg/kg IV as required
Paralysis
Action
Rocuronium 0.6 mg/kg IV every 15 minutes (consult only)

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 the AV Clinician 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.
- In most cases, adding extra medication to prime the mucosal atomisation device is unnecessary, as the volume is clinically insignificant. When administering very small doses, consider adding 0.1 mL to account for dead space.
- Administer half of the IN dose into each nostril where possible to maximise absorption.
- Limit the volume of IN medication to a maximum of 1 mL per nostril per dose. Volumes exceeding 1 mL per nostril are not reliably absorbed and often result in medication runoff.
- 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 - ALS/MICA) 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 A0722 Opioid toxicity**.

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 the AV Medical Advisor via the AV Clinician 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 the AV Medical Advisor via the AV Clinician for management options which may include administration of **Atropine** (MICA only)

Monitoring

- Patients managed with methoxyflurane, fentanyl, morphine, or ketamine, require on-going pain assessments as well as monitoring for side-effects
- At a minimum, observations must be undertaken and documented every 15 minutes as per https://av-digital-cpg.web.app/assets/pdf/professional-standards/Patient Assessment Standards.pdf
- Minimum repeat assessments in the context of moderate-to-severe pain include:
  - Airway patency
  - RR, SpO_2, HR, BP
  - Sedation Assessment Tool (SAT) Score
- Where ketamine is used or in the event of inadvertent sedation (SAT < 0) following analgesia administration, in addition to the above, nasal $ETCO_2$ monitoring must be commenced, line-of-sight monitoring initiated, and consideration given to more frequent vital sign assessment.

Wilderness response paramedics

- Wilderness response paramedics who are appropriately trained and credentialed may provide additional analgesia as per **CPG AAV P03 Pain Relief (paediatric) – AAV** to adolescent patients (12-15 years old) on consult with the AV Medical Advisor or PIPER via the AV Clinician.
- The minimum monitoring equipment standard for all patients receiving analgesia in remote and austere environments is:
  - manual blood pressure cuff,
  - stethoscope, and
  - pulse oximeter.

Paediatric paracetamol dose table

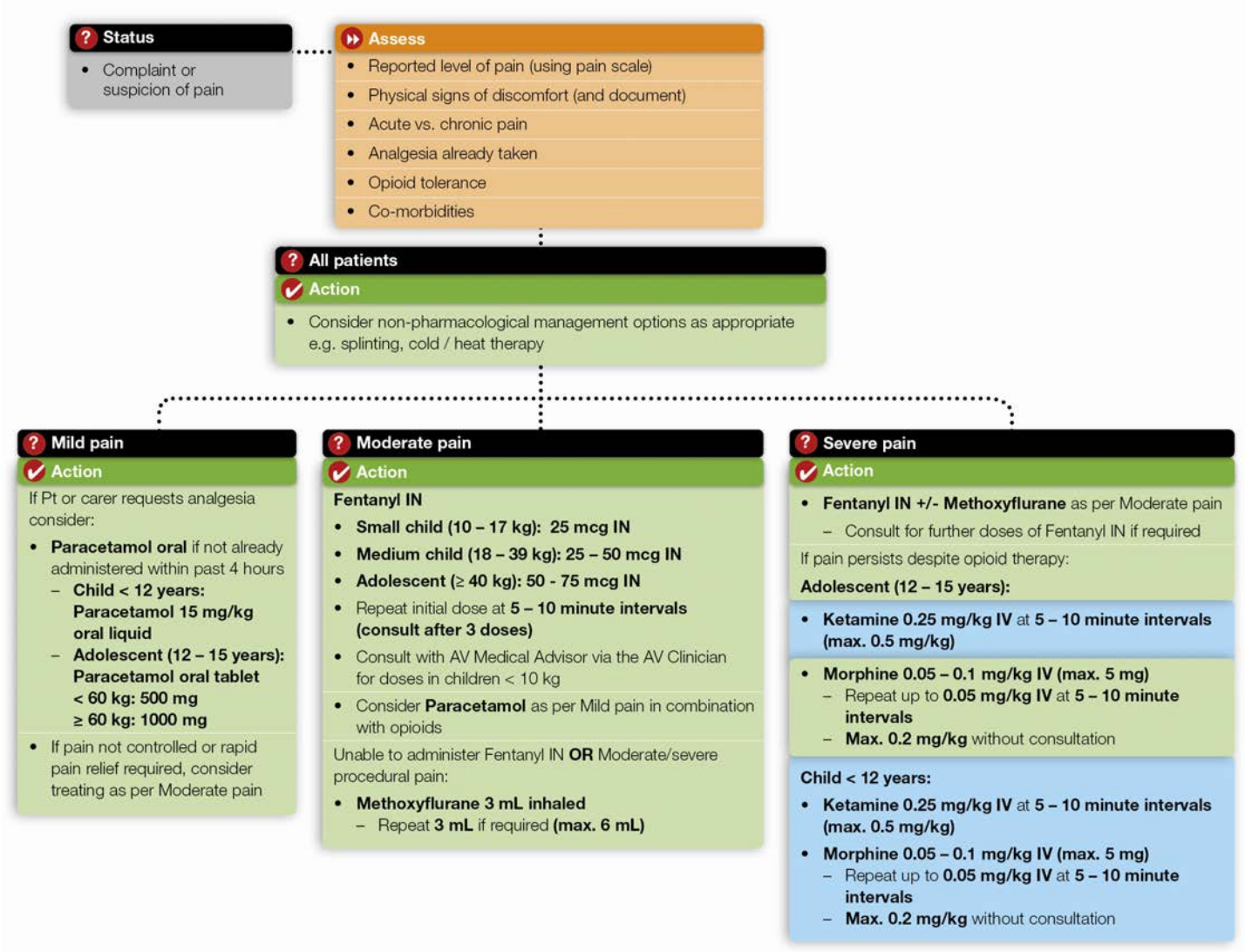
Paracetamol 15 mg/kg dose (based on 120 mg in 5mL liquid) CONFIRM DOSE WITH LABEL ON BOTTLE

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

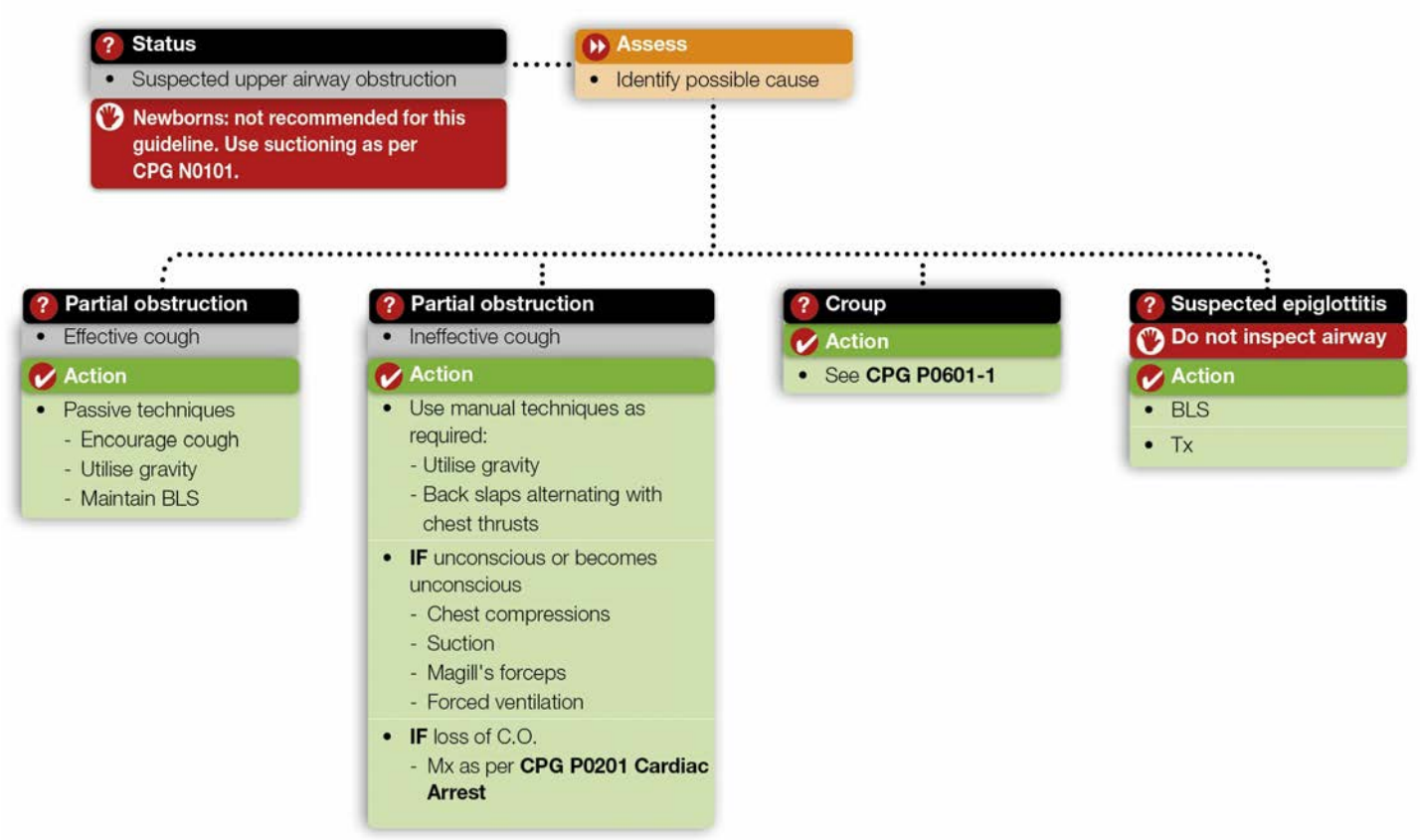
Upper Airway Obstruction CPG P0601

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



Assessment	Mild	Moderate	Severe
Behaviour	Normal	Intermittent mild agitation	Increasing agitation Drowsiness
Stridor	None or only when active	Intermittent at rest	Persistent at rest Decreasing (late sign)
Respiratory rate	Normal	Increased	Marked increase Decrease (late sign)
Accessory muscle use	None	Moderate chest wall retraction	Marked chest wall retraction
SpO_2	≥ 96%	≥ 96%	< 96% (late sign)
Care	• **Dexamethasone** • Self-care advice • Safety netting • Provide RCH Croup Factsheet	• **Dexamethasone**	• **Adrenaline** • **Dexamethasone** (high dose)
Disposition	• Self-care	• VED Ambulance Referral	• Transport

Dose table	
Dexamethasone	**150 mcg / kg Oral** (max 12 mg)
Dexamethasone (high dose)	**600 mcg / kg Oral** (max 12 mg)
Adrenaline	**5 mg (5 mL, 1:1000) Nebulised at 5 minute intervals** until improvement

Care Objectives

- Identify severity
- Dexamethasone for all cases
- Adrenaline for severe cases
- Identify appropriate disposition
  - Mild: Self care
  - Moderate: VED Referral +/- transport to ED
  - Severe: AV Transport to ED

Intended patient group

- Patients aged < 16 years with croup

Overview

- Respiratory illness involving inflammation of the upper airway, larynx and trachea.
- Most common from 6 months to 3 years of age.

0 - 3 months	3 - 6 months	6 months - 3 years	5 years	6 years	Older children	Adolescent	Adults
++ Rare	+ Rare	++ Common	+ Common	Common	Rare	+ Rare	++ Rare

- Video Overview

Assessment

Clinical features

Croup is a viral illness characterised by:

- Barking cough
- Inspiratory stridor
- Hoarse voice
- Increased work of breathing
- Agitation
- Symptoms often worse at night
- Fever or wheeze may be present

Expected course

- Total duration 3-7 days
- URTI symptoms for 1-2 days followed by onset of barking cough
- Cough (approx. 3 days)
- Symptoms peak on days 3-4
- Symptoms are usually self-limiting

Risk factors for severe croup

- Age < 6 months
- Pre-existing airway narrowing / abnormality (e.g. tracheomalacia, subglottic stenosis)
- Past Hx of severe croup

- Sudden onset / rapidly progressing symptoms
- Complex medical conditions or those that predispose the patient to respiratory failure (e.g. neuromuscular disorders, Down syndrome)

Differential diagnosis

- **Foreign body airway obstruction:** consider speed of onset and history suggestive of FBAO (e.g. playing with small objects, eating)
- **Epiglottitis:** consider if drooling or difficulty swallowing. Drooling without coughing is suggestive of epiglottitis.
- **Anaphylaxis:** consider rapid onset, other anaphylaxis symptoms, exposure to allergens.

Other

- RAT should not be administered, especially in severe cases.

Care

- Minimise distress to the child as this can worsen upper airway obstruction.
- Keep children with carers as much as possible to reduce distress.
- Intermittent stridor is not considered a clinical red flag in the context of mild/moderate croup that has been treated with dexamethasone and meets the criteria for self-care or referral to VED in this guideline.

Mild

Self-care advice

- Croup usually gets better within 3 - 4 days. Dexamethasone may help to reduce symptoms.
- Croup is usually worse at night. Many children will be more settled if someone stays with them.
- Keep child calm. Breathing is often more difficult when upset, active or lying flat. Try sitting quietly, reading a book, or watching TV.
- Paracetamol or ibuprofen may help if your child has a fever and is irritable.

Safety netting

- Call 000 if:
  - Struggling to breath
  - Looks very sick, pale and drowsy
  - Stridor at rest (they are not active or upset but still have a stridor with each breath)
  - Child starts to drool or can't swallow
- More information is available in the RCH Croup Fact Sheet.

Moderate

- Either care in the community or transport may be appropriate depending on a range of factors (nuances of the patient's presentation, medical history, response to treatment, ability to eat / drink, distance to hospital and social / environmental factors).
- Consult with VED regarding the most appropriate disposition.
- If VED is not available, transport to an emergency department.

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/Croup MAC paper August 2022.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 SpO_2 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.

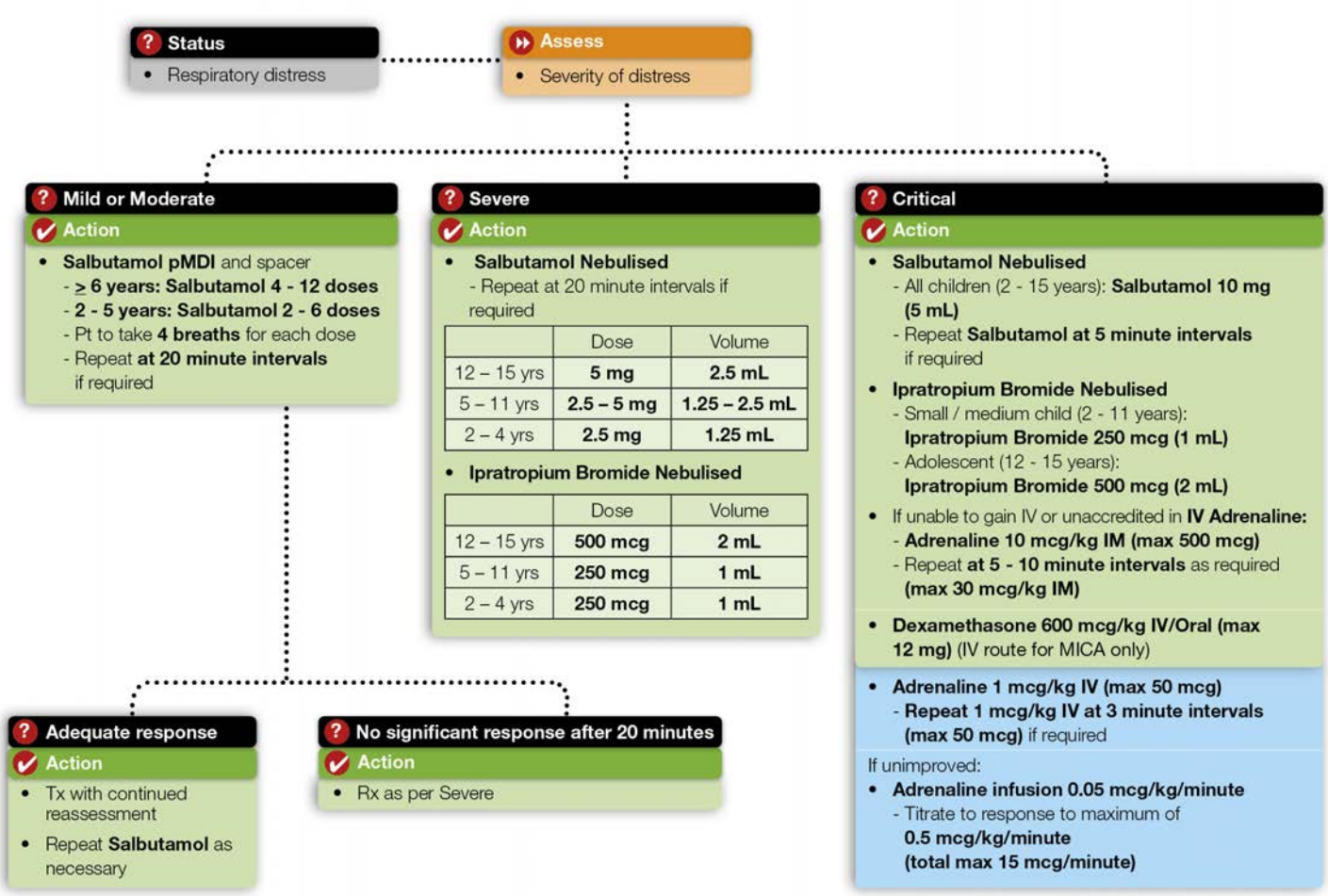
Critical: Altered conscious state, maximal work of breathing, marked tachycardia, unable to talk.

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.

- Maintain a high index of suspicion for anaphylaxis in patients with a history of asthma or food allergy.

Flowchart



Related Resources

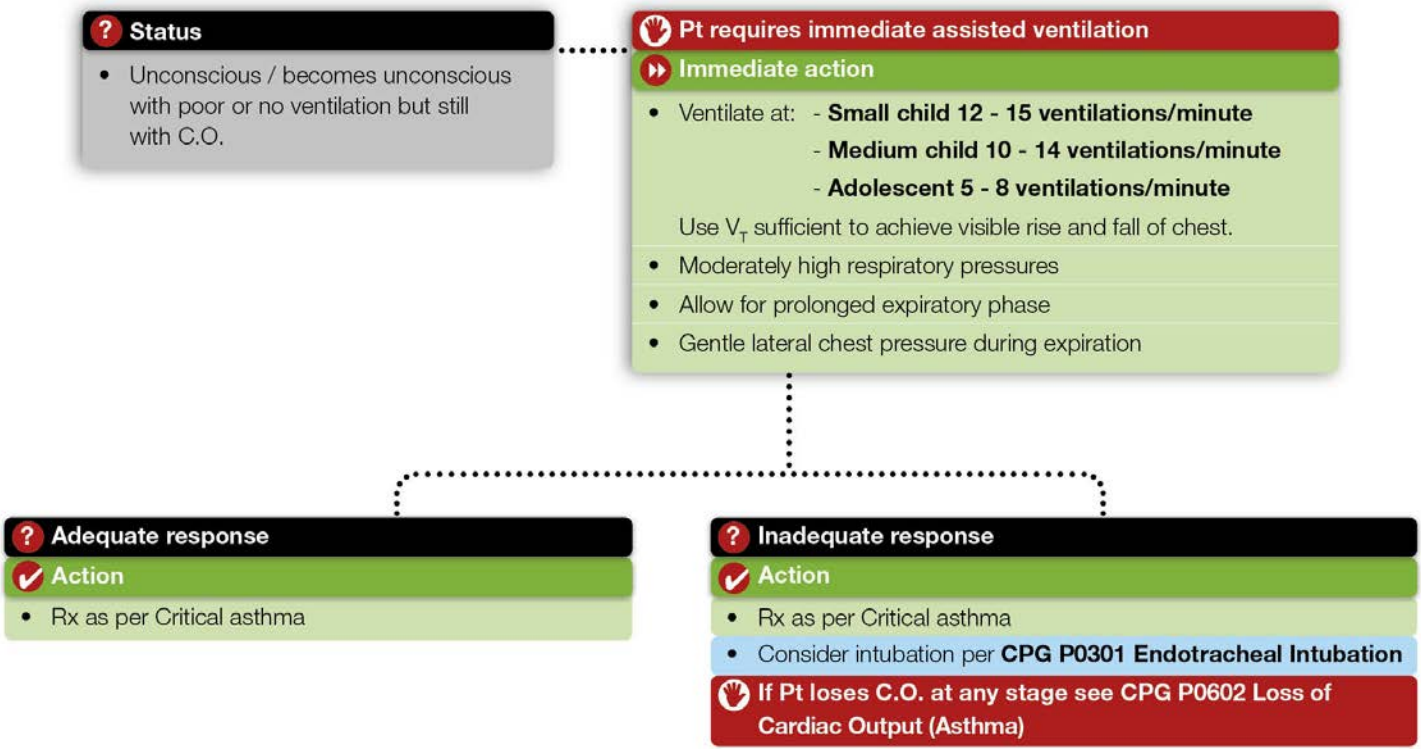
- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC CPG P0602 Paediatric Asthma Aug 2015.pdf

Unconscious (Asthma) CPG P0602

General Notes

- High $ETCO_2$ levels should be anticipated in the intubated asthmatic patient. An $ETCO_2$ 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 $ETCO_2$.
- 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

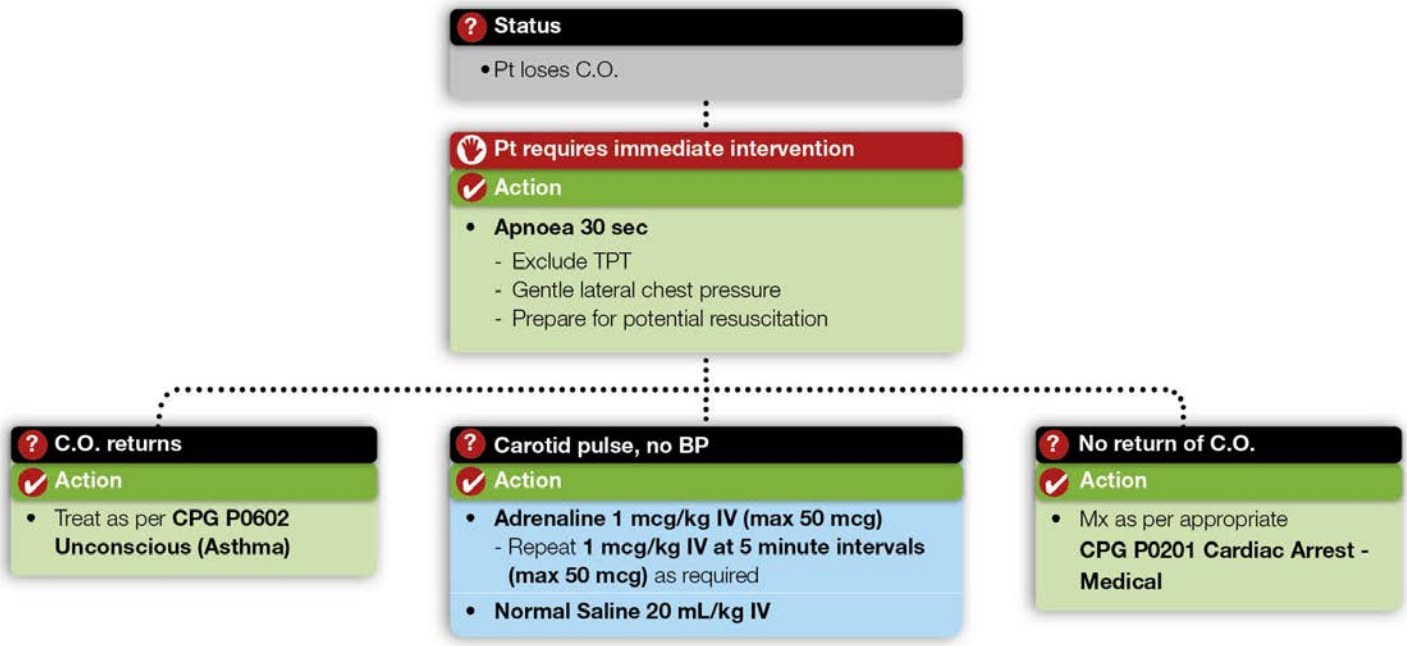


Loss of Cardiac Output (Asthma) CPG P0602

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

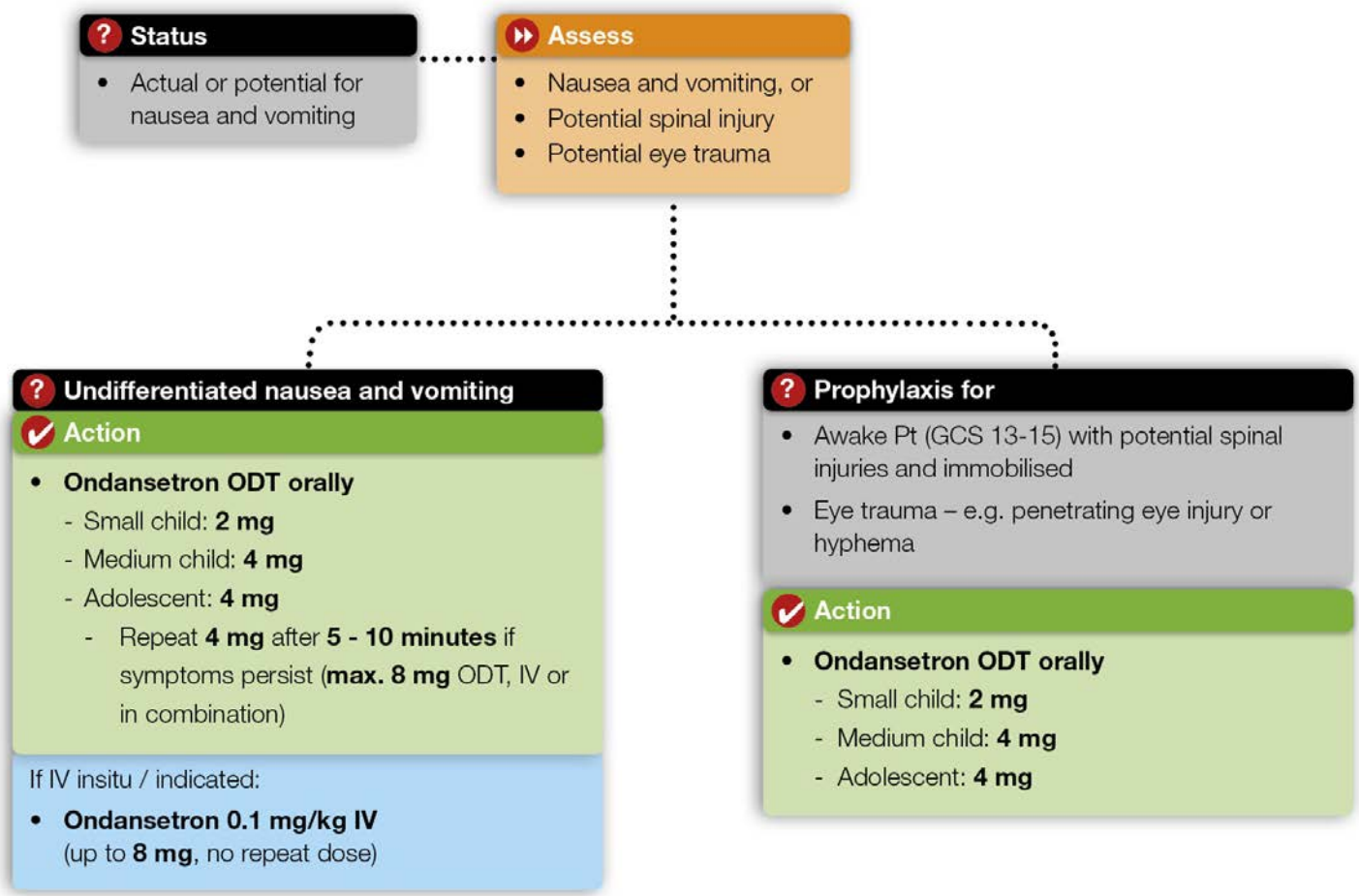


Nausea and Vomiting CPG P0701

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

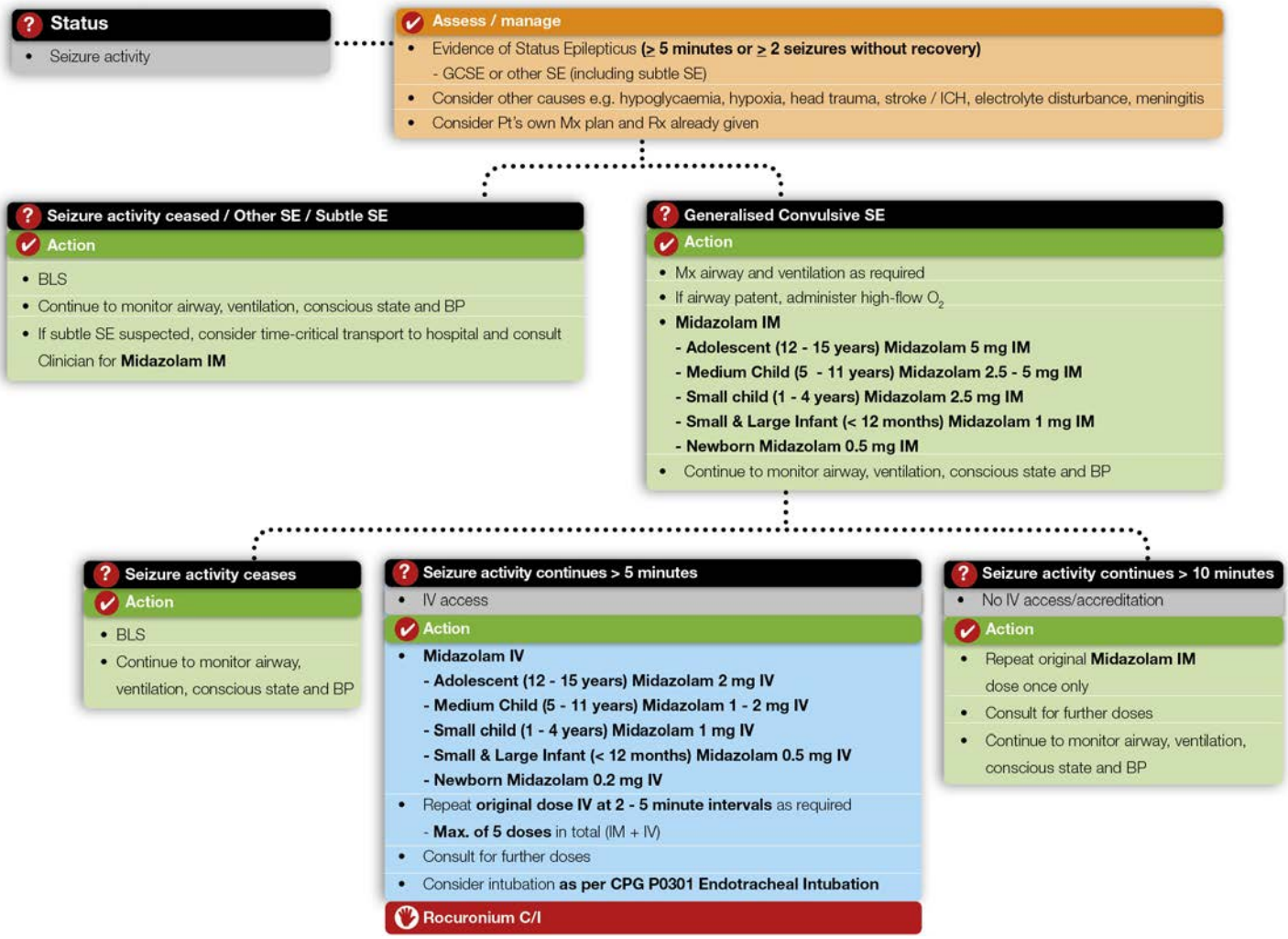
Flowchart



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 AV 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.

Flowchart



Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC CPG A0703 P0703 June 2015 Seizure CPG.pdf

Anaphylaxis CPG P0704

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

- Patients aged < 16 years with anaphylaxis

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 the AV Medical Advisor via the AV Clinician 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.

- **Children < 10 kg / 1-year-old:** A minimum IM dose of 100 mcg (0.1 mL) is recommended to avoid order-of-magnitude errors if using the 1:1,000 ampoule.

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

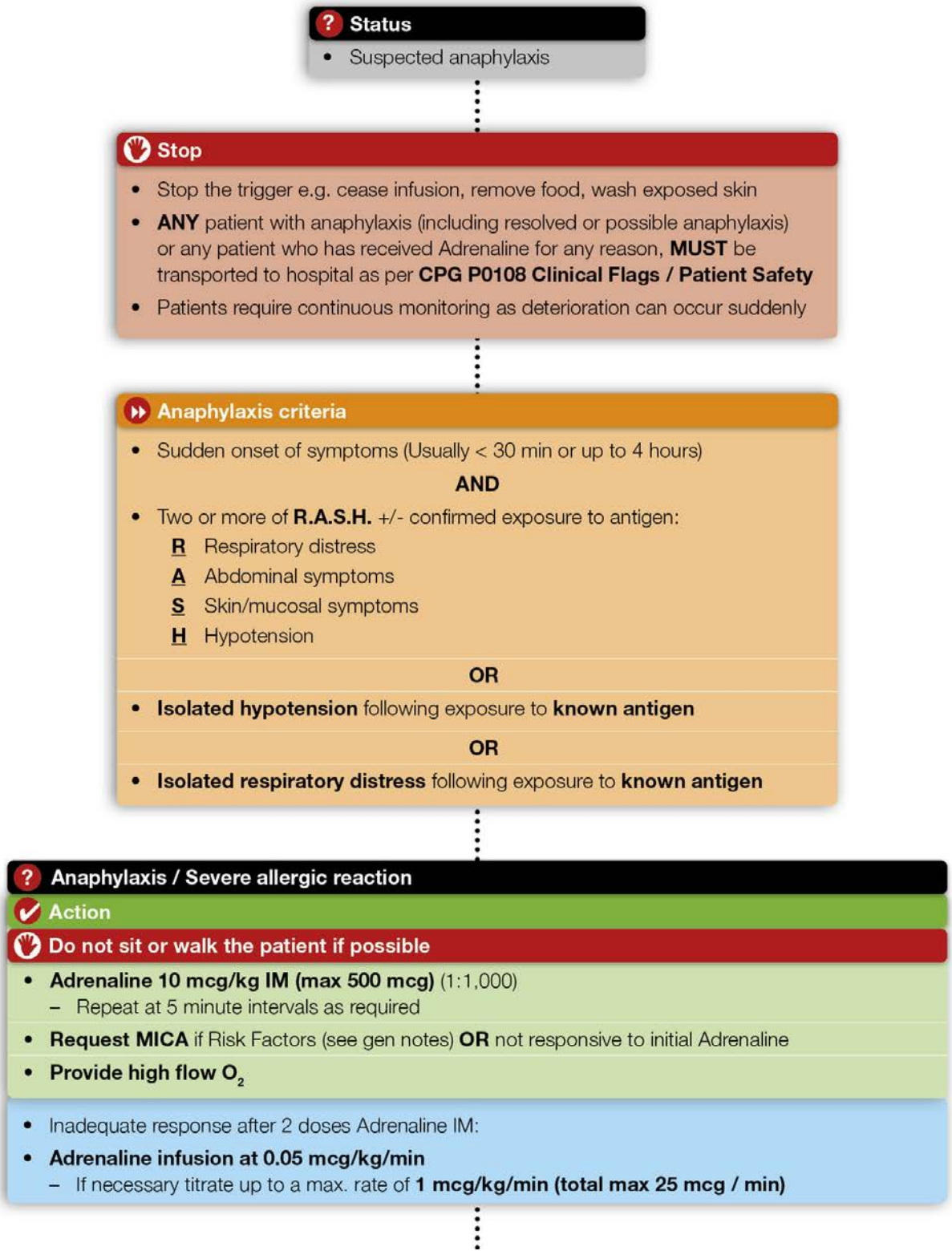
(Via syringe pump)

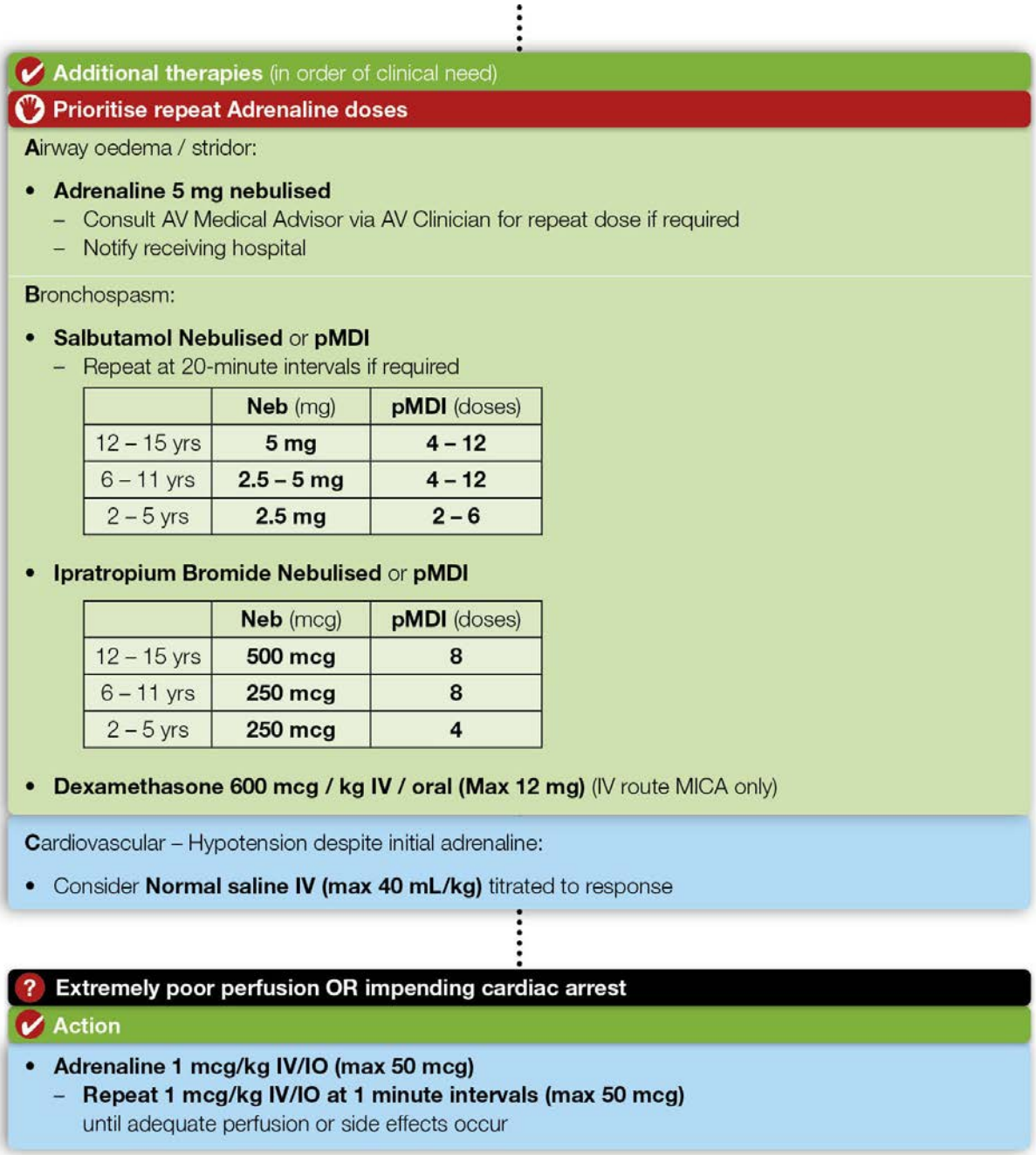
- Dilute **Adrenaline 300 mcg** to 50 mL with **5% Dextrose** or **Normal Saline** (in a 50 mL syringe)
- 1 mL = 6 mcg
- 1 mL/hr = 0.1 mcg/min

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


Status
Suspected anaphylaxis
Stop
Stop the trigger e.g. cease infusion, remove food, wash exposed skin
ANY patient with anaphylaxis (including resolved or possible anaphylaxis) or any patient who has received Adrenaline for any reason, MUST be transported to hospital as per CPG P0108 Clinical Flags / Patient Safety
Patients require continuous monitoring as deterioration can occur suddenly
Anaphylaxis criteria
Sudden onset of symptoms (Usually < 30 min or up to 4 hours)
AND
Two or more of R.A.S.H. +/- confirmed exposure to antigen:
R Respiratory distress
A Abdominal symptoms
S Skin/mucosal symptoms
H Hypotension
OR
Isolated hypotension following exposure to known antigen
OR
Isolated respiratory distress following exposure to known antigen
Anaphylaxis / Severe allergic reaction
Action
Do not sit or walk the patient if possible
Adrenaline 10 mcg/kg IM (max 500 mcg) (1:1,000)
– Repeat at 5 minute intervals as required
Request MICA if Risk Factors (see gen notes) OR not responsive to initial Adrenaline
Provide high flow O2
Inadequate response after 2 doses Adrenaline IM:
Adrenaline infusion at 0.05 mcg/kg/min
– If necessary titrate up to a max. rate of 1 mcg/kg/min (total max 25 mcg / min)



Related Resources

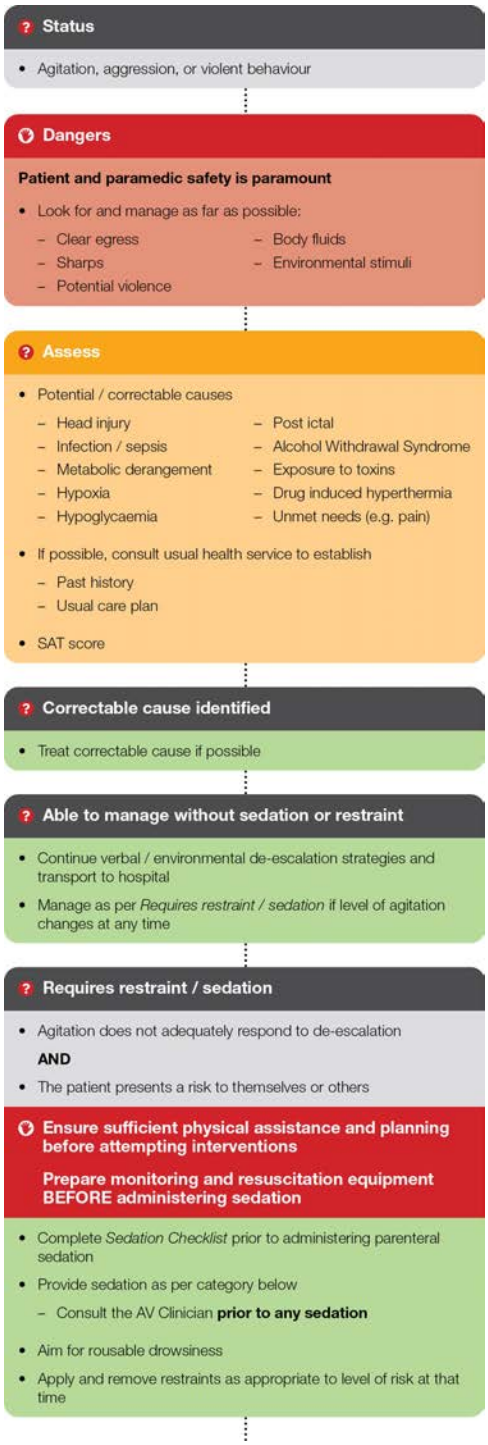
References

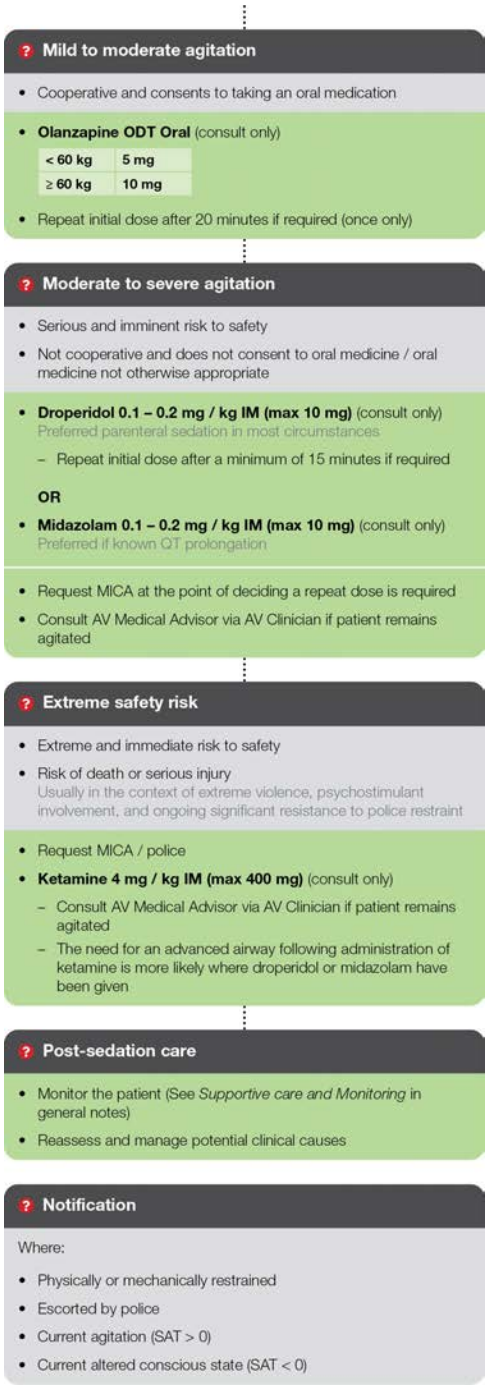
1. Safer Care Victoria. Anaphylaxis clinical care standard. 2019 Feb. Available from: https://www.bettersafercare.vic.gov.au/resources/clinical-guidance/emergency-care/anaphylaxis-adults

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

Flowchart


Status
Agitation, aggression, or violent behaviour
Dangers
Patient and paramedic safety is paramount
Look for and manage as far as possible:
Clear egress
Sharps
Potential violence
Body fluids
Environmental stimuli
Assess
Potential / correctable causes
Head injury
Infection / sepsis
Metabolic derangement
Hypoxia
Hypoglycaemia
Post ictal
Alcohol Withdrawal Syndrome
Exposure to toxins
Drug induced hyperthermia
Unmet needs (e.g. pain)
If possible, consult usual health service to establish
Past history
Usual care plan
SAT score
Correctable cause identified
Treat correctable cause if possible
Able to manage without sedation or restraint
Continue verbal / environmental de-escalation strategies and transport to hospital
Manage as per Requires restraint / sedation if level of agitation changes at any time
Requires restraint / sedation
Agitation does not adequately respond to de-escalation
AND
The patient presents a risk to themselves or others
Ensure sufficient physical assistance and planning before attempting interventions
Prepare monitoring and resuscitation equipment BEFORE administering sedation
Complete Sedation Checklist prior to administering parenteral sedation
Provide sedation as per category below
Consult the AV Clinician prior to any sedation
Aim for rousable drowsiness
Apply and remove restraints as appropriate to level of risk at that time



Sedation checklist

Care Objectives

- Maintain safe environment for patients, staff, other emergency responders, family and bystanders

- Use the least restrictive means possible, maintaining verbal and environmental de-escalation strategies throughout the interaction
- Consider clinical causes of acute behavioural disturbance

Intended patient types

- Patients < 16 years of age who present with agitation, aggression, or violent behaviour.
- The following patients are not excluded and may be cared for under this CPG:
  - Patients experiencing a mental health crisis including those being cared for under Section 232 of the Mental Health and Wellbeing Act 2022.

Assessment

Causes of agitation in paediatric patients

- Causes vary considerably and are influenced by the situation, environmental factors and staff interactions. These circumstances are typically outside of the control of the patient.
- Critical illness can cause agitation and should be considered in the assessment.
- Potential contributors to acute behavioural disturbances in young patients:
  - Neurodiversity (e.g. autism, ADHD)
  - Severe developmental trauma (e.g. family violence)
- The following are potential causes of acute behavioural disturbances:
  - Physical injury and / or pain (e.g. head injury)
  - Acute medical conditions (e.g. hypoglycemia, post ictal state)
  - Unmet needs (e.g. bladder distension, constipation, hunger, thirst)
  - Substance abuse / poisoning (e.g. methamphetamine, alcohol)
  - Acute and uncontrolled mental health condition (e.g. panic attack, acute mania)

Severity of agitation

- **Mild**
  - Able to cooperate, not aggressive
  - Anxious, pacing, restless (can't sit still), excessive talking, hypervigilant
  - Rapid shallow breathing
  - Limited eye contact
- **Moderate**
  - Loud outbursts, frequent non-purposeful movements
  - Not physically aggressive or violent
- **Severe**

  - Combative, violent, immediate danger to patient and/or staff
  - Unable to cooperate
  - Yelling, verbally abusive

- Assessment should be ongoing as a patient's condition is dynamic. For example, a patient initially managed under *Moderate Agitation* may escalate to a higher level of risk than when initially assessed or risk may decrease in response to effective de-escalation strategies.

Neurodiversity and disability

- Communicating with patients with neurodiversity or disability requires a considered approach. Seek advice from the family / carers as to what communication methods are most effective. Seek an established care plan. Contact related health care service to seek advice.
- De-escalation and management strategies listed in this CPG are effective for all young people experiencing acute behavioural disturbance whether they have known neurodiversity or not.

Care approach and de-escalation

Consider **CPG A1101 Mental Health and Wellbeing Principles** where applicable.

Paramedic demeanour

- Nominate one person to build a rapport and communicate directly with the patient
- Don't touch the patient
- Non-threatening stance, neutral position (e.g. don't stand over the patient or cross your arms)
- Be quietly confident – reassures and calms the patient to know that someone has a plan to help them
- Use a quiet, calm and reassuring voice with slower speech
- Exaggerate friendly expressions

Environmental de-escalation

- Reduce stimulus and sensory sensitivities
  - Work with a trusted person who can positively influence the patient's behaviour
  - Minimise sudden movements
  - Find out what sensory sensitivities the patient has and offer calming strategies. This will be unique to each patient.
  - Common sensitivities include:
    - Noise - limit noise where possible (e.g. quiet room, minimise presence of other people, headphones)
    - Light - dim lights or turn off
- Other sensory techniques may include:
  - Calming toys, ice / icy-pole, warm blankets
  - Distraction activities - music / TV / screen distraction
  - Food, drink

Verbal de-escalation

- Introduce yourself and other team members
- One person should be speaking only
- Use the patient's name to personalise the interaction
- Focus only on keeping things safe. Emphasise 'we want everyone to be safe'.
- Active listening
- Simple script: instructions should be one at a time, use as few words as possible. Repetitive simple statements.
- Don't make jokes as they may be misunderstood.
- Be clear about what needs to happen, make it predictable.
- Give more time for responses (stressed brains take longer to process information)
- Avoid 'no' language which may prompt an aggressive response.
- Forced choices, e.g. 'shall we sit on the kitchen chair or the lounge chair?'
- No threats or ultimatums. No 'show of force' as this will always escalate
- Focus on things that matter (and compromise on things that don't)

Management

- Use interventions proportionate to the severity of risk posed by the acute disturbance. Always use the least restrictive intervention available unless there is an imminent risk of significant harm to self or others.
- Patients displaying these behaviours almost always have a clinical cause for their agitation, and as such it is reasonable that the AV crews are the lead decision-makers at the case. Police at scene will ensure scene safety.

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** throughout the case.
- Consider exit strategy (e.g. position yourself near exit).
- Verbal and environmental de-escalation with the patient is essential and should be maintained throughout all phases of care.
- Where sedation or physical restraint is absolutely necessary, clear communication with all parties involved in restraining the patient is a key factor in reducing the risk of needle-stick or other injuries.

Correctable Causes

- If a correctable cause of agitation is identified (e.g. hypotension, hypoxia, hypoglycaemia), the preference is to treat the cause rather than provide sedation.

- In some circumstances, agitation may be so severe that the cause cannot be treated without sedation. Sedation may be administered if it is required to facilitate safe treatment of the underlying cause. De-escalation should continue while correctable causes are addressed.

Psychostimulant affected patients

- Patients affected by methamphetamine may present with severe agitation and violence. These patients may need to be managed as per the *Extreme Safety Risk* section of this CPG using ketamine (consult only) if necessary.
- Cool the hyperthermic patient as per **CPG P0902 Hyperthermia / heat stress**.
- Consult the AV Medical Advisor via the AV Clinician for management of drug induced hyperthermia in psychostimulant toxicity patients.

Traumatic brain injury

- **Severe agitation:** Extraordinary and immediate risk may be managed with ketamine regardless of head injury.
- **Mild / Moderate agitation:** Manage with judicious analgesia. The hypotensive effects of midazolam and droperidol can be detrimental to patient outcomes.

Restrictive practices

Any form of restrictive practice should only be used as a last resort
(e.g. chemical, physical or mechanical restraint).

- If de-escalation strategies are unsuccessful or there is an immediate and likely risk of harm to the patient or staff, oral or IM sedation may be considered. This may or may not require the use of mechanical or physical restraint.

Physical / mechanical restraint

- **Physical restraint** means the use by a person of their body to prevent or restrict another person's movement, where **mechanical restraint** means the use of a device to prevent or restrict a person's movement
- Mechanical restraint must be proportionate to the risk of harm, and only be employed for the minimum duration that ensures the safety of the patient, staff and others.
- Mechanical restraint devices may be used without the use of sedation in circumstances where the patient complies with the restraint and will not sustain further harm by fighting against the restraints.
- Observe the patient continuously to ensure their airway, breathing and circulation are not obstructed, and the restraint devices are not causing injury.
- Where the patient has been sedated and mechanical restraints are still required, the patient should be positioned in the lateral position to avoid aspiration.
- DO NOT restrain the patient in the prone position. This position has been associated with asphyxia and death.
- Mechanical restraints 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, the time of application and removal, the patient's response, and any adverse outcomes must be documented on the PCR.

Sedation

- The AV Clinician must be consulted prior to any sedation.

- The AV Clinician may approve sedation in the following circumstances:
  - Oral sedation in paediatric patients of all ages.
  - Parenteral sedation in adolescent patients with weight > 50 kg.
- Consultation with the AV Medical Advisor via the AV Clinician is required in all other circumstances.
- The use of sedation to manage acute behavioural disturbance in patients with a mental health illness is also known as chemical restraint.
- Monitoring and resuscitation equipment must be prepared prior to sedation and immediately available at all times.
- The patient who has taken multiple medicines, drugs or who is intoxicated is at greater risk of airway compromise when sedation is administered.
- Parenteral sedation should aim for *rousable drowsiness* which is defined as the patient being asleep but rousing if their name is called. Aim to use the lowest dose possible and carefully monitor for side effects.
- **Droperidol or midazolam** should be used where there is a *serious and imminent risk* to safety and oral medication is not appropriate or the patient refuses.
  - Droperidol is therapeutic and has a longer duration of action. It is the preferred parenteral sedative in most circumstances.
  - Use when safety is not immediately at extreme risk (i.e. does not urgently require control within seconds to minutes) but there is significant potential for harm if the patient is not chemically restrained.
  - Midazolam is the preferred agent if paramedics are aware that the patient has QT prolongation. However, the nature of cases involving agitation will often mean this history is difficult to identify. There is no requirement that this is systematically excluded prior to providing sedation.
- **Ketamine** should only be used if there is an *extreme and immediate risk*.
  - Ketamine has a shorter duration, is non-therapeutic and does not treat the underlying cause of agitation, but has a slightly shorter onset time.
  - The intent is that ketamine be limited to situations where the risk is so overwhelming that the shorter onset time of ketamine is necessary to prevent harm, despite the medication's disadvantages. This is usually in the context of extreme violence, psychostimulant involvement, and ongoing significant resistance to police restraint.
  - Extreme risk relates to a substantial potential for death or serious injury.
  - Immediate risk refers to the risk being present right now or occurring very soon (i.e. seconds).

- Avoid cutting clothing or administration of an IM injection through patient clothing where possible.
- Consider the use of oral olanzapine to maintain a calm state where the agitated patient has responded to de-escalation yet has the propensity to re-escalate.
- Do not sedate a patient with a history of agitation 'just in case' where they do not display any anxiety or agitation.
- **Sedation checklist**

Combining sedation agents

- A combination of sedative agents can cause profound sedation requiring advanced airway management.
- Multiple parenteral agents should only be used for initial sedation where advanced airway management is possible (MICA only) and where the full onset time of the initial medicine administered has passed. If advanced airway management is not possible (e.g. no MICA on scene), ALS paramedics must consult the AV Medical Advisor via the AV Clinician prior to combining different parenteral sedatives.
- The use of olanzapine may be considered where care times are extended and the therapeutic effects of droperidol are wearing off and the patient is cooperative but remains agitated.
- Where ketamine is required to manage extreme agitation in the patient who is also experiencing serotonin toxicity or severe drug withdrawal, midazolam can be therapeutic. Prepare for advanced airway management. Consult the AV Medical Advisor via the AV Clinician for midazolam where ketamine has already been administered.

Post-sedation care

- Where parenteral sedation has taken effect and SAT < -1, a minimum standard of monitoring and supportive care is required.

Supportive care

- Supportive care should be provided as required including:
  - Airway management
  - Position patient in lateral position
  - Provide high flow oxygen
  - Temperature management as per **CPG P0901 Hypothermia / cold exposure** or **CPG P902 Hyperthermia / heat stress**
  - Reassessment and management of clinical causes of acute behavioural disturbance
  - **Ketamine:** Management of hypersalivation. On most occasions suctioning will be sufficient. Where hypersalivation becomes difficult to manage, consult AV Medical Advisor via the AV Clinician for advice including potential need for **Atropine 20 mcg/kg IV/IM** (MICA)

Monitoring

- Maintain line-of-sight monitoring at all times.
- At a minimum, observations must be undertaken and documented every 15 mins.
- Minimum repeat assessment:
  - Airway patency

- RR, HR
- Skin – pallor / mottling / cyanosis
- Sedation Assessment Tool
- SpO_2
- Continuous cardiac monitoring
- Neurovascular status of restrained limbs
- Injury from mechanical restraints
- Blood pressure (if compliant)
- $ETCO_2$: Any time ketamine is used or sedation SAT < 0, nasal $ETCO_2$ monitoring must be commenced, line-of-sight monitoring initiated, and consideration given to more frequent vital sign assessment.

- **SAT:** Use of the Sedation Assessment Tool (SAT) will assist in ongoing monitoring, clinical handover and case documentation.

SCORE	RESPONSIVENESS	SPEECH
+3	Combative, violent out of control	Continual loud outbursts
+2	Very anxious and agitated	Loud outbursts
+1	Anxious / restless	Normal / talkative
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

Transport destination

- If possible, transport to the patient's usual health service if they have a significant past history of care at a particular hospital.
- If this is not possible or appropriate, transport to a hospital with an emergency department capable of accepting paediatric patients.

Aeromedical

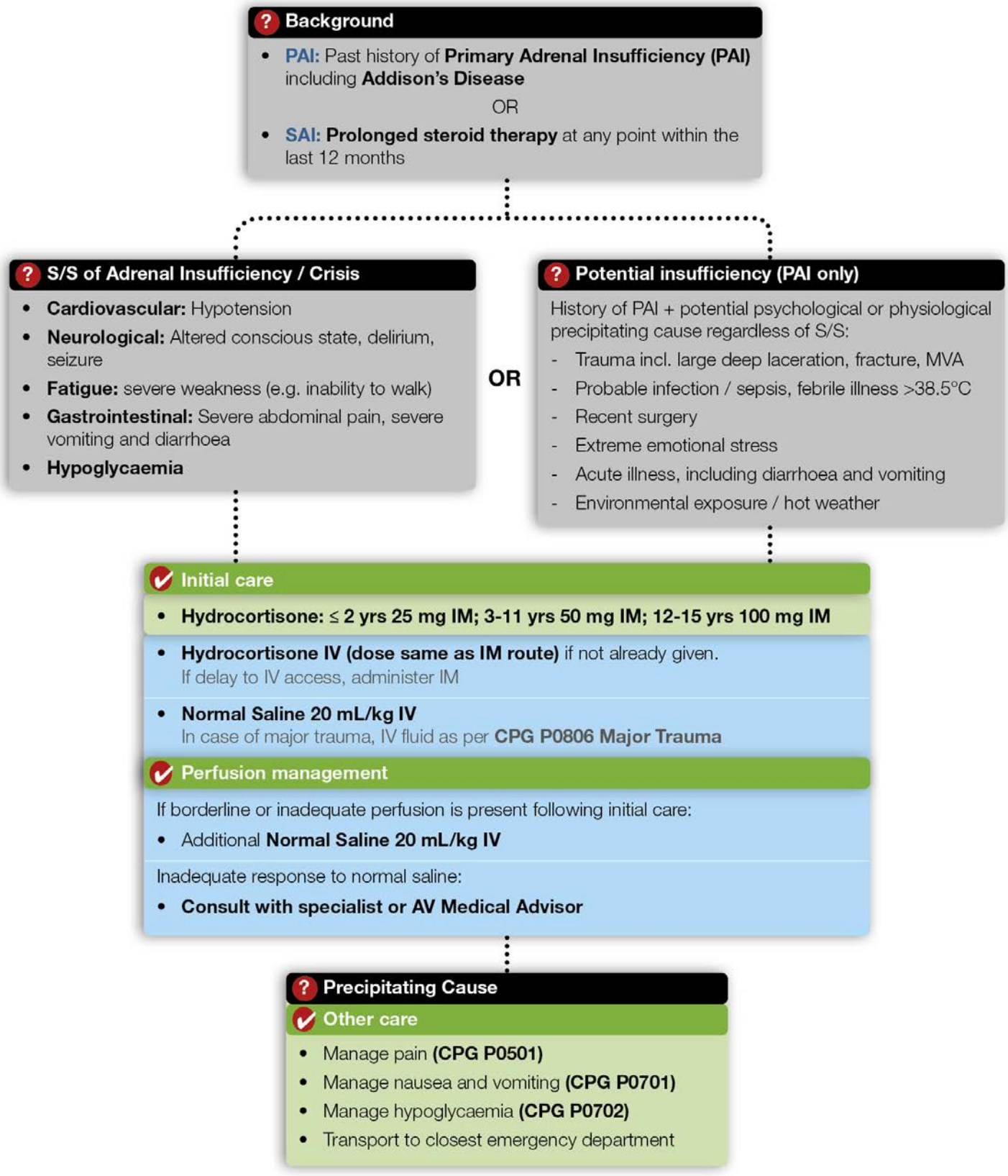
- The agitated patient, regardless of the cause, has the potential to endanger both aircrew and the aircraft. A strong index of suspicion should be maintained for the potential for agitation or escalation of behaviour for any patient requiring aeromedical transport and a lower threshold for intervention should form an essential part of the dynamic risk assessment.
- All patients requiring aeromedical transport must be screened for any potential behaviours of concern prior to loading onto an aircraft. All reasonable steps must be undertaken including the use of an appropriate sedation regime as outlined in this CPG and/or mechanical restraints as necessary to ensure crew and aircraft safety.
- If any doubt exists as to any potential safety issues resulting from patient behaviour or potential behaviour, Aeromedical crew may elect to refuse air transport and notwithstanding the presenting clinical problem, may request transport of the patient by road to the nearest appropriate facility.

- Under CASA law, the pilot in command (PIC) can determine that the carriage of a patient may be unsafe and request further steps be undertaken to mitigate any potential risks. The PIC has the statutory power to refuse transport of a patient or persons at any time.

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Agitation CPG review March 2021.pdf
- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC paper - Acute Behavioural Disturbance updates 2024.pdf
- CPG Walkthrough Video - Acute Behavioural Disturbance (Part 1: Assessment and De-escalation)
- CPG Walkthrough Video - Acute Behavioural Disturbance (Part 2: Restraint and Sedation)
- Key references
  - Royal Children's Hospital Acute Behavioural Disturbance: Acute Management Guidelines (2021).
  - Therapeutic Guidelines Psychotropic (Acute Behavioural Disturbance chapter). 2021.

Flowchart


Background
PAI: Past history of Primary Adrenal Insufficiency (PAI) including Addison's Disease
OR
SAI: Prolonged steroid therapy at any point within the last 12 months
S/S of Adrenal Insufficiency / Crisis
Cardiovascular: Hypotension
Neurological: Altered conscious state, delirium, seizure
Fatigue: severe weakness (e.g. inability to walk)
Gastrointestinal: Severe abdominal pain, severe vomiting and diarrhoea
Hypoglycaemia
OR
Potential insufficiency (PAI only)
History of PAI + potential psychological or physiological precipitating cause regardless of S/S:
- Trauma incl. large deep laceration, fracture, MVA
- Probable infection / sepsis, febrile illness >38.5°C
- Recent surgery
- Extreme emotional stress
- Acute illness, including diarrhoea and vomiting
- Environmental exposure / hot weather
Initial care
Hydrocortisone: ≤ 2 yrs 25 mg IM; 3-11 yrs 50 mg IM; 12-15 yrs 100 mg IM
Hydrocortisone IV (dose same as IM route) if not already given.
If delay to IV access, administer IM
Normal Saline 20 mL/kg IV
In case of major trauma, IV fluid as per CPG P0806 Major Trauma
Perfusion management
If borderline or inadequate perfusion is present following initial care:
Additional Normal Saline 20 mL/kg IV
Inadequate response to normal saline:
Consult with specialist or AV Medical Advisor
Precipitating Cause
Other care
Manage pain (CPG P0501)
Manage nausea and vomiting (CPG P0701)
Manage hypoglycaemia (CPG P0702)
Transport to closest emergency department

Care Objectives

- Prioritise corticosteroid therapy
- Support perfusion with IV fluid
- Transport to closest emergency department

Intended patient group

- Patients aged < 16 years with adrenal insufficiency

General Notes

Adrenal insufficiency

- An endocrine disorder characterised by inadequate production of the adrenal hormones cortisol +/- aldosterone leading to impaired regulation of glucose levels and cardiovascular function.
- Can lead to an **adrenal crisis**, a severe life-threatening form of adrenal insufficiency.

Types

Primary Adrenal Insufficiency (PAI)

- Includes Addison's Disease and Congenital Adrenal Hyperplasia (CAH)
- Due to adrenal gland destruction or impairment
- Often triggered by physiological or psychological stress

Secondary Adrenal Insufficiency (SAI)

- Occurs where pituitary or hypothalamic impairment reduces production of adrenocorticotropic hormone (ACTH) in turn reducing steroid hormone secretion from adrenal glands
- Can occur following prolonged (glucocorticoid) steroid therapy. If therapy is suddenly ceased or the dose is inadequate for the amount of stress present, the adrenal glands may not be able to produce sufficient cortisol to meet demand, precipitating an adrenal crisis.

Prolonged steroid therapy

- Illnesses managed with steroid therapy include: asthma, inflammatory bowel diseases, rheumatic diseases, vasculitis and organ transplantation.
- The potency, dose, and duration of steroid therapy can vary. As a guide, patients likely to have SAI in this setting will have prescribed steroid therapy for greater than 4 weeks.
- As SAI is also capable of precipitating life-threatening adrenal crisis it must be viewed as comparable in severity to PAI.

Assessment

The assessment items below are of particular relevance in adrenal insufficiency.

- **History:** PAI, corticosteroid pharmacotherapy, physiological or psychological stress
- **ECG:** Due to risk of hyperkalaemia
- **BGL:** Due to risk of hypoglycaemia

Symptoms of adrenal insufficiency may be mild to severe. Early signs may include mood swings, irritability, joint pain, fatigue, difficulty to rouse, and abdominal cramping.

Unstable PAI children are dynamic and have the potential to deteriorate quickly. Do not leave unwell PAI children at home or refer to GP. Consider early the potential need for MICA assistance especially where long transport times are required.

Gender identity

In a small proportion of children, the mechanisms of PAI (especially CAH) can result in undifferentiated development of sexual organs during in-utero growth. Children may be born with atypical genitalia, and this may or may not have been surgically corrected at some point. Be mindful of gender cues in conversation as a patient may be referred to as they/them.

Management

All patients

- Patients with a history of PAI must be considered for treatment with hydrocortisone where any physiological or psychological stressor is considered moderate or severe in order to avoid potential adrenal crisis.
- Signs and symptoms of adrenal insufficiency are not required to manage this patient group.
- Parent / carers of children with PAI are generally well educated about the illness and can often identify symptoms of adrenal insufficiency. Accordingly the parent / carer may have initiated their ‘sick day management plan’ including administration of their own IM injection of hydrocortisone. Alternatively the parent / carer may request Paramedics administer hydrocortisone. Review the patient's care plan as a part of your assessment.
- The patient with a history of PAI may have very poor veins for IV access. Do not delay hydrocortisone while trying to gain IV access. Use the IM route.

Extended travel time > 1 hour

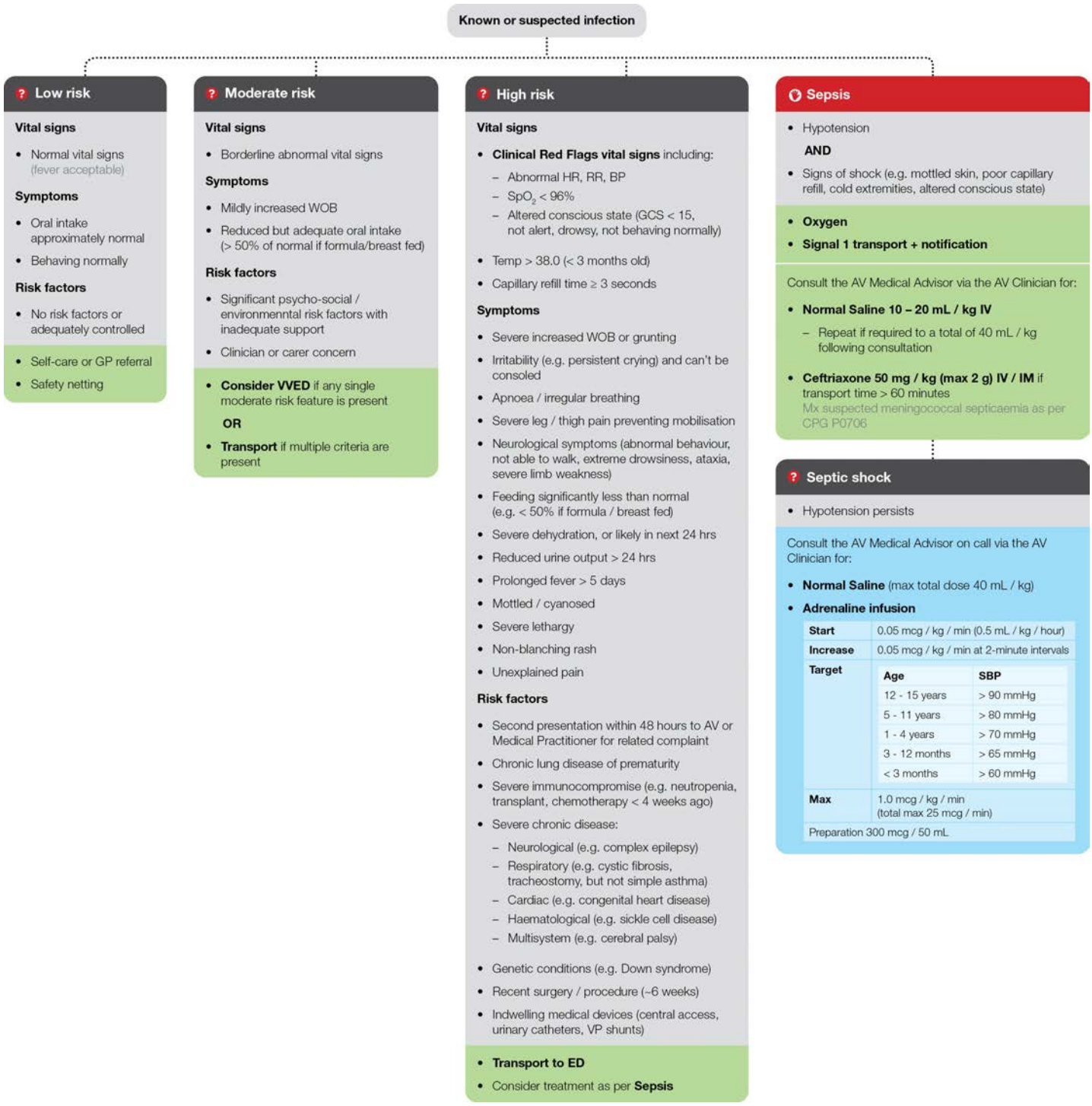
- Consult with the patient’s endocrine specialist or Medical Advisor via AV Clinician to establish ongoing IV fluid management plan and any other care priorities.

Hydrocortisone is unlikely to cause harm but has the potential to be life-saving.
If there is any doubt, initiate Hydrocortisone and IV fluids.

Related Resources

- Video: Adrenal crisis - When to give an emergency injection (Consumer Information)
- RCH Adrenal Insufficiency Guideline
- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Adrenal Insufficiency CPG - MAC Sept 2021.pdf

Flowchart



Care Objectives

- Identify and treat patients with clear signs of sepsis
- Risk stratify patients presenting with infection to inform an appropriate disposition

Intended patient group

- Patients aged <16 years of age with suspected infection or sepsis

Overview

- **Sepsis** is life-threatening organ dysfunction caused by a dysregulated response to infection.[1]
- **Septic shock** is sepsis with circulatory and cellular / metabolic abnormalities significant enough to substantially increase mortality.[1]
- Those most at risk of sepsis include neonates, immunocompromised children, and children with central venous access devices.

Assessment

- Sepsis is difficult to reliably exclude in children presenting with suspected infection. There are no well validated clinical decision tools or criteria that consistently risk stratify patients with infection. Sepsis shares signs and symptoms (particularly early in the course of illness) with self-limiting, usually viral illness.
- If there is any doubt, share the decision.

Low risk

- **Self-care / GP referral is appropriate** for children with normal vital signs (+/- fever), approximately normal oral intake and no significant risk factors.
- **Normal behaviour** includes what is normal for that child in the context of illness if that can be established. Some degree of emotional distress and fatigue is normal for children with minor illness. Parental concern about something being “off” or “not right” or acting in some way that significantly concerns the parents or caregivers is more concerning and should be considered abnormal. Persistent irritability or an inconsolable child should also be considered abnormal.

Moderate risk

- **VVED referral is appropriate** for children with some element of complexity associated with their presentation but no obvious signs / symptoms that are high-risk for sepsis:
  - Alterations in vital signs that only marginally exceed the Clinical Flag threshold (“borderline vitals”) but that are consistent with the overall presentation (most commonly, fever and mild tachycardia), and where there are no other concerning features. Children with multiple or more significant abnormal findings should be transported to ED.
  - Symptoms potentially indicative of more significant underlying illness or that may lead to more significant illness (e.g. reduced oral intake) but that are not yet concerning.
  - General psycho-social and environmental risk factors that may complicate their ability to be adequately monitored, escalate care in the event of deterioration or receive appropriate ongoing care (e.g. health literacy, parental substance dependence, remote location), and that

have not been adequately controlled for or supported.

High risk

- **Transport to an emergency department is required** for children with any high-risk feature.
- **Neutropenia** refers to low neutrophil count. There is no way to identify neutropenia clinically. Patients may report that they are neutropenic or have a low white blood cell count. Neutropenia is commonly caused by chemotherapy for cancer but may also be caused by some types of infections, cancers, and autoimmune diseases.
- **Chemotherapy** includes any kind of IV or oral medications to treat cancer that affect the immune system, administered within the past four weeks.

Sepsis

- Patients most at risk of sepsis also frequently present significant challenges in gaining intravenous access.
- Fluid resuscitation, antibiotics and vasopressors should ideally be administered following consultation with the AV Medical Advisor via the AV Clinician. If there is a delay to consultation or the patient is in severe shock, fluid resuscitation and vasopressors may be initiated at the judgement of the paramedic while attempts to consult continue.
- Patients with suspected meningococcal septicaemia should receive ceftriaxone as per **CPG P0706**.
- If the patient has an existing central line and an appropriately trained staff member (e.g. nurse) or an accredited parent is available, then consult the AV Medical Advisor via the AV Clinician to access the line if required (e.g. unable to gain IV access).

Temperature

- The degree of fever (or “height”), the speed of onset and response to antipyretic medication (e.g. paracetamol) do not predict the severity of illness. Similarly, the degree of fever does not indicate whether the underlying cause is bacterial or viral.
- Hypothermia is sometimes present amongst septic children, but it is usually present in the setting of other risk factors and multiple signs of critical illness. It is unlikely to be the only high-risk feature.
- A temperature < 36.0 should prompt thorough consideration of other indications of significant illness. However, that reading alone should not prompt escalation of care in the setting of a child who is otherwise low risk.

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Sepsis and Infection (Paed) 2024.pdf
- CPG Walkthrough Video - Sepsis and Infection

Meningococcal Septicaemia CPG P0706

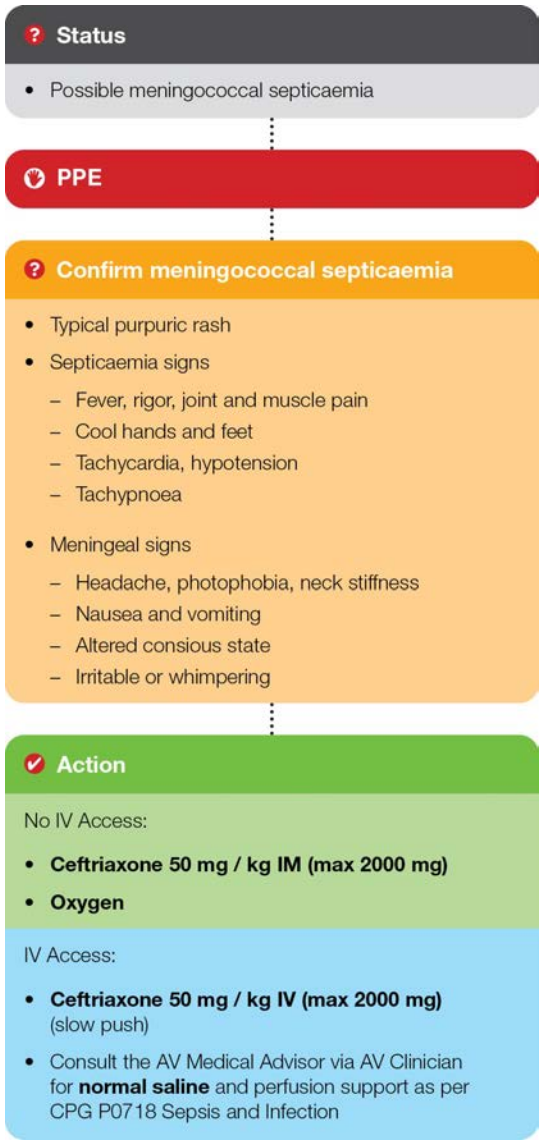
General Notes

- 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.

Ceftriaxone preparation

- IV administration
  - 1g vial: Dilute with 9.5 mL water for injection to 10 mL.
  - 2g vial: Dilute with 19 mL water for injection to 20 mL.
  - Administer 50 mg/kg IV (max 2000 mg) over 4 minutes.
- IM administration
  - 1g vial: Dilute with 3.5 mL lignocaine 1% to 4 mL.
  - 2g vial: Dilute with 7 mL lignocaine 1% to 8 mL.
  - Administer 50 mg / kg IM. Each 1g dose must be separately administered into lateral upper thigh.

Flowchart


Status
Possible meningococcal septicaemia
PPE
Confirm meningococcal septicaemia
Typical purpuric rash
Septicaemia signs
Fever, rigor, joint and muscle pain
Cool hands and feet
Tachycardia, hypotension
Tachypnoea
Meningeal signs
Headache, photophobia, neck stiffness
Nausea and vomiting
Altered consious state
Irritable or whimpering
Action
No IV Access:
Ceftriaxone 50 mg / kg IM (max 2000 mg)
Oxygen
IV Access:
Ceftriaxone 50 mg / kg IV (max 2000 mg) (slow push)
Consult the AV Medical Advisor via AV Clinician for normal saline and perfusion support as per CPG P0718 Sepsis and Infection

Influenza-like illness (paediatric) CPG P0716

Flowchart

- **Perform RAT**
  If positive, manage as per **CPG P0717 COVID-19 Management**

High risk

Vital signs

- **Clinical Red Flags**

Symptoms

- Severe chest pain
- Severe increased WOB
- Severe leg pain preventing mobilisation
- Neurological symptoms (not able to walk, extreme drowsiness, ataxia, severe limb weakness)
- Feeding significantly less than normal (e.g. < 50%) (formula / breast fed)
- Prolonged fever > 5 days

Risk factors

- Chronic lung disease of prematurity
- Severe immunocompromise (e.g. neutropenia, transplant, chemotherapy)
- Severe chronic disease:
  - Neurological (e.g. complex epilepsy)
  - Respiratory (e.g. cystic fibrosis, tracheostomy, but not simple asthma)
  - Cardiac (e.g. congenital heart disease)
  - Haematological (e.g. sickle cell disease)
  - Multisystem (e.g. cerebral palsy)
- Genetic condition (e.g. down syndrome)

- **Transport to hospital** if any one of VSS, symptoms or risk factors are present.

Low risk

Vital signs

- Normal vital signs
  Fever is acceptable.

Symptoms

- Cough
- Fever (≥ 38.0°C)
- Sore throat
- Mild croup
- Headache
- Sneezing
- Fatigue
- Ear pain
- Mild GI symptoms
- Mild chest tightness/discomfort (rare)

Risk factors

- No risk factors

- Education on expected course
- Safety netting
- Self-care advice (as per RCH fact sheet)
- Provide the RCH fact sheet
- Refer vulnerable close contacts for consideration of anti-viral prophylaxis
- Consider VED Ambulance referral if ongoing clinician or parental concern.

Care objective

- Identify patients with influenza-like illness
- Identify severity of disease and risk
- Identify a care pathway appropriate to the patient's condition / risk profile

Intended patient group

- Patients aged < 16 years with influenza-like illness

Assessment

Clinical features

Influenza is a viral respiratory illness characterised by:

- Seasonal nature (Australian flu season April to October)
- Abrupt onset, typically longer duration (>36 hours) and greater severity of symptoms by comparison to other common respiratory viruses (e.g. common cold)
- Respiratory symptoms:
  - Cough
  - Nasal congestion
  - Sneezing
  - Sore throat
  - Mild croup
  - Ear pain
- GI symptoms:
  - Abdominal pain
  - Nausea
  - Vomiting
- Systemic symptoms:
  - Chills
  - Myalgia
  - Malaise
  - Fatigue
  - Headache

  - Loss of appetite

- Fever (≥ 38.0°C)
- Young children (< 2 years) may present differently to older children:
  - Less likely to have respiratory symptoms
  - More likely to have febrile seizures
  - More likely to have GI symptoms

Expected course

- Systemic systems and fever last approximately 2-5 days in uncomplicated cases.
- Cough, mild fatigue and other respiratory symptoms may persist for several weeks.

Other considerations

- Close contacts with risk factors for complications should seek advice from their GP as soon as possible to discuss if any preventative treatment required. Recommend that they consult their GP immediately if they develop symptoms.
- Consider paracetamol for muscle aches as per **CPG P0501 Pain relief** regardless of transport decision.
- **Chemotherapy** includes any kind of IV or oral medications to treat cancer that effect the immune system, administered within the past four weeks.
- **Neutropenia** refers to reduced neutrophil count. There is no way to identify neutropenia clinically. Patient may report that they are neutropenic or have a low white blood cell count. Neutropenia is most commonly caused by chemotherapy for cancer but may also be caused some types of infections, cancers and autoimmune diseases.
- **Severe leg pain** preventing mobilization in children with influenza is indicative of myositis / rhabdomyolysis.
- **Neurological symptoms** are indicative of life threatening encephalopathy / encephalitis and include:
  - Unable to walk when usually able to
  - Ataxia in children usually able to walk
  - Severe limb weakness
  - Extreme drowsiness
- If COVID status cannot be ascertained (e.g. RAT contraindicated), using either the COVID Management CPG or this CPG is appropriate based on clinical judgement and the most likely underlying cause.

Related resources

- MAC Paper
- Walkthrough Video - Influenza

References

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5. St John Ambulance New Zealand. Clinical procedures and guidelines – Influenza. 2018. Available from: www.stjohn.org.nz/globalassets/documents/health-practitioners/clinical-procedures-and-guidelines---comprehensive-edition.pdf
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10. Safer Care Victoria. Colds and flu (patient fact sheet). 2019. Available from: https://www.safercare.vic.gov.au/clinical-guidance/emergency/colds-and-flu
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COVID-19 Management (Paediatric) CPG P0717

Care Objectives

- Identify severity of disease and risk
- Identify an appropriate care pathway
- Provide oxygen and other supportive care as required
- Transport to a paediatric emergency department

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 (PCR or RAT) 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

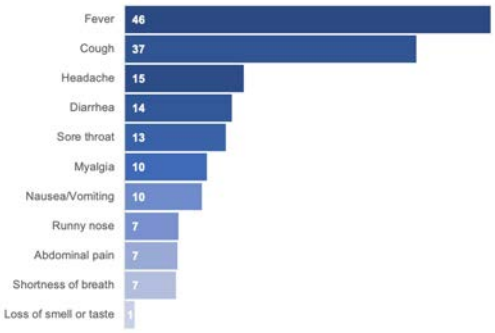
COVID-19 is the illness caused by infection with SARS-CoV2. It has multisystem features, but upper and lower respiratory features are most prominent. Other clinical presentations include gastrointestinal illness, neurological dysfunction and cardiac dysfunction.

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.

The Omicron variant is now the dominant strain of SARS-CoV-2 in Victoria. This strain is characterised by extremely high transmissibility via the airborne route and, in most patients, a milder clinical course than previous variants (although this finding may just reflect the very high vaccination rate in the community).

When there is very high prevalence of an infectious illness in the community, it is important to have a high index of suspicion for non-COVID related causes for a patient's symptoms.

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, including those infected with newer variants. 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.
- Paediatric Inflammatory Multisystem Syndrome temporally associated with SARS-CoV-2 (PIMS-TS) is a serious complication of COVID-19 in children. It may occur 2 – 6 weeks after the initial COVID infection (even if mild). Consider PIMS-TS in a child who presents with fever ≥ 3 days with acute GI symptoms and rash. Shock is a late sign of PIMS and detecting cases early is key. Some patients with PIMS-TS may require ICU. There are no modifications to paramedic management for this condition.

Mild	Moderate		Severe / Critical
Symptoms	Symptoms + **Lung involvement**		Symptoms + Lung involvement + **Hypoxia / Shock**
Cough Fever Myalgia Headache Sore throat Mild GI symptoms	**Low risk** Mild chest discomfort	**High risk** Increased WOB Moderate-severe chest pain Severe dehydration, or likely in future Reduced urine	SpO_2 < 96% Severe respiratory distress Any Red Flag vital signs Altered conscious state

		output >24hrs Syncope Significant risk factors with inadequate support Croup Severe lethargy Carer concern	Confusion / drowsiness Cyanosed / cold / pale / mottled skin Haemoptysis (frank) Respiratory failure Agitation Pauses in breathing / irregular breathing Febrile (< 3 months old) Fever ≥ 5 days
Self-care	**Timely medical review**	**Hospitalisation**	**Urgent prehospital care**
• **Self-care** advice • Safety netting • Refer to GP for follow-up if appropriate **OR** • **Self-present** if CPPP has already advised patient to call 000	• **VED Ambulance referral** If VED paediatric emergency physician unavailable, transport patient. • Mx as per *Mild* if appropriate **OR** • **Self-present** if CPPP has already advised patient to call 000 **OR**	• Transport	• **Oxygen** • **Prone position** for refractory hypoxia • **Transport**

	• **Transport** if self-presentation is not appropriate		

CPPP

COVID Positive Pathway Program (CPPP)

- COVID positive patients 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.
- Patients are generally advised to seek help for their symptoms via primary care services such as their GP or nurse on call.
- More information is available on the COVID Positive Pathways website.

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

GI Symptoms

- Many patients with COVID-19 will have typical viral gastrointestinal symptoms such as nausea, vomiting, diarrhoea and abdominal cramping.
- **Vomiting and diarrhoea** are concerning if they result in significant dehydration.
- Smaller children and infants may be less able to tolerate fluid losses associated with GI symptoms.
- **Abdominal pain** is often related to diarrhoea and is typically benign. Mild non-distressing abdominal pain may be suitable for self-care. Maintain a high index of suspicion for surgical or gynaecological causes co-presenting with COVID-19.

Rapid antigen test (RAT)

- RATs for paediatric patients may be used for patients with suspected COVID or when establishing an alternative care pathway (e.g. in consultation with VED) to ensure symptoms are due to COVID.
- Perform RAT in open space prior to loading patient. Do not delay transport waiting for test result.
- RATs are commonly used in school age children, however in some cases they may cause significant discomfort or distress. It is reasonable to withhold a RAT in this circumstance, particularly if the patient has respiratory distress.
- RAT is not mandatory (e.g. patient / parent refuses RAT, RAT not available).
- Performing a RAT should not take priority over other clinical interventions.
- RATs should not be provided to people who call 000 purely for testing. Refer these patients to a testing center.
- If the patient's COVID status is already known, a RAT is not required.
- **Instructions:** See **CWI OPS 197 Nasal Swab – Rapid Antigen Test**

Mild

Mild
Symptoms only

Cough Fever Myalgia Headache Sore throat

- Mild symptoms of upper respiratory tract infection or asymptomatic.
- Normal SpO_2 for patient and no signs of lower respiratory tract infection.
- Mild GI symptoms
  - Mild or transient vomiting or diarrhoea without dehydration
  - Mild or transient non-distressing abdominal pain
- Most children with mild COVID can be managed in the community. They are generally not enroled 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 enroled 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 enroled 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
  Mild chest discomfort

  Patient to contact GP or CPPP if enroled

- **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

$SpO_2 \geq 96\%$ Increased WOB

- COVID symptoms (often of greater severity) with signs of lung involvement / lower respiratory tract infection.
- $SpO_2 \geq 96\%$ 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

- Use **VED - Ambulance Referral** to discuss care at home vs transport with paediatric emergency physician.
- 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 conscious state
    - Severe vomiting / diarrhoea (e.g., $\geq$ 4 x day, $\geq$ 4 days) and unable to tolerate oral intake (or not feeding / drinking)
  - Reduced urine output (> 24 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.
- Transport patients to the nearest paediatric emergency department.

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

- Indigenous
- Morbid obesity
- History of smoking
- Low health literacy
- Low digital literacy
- Unvaccinated
- Pregnant
- Infant

- **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

- Risk of violence, abuse or neglect
- Poor access to care
- Remote location

Severe / Critical

Severe / Critical
Symptoms + Lung involvement + Hypoxia / Shock

SpO_2 < 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.

Virtual Emergency Department

- The Virtual Emergency Department (VED) service provides telehealth assessments via video call.
- Paediatric VED consultations **must involve a VED paediatric emergency physician**. If there are no paediatric physicians available, transport the patient.
- It is recommended that at least one attending paramedic has completed VED induction prior to using the service. prior to using the service.

VED contact details

VED catchments & operating times

VED Self-Referral

- Do not use VED Self-referral for paediatric COVID patients.

VED Ambulance Referral

- Paramedics contact the VED while on scene.
- Paramedics are required to provide a handover and may facilitate further management in consultation with VED staff (e.g. anti-emetics).
- AV has priority access to VED. However, wait times up to 30 minutes are possible in some circumstances.

Related resources

- PPE Requirements
- CWI/OPS/195 Awake prone position

- Vehicle cleaning and decontamination
- CPR on prone position patients
- https://av-digital-cpg.web.app/assets/pdf/My COVID Assessment Plan 1.0.pdf

References

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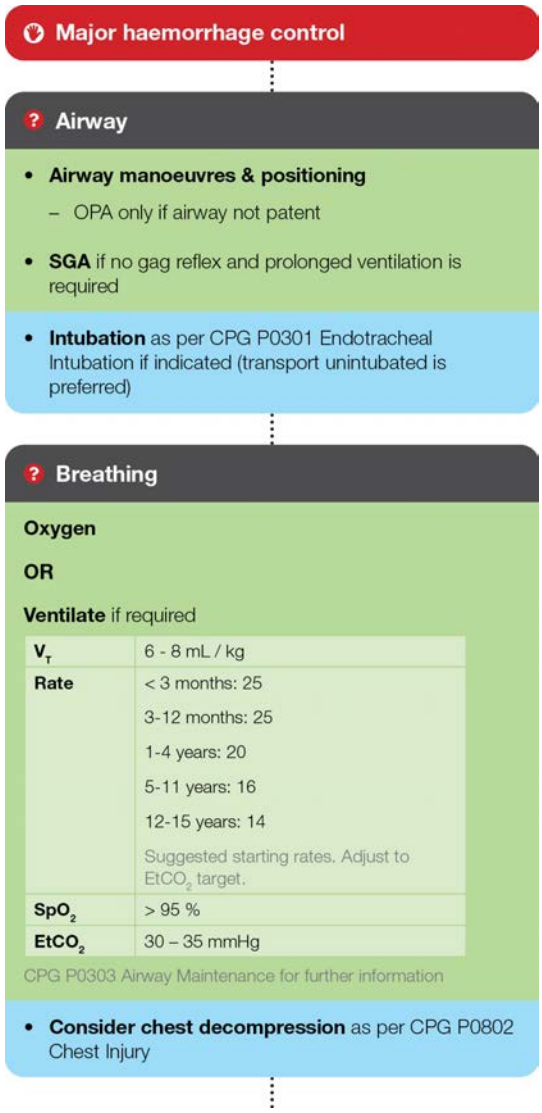
Flowchart


Major haemorrhage control
Airway
• Airway manoeuvres & positioning
– OPA only if airway not patent
• SGA if no gag reflex and prolonged ventilation is required
• Intubation as per CPG P0301 Endotracheal Intubation if indicated (transport unintubated is preferred)
Breathing
Oxygen
OR
Ventilate if required
V_T 6 - 8 mL / kg
Rate < 3 months: 25
3-12 months: 25
1-4 years: 20
5-11 years: 16
12-15 years: 14
Suggested starting rates. Adjust to EtCO2 target.
SpO2 > 95 %
EtCO2 30 – 35 mmHg
CPG P0303 Airway Maintenance for further information
• Consider chest decompression as per CPG P0802 Chest Injury

Circulation

First line

- **Fluid resuscitation** targeting adequate perfusion

Age	HR	SBP
12 - 15 years	60 - 130	90 mmHg
5 - 11 years	80 - 140	80 mmHg
1 - 4 years	90 - 160	70 mmHg
3 - 12 months	100 - 180	60 mmHg
< 3 months	100 - 180	50 mmHg

  - **Normal saline IV (max 40 mL/kg)** titrated to response
  - Consult AV Medical Advisor via AV Clinician for further Mx if inadequate response
  - Seek consent for blood transfusion from parents / guardian
  - **PRBC 10 mL / kg IV** in preference to normal saline if available, titrated to response (no max dose)
- **Pelvic splint** if blunt trauma to the pelvis or for all unconscious multi-trauma patients
- **Consider other causes** of shock

  Haemorrhage control, chest decompression, pelvic splint, ventilator strategy, anaphylaxis to medications

Supportive care

- Warm the patient
- **Pain relief** as required
- **Spinal immobilisation** if required
- **Mx wounds / fractures**
- **Seizures** as per CPG P0703 Seizures
- **Hypoglycaemia** as per CPG P0702 Hypoglycaemia
- Pressure care

Osmotherapy

- Intubated neurotrauma

  AND
- Signs of deterioration, with one or two dilated pupils

  AND
- HEMS transport > 20 minutes flight time
- **Sodium Chloride 3% 3 mL / kg (max 250 mL) IV** (MFP Only – Consult with AV Medical Advisor via AV Clinician prior to administration)
  - Aim for infusion over minimum 5 – 10 minutes

Care Objectives

- Immediate control of major haemorrhage

- Ensure:
  - Airway patency
  - Breathing (adequate oxygenation and ventilation)
  - Circulation (adequate perfusion)
- Prioritise transport
- Supportive care as required

General Notes

Intended patient group

- Patients aged < 16 with traumatic injuries.

Using this guideline

This guideline outlines a hierarchy of priorities. Its purpose is to assist in prioritising care where the patient has multiple needs. It is not intended to be applied in a strictly linear way. In many cases, multiple aspects of this guideline may be applied simultaneously.

This guideline is primarily intended for patients with major trauma. However, it is not strictly limited to patients meeting the criteria in **CPG P0105 Time Critical Guidelines (Trauma Triage)**. The priorities apply equally to patients with minor injuries, though the majority of management included in this CPG will not be relevant.

Prioritising transport

- **All major trauma:** Minimise scene time for all patients that meet the criteria in **CPG P0105 Time Critical Guidelines (Trauma Triage)**.
- **Shock or penetrating truncal trauma:**
  - Only immediately life-threatening conditions should be treated prior to transport.
  - Pain may be managed concurrently with transport where possible.

More information

The effect of prehospital times on outcomes for trauma patients is controversial. The impact likely depends on the extent and type of injury. Nonetheless, it is important to minimise prehospital time for all trauma patients who are critically ill or who may deteriorate.

This CPG is not intended to be prescriptive regarding exactly when transport should occur in a workflow. Clinical judgement will inform what is prioritised based on the circumstances and patient's presentation.

There is strong consensus that delaying transport to gain IV access is detrimental for shocked trauma patients in adults. IV access for fluid resuscitation is not as important as surgical intervention to definitively treat the cause of shock (e.g. control of bleeding). An improvement in blood pressure following fluid resuscitation does not reduce the urgency of transport.

Evidence suggests that short prehospital times are especially important in penetrating truncal trauma and shock where injuries are likely to require emergency surgical interventions.

Major haemorrhage

- **Major haemorrhage control should be prioritised.** Regularly reassess the patient to ensure the haemorrhage remains controlled.

More information

Haemorrhage control

Control of major haemorrhage is the absolute priority throughout the entire episode of care. These important measures may be neglected if they are not actively considered and reassessed.

The adequacy of haemorrhage control may change over time:

- Dressings and tourniquets may become dislodged
- A pelvic splint may be forgotten or improperly positioned
- Bleeding may resume as a patient is resuscitated and their blood pressure increases

This may not be immediately recognized especially if they're obscured (e.g. covered by a blanket). Reassessment is essential to ensure ongoing bleeding is identified.

Airway

- Airway manoeuvres and position as per **CWI/OPS/190**.
- OPAs may provoke the patient's gag reflex and should not be used unless the airway patency cannot be maintained with other measures.

Breathing

- Oxygen via non-rebreather mask at 10-15 L/min for patients meeting the major trauma triage criteria.
  - Oxygen may be titrated to SpO_2 > 95 % if haemodynamically stable and pulse oximetry reading is reliable.
- Refer to **CPG P0802 Chest Injury** for indications for chest decompression

More information

Oxygen

There is broad consensus that oxygen therapy is appropriate during initial care of any critically ill or unstable patient because:

- It may improve oxygen delivery (based on expert opinion)
- Hypoxia may go unrecognized and untreated if pulse oximetry is unreliable or the clinician is task-saturated

However, there is no strong evidence that oxygen improves outcomes for trauma patients without hypoxia and it is not an essential element of care. Once the patient is stable, oxygen saturation is reliably measured and other important elements of patient care have been addressed, oxygen may be titrated down and/or removed.

Circulation

- Fluid resuscitation should target adequate perfusion. Permissive hypotension is not recommended for children.
- Age specific blood pressure / heart rate targets are an approximate guide to the adequacy of perfusion.
- The presence of a radial pulse, central capillary refill time and normal mentation may assist in determining that the blood pressure is adequate.

More information

Blood pressure

BP is a poor measure of the adequacy of perfusion in many trauma patients and it can be difficult to ascertain accurately. Additionally, the exact blood pressure at which perfusion is adequate will vary between patients. These complications are especially true of paediatric patients. Despite this, blood pressure is the main indication for fluid resuscitation in this CPG as it is an objective and clear threshold.

The presence of a radial pulse, central capillary refill time of < 3 seconds and/or a normal level of alertness are generally considered to be better indications of the adequacy of perfusion. However, they are more subjective, difficult to assess and easily confounded (e.g. drugs and alcohol). If circumstances permit, it may be appropriate to combine these assessments with the use of BP to judge the adequacy of perfusion, especially where BP is thought to be inaccurate or cannot be taken.

This guideline recommends against applying the concept of permissive hypotension in children based on advice from RCH that hypotension in children is indicative of impending cardiac arrest and should be treated aggressively. Fluid resuscitation is appropriate if there are any signs of shock including tachycardia, hypotension, altered mental status, prolonged central capillary refill time or the absence of a radial pulse.

Other considerations

- Hypotension from isolated SCI should be treated as per **CPG P0804 Spinal Injury**

Blood components

- **MICA paramedics credentialed** in blood component administration may administer PRBC.
- Blood components are the preferred resuscitation fluid and, where possible, should be considered in preference to normal saline (e.g. interhospital transfer, HEMS).
- Indications for fluid resuscitation with blood components differ from those of normal saline given the greater potential benefits. There is no single combination of indications.
- **Legal minor:** Packed Red Blood Cells (PRBC) must only be administered to a child < 18 years if:
  - A parent / legal guardian can be contacted and the parent / legal guardian does not object to the administration of a blood transfusion.

  OR

  - A medical doctor approves administration (preferably AV Medical Advisor via the AV Clinician or RCH)
- **Religious objection:** PRBC must not be administered to a patient with a known religious objection to blood transfusion (e.g. Jehovah's Witness) and refuses consent.

Delivering blood components to scene

- If HEMS is significantly delayed or unavailable, consider blood component access:
  - Metropolitan Melbourne: contact the Metro Clinician.
  - Regional Victoria: contact the Adult Retrieval Victoria Clinical Co-ordinator. If ARV is unable to be contacted within 10 minutes, contact the AV Clinician.
- The initial attending MICA unit should not delay arrival at the scene to obtain PRBC.
- Scene time should not be prolonged waiting for PRBC.
- ARV / PIPER should be notified of any patient requiring PRBC that is not transported to a Major Trauma Centre. This facilitates early support of Regional Trauma Centres and arrangement of secondary transfer where appropriate.

Supportive care

- Supportive care should occur in parallel to other aspects of care in the primary survey if possible.

Warm the patient

- Prevent heat loss and actively warm the patient if possible.
  - Ambulance heater
  - Removing wet clothes / drying the patient
  - Blankets
  - Cover the head (beanie, towels, etc)
  - Chemical warming blankets (if shocked, intubated or hypothermic)
  - Blood / fluid warmer if available

More information

Warmth and the prevention of hypothermia

Hypothermia is an independent predictor of mortality in major trauma patients and is thought to worsen coagulopathy. While hypothermia may be a marker of shock rather than the cause of increased mortality, there is broad consensus that it should be prevented.

Basic measures to prevent heat loss should be considered for all trauma patients regardless of their injuries, vital signs, body temperature or the environmental conditions.

Consider heating the ambulance, removing wet clothes, drying the patient, and applying blankets. Preventing heat loss may be particularly important for trapped patients during extrication.

There is no strong evidence to support chemical warming blankets for all trauma patients. Their use should be limited to patients with particularly high risk of coagulopathy and death:

- Shock
- Intubation
- Hypothermia

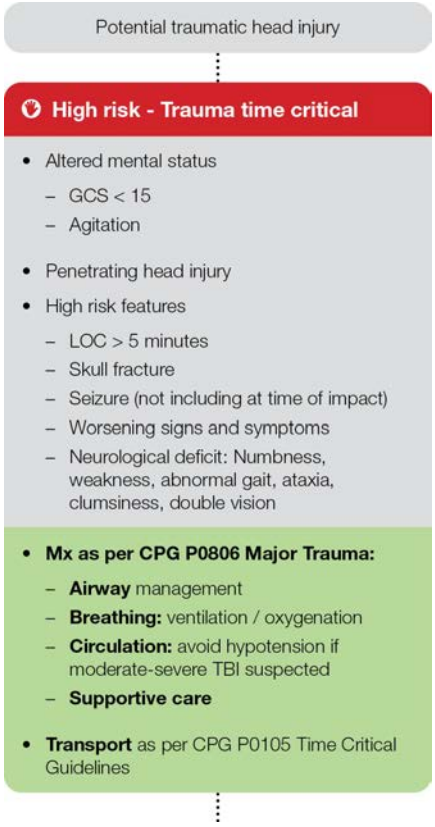
Spinal immobilisation

- Consider spinal immobilisation as per **CPG P0804 Spinal Injury**. If intubation is required, apply cervical collar after intubation. Attempt to minimise jugular vein compression.
- Consider raising the head of the stretcher by 10-15 degrees to aid venous drainage if TBI / chest injury.

Related resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Major Trauma (PAED).pdf
- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Hypertonic Saline 3.pdf

Flowchart


Potential traumatic head injury
High risk - Trauma time critical
Altered mental status
GCS < 15
Agitation
Penetrating head injury
High risk features
LOC > 5 minutes
Skull fracture
Seizure (not including at time of impact)
Worsening signs and symptoms
Neurological deficit: Numbness, weakness, abnormal gait, ataxia, clumsiness, double vision
Mx as per CPG P0806 Major Trauma:
Airway management
Breathing: ventilation / oxygenation
Circulation: avoid hypotension if moderate-severe TBI suspected
Supportive care
Transport as per CPG P0105 Time Critical Guidelines

Moderate risk

Any of:

- Repetitive questioning
- Slow response to verbal communication
- Acting abnormally per the parent /carer (age < 2)
- Dangerous mechanism of injury
  - Motor/cyclist impact > 30 km/h
  - High speed MCA > 60 km/h
  - Pedestrian impact
  - Ejection from vehicle
  - Prolonged extrication
  - Fall from height > 3 m
  - Struck on head by object falling > 3 m
  - Explosion
- Intoxication
- Coagulopathy / anti-coagulant / antiplatelet (not aspirin)
- Severe headache
- Vomiting more than once
- Loss of consciousness
- Non-frontal scalp haematoma (age <2)
- Age < 6 months
- VP shunt
- Neurodevelopmental disorder

- **Transport** (CT scan or observation required)
- **Consider VVED** if any of the following are the only risk factors and there are no other concerning features:
  - Multiple vomits
  - Scalp haematomas
  - Neurodevelopmental disorders

Low risk

- No high or moderate risk criteria
- Competent adult available to monitor patient for 4 hours

Concussion symptoms:

- Self-care
- Safety netting
- Provide health information sheet
- GP follow-up (within 2-3 days)

No symptoms:

- Safety netting
- Provide health information sheet

Care Objectives

- Moderate-Severe TBI: Optimise airway patency, oxygenation, ventilation, and cerebral perfusion pressure to prevent secondary brain injury
- Mild TBI / other head injuries:
  - Identify high risk patients and triage to neurosurgical facility where possible
  - Identify moderate risk patients and transport to ED for CT or observation
  - Identify low risk patients and refer into the community with self-care advice

Intended patient group

- Patients aged < 16 with potential traumatic head injury.

High risk – trauma time critical

Moderate – Severe TBI

- Treatment is focused on maintaining normal physiology and reducing the likelihood of secondary brain injury.
- Specific management is included in **CPG P0806 Major Trauma**.

Airway

- Maintain airway patency with manoeuvres and positioning initially
- Only use airway adjuncts (OPA / NPA) if necessary to maintain airway patency

Breathing

- Target normal oxygen saturation and $ETCO_2$ levels

Circulation

- Target normal or supranormal blood pressure to maintain perfusion to the brain

Supportive care

- Consider raising the head of the stretcher by 10-15 degrees to aid venous drainage

Penetrating injury

- Maintain a high index of suspicion for any patient with an MOI that could cause a penetrating brain injury.

More information

Significant penetrating injuries can occur without altered conscious state or obviously serious wounds. Patients with seemingly mild injuries and normal mentation can go on to significantly and

rapidly deteriorate.

High risk features

- Indicate high risk of serious underlying injury or deterioration.

More information

Normal GCS alone does not rule out more severe injury.[1] Deterioration from normal or near-normal conscious state can subsequently occur, sometimes rapidly. The high risk features outlined in this CPG are associated with increased risk of underlying severe injuries that can lead to rapid deterioration.

Base of Skull fracture

- Signs include:
  - Haemotympanum (the presence of blood leaking from the middle ear)
  - CSF leaking from the ears or nose
  - Battle sign (bruising over the mastoid process)
  - Racoon eyes (bruising under the eyes)
- An absence of these signs does not exclude basal skull fracture as some may take up to three days to become apparent.

More information

Base of skull fractures

- Base of skull fractures (also known as basal or basilar skull fractures) are usually caused by significant blunt head trauma from a high energy mechanism of injury such as an MVA, fall from height or assault with a weapon.
- Base of skull fractures are commonly associated with serious facial injuries, cervical spine injury and intracranial haemorrhage.
- The classic signs and symptoms of basal skull fracture are highly predictive if they are identified. However, they are limited in several ways, especially in the prehospital context. Battle sign and raccoon eyes can take up to three days to develop. Haemotympanum and CSF leakage can be subtle and easily confounded by blood and fluid from other sources.

Disposition

- These patients should be transported as per **CPG P0105 Time Critical Guidelines (Trauma Triage)** to the highest level of trauma service within 60 minutes.

Moderate risk

- **Mechanism of injury:** High energy mechanism of injury in combination with the potential for head injury (e.g. head strike) may warrant a period of observation or, if combined with other concerning findings, imaging.
- **Drug or alcohol intoxication:** treat as if the neurological findings are due to the head injury.
- **Bleeding disorders/anticoagulant/antiplatelet therapy:** for example, immune thrombocytopenia. Potentially increased risk of bleeding and frequently associated with increased complexity due to the underlying medical conditions.
- **< 6 months old:** higher risk of intracranial injury. May also be associated with higher risk of non-accidental injury given the development capabilities of the patient make head injury unlikely (e.g. can't walk or roll).
- **Ventricular shunt:** risk of shunt failure and malfunction. Can be dynamic. Requires thorough assessment in an emergency department and may require neurosurgical advice.
- **Neurodevelopmental disorders:** These patients may be difficult to assess and the preference is to include the patient's primary treating team where possible.
- **Possible non-accidental injury:** transport to hospital regardless of severity of head injury. Assessment will include expert evaluation of injuries and referral regarding family violence.
- **Scalp hematoma:** non-frontal (e.g. occipital, temporal, or parietal haematoma) may be associated with increased risk in younger children. However, the judgement of severity is subjective and there is a spectrum of risk. Disposition decision may be made in collaboration with VVED.
- **Vomiting:** vomiting following head injury in children is common and not concerning in isolation. Multiple episodes of vomiting may be concerning in some circumstances. Disposition decision may be made in collaboration with VVED.

Low risk

Disposition

- The absence of high or moderate risk criteria indicates the patient has a very low risk of having a clinically significant injury requiring emergency treatment.
- Self-care may be appropriate.
- Ongoing symptoms indicate mild brain injury (concussion). The patient requires advice on the care of mild brain injury and follow up with a GP for ongoing management.

More information

"Concussion symptoms" refers to any minor symptoms typical of minor TBI (e.g. mild headache, nausea or fatigue) but not included in high or moderate risk criteria.

Self-care advice

- For patients with concussion symptoms:
  - Rest: limit physical and cognitive activity, including screen time (e.g. mobile phones, TV) until symptoms resolve
  - Paracetamol for headaches
  - Do not drive, drink alcohol or take sedatives for 24 hours
  - A competent adult should be available to monitor the patient for at least 4 hours and ideally up to 24 hours.

Safety netting

- Advise patient/carer to seek immediate help if they experience:
  - Severe or increasing headache
  - Repeated vomiting
  - Increasing confusion / agitation
  - Altered conscious state, "black outs" or cannot be woken
  - Seizures
  - Weakness or altered sensation in limbs
- Provide Heath information Sheet

Referral

Concussion symptoms

- Non-urgent follow up with a GP is required (2-3 days) as patient may require further advice and care for chronic symptoms of mild brain injury.

No concussion symptoms

- No referral is required for a low risk patient with no symptoms.

Monitoring

- Pupil exam: 15 minutely in patients being transported.
  In addition to baseline monitoring requirements outlined in CPG A0101 Clinical Approach.

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Traumatic head injury.pdf

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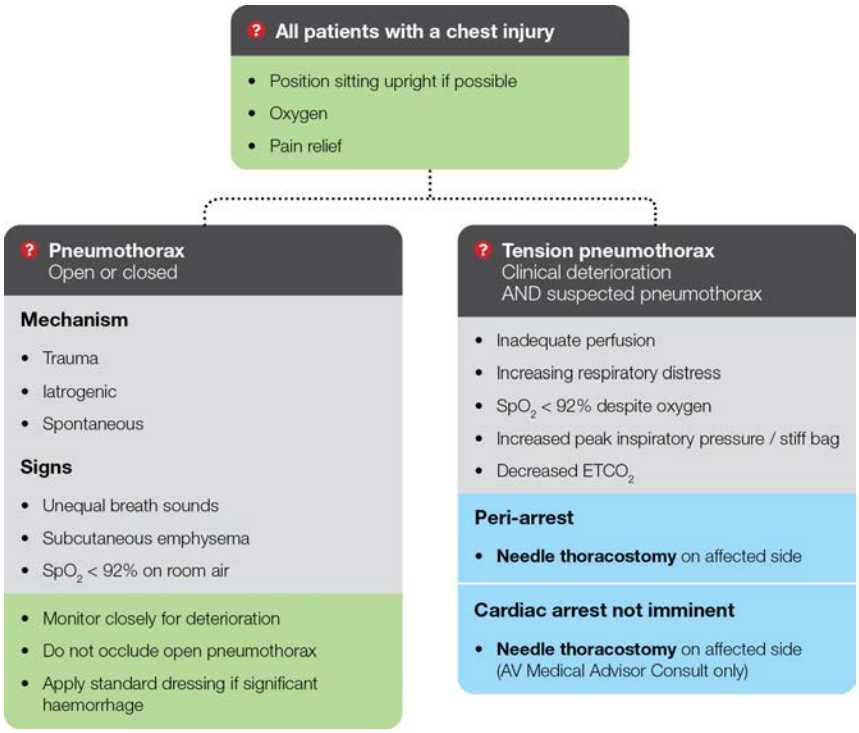
Chest Injury CPG P0802

Flowchart



Care Objectives

- Adequate oxygenation
- Effective pain relief to assist in maintaining adequate ventilation
- Early identification and management of tension pneumothorax

Intended patient group

- Patients aged < 16 with a chest injury

Overview

Chest injury includes a range of pathologies that affect the chest wall and underlying organs. Several of these have specific prehospital management considerations.

More information

- **Rib fractures** – Fractures to one or more ribs, leads to pain and may impair ventilation and gas exchange. More than 3 fractures to the chest wall is associated with higher rates of

complications. **Flail segment** may occur where multiple ribs are fractured in more than one location each, creating a segment that can move independently of the rib cage leading to significant ventilatory impairment. On inspiration the flail segment may be seen to move inward while the rest of the chest wall is expanding.

- **Pneumothorax** - Infiltration of air into the pleural cavity leading to a partial collapse of the lung on the affected side. May be **open** (external wound allowing air into pleural space) or **closed** (wound to visceral pleura allowing air to enter pleural space). A pneumothorax that does not impact on other structures within the chest may also be known as a simple pneumothorax.
- **Haemothorax** – Infiltration of blood into the pleural cavity leading to a partial collapse of the lung on the affected side. Massive hemothorax can lead to complications of tension pneumothorax and hypovolaemia.
- **Tension pneumothorax** - A pneumothorax where a segment of damaged tissue creates a valve that allows air to enter the pleural space but inhibits its escape, creating progressive expansion and impairing ventilatory function. This pressure can shift the mediastinal structures laterally away from the affected side leading to compression or kinking of the large vessels, obstructive shock and cardiac arrest.

Assessment

Respiratory

- Perform a respiratory status assessment
- Monitor SpO_2
- Consider nasal capnography for monitoring of respiratory rate and trends in ventilation

Secondary Survey

- Expose the chest
- Observe
  - Bruising, deformity, abnormal chest movements
  - Open / penetrating wounds. Assess areas not easily visualised including the axilla and back
- Palpate
  - Tenderness, crepitus, subcutaneous emphysema

Pneumothorax

- Pneumothorax is challenging to diagnose in the prehospital environment.
- Closely monitor any patient with suspected pneumothorax for progression to tension pneumothorax.
- Isolated symptoms should not be used to diagnose or exclude pneumothorax. Consider diagnosis in the context of mechanism of injury and presence of other signs / symptoms.

- Consider mechanism of injury
  - Traumatic
  - Spontaneous
  - Iatrogenic

More information

Mechanism of injury

- Traumatic
  - Blunt
  - Penetrating
- Spontaneous
  - Primary spontaneous pneumothorax presents in patients without a precipitating event in the absence of lung disease, often caused by an unrecognised lung abnormality (e.g. a bleb). Most commonly occurs in older adolescent and young adult males. Other risk factors include smoking, tall and slim build, family history or genetic predisposition including connective tissue diseases.
  - Secondary spontaneous pneumothorax occurs as complication of existing lung disease (e.g. COPD)
- Iatrogenic
  - Barotrauma (i.e. secondary to positive pressure ventilation)
  - Medical procedure (e.g. CPR, lung biopsy)

- Signs and symptoms may include:
  - Unequal breath sounds
  - Subcutaneous emphysema
  - SpO_2 < 92% on room air

More information

- Equal air entry on chest auscultation does not exclude pneumothorax as referred noises may be heard, particularly in ventilated patients.
- Subcutaneous emphysema is the presence of air beneath the skin; however it is not always present in pneumothorax.

Tension Pneumothorax

- Tension pneumothorax should be suspected in the patient with a likely mechanism for pneumothorax and clinical deterioration, with or without signs of pneumothorax. They may present with:
  - Inadequate perfusion
  - Increasing respiratory distress
  - SpO_2 < 92% despite oxygen
  - Distended neck veins and tracheal deviation (these are unreliable and late signs).
- There are differences in the respiratory mechanics of spontaneously breathing and ventilated patients which can influence how tension pneumothorax develops. Below are commonly seen trends but do not reflect all presentations of tension pneumothorax.

Spontaneously breathing

- Tends to progressively worsen over time.
- Presents predominantly with hypoxaemia and increasing respiratory distress.
- Inadequate perfusion is usually a late sign.

Ventilated

- High risk of developing tension pneumothorax in major trauma, particularly where there is evidence of chest injury.
- Tends to develop rapidly (seconds to minutes).
- Presents predominantly with haemodynamic compromise and hypoxaemia.
- Increased peak inspiratory pressure / stiff bag (difficulty squeezing the BVM).
- Decreased $ETCO_2$.
- Consider in ventilated cardiac arrest patients who have received vigorous CPR where there is a sudden deterioration in SpO_2 and $ETCO_2$.

More information

The mechanics of spontaneous ventilation and positive pressure ventilation are different, which influences some aspects of the clinical presentation of tension pneumothorax. However these differences do not occur in the same way for every patient.

The proposed pathophysiology for spontaneously breathing patients suggests that a one-way valve allows for pneumothorax volumes to progressively increase, while compensatory mechanisms such as increasing respiratory rates and tidal volumes prevent sudden haemodynamic compromise. This leads to a slower progression of symptoms, presenting with hypoxaemia and increasing respiratory distress first.

Ventilated patients may be less likely to compensate due to increased inspiratory pressures and sedation / unconsciousness. Positive pressure ventilation causes a faster accumulation of intrapleural gas leading to earlier compressive effects on the heart or vessels. This can lead to a

sudden (seconds to minutes) deterioration presenting predominantly with haemodynamic compromise.

There are no standard diagnostic criteria for tension pneumothorax and the presentation may vary from the broad categories listed in this guideline. Diagnosis is subjective and should consider the mechanism and all signs and symptoms in context.

Management

Positioning

- Sitting upright (awake and spontaneously ventilating patients)
  Optimises respiratory mechanics
- Lie supine / 10-15 degrees head-up: where patient is hypo perfused or requires spinal precautions

Oxygenation

- Consider the need for oxygen in any patient with chest injury or impaired ventilation.
- Consider oxygen regardless of SpO_2 in anyone with suspected or diagnosed pneumothorax.

Pain relief

- Early and effective analgesia is essential.
  Pain associated with rib fractures can lead to hypoventilation.
  Methoxyflurane may be less effective if pain on inspiration impedes administration.
- Do not splint chest injury
  This is not effective and may increase pain.

Open chest wounds

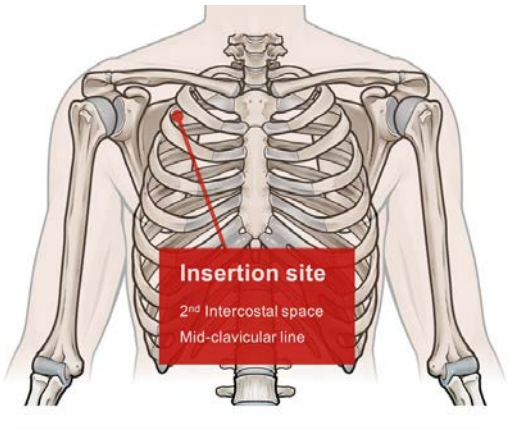
- Do not cover open chest wounds unless there is significant haemorrhage.
  Covering will seal the wound and may worsen or cause a tension pneumothorax.
- Leave the wound open and monitor the patient closely.

Vented Chest seals

- Chest seals may have already been applied to open chest wounds by other agencies such as the police special operations group
- Remove chest seal if there is evidence of tension pneumothorax

Needle thoracostomy

- Chest decompression by needle thoracostomy is the primary management for tension pneumothorax.
  - ARS or IV Cannula: **CWI/OPS/169**
  - Arrow® Pneumothorax Kit: **CWI/OPS/073**



- Do not perform needle thoracostomy unless there is evidence of tension pneumothorax.
- Consult AV Medical Advisor via the AV Clinician for suspected tension pneumothorax where cardiac arrest is not imminent.
- Local anaesthetic with lignocaine is not recommended due to the risk of damage to underlying vessels in paediatric patients.
- An uncomplicated pneumothorax does not routinely require decompression for flight.

More information

Previous clinical practice has included decompression of pneumothorax without signs of tension in preparation for flight, due to the perceived high likelihood of deteriorating due to changes in pressure.

Recent practice has shown these patients are frequently able to be managed without decompression and this procedure should not be routinely performed prior to flight without clear signs of tension pneumothorax.

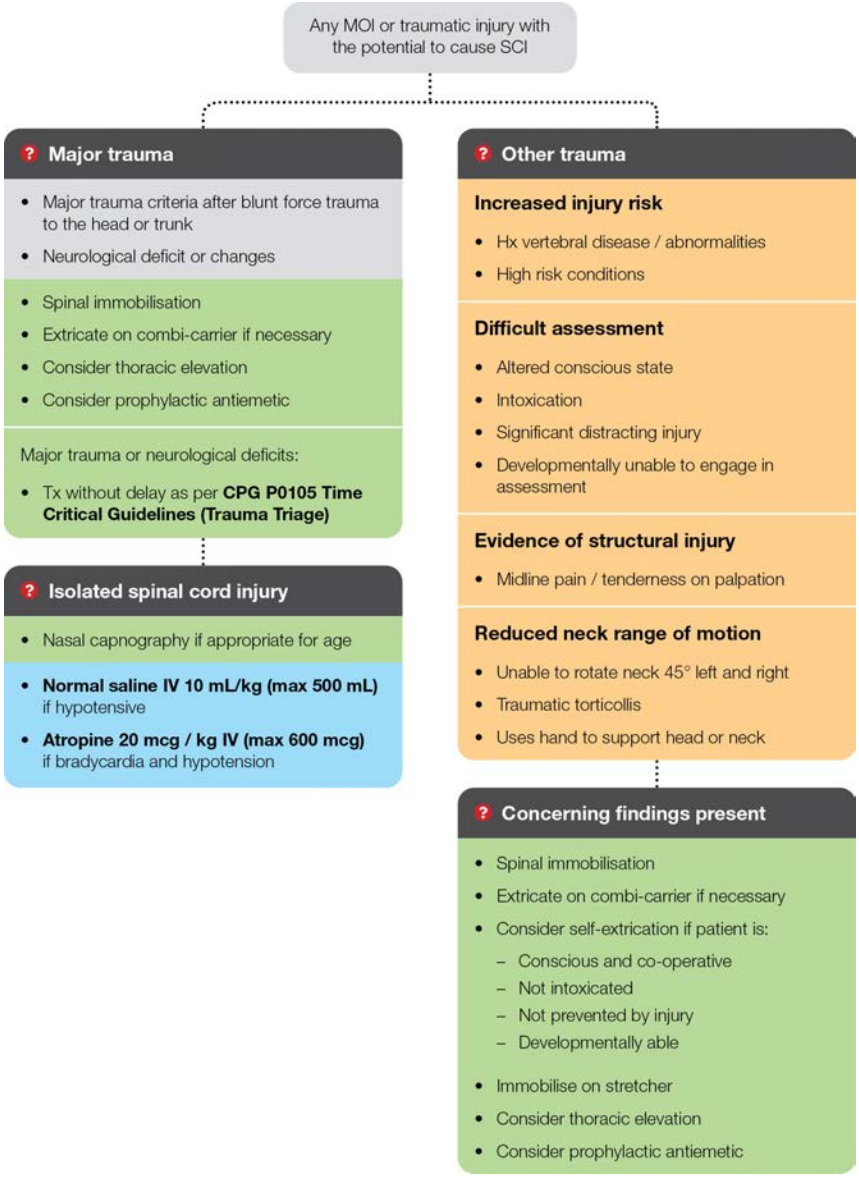
Shock

- Concurrently manage shock as per **CPG P0806 Major Trauma (Paediatric)**

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Chest Injury.pdf

Flowchart



Neurological examination

Motor function

Any weakness when asked to:

- **Arms:** grasp / pull / push.
- **Legs:** push / plantar flex, pull / dorsiflex, leg raise.

Sensory function

Reduced or no sensation when applying light touch to the following:

- **Arms:** Light touch across the palm and back of hand (C6-8)
- **Legs:** Light touch lateral side of calcaneus (S1)

- The patient should be questioned regarding 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 a neurological deficit and CANNOT be spinally cleared.
- The left and right sides should be tested simultaneously to compare strength between sides of the body.

Neck range of motion

Test for pain or restricted range of motion by asking the patient to:

- turn their own head slowly,
- to the left and the right,
- approximately 45 degrees each way,
- stopping if they feel any pain or resistance.

Do not turn the patient's head for them.

Care Objectives

- 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.

Intended patient group

- Patients < 16 years of age with a MOI capable of causing injury to the spinal column

Overview

- See **CPG A0804 Spinal Injury (Adult)**

Assessment

Mechanism of injury

Concerning MOIs

- Includes those with the potential for hyper-flexion, hyper-extension, hyper-rotation or axial loading of the spinal column.

Healthy patients

- Spinal injuries in healthy children are extremely rare. 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.

Higher risk of injury

- Far less force is required to damage the vertebrae of patients with:
  - Vertebral disease (ankylosing spondylitis, spinal stenosis, rheumatoid arthritis)
  - Previous spinal abnormalities (spinal fusion, previous c-spine injury or surgery)
  - High risk conditions: Down syndrome, osteogenesis imperfecta, achondroplasia, any complex rheumatological, genetic or metabolic condition.

Penetrating trauma

- Do not routinely spinally immobilise. Immobilisation of patients with penetrating trauma is associated with higher mortality.
- Spinal immobilisation should only be applied if the patient has a neurological deficit.

Learn more

MOI

- The role of MOI in paediatric spinal clearance is controversial.[1] Significant axial loading injury (e.g. diving accidents) and high speed MVA are significant risk factors for cervical injury in children.[2, 3] They are included as exclusion criteria in some spinal clearance algorithms.
- This guideline considers high risk mechanism of injury should increase the index of suspicion for spinal injury but does not automatically exclude the patient from spinal clearance if there are clearly no other concerning features. This position is based on expert consensus[1], the RCH guideline and expert advice during the development of the guideline.

SCI and Major Trauma

- **SCI or major trauma:** Patients with neurological deficit or other major trauma criteria should receive spinal immobilisation and expedited transport. They are not candidates for spinal clearance.
- **Other trauma patients:** Spinal clearance should be considered for all other trauma patients with a MOI that could potentially cause injury to the spinal cord or column.

Learn more

Neurological deficit

Neurological deficits indicate spinal cord injury. The patient meets the major trauma criteria and should be transported accordingly.

Neurological deficits are included in the NEXUS criteria. However, in this guideline, neurological deficit is included in a separate pathway as it indicates actual cord injury and leads to an urgent and unique care pathway.

The other NEXUS criteria indicate a higher risk of unstable vertebral or ligamentous injury. These injuries are serious and management less urgent.

The modified NEXUS criteria used in this guideline are not intended to be used for severely injured trauma patients. The treatment of life-threatening injuries and expediting transport are the priorities. These patients also have a higher likelihood of spinal column injury and more distracting factors, increasing the chances of erroneous spinal clearance.

AV guidelines recommend against attempting spinal clearance in any patient meeting the criteria in **CPG P0105 Time Critical Guidelines (Trauma Triage)** following blunt trauma to the head, neck or trunk (chest / back / abdomen). Spinal clearance may be appropriate in some cases as not all patients meeting these criteria will be severely injured. However, the guideline recommends against attempting spinal clearance for the sake of simplicity.

Spinal clearance

- Spinal clearance involves clinically excluding spinal cord injury and unstable vertebral injury. Spinal immobilisation is not required once the patient has been spinally cleared.
- A patient can be spinally cleared if there are:
  - No neurological deficits
  - No evidence of vertebral injury in the form of pain or tenderness on palpation
  - No factors increasing the difficulty of patient assessment (altered conscious state, distracting injury)
  - No increased risk of injury (e.g. Down syndrome)
  - Normal neck range of motion (the patient can turn their own head approximately 45 degrees, slowly to the left and right), no traumatic torticollis.
- **Altered conscious state** includes any presentation which may confound the results of a physical examination (e.g. GCS < 15 for any reason, concussion).

- **Distracting injury:** injuries that cause significant pain or distress to the extent that they may distract the patient from the pain caused by vertebral injury, making the physical exam unreliable. Generally these are very painful injuries such as fractures or burns. Small haematomas or lacerations are not usually considered distracting.
- **Developmentally unable to engage in assessment:** Dependent on the individual child and clinical judgement.
- **Intoxication:** the use of any alcohol, drugs or medications that conceal the pain of a vertebral fracture or distract the patient from reporting neurological deficits, making the physical examination unreliable.
- **Traumatic torticollis:** lateral twisting or tilting of the head or neck to one side with limited range of motion (image).

More information

Spinal clearance

- Spinal clearance is the process of excluding spinal cord injury and unstable vertebral or ligamentous injury based on clinical exam, without the need for imaging such as a CT scan.
- The concept of spinal clearance is based on the principle that cord injury causes neurological deficits and vertebral fractures cause pain. Both of these features can be assessed as part of a physical exam.
- If the patient does not have neurological deficits or pain and the physical examination is reliable (e.g. they are not intoxicated, distracted or in an altered conscious state), then cord injury or unstable vertebral injury are very unlikely.
- The National X-ray utilization study (NEXUS) found this approach is extremely reliable. However, there have been cases where these criteria alone missed unstable vertebral injuries.
- The modified NEXUS criteria used by AV includes additional components aimed at further reducing the likelihood of missed unstable injury.

Care

Spinal immobilisation

- Spinal immobilisation techniques are included in **CWI/OPS/188 Soft Cervical Collar**
- 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. Techniques 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).
- Maintain neutral alignment of the cervical spine by providing head elevation (see thoracic elevation below).
- The head MUST NOT be restrained to the stretcher.
- Repositioning the neck may worsen injury in some circumstance and should not be attempted even if the position prevents the application of a cervical collar. The following three types of patients should be supported in a position of comfort:
  - Children who use their hands to support the head
  - Children with traumatic torticollis
  - Concerning abnormal neurology on examination
- The CombiCarrier extrication board should only be used as an extrication device. Patients should NOT be immobilized on the board for transport to hospital.
- Manual In-Line Stabilisation (MILS) as per **CWI/OPS/205** should be used when transferring the patient or during intubation.
- During extrication, all movements should be planned and coordinated as a team to minimise unnecessary handling of the patient and potential for manual handling injuries.
- Consider prophylactic antiemetic as per **CPG P0701 Nausea and Vomiting** in all awake spinally immobilised patients

Thoracic elevation

- Younger paediatric patients have larger occiputs by comparison to their torso. Elevating the torso may assist in maintaining a neutral position.
- Consider thoracic elevation in all patients < 8 years of age. The extent of the required elevation depends on the patient's size.
- 2 – 4 centimeters is appropriate in most patients and can be achieve by placing folded towels on the stretcher prior to loading the patient.

Monitoring for suspected SCI

- Vital signs, neurological observation (strength and sensation in limbs): 15 minutely
- Cardiac monitoring, SpO_2, nasal capnography: continuous.

More information

- Patients with suspected spinal cord injury should be monitored using nasal capnography if the nasal cannula fits the patient.
- Elevated or increasing $ETCO_2$ indicates hypoventilation. The patient may require ventilation and escalation of care.

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC paper - Spinal injury (PAED).pdf

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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 ≤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.

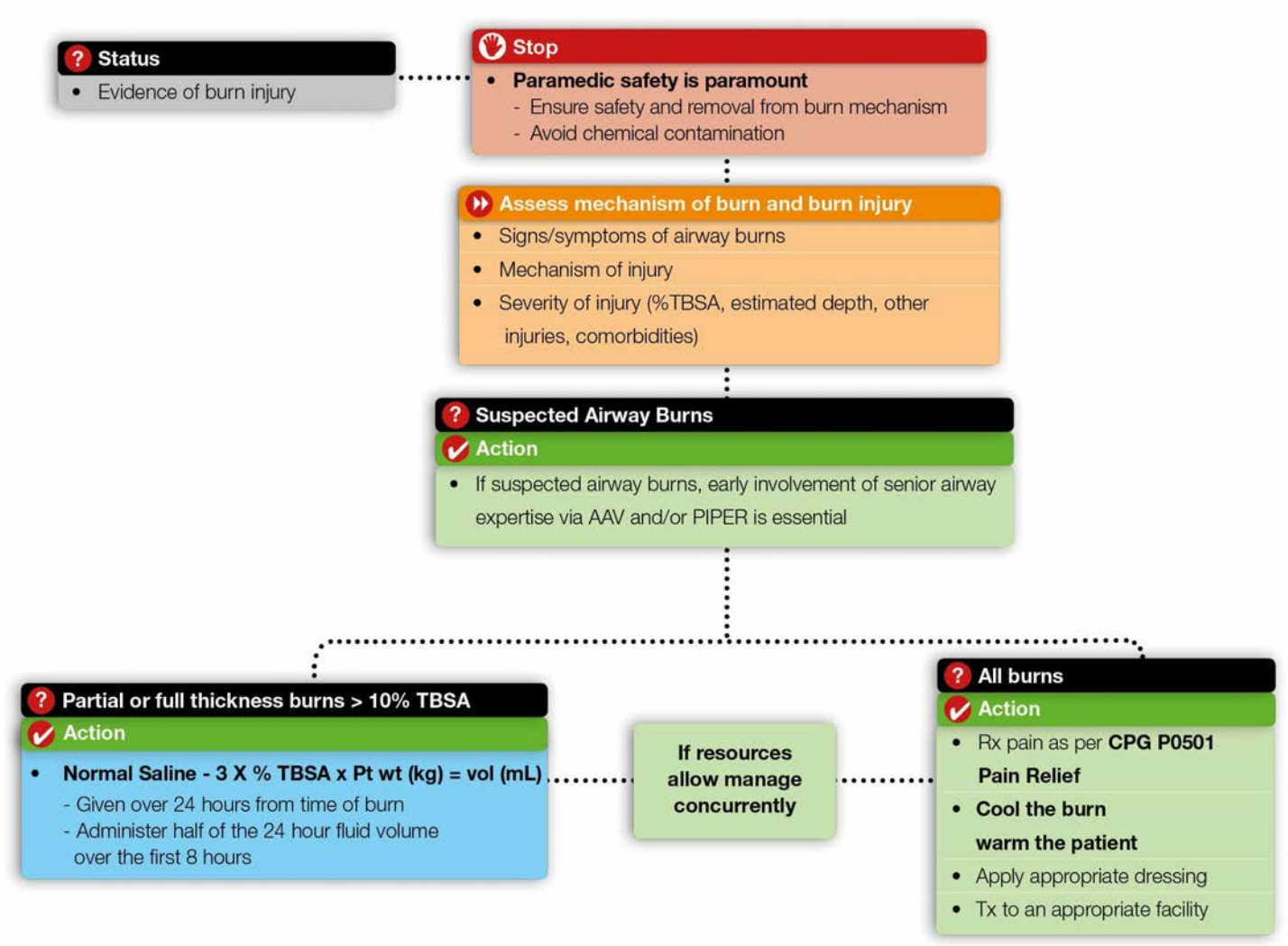
Dressing

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

Transport

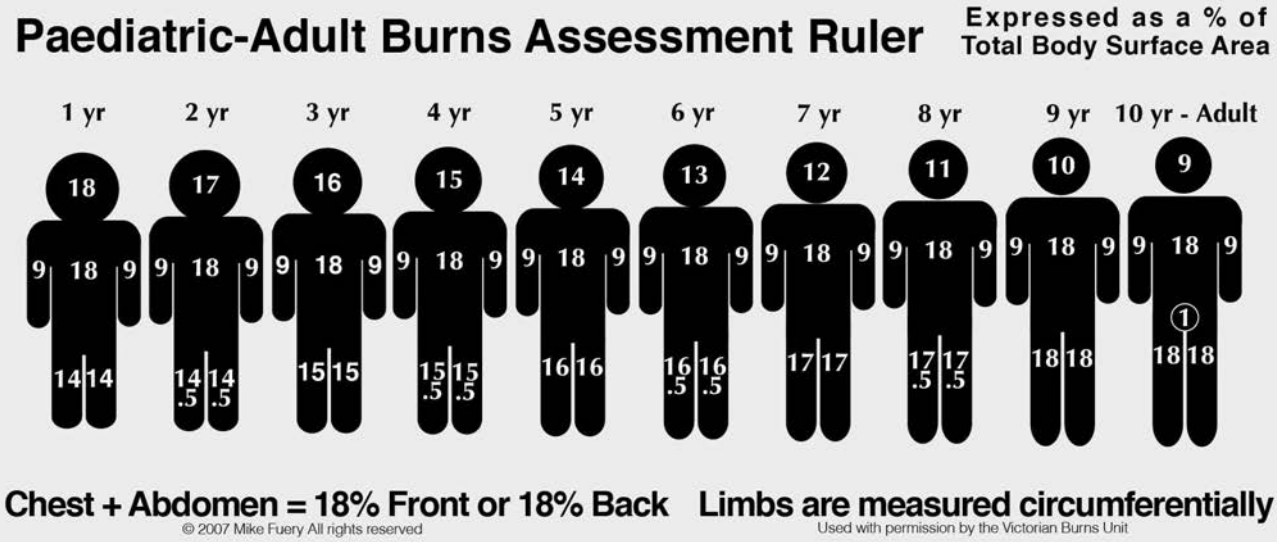
- All burns patients who meet the time critical trauma criteria (> 10% TBSA, suspected airway burns, > 1000 volt electrical burns) should be transported to the Royal Children's Hospital as a preference, if within 60 minutes transport time. If transport time > 60 minutes, transport to the nearest alternative 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 – consult the AV Medical Advisor via the AV Clinician for further management, appropriate destination and hospital notification.

Flowchart


Status
Evidence of burn injury
Stop
Paramedic safety is paramount
- Ensure safety and removal from burn mechanism
- Avoid chemical contamination
Assess mechanism of burn and burn injury
Signs/symptoms of airway burns
Mechanism of injury
Severity of injury (%TBSA, estimated depth, other injuries, comorbidities)
Suspected Airway Burns
Action
If suspected airway burns, early involvement of senior airway expertise via AAV and/or PIPER is essential
Partial or full thickness burns > 10% TBSA
Action
Normal Saline - 3 X % TBSA x Pt wt (kg) = vol (mL)
- Given over 24 hours from time of burn
- Administer half of the 24 hour fluid volume over the first 8 hours
If resources allow manage concurrently
All burns
Action
Rx pain as per CPG P0501 Pain Relief
Cool the burn warm the patient
Apply appropriate dressing
Tx to an appropriate facility

Paediatric - Adult Burns Assessment Ruler

Special Notes



Hypothermia / Cold Exposure CPG P0901

Care Objectives

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

General Notes

Intended patient group

- Patients aged < 16 years with cold exposure or hypothermia

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 the AV Medical Advisor via the AV Clinician 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.

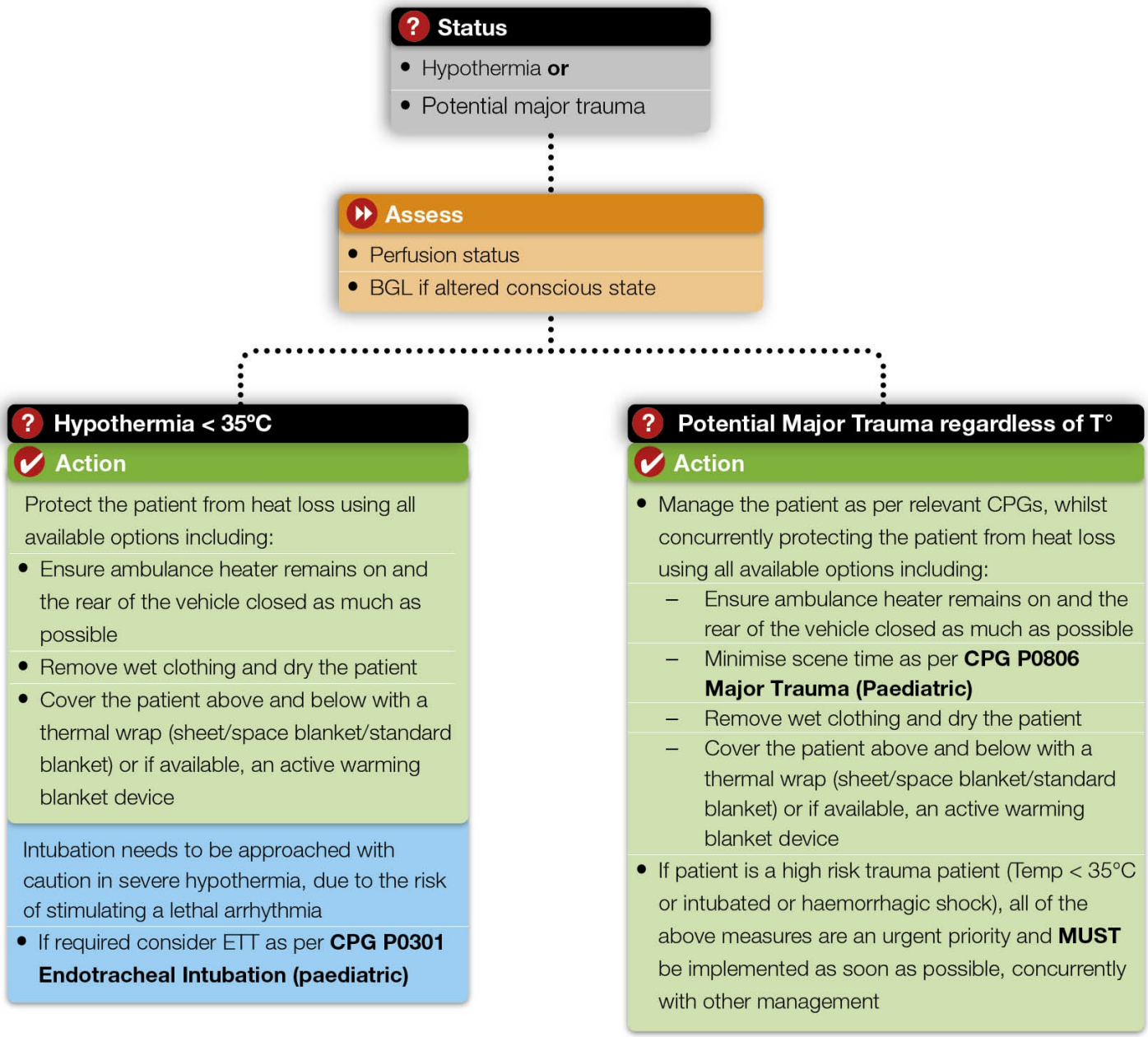
Cardiac arrest

- The onset and duration of medications is prolonged during hypothermia. In cardiac arrest if the patient has a temperature < 30°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


Status
Hypothermia or
Potential major trauma
Assess
Perfusion status
BGL if altered conscious state
Hypothermia < 35°C
Action
Protect the patient from heat loss using all available options including:
Ensure ambulance heater remains on and the rear of the vehicle closed as much as possible
Remove wet clothing and dry the patient
Cover the patient above and below with a thermal wrap (sheet/space blanket/standard blanket) or if available, an active warming blanket device
Intubation needs to be approached with caution in severe hypothermia, due to the risk of stimulating a lethal arrhythmia
If required consider ETT as per CPG P0301 Endotracheal Intubation (paediatric)
Potential Major Trauma regardless of T°
Action
Manage the patient as per relevant CPGs, whilst concurrently protecting the patient from heat loss using all available options including:
Ensure ambulance heater remains on and the rear of the vehicle closed as much as possible
Minimise scene time as per CPG P0806 Major Trauma (Paediatric)
Remove wet clothing and dry the patient
Cover the patient above and below with a thermal wrap (sheet/space blanket/standard blanket) or if available, an active warming blanket device
If patient is a high risk trauma patient (Temp < 35°C or intubated or haemorrhagic shock), all of the above measures are an urgent priority and MUST be implemented as soon as possible, concurrently with other management

Hyperthermia / Heat Stress CPG P0902

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°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°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

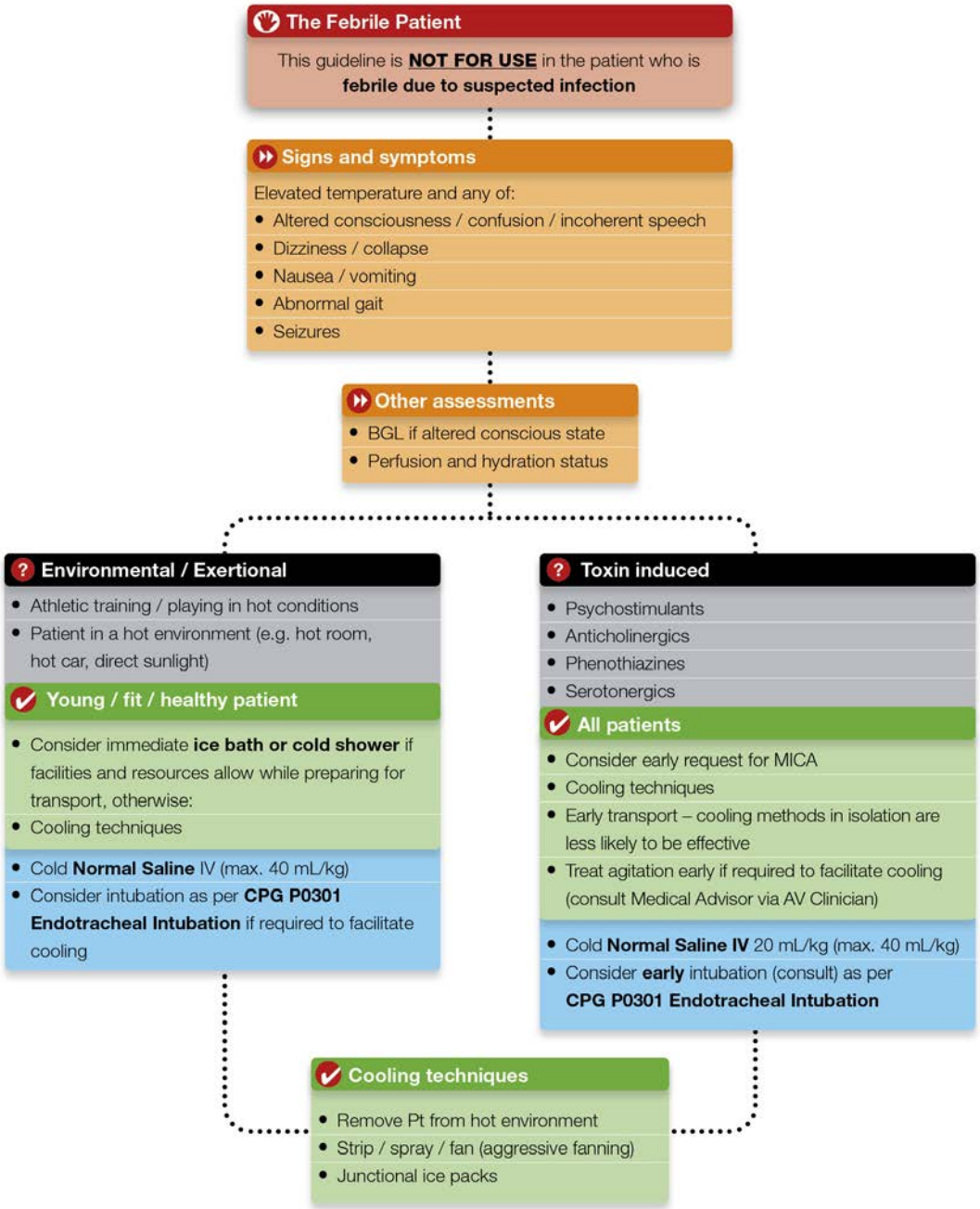
Very young patients

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

- Consider assessment and management principles in **CPG A0719 Drug Induced Hyperthermia** including sedate - cool - hydrate
- Consult VPIC

Flowchart


The Febrile Patient
This guideline is NOT FOR USE in the patient who is febrile due to suspected infection
Signs and symptoms
Elevated temperature and any of:
Altered consciousness / confusion / incoherent speech
Dizziness / collapse
Nausea / vomiting
Abnormal gait
Seizures
Other assessments
BGL if altered conscious state
Perfusion and hydration status
Environmental / Exertional
Athletic training / playing in hot conditions
Patient in a hot environment (e.g. hot room, hot car, direct sunlight)
Young / fit / healthy patient
Consider immediate ice bath or cold shower if facilities and resources allow while preparing for transport, otherwise:
Cooling techniques
Cold Normal Saline IV (max. 40 mL/kg)
Consider intubation as per CPG P0301 Endotracheal Intubation if required to facilitate cooling
Toxin induced
Psychostimulants
Anticholinergics
Phenothiazines
Serotonergics
All patients
Consider early request for MICA
Cooling techniques
Early transport – cooling methods in isolation are less likely to be effective
Treat agitation early if required to facilitate cooling (consult Medical Advisor via AV Clinician)
Cold Normal Saline IV 20 mL/kg (max. 40 mL/kg)
Consider early intubation (consult) as per CPG P0301 Endotracheal Intubation
Cooling techniques
Remove Pt from hot environment
Strip / spray / fan (aggressive fanning)
Junctional ice packs

Definitions

Term:	37 - 42 weeks gestation
Preterm:	23 – < 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

Focused 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
$PaCO_2$	↓ 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 O_2: To maintain SpO_2 > 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:

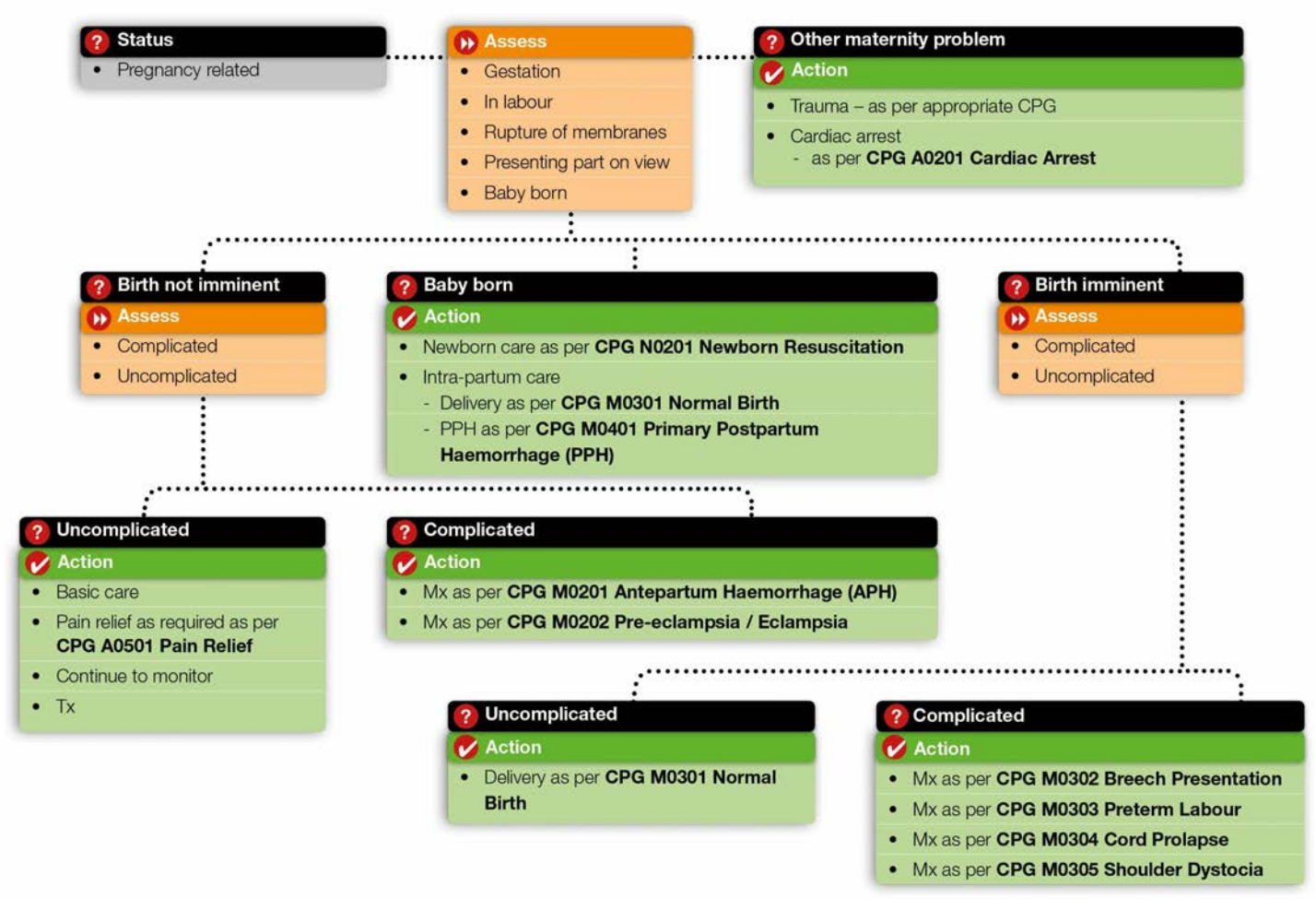
- Assessment and resuscitation of the mother must take priority as ultimately the welfare of the fetus is optimised by providing the best available care to the mother.
- If there is any doubt as to the application of any maternity CPG, consult with PIPER

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

- https://av-digital-cpg.web.app/assets/pdf/MAC/4.1.1 CPG Change Proposal - Maternity CPG.pdf

General Notes

- If birth is imminent transport to the closest hospital with a maternity service.

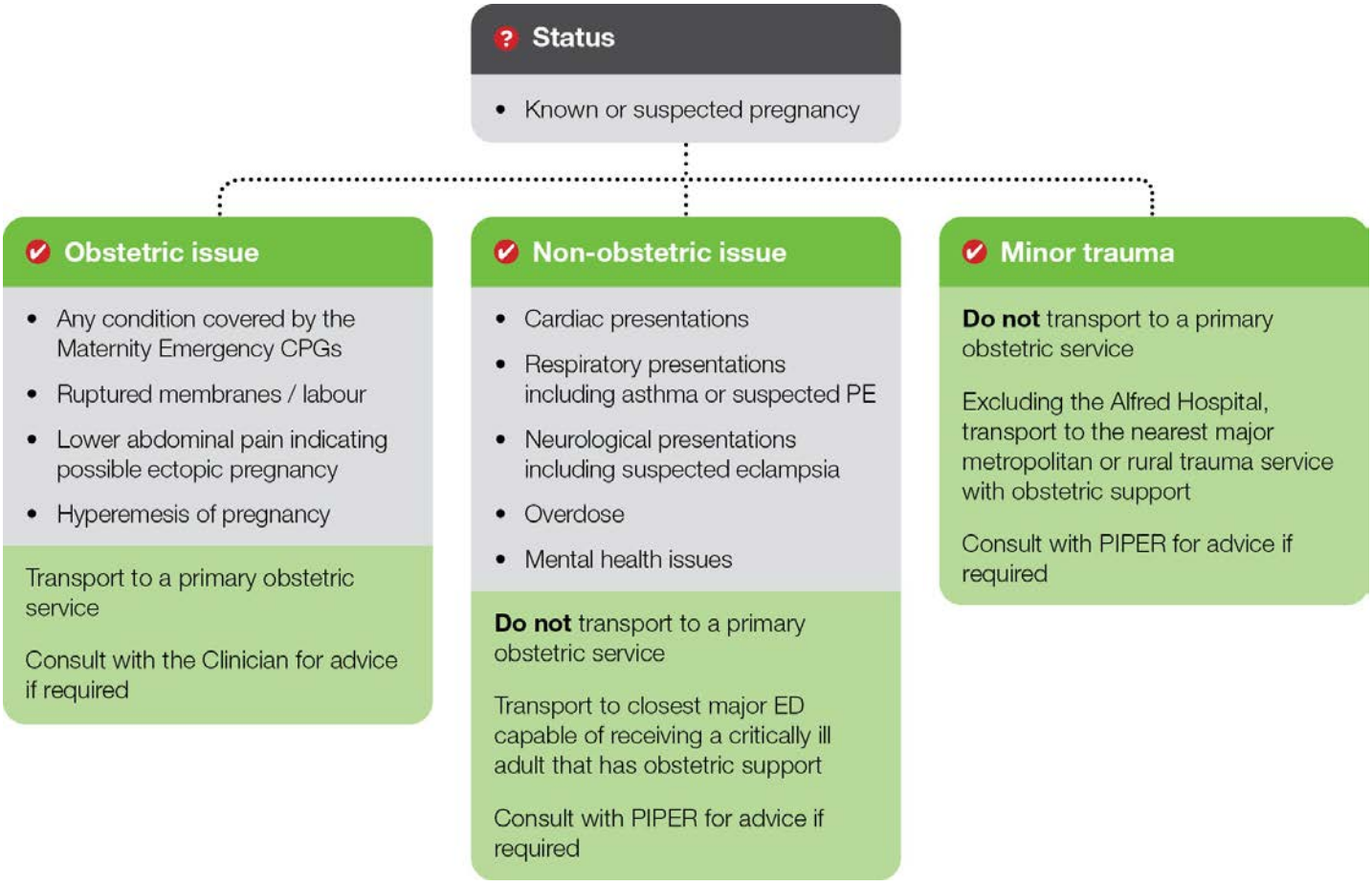
Metropolitan

- When transporting a baby born outside hospital or a woman in labour, if ≥32 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 <32 weeks gestation transport the patient to the closest of the Royal Women's Hospital, Mercy Hospital for Women Heidelberg, Monash Medical Centre Clayton or Joan Kirner Women's and Children's Hospital 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



Female Genital Mutilation/Cutting CPG M0101-3

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.

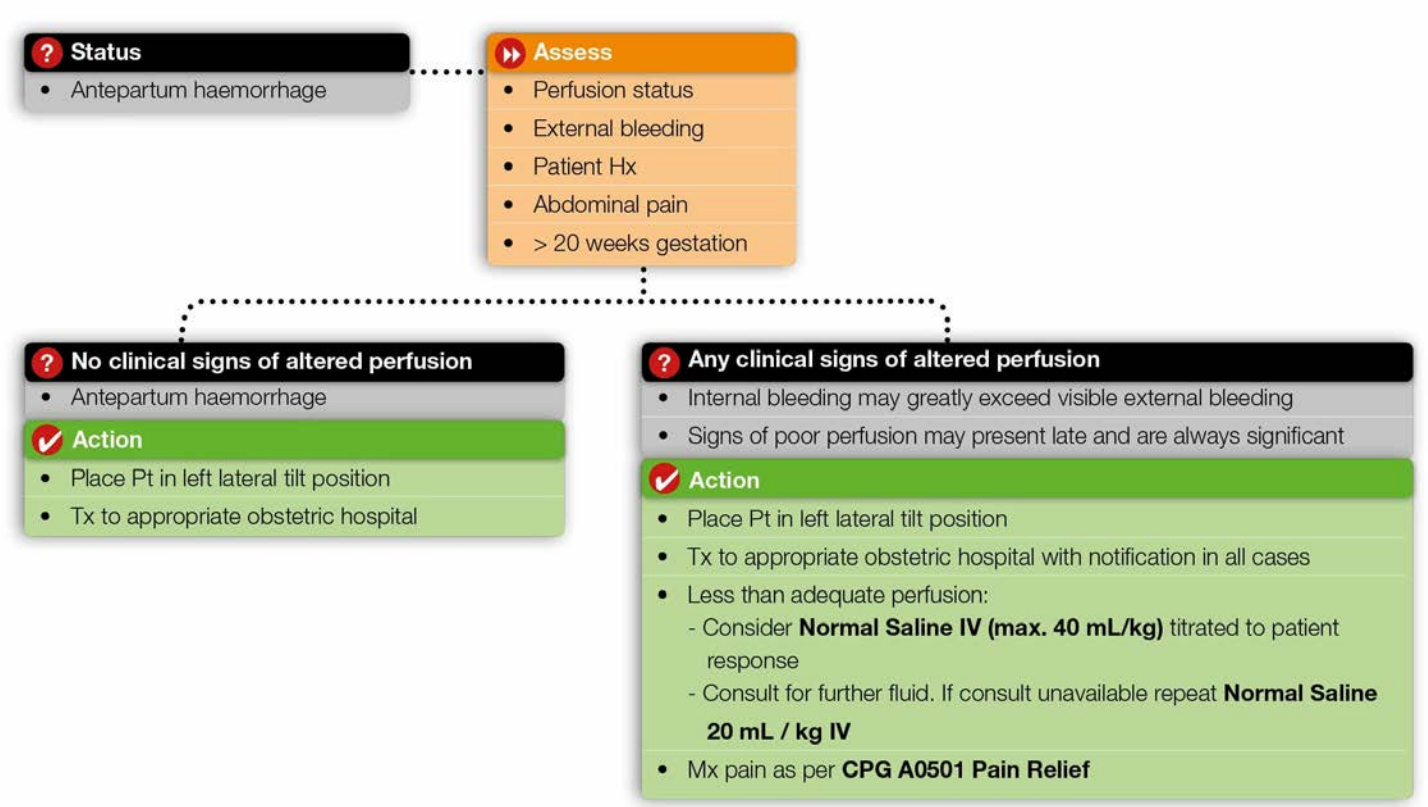
General Care

- 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.
- 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 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

Flowchart


Status
Antepartum haemorrhage
Assess
Perfusion status
External bleeding
Patient Hx
Abdominal pain
> 20 weeks gestation
No clinical signs of altered perfusion
Antepartum haemorrhage
Action
Place Pt in left lateral tilt position
Tx to appropriate obstetric hospital
Any clinical signs of altered perfusion
Internal bleeding may greatly exceed visible external bleeding
Signs of poor perfusion may present late and are always significant
Action
Place Pt in left lateral tilt position
Tx to appropriate obstetric hospital with notification in all cases
Less than adequate perfusion:
- Consider Normal Saline IV (max. 40 mL/kg) titrated to patient response
- Consult for further fluid. If consult unavailable repeat Normal Saline 20 mL / kg IV
Mx pain as per CPG A0501 Pain Relief

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 g 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

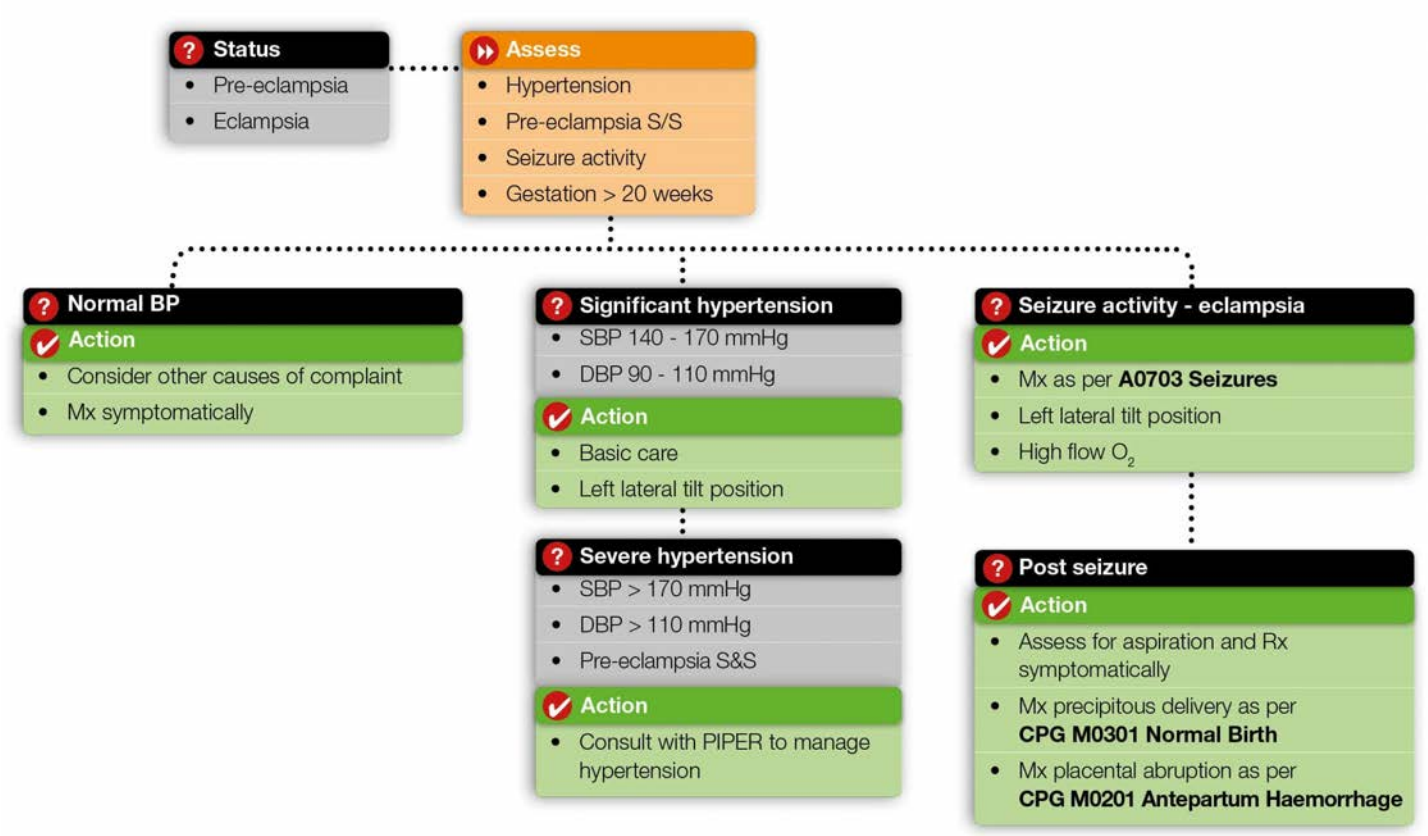
- Initial IV bolus of 20 mg given slowly over 2 minutes. This can be repeated every 10 minutes until optimal BP is achieved or max. dose of 300 mg delivered. Alternatively a 20 – 160 mg/hr infusion can follow the initial bolus titrated to achieve optimal BP.

IV Hydralazine

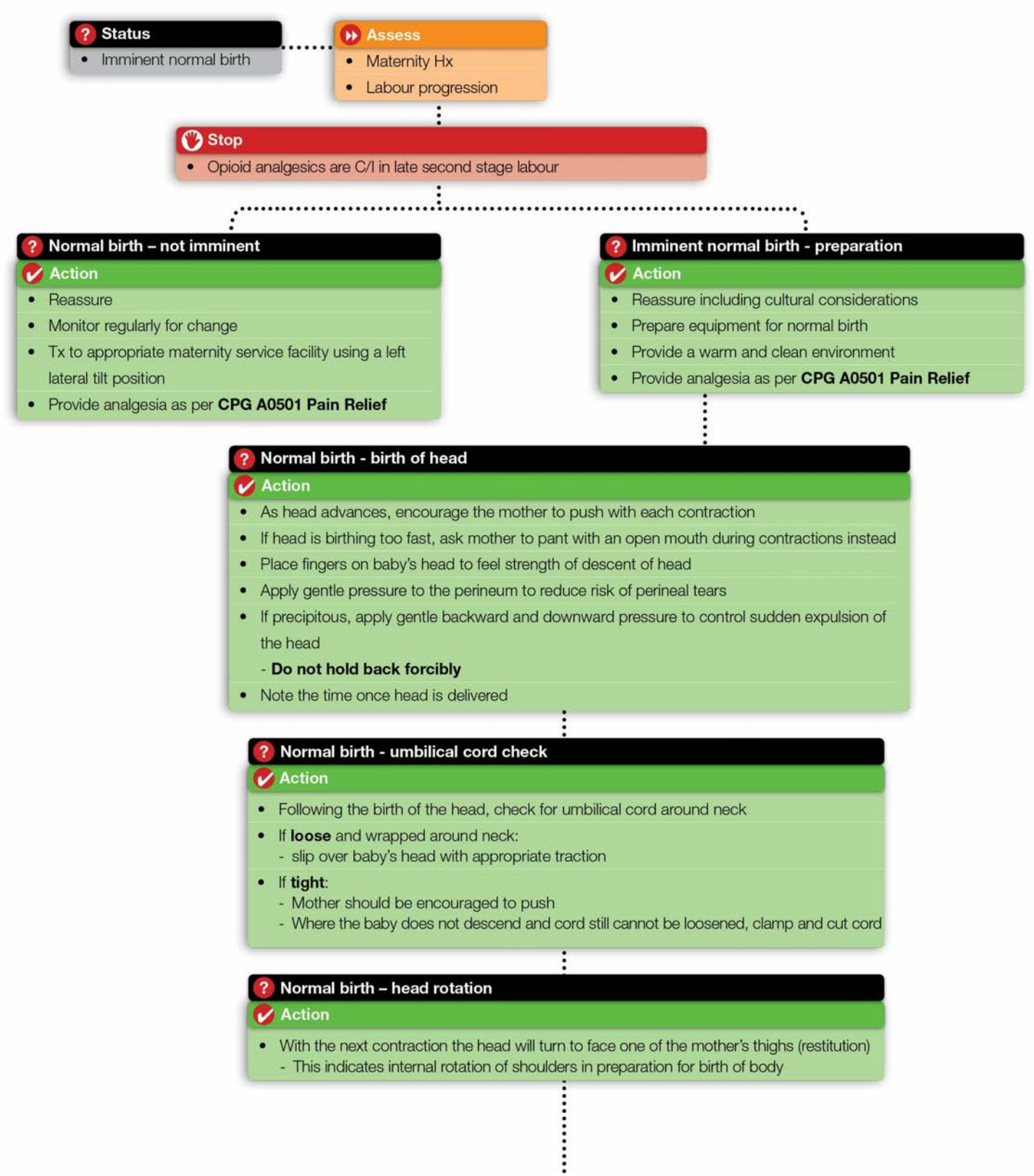
- Initial IV bolus (usually 5 – 10 mg) over 5 – 10 minutes. This can be repeated two more times at 30 minute intervals. Maintenance infusion run at 5 mg/hr. Adjust rate to maintain BP between 140 - 160 / 90 - 100 mmHg. The BP should not fall below 140/80 mmHg as the placental circulation will have adapted 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


Status
Imminent normal birth
Assess
Maternity Hx
Labour progression
Stop
Opioid analgesics are C/I in late second stage labour
Normal birth – not imminent
Action
Reassure
Monitor regularly for change
Tx to appropriate maternity service facility using a left lateral tilt position
Provide analgesia as per CPG A0501 Pain Relief
Imminent normal birth - preparation
Action
Reassure including cultural considerations
Prepare equipment for normal birth
Provide a warm and clean environment
Provide analgesia as per CPG A0501 Pain Relief
Normal birth - birth of head
Action
As head advances, encourage the mother to push with each contraction
If head is birthing too fast, ask mother to pant with an open mouth during contractions instead
Place fingers on baby's head to feel strength of descent of head
Apply gentle pressure to the perineum to reduce risk of perineal tears
If precipitous, apply gentle backward and downward pressure to control sudden expulsion of the head
- Do not hold back forcibly
Note the time once head is delivered
Normal birth - umbilical cord check
Action
Following the birth of the head, check for umbilical cord around neck
If loose and wrapped around neck:
- slip over baby's head with appropriate traction
If tight:
- Mother should be encouraged to push
- Where the baby does not descend and cord still cannot be loosened, clamp and cut cord
Normal birth – head rotation
Action
With the next contraction the head will turn to face one of the mother's thighs (restitution)
- This indicates internal rotation of shoulders in preparation for birth of body

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 skln 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 permissable e.g. lotus births

Normal birth – birthing placenta (third stage)

- Delivery of baby to placenta

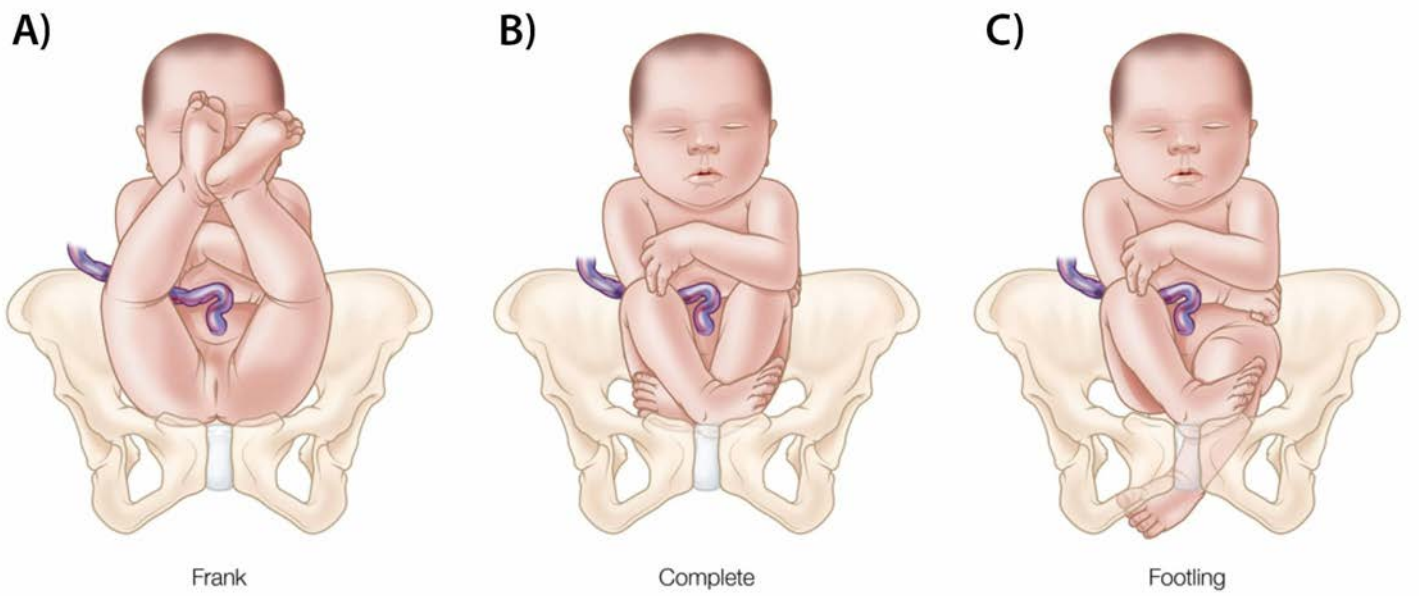
Action

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 = ½ 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.

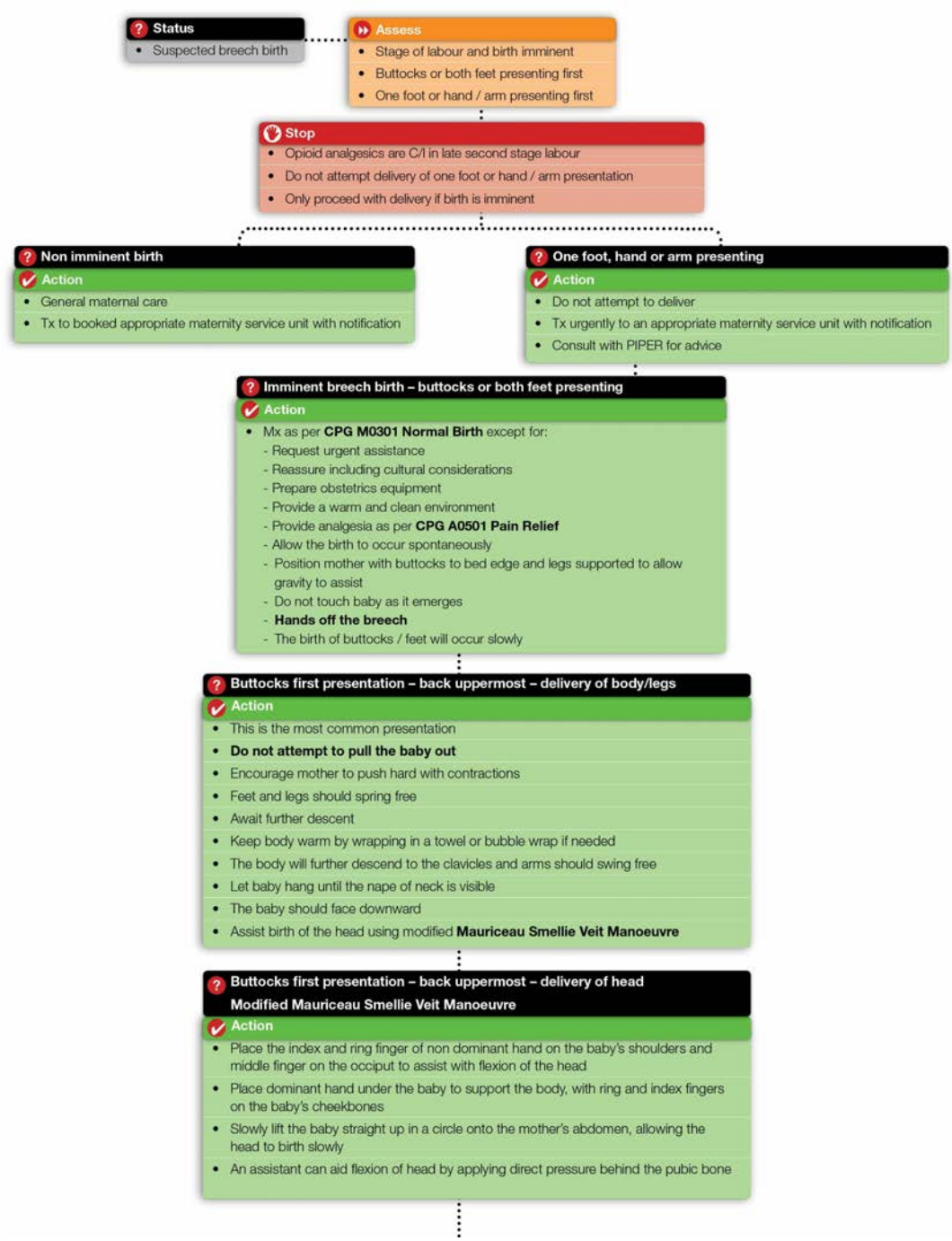
General Care

During all breech labour

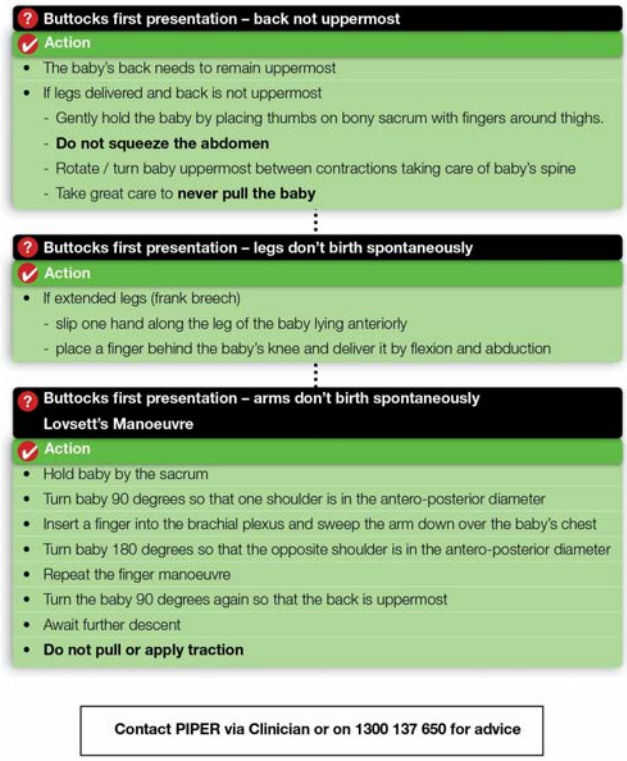
- Keep mother informed of progress. Encourage mother to push hard with contractions.
- Position mother with buttocks to bed edge with legs supported (lithotomy position) if on a stretcher or bed. Standing or squatting may be preferred by the mother and is more anatomically and physiologically sound though 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


Status
Suspected breech birth
Assess
Stage of labour and birth imminent
Buttocks or both feet presenting first
One foot or hand / arm presenting first
Stop
Opioid analgesics are C/I in late second stage labour
Do not attempt delivery of one foot or hand / arm presentation
Only proceed with delivery if birth is imminent
Non imminent birth
Action
General maternal care
Tx to booked appropriate maternity service unit with notification
One foot, hand or arm presenting
Action
Do not attempt to deliver
Tx urgently to an appropriate maternity service unit with notification
Consult with PIPER for advice
Imminent breech birth – buttocks or both feet presenting
Action
Mx as per CPG M0301 Normal Birth except for:
- Request urgent assistance
- Reassure including cultural considerations
- Prepare obstetrics equipment
- Provide a warm and clean environment
- Provide analgesia as per CPG A0501 Pain Relief
- Allow the birth to occur spontaneously
- Position mother with buttocks to bed edge and legs supported to allow gravity to assist
- Do not touch baby as it emerges
- Hands off the breech
- The birth of buttocks / feet will occur slowly
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



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

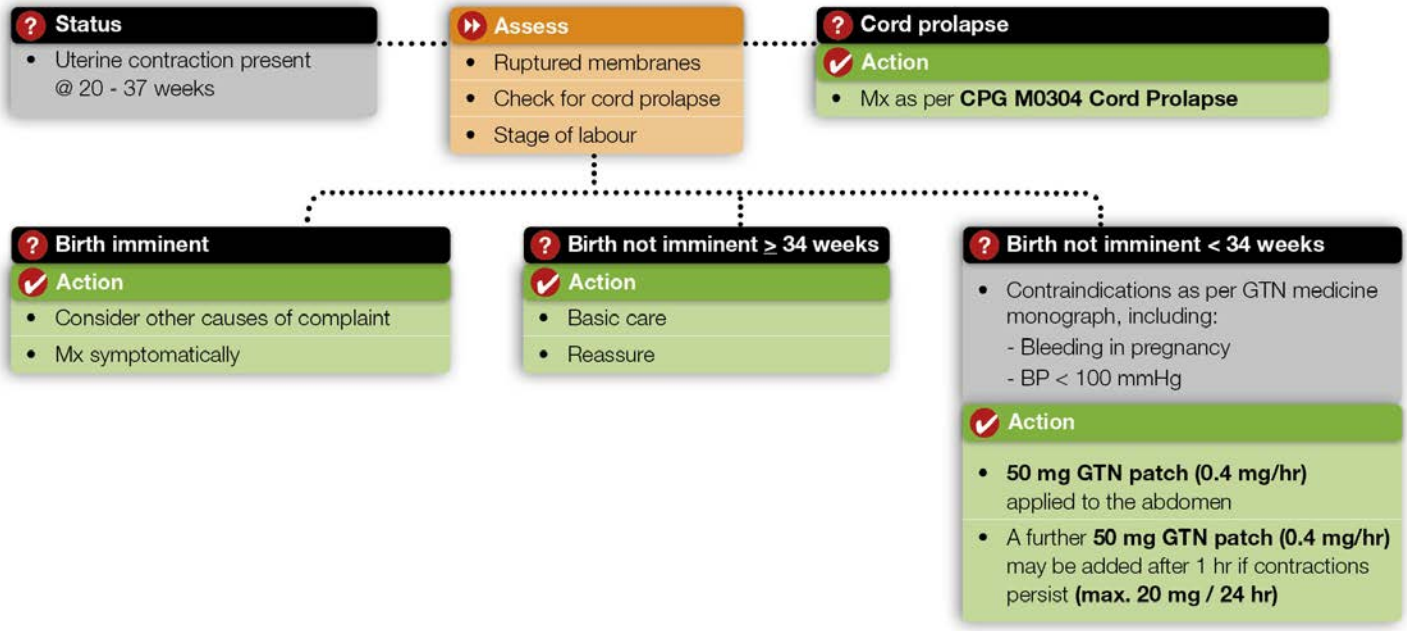
- The drug of choice. Initial dose of up to 20 mg orally given by hospital. Monitor for adverse reaction prior to transport. Can repeat if contractions persist after 30 minutes. Ongoing monitoring of blood pressure and pulse is required.

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).
- 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


Status
• Uterine contraction present @ 20 - 37 weeks
Assess
• Ruptured membranes
• Check for cord prolapse
• Stage of labour
Cord prolapse
Action
• Mx as per CPG M0304 Cord Prolapse
Birth imminent
Action
• Consider other causes of complaint
• Mx symptomatically
Birth not imminent ≥ 34 weeks
Action
• Basic care
• Reassure
Birth not imminent < 34 weeks
• Contraindications as per GTN medicine monograph, including:
- Bleeding in pregnancy
- BP < 100 mmHg
Action
• 50 mg GTN patch (0.4 mg/hr) applied to the abdomen
• A further 50 mg GTN patch (0.4 mg/hr) may be added after 1 hr if contractions persist (max. 20 mg / 24 hr)

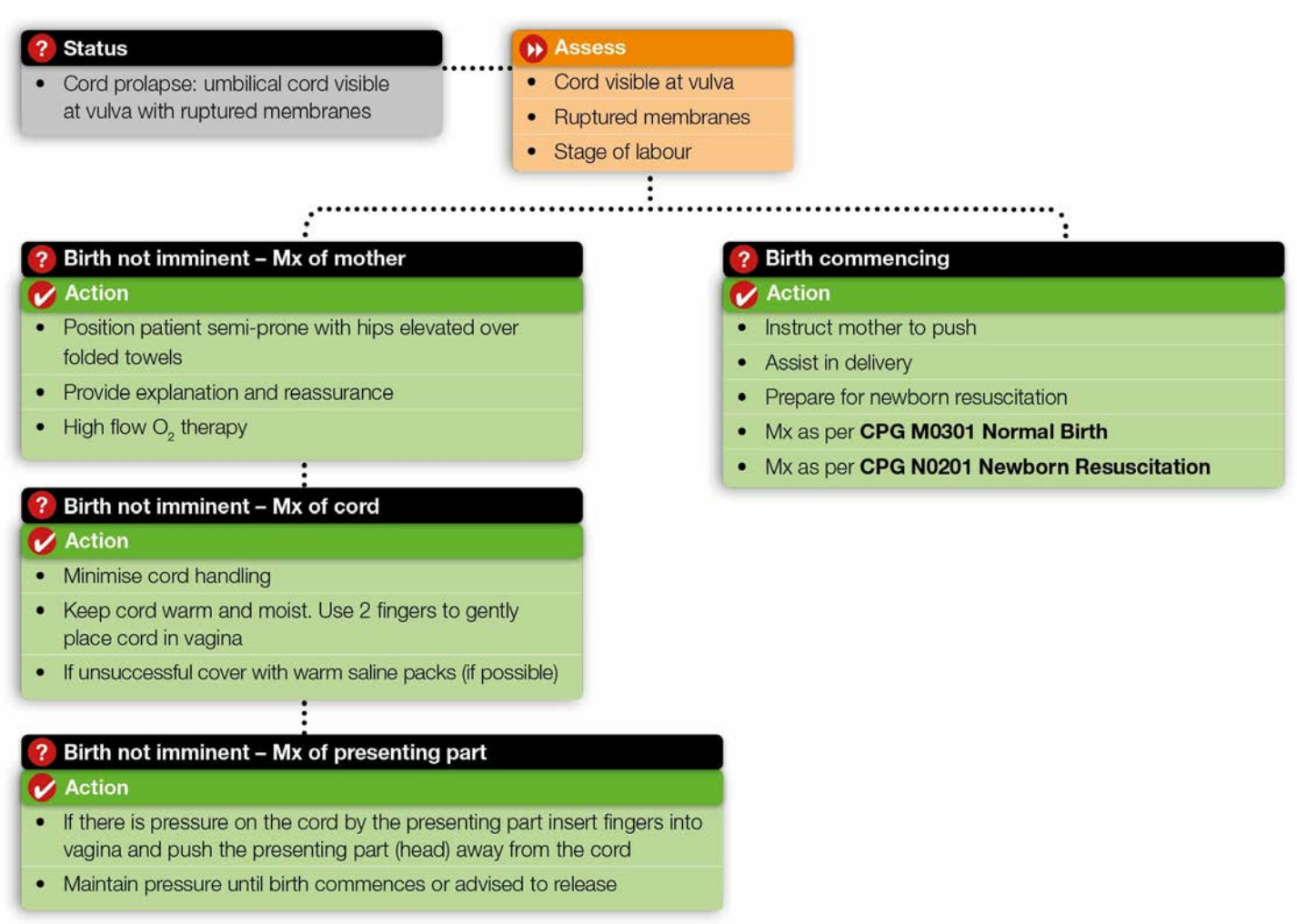
Cord Prolapse CPG M0304

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

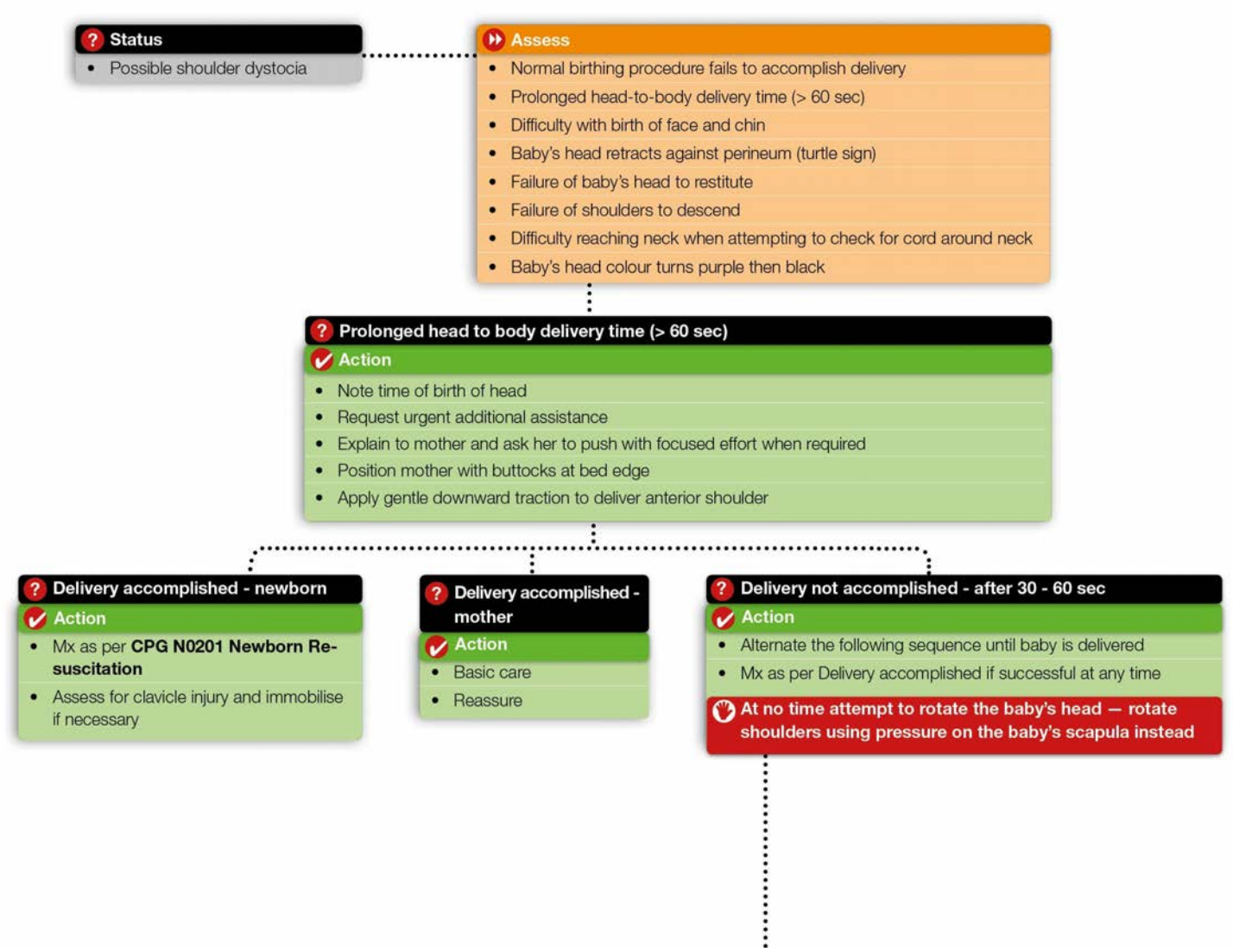

Status
Cord prolapse: umbilical cord visible at vulva with ruptured membranes
Assess
Cord visible at vulva
Ruptured membranes
Stage of labour
Birth not imminent – Mx of mother
Action
Position patient semi-prone with hips elevated over folded towels
Provide explanation and reassurance
High flow O_2 therapy
Birth commencing
Action
Instruct mother to push
Assist in delivery
Prepare for newborn resuscitation
Mx as per CPG M0301 Normal Birth
Mx as per CPG N0201 Newborn Resuscitation
Birth not imminent – Mx of cord
Action
Minimise cord handling
Keep cord warm and moist. Use 2 fingers to gently place cord in vagina
If unsuccessful cover with warm saline packs (if possible)
Birth not imminent – Mx of presenting part
Action
If there is pressure on the cord by the presenting part insert fingers into vagina and push the presenting part (head) away from the cord
Maintain pressure until birth commences or advised to release

Special Notes

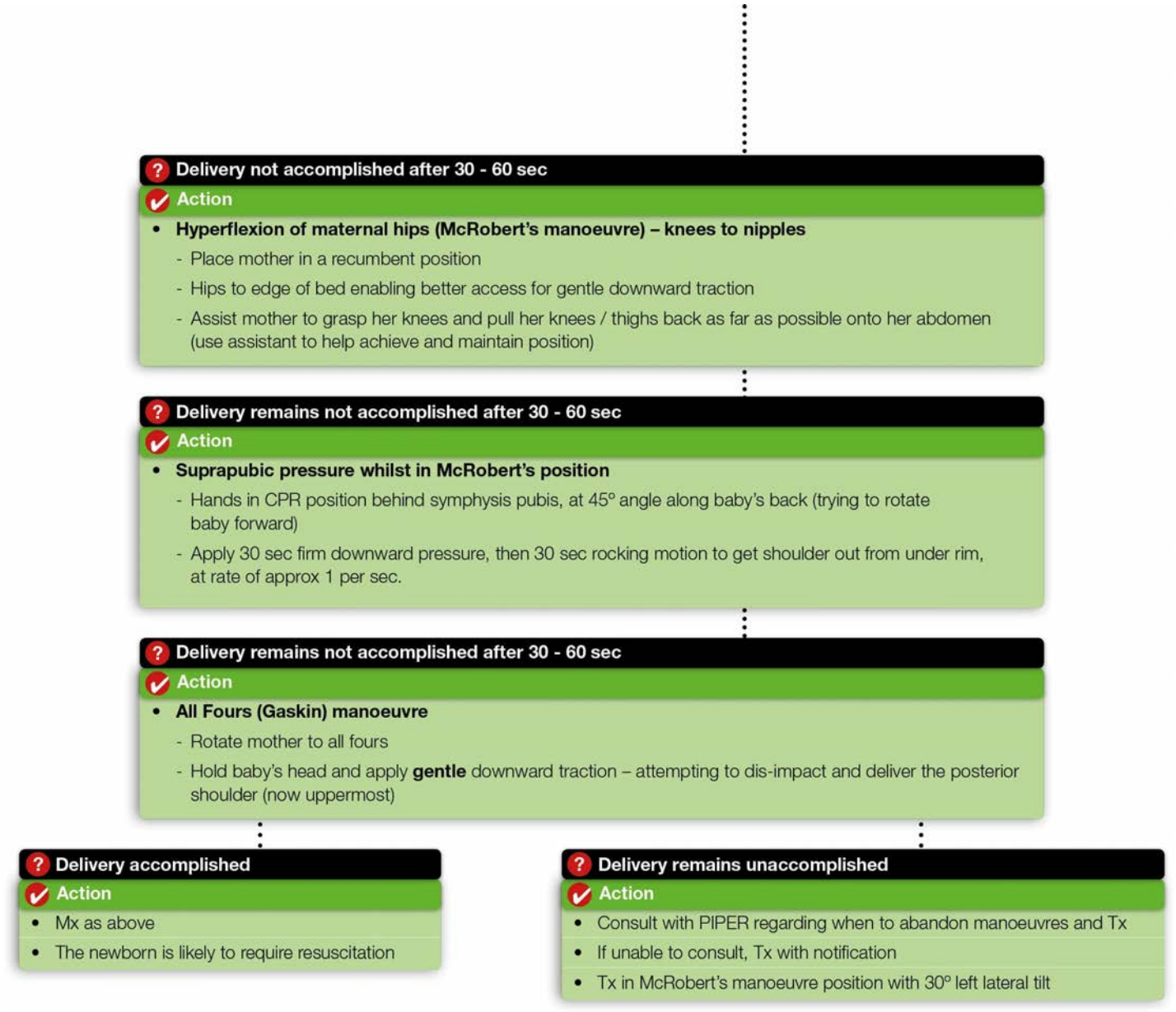
- This is a time critical situation. There is 5 - 7 minutes to deliver the baby due to compression of the cord against the pelvic rim.
- Explain the situation to the mother to gain maximum co-operation.
- It is important to note times of birth of head, timing of manoeuvres and delivery of body.
- The 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


Status
Possible shoulder dystocia
Assess
Normal birthing procedure fails to accomplish delivery
Prolonged head-to-body delivery time (> 60 sec)
Difficulty with birth of face and chin
Baby's head retracts against perineum (turtle sign)
Failure of baby's head to restitute
Failure of shoulders to descend
Difficulty reaching neck when attempting to check for cord around neck
Baby's head colour turns purple then black
Prolonged head to body delivery time (> 60 sec)
Action
Note time of birth of head
Request urgent additional assistance
Explain to mother and ask her to push with focused effort when required
Position mother with buttocks at bed edge
Apply gentle downward traction to deliver anterior shoulder
Delivery accomplished - newborn
Action
Mx as per CPG N0201 Newborn Re-suscitation
Assess for clavicle injury and immobilise if necessary
Delivery accomplished - mother
Action
Basic care
Reassure
Delivery not accomplished - after 30 - 60 sec
Action
Alternate the following sequence until baby is delivered
Mx as per Delivery accomplished if successful at any time
At no time attempt to rotate the baby's head — rotate shoulders using pressure on the baby's scapula instead

Flowchart continued



Primary Postpartum Haemorrhage (PPPH) CPG M0401

Special Notes

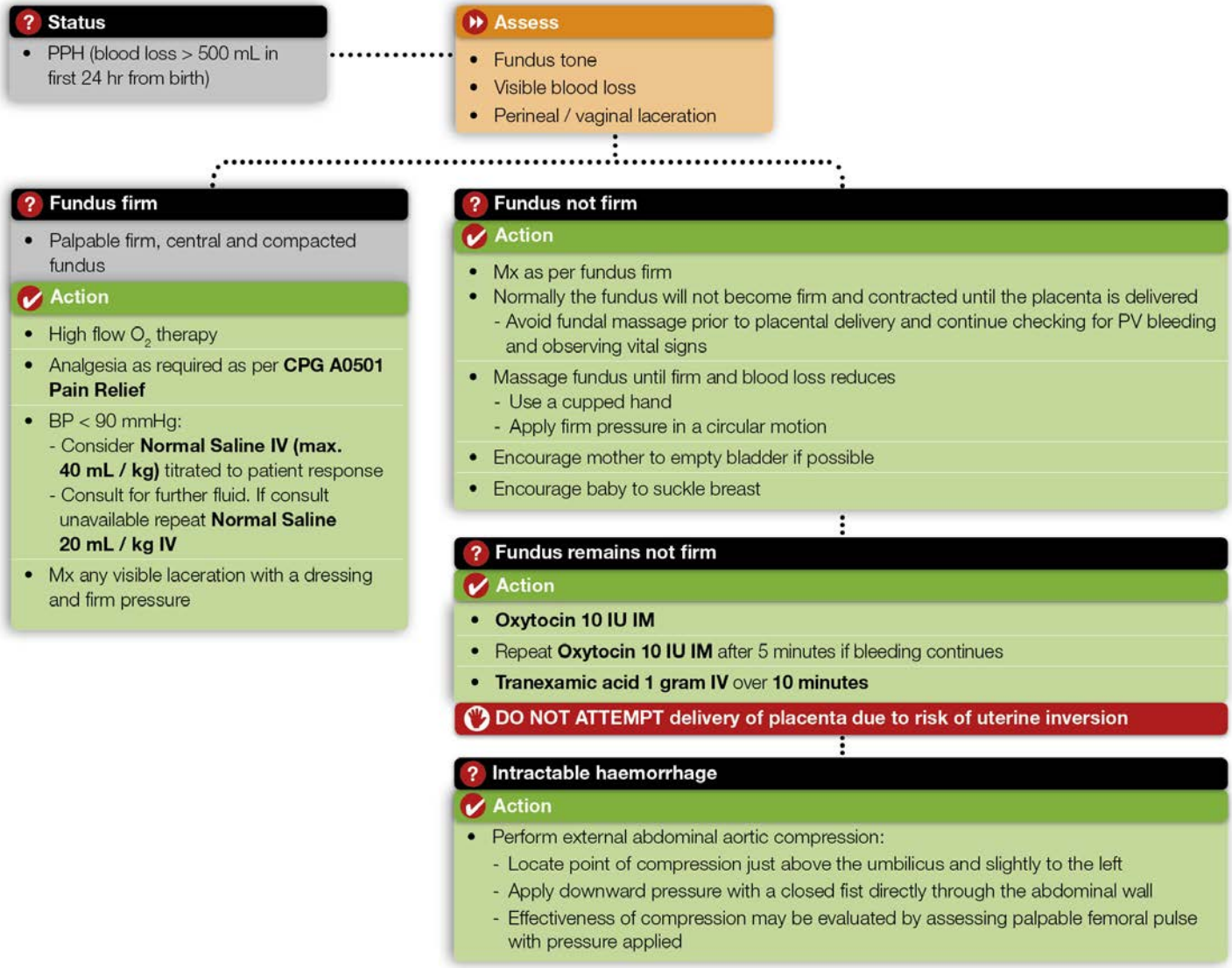
- Massaging a fundus that is firm, central and contracted may interfere with normal placental post birth separation and worsen bleeding. Fundal massage should only be applied when the fundus is not firm.
- Causes of PPH include the 'four Ts':
  - Tone (uterine atony)
  - Trauma (to genital structures)
  - Tissue (retention of placenta or membranes)
  - Thrombin (coagulopathy)

  The most common cause of PPH is uterine atony.
- **An empty and contracted uterus does not bleed.**
- Higher risk patients include multiple pregnancy, more than four pregnancies, past history of PPH, 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 PPH), consult with receiving hospital regarding the administration of **Oxytocin**
- **Tranexamic acid**
  - Tranexamic acid is indicated if haemorrhage continues despite fundal massage, oxytocin and direct pressure on any visible lacerations
  - Tranexamic acid administration must not delay transport.

Contact Paediatric Infant Perinatal Emergency Retrieval (PIPER) via Clinician or on 1300 137 650 for advice

Primary Postpartum Haemorrhage (PPPH) CPG M0401

Flowchart



Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/4.1.1 (2) Oxytocin MAC March 2021.pdf

Miscarriage CPG F0003

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 < 22 weeks gestation. Infants delivered ≥ 22 weeks gestation, or where the gestation is unclear but there is a reasonable likelihood that it may be ≥ 22 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 22 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. Oxytocin 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 < 22 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 SpO_2 (mins post birth) Pulse oximeters should always be placed on the right wrist or hand (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 and place a beanie. 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. Dry the head and place a beanie. Ensure the environment is appropriately warm. Bubble wrap may be placed over the newborn's body to maintain warmth. NB. Chemical self-warming blankets must **not** to be used to warm neonates.

Preterm infants

- Preterm infants may experience greater difficulty in establishing and maintaining effective respiration due to incomplete maturity of the lungs.
- All newborns are vulnerable to hypothermia. Preterm newborns are especially vulnerable. Hypothermia is an independent predictor of poor outcomes and should be aggressively prevented.
- The ideal order of steps varies depending on gestational age and whether the birth was witnessed.
  - Term / preterm (32 - 42 wks): Place the newborn skin to skin on mother, simultaneously dry them, cover with fresh towels / blanket or bubble wrap, place a beanie.

- Very Preterm (< 32 wks), witnessed: Leave the newborn wet as the remaining fluid remains warm and will assist in maintaining the newborn's temperature. Place them straight into a polyethylene bag with a hole pre-cut for the head, dry head and place a beanie.
- Very Preterm (< 32 wks), unwitnessed: Dry the newborn as the remaining fluid is likely now cold and should be removed to assist in maintaining temperature. Place them in a polyethene bag with a hole pre-cut for the head and place a beanie.

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.

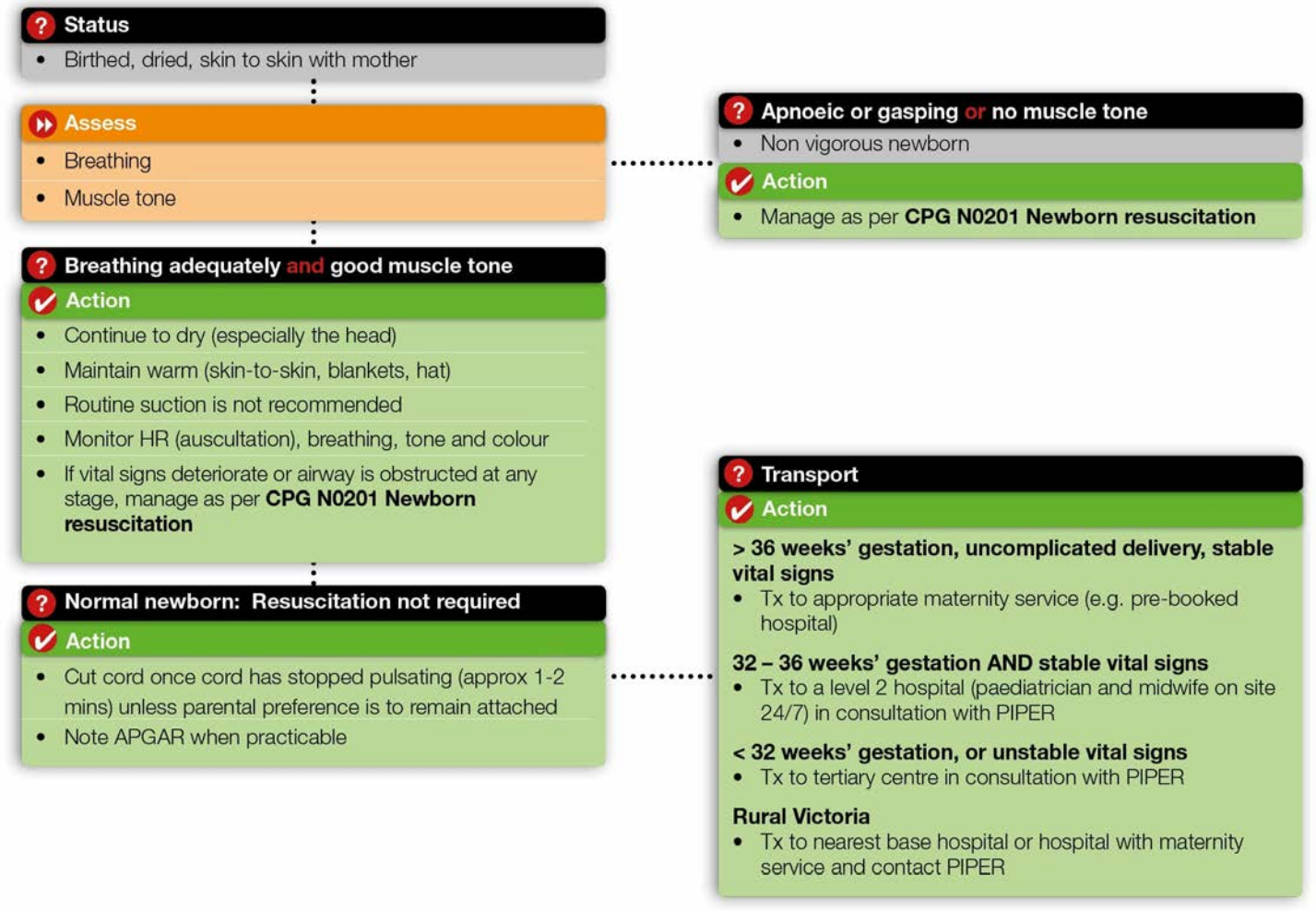
Cutting the cord

- 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), Royal Children's Hospital (RCH) or Joan Kirner Women's and Children's Hospital.
- 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

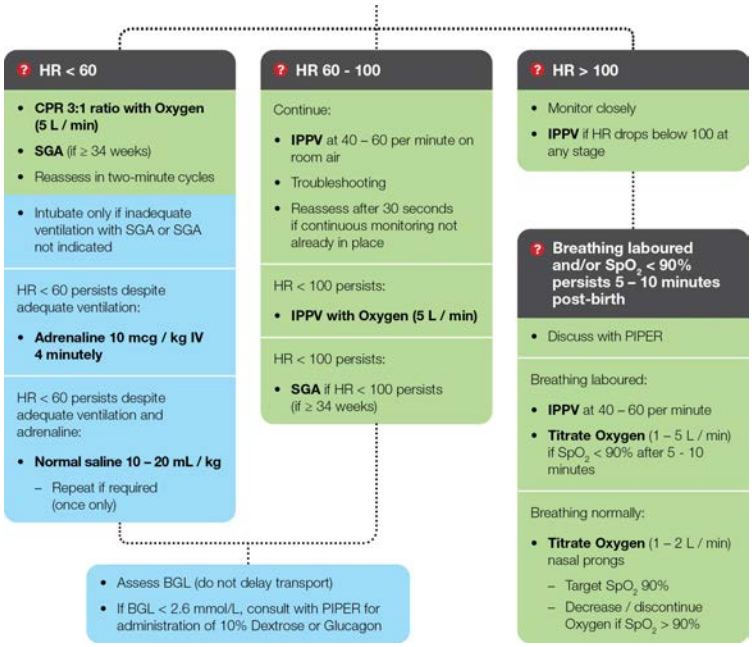
7 - 10 Satisfactory
4 - 6 Respiratory depression, may require ventilation
0 - 3 Requires ongoing resuscitation

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC March 2017 CPG N0101 Newborn patient and resus.pdf

Flowchart


Birthed
Maintain warmth / stimulate
– Term or preterm (32 – 42 weeks): Skin to skin, dry, beanie
– Very preterm (< 32 weeks), witnessed: Leave wet, polyethylene bag, dry head, beanie
– Very preterm (< 32 weeks), unwitnessed: Dry, polyethylene bag, beanie
Breathing / crying
Muscle tone (flexed arms and legs)
Breathing adequately and good muscle tone
Manage as per CPG N0101 Newborn Baby
Apnoeic / gasping or poor muscle tone
Position
– Cut cord if necessary to facilitate resuscitation
– Move to resus area (fresh towel, bubble wrap)
Airway
– Neutral position (towel under shoulders)
– Suction only if airway obstruction is suspected
Continue drying / stimulating while assessing (no more than 30 seconds)
Breathing / crying
Muscle tone (flexed arms and legs)
Heart rate (auscultate)
1 minute
Apnoeic / gasping or poor muscle tone or HR < 100
IPPV at 40 – 60 per minute on room air
– Target chest rise and fall
– PEEP: 5 cm H2O
Troubleshooting as required:
– Mask size and fit
– Chin lift and open mouth
– Ensure neutral airway position
– Two person BVM technique
– Increase inspiratory pressure
– Swap operators
– Consider suction (if airway occlusion suspected)
Escalate care / PIPER via the AV Clinician if not already contacted
SpO2 monitoring (right hand or right wrist)
ECG monitoring (if resources permit, low priority, do not apply to newborns < 28 wks)
Reassess after 30 seconds



Care objectives

- **Temperature:** Maintain normothermia.
- **Ventilation:** Establish and maintain effective ventilation.
- **Escalation of care:** Seek early backup, expert advice and ensure transport to a facility appropriate for the patient's acuity.

Intended patient group

- Newborns who require resuscitation after birth

More information

This guideline is intended to support newborns requiring resuscitation while transitioning to the extrauterine environment. Usually this is immediately following birth. For simplicity, the AV definition of "Newborn" includes the first 24 hours of life and this guideline can be applied during that period.

General notes

Overview

- **Ventilation and temperature:** Establishing and maintaining effective ventilation and the maintenance of normothermia are the most important principles of newborn resuscitation. Other elements of resuscitation such as introducing supplemental oxygen, IV access and adrenaline are not as important and are unlikely to add any value if they come at the expense of ventilation and temperature.
- **Escalation of care:** Newborn resuscitation is a complex, high acuity, low occurrence skill, often required in the context of having multiple patients (i.e. mother and newborn). Early backup and early expert advice from PIPER is essential.

Initial care

- Immediate care following birth is focused on maintaining temperature while simultaneously stimulating and assessing the newborn.

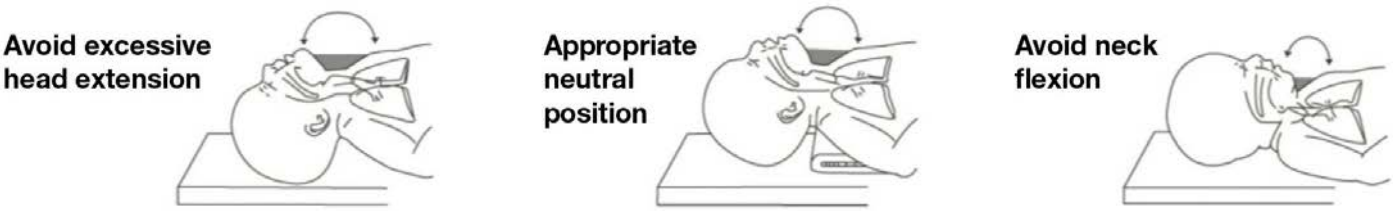
More information

- All newborns are vulnerable to hypothermia. Preterm newborns are especially vulnerable. Hypothermia is an independent predictor of poor outcomes and should be aggressively prevented.
- The ideal order of steps varies depending on gestational age and whether the birth was witnessed.
  - Term / preterm (32 - 42 wks): Place the newborn skin to skin on mother, simultaneously dry them, cover with fresh towels / blanket or bubble wrap, place a beanie.
  - Very Preterm (< 32 wks), witnessed: Leave the newborn wet as the remaining fluid remains warm and will assist in maintaining the newborn's temperature. Place them straight into a polyethylene bag with a hole pre-cut for the head, dry head and place a beanie.
  - Very Preterm (< 32 wks), unwitnessed: Dry the newborn as the remaining fluid is likely now cold and should be removed to assist in maintaining temperature. Place them in a polyethene bag with a hole pre-cut for the head and place a beanie.

Initial assessment

- Focus on:
  - Adequacy of breathing: Regular spontaneous breathing usually occurs within 15-30 seconds with stimulation / drying
  - Muscle tone: Moving all limbs and flexed posture
- **Good muscle tone and adequate breathing:** unlikely to need resuscitation.
- **Inadequate breathing or poor muscle tone:**
  - **Position:** Place the newborn in a resuscitation area.

- **Airway:** Place the airway in a neutral position as per **CWI/OPS/190 Airway Manoeuvres & Positioning** (likely requires a folded towel under the shoulders)



Reassess

- If poor muscle tone or inadequate breathing clearly persist, there is no need to delay initiating resuscitation to auscultate the heart rate. Proceed directly to providing IPPV.
- If some improvement is seen, auscultate the heart rate to inform the need for resuscitation.

More information

Position

The resuscitation area may be either of the following at the judgement of the paramedic:

- Between the mother's legs after replacing soiled towels / blankets. This allows for the umbilical cord to remain attached which may be beneficial as there is some evidence that delayed cord clamping leads to smoother transition to extra-uterine life. It also streamlines the initial assessment and resuscitation (i.e. focus on ventilation and warmth rather than cord cutting). Cutting the cord will still be required in the first minutes of resuscitation after ventilation has been initiated.
- A dedicated resuscitation area nearby. If resuscitation cannot be performed (usually because of the logistics of caring for both mother and newborn), clamping and cutting the cord to move the newborn to a resuscitation area is equally acceptable.

Airway

Place the head in a neutral position to open the airway. This may require a folded towel to be placed under the newborn's shoulders.

Continue measures to maintain temperature and stimulate (e.g. finish drying, applying beanie, place bubble wrap). For very preterm newborns placed directly into a polyethylene bag, the application of the bag, drying of the head and application of the beanie is sufficient stimulation. Many very preterm babies require positive pressure ventilation (PPV) regardless of initial efforts to stimulate and dry.

Reassess the adequacy of breathing and muscle tone, and auscultate the heart rate with a stethoscope (the heart rate should rise to above 100 bpm within a minute of birth). If the newborn is not breathing effectively, has poor muscle tone, or HR remains < 100 bpm after drying and stimulating, initiate PPV on room air. Breathing and tone are the quickest to assess and if they remain clearly inadequate, the newborn will require PPV - there is no need to delay PPV to measure a heart rate. Heart rate should still be auscultated as soon as practicable to guide continued resuscitation interventions.

Ventilation

- Initiate ventilation within the first 60 seconds of management in the non-vigorous newborn.
- A correctly sized facemask will achieve a seal around the mouth and nose but not cover the eyes or overlap the chin.
- **OPAs are not recommended** for routine use as they may cause airway obstruction and vagally mediated bradycardia. They should only be used if airway abnormalities or the newborn's tongue impede effective ventilation. Size 0 is appropriate for most newborns.
- An increase in heart rate > 100 bpm is the most important indicator of the adequacy of ventilation.
- If the heart rate does not increase, the most likely cause is inadequate ventilation. This should prompt a strong and ongoing focus on troubleshooting bag valve mask ventilation, followed by progression to other means of ventilation (e.g. SGA or ETT) if these attempts are unsuccessful.
- During the initial period of ventilation, escalating care / contacting PIPER via the AV Clinician (if not already activated) and applying pulse oximetry with the primary goal of measuring heart rate are the next priorities.
- Healthy newborns normally have an SpO_2 of approximately 60 - 65% at birth. This gradually increases to 85 - 95% within the first ten minutes of life. If the heart rate is > 100, breathing is normal and the SpO_2 trends upwards to > 90% at 5 - 10 minutes post-birth, no further interventions are required. Continue to assess breathing, heart rate and muscle tone, and maintain warmth by placing the newborn skin-to-skin on the mother's chest. Further management should ideally be informed by PIPER:
  - IPPV may still be required in the first 10 minutes if breathing is labored and SpO_2 remains low. Titrate supplemental oxygen if SpO_2 continues to remain low at 5 - 10 minutes.
  - If the newborn is breathing normally, but still has an SpO_2 < 90% at 5 - 10 minutes, provide oxygen via a nasal canula targeting an SpO_2 of 90%. If the SpO_2 rises above 90%, reduce the oxygen flow rate to avoid hyperoxia.
  - If the nasal canula does not fit, provide "blow-by" oxygen by placing the canula or oxygen tubing close to the nose.

Suction

- Suction is only required where the airway is obstructed. If suction is required, the mouth should be suctioned first, followed by the nose. Newborns are nasal breathers 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 lower airway obstruction (e.g. meconium or blood) is suspected.

Advanced airway

- Both the monitor and EMMA capnographs should be used to confirm tube placement. The EMMA

infant airway adaptor must be used for neonates.

- Monitor $ETCO_2$ using the primary (e.g. the monitor) capnograph. Remove the EMMA to reduce strain on the tube but keep the adapter in place in case trouble shooting is required.

	ETT size (mm)	Lip length (wt in kg + 6 cm)	ETT suction catheter	NG tube	Laryngoscope blade	i-Gel	Suction catheter (negative pressure)
Extremely preterm (< 1 kg or < 28 wks)	2.5	6 – 7 cm	6 FG	6 FG	00 straight Miller blade	None	10 – 12 FG (-100 mmHg)
Moderately preterm (1 – 3 kg or 28 – 34 wks)	3	7 – 9 cm	6 FG	8 FG	0 or 1 straight Miller blade	Size 1.0 for >2 kg	
Term or near term (> 3 kg or ≥ 35 wks)	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 should routinely be measured by auscultation using a warmed stethoscope. Palpation of pulses or the umbilical cord is challenging and unlikely to be reliable.
- In the non-vigorous newborn requiring resuscitation, pulse oximetry is preferred over ECG for real-time heart rate monitoring.
  - Pulse oximetry: provides real-time monitoring of heart rate and SpO_2. However, it may be unreliable in the initial stages of resuscitation. Auscultation is the preferred method.
  - ECG: provides heart rate monitoring but can damage the skin of extremely preterm newborns. ECG electrodes may be placed to guide resuscitation if required, but they are not a priority.
- ECG electrodes should not be applied to extremely preterm newborns (< 28 weeks) as the electrodes may damage their skin.
- Shockable rhythms are **extremely rare** in newborns, but if observed, apply multifunction electrode pads and defibrillate in manual mode using 4 J / kg at 2 - minute intervals.

Pulse oximetry

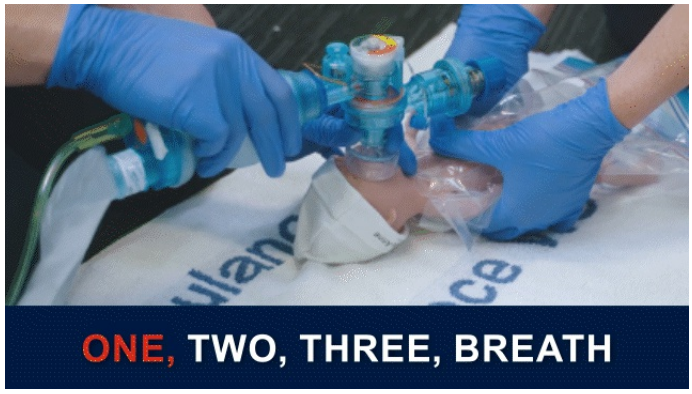
- Attach to the right hand or right wrist (pre-ductal).
  - Watch video of applying the SpO_2 probe
- See **CPG N0101 The Newborn Baby** for normal SpO_2 values post birth. These gradually increase to > 90% in the first ten minutes after birth.

  - Newborns with an SpO_2 < 90% at ten minutes post birth may require supplemental oxygen.
  - If the SpO_2 is significantly lower than normal values in the first ten minutes post birth, supplemental oxygen may be required. However, tailoring oxygen therapy to this dynamic target is challenging and is not expected outside of acting on advice from PIPER.

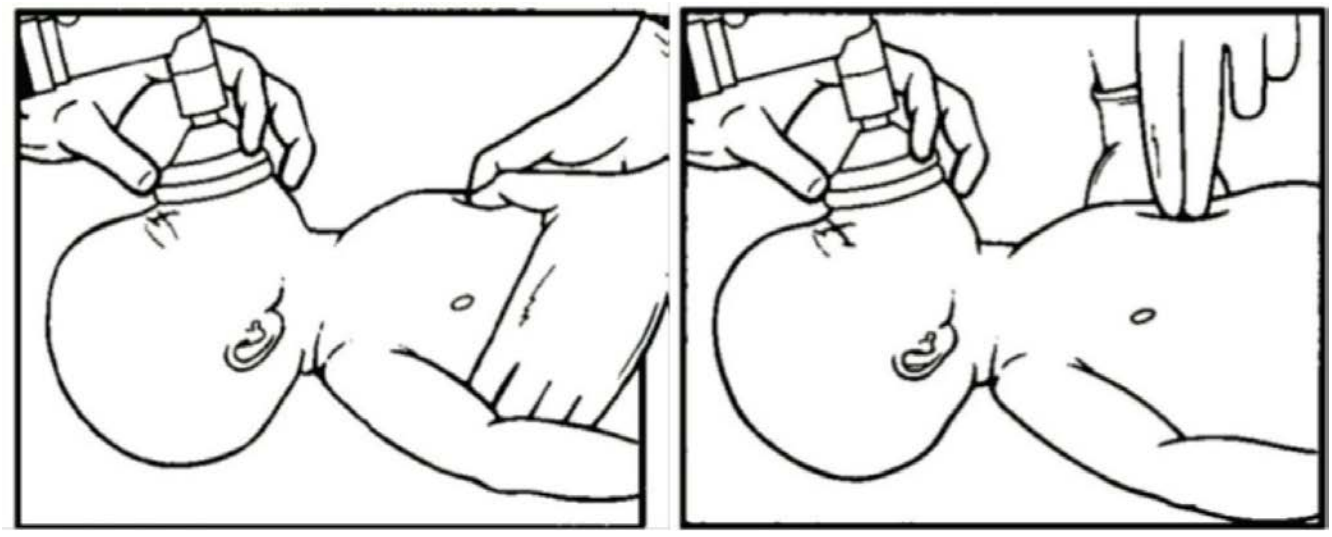
- Applying the probe under bubble wrap or plastic coverings is difficult and should not come at the expense of ventilation or maintaining warmth.
- Obtaining a reliable SpO_2 trace in newborns can be problematic. Consider SpO_2 strength of waveform and overall patient condition in determining the reliability of SpO_2 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 chest compressions and PPV at 3:1 as a single operator is unlikely to be effective in restoring heart rate.

PIPER handover (IMIST)

Identification	Identify yourself, scene location
Mechanism / Medical Complaint	Nature of presentation (e.g preterm baby is not breathing)
Information	• Gestational age • Time since birth
Signs	• Respiratory rate and effort • Movement and muscle tone • Heart rate (< 60, 60-100, >100)
Treatment	Management currently being provided (focus on ventilation and temperature management)

Indications for withholding resuscitation

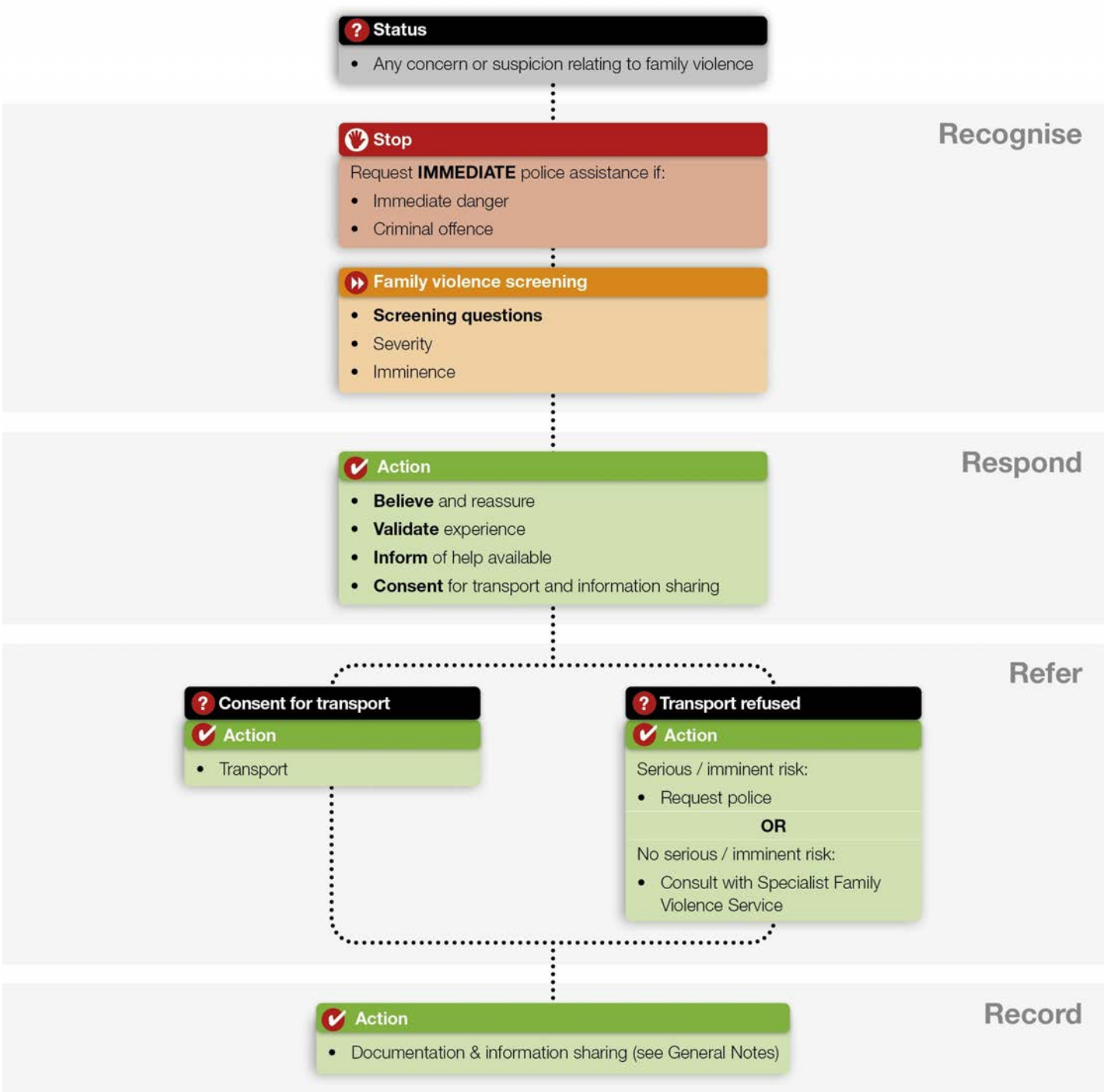
- Resuscitative efforts should be withheld in newborns < 22 weeks gestation as there is no possibility of successful resuscitation. Where there is any doubt as to the gestation of the newborn, paramedics should attempt resuscitation and consult with PIPER via the AV Clinician.
- While resuscitative efforts 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.

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Newborn Resuscitation 2024.pdf

  CPG Walkthrough Video - Newborn Resuscitation

Flowchart



Risk assessment

Family violence MARAM brief risk Assessment tool

Only ask questions if it is safe to do – perpetrator is not in hearing distance

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 hurt you or threatened to hurt you in any way?
   Identify threats to harm or kill, including sexual assault.

   Identify history of harm, particularly if it includes strangling, weapons or sexual assault.
4. Do you have any immediate concerns about the safety of your children or someone else in your family?
   Identify imminence of the risks identified in Q 1-3.
5. Will you feel safe if I leave here today?
   Identify imminence.
6. 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.

Serious risk factors

Increased risk of the victim being killed or almost killed.

Victim-survivors circumstances

- Physical assault while pregnant or following new birth
- Planning to leave or recent separation
- Escalation of violence

Behaviour by perpetrator

- **Weapons:** Access to weapons or use of weapon in most recent event
- **Strangle:** Has ever tried to strangle the victim
- **Threats to kill:** Has ever threatened to kill the victim
- **Animals:** Has ever harmed or threatened to harm or kill pets or other animals
- **Sexual assault** of victim
- **Stalking** of victim
- **Controlling** behaviours
- **Obsessive / jealous** behaviour toward victim
- **Unemployed / disengaged** from education (perpetrator)

- **Drug** and/or alcohol abuse/misuse (perpetrator)
- **Perpetrator self-harm:** Has every threatened or tried to self-harm or commit suicide (perpetrator)

Other risk factors, paediatric risk factors and protective factors

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

Systems intervention	• 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
Practical/environmental	• 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)
Strengths-based (Identity / Relationships / Community)	• 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

Overview

- **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.

Immediate risk

- Request immediate VicPol 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).
- **Only ask the screening questions if safe to do so.** Do not ask if the perpetrator is present or within hearing range, as this can escalate risk of harm once paramedics depart.
- Further explanation of the purpose of each screening question and the meaning associated with different answers can be found HERE.

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 VicPol attendance.
- **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 (e.g. not in front of the perpetrator, or asking if the person would like the information written / brochure).
  - 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 The Orange Door in the first instance. If The 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.

Referral Services

The Orange Door (business hours)

Open in 15 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).

	Bayside Peninsula – Bentleigh, Frankston, Hastings	1800 319 353
	Central Highlands – Bacchus Marsh	1800 219 819

Metro	Hume Moreland – Broadmeadows, Coburg, Sunbury	1800 271 151
	Inner Eastern Melbourne - Box Hill	1800 354 322
	North Eastern Melbourne – Epping, Heidelberg	1800 319 355
	Outer Eastern Melbourne – Belgrave, Croydon	1800 271 150
	Southern Melbourne – Cranbourne, Dandenong, Pakenham	1800 271 170
	South Western Melbourne – Werribee	1800 271 045
	Western Melbourne – Melton & Sunshine	1800 271 046
Rural	Barwon – Colac, Drysdale, Geelong	1800 312 820
	Central Highlands – Bachas Marsh and Ballarat	1800 219 819
	Gippsland Inner – Leongatha, Morwell, Warragul	1800 319 354
	Gippsland Outer – Bairnsdale, Sale	1800 512 358
	Goulburn – Shepparton and Wallan	1800 634 245
	Loddon – Bendigo, Echuca, Maryborough	1800 512 359
	Mallee – Mildura and Swan Hill	1800 290 943
	Ovens Murray – Wangaratta & Wodonga	1800 271 157
	Wimmera South West - Warrnambool	1800 271 180
	Wimmera South West - Horsham	1800 271 042

Safe Steps Family Violence Response Centre (available 24/7) Crisis phone service for crisis assessment, safety planning and crisis accommodation	1800 015 188

Seniors Rights Victoria Elder Abuse Hotline	1300 368 821

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 VicPol, 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

- Victorian Government MARAM resources
- Victoria Government Family Violence Information Sharing Guidelines
- Victorian Government Child Information Sharing Scheme

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.

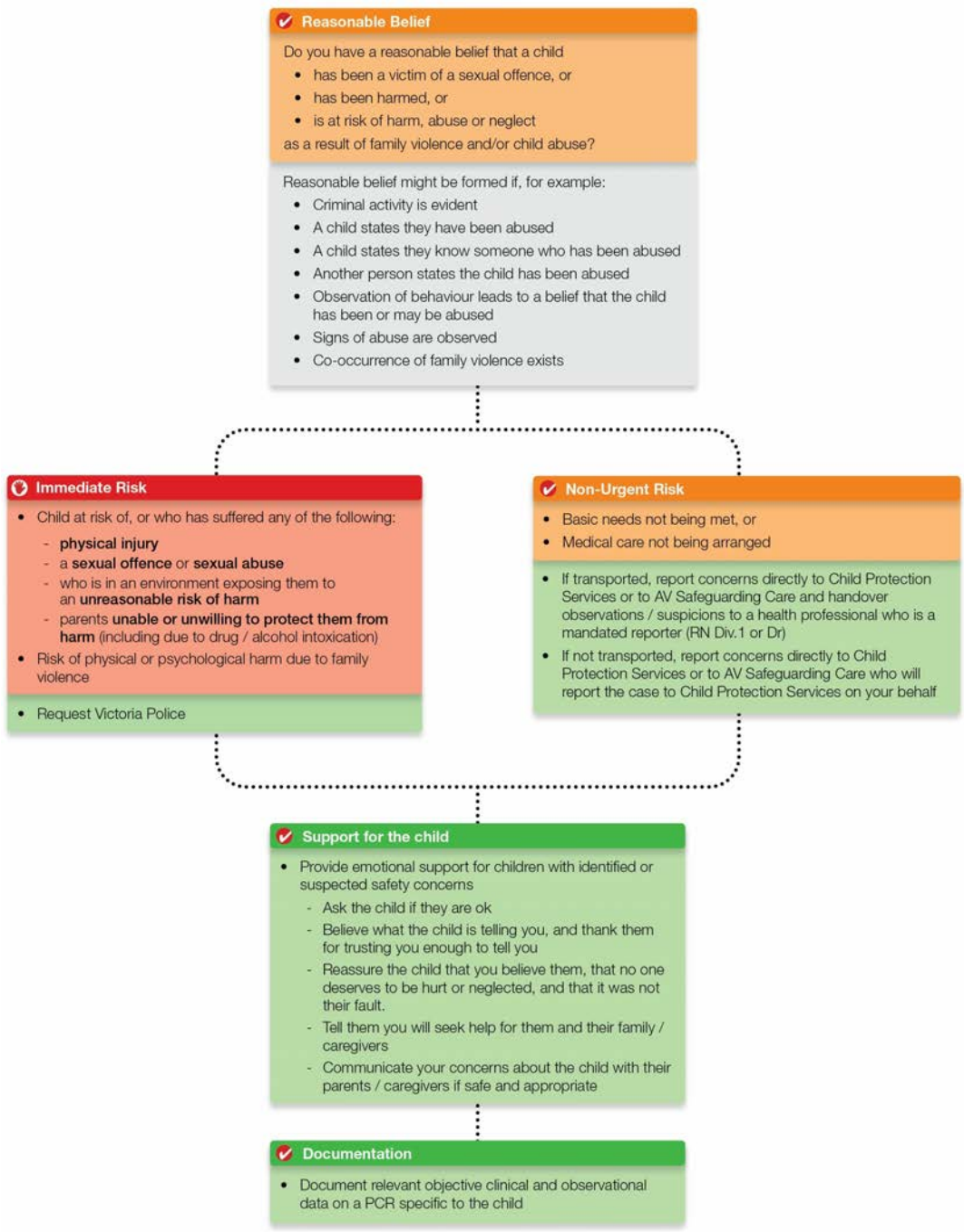
Unacceptable conduct

- 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).

Flowchart



Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/Agenda item 4.1.4 Child Safety.pdf

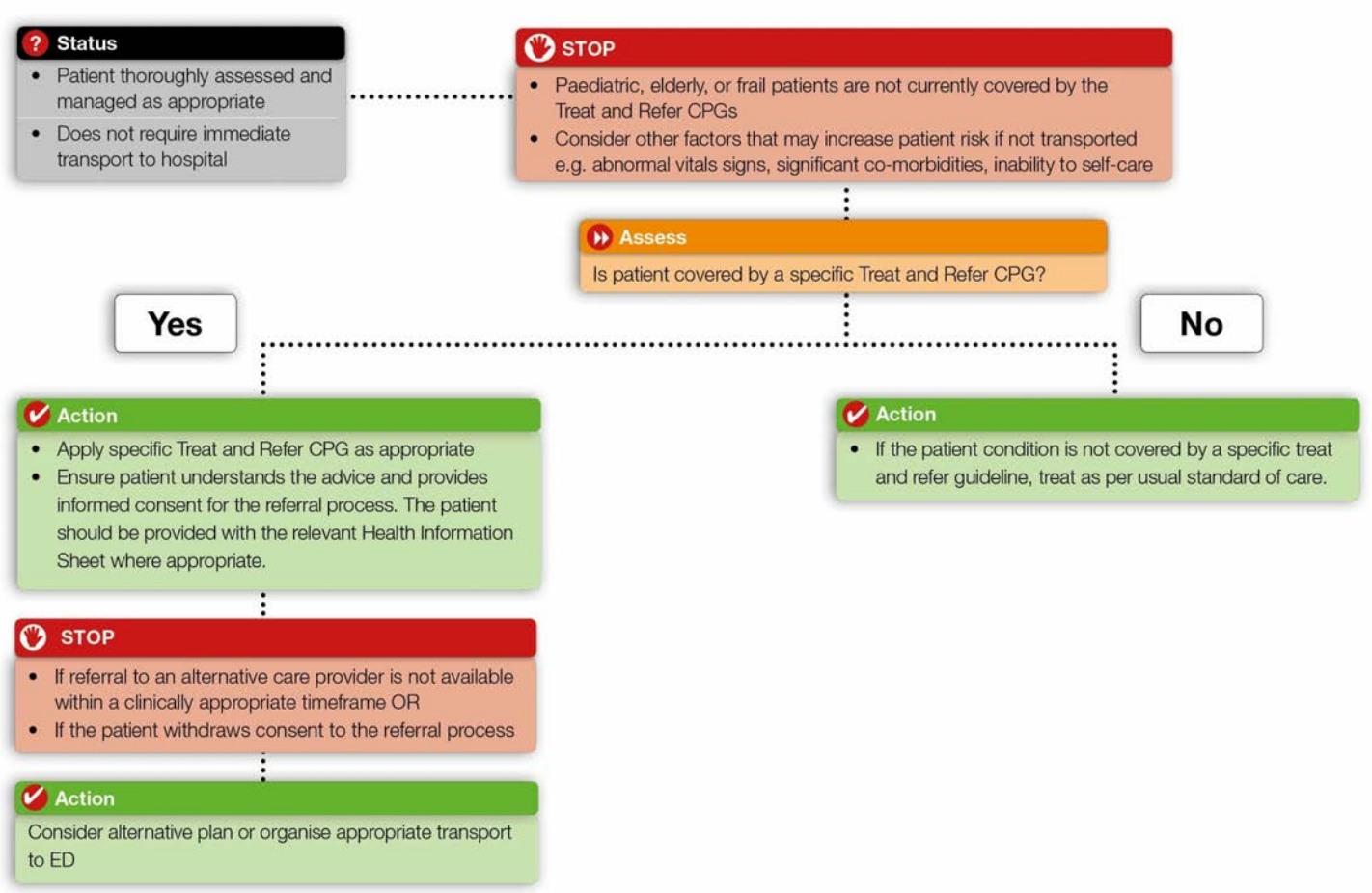
Special Notes

- 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 outof- 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

Epistaxis CPG TR0201

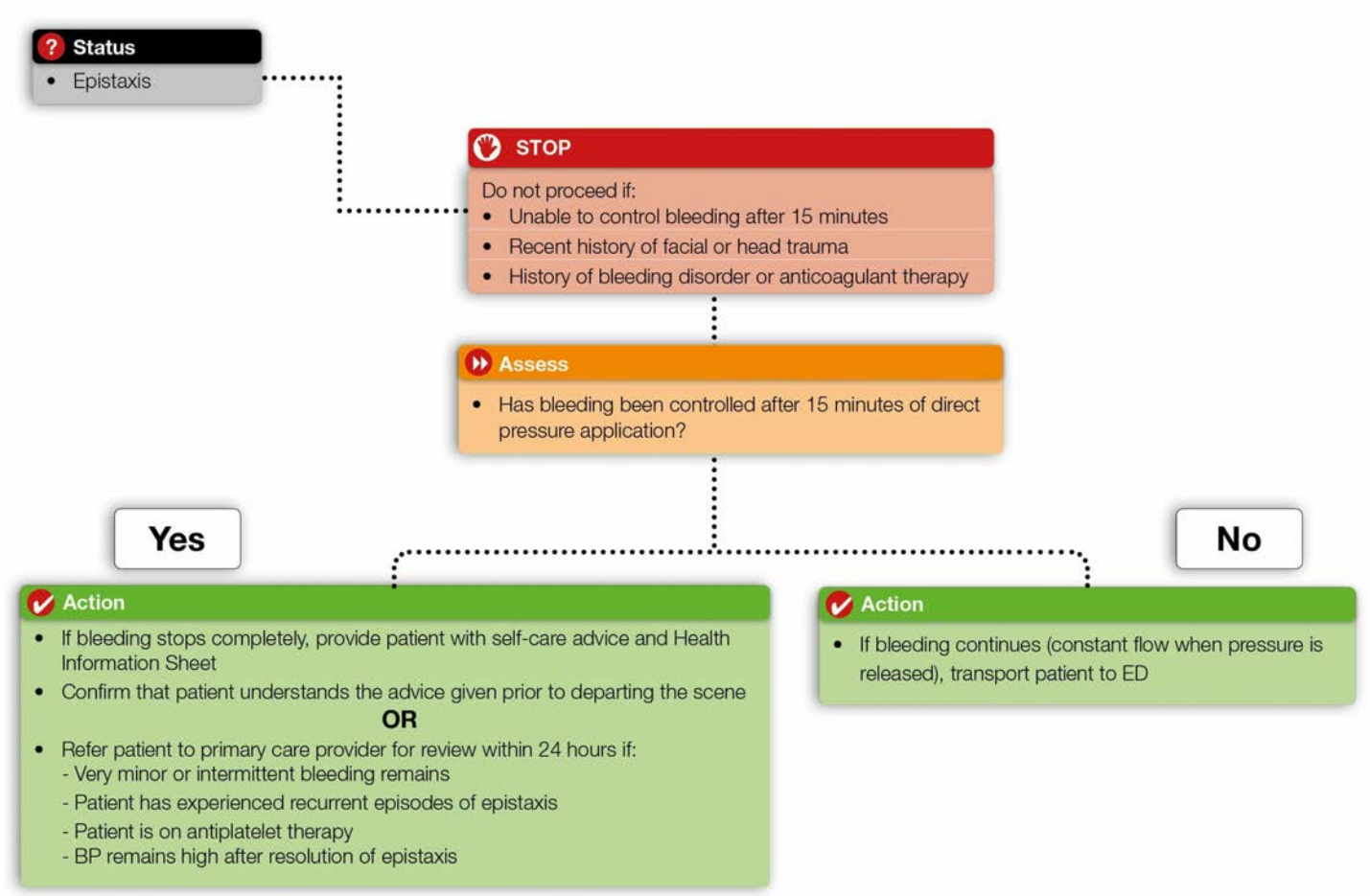
Special Notes

- 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

Suspected Gastroenteritis CPG TR0202

Special Notes

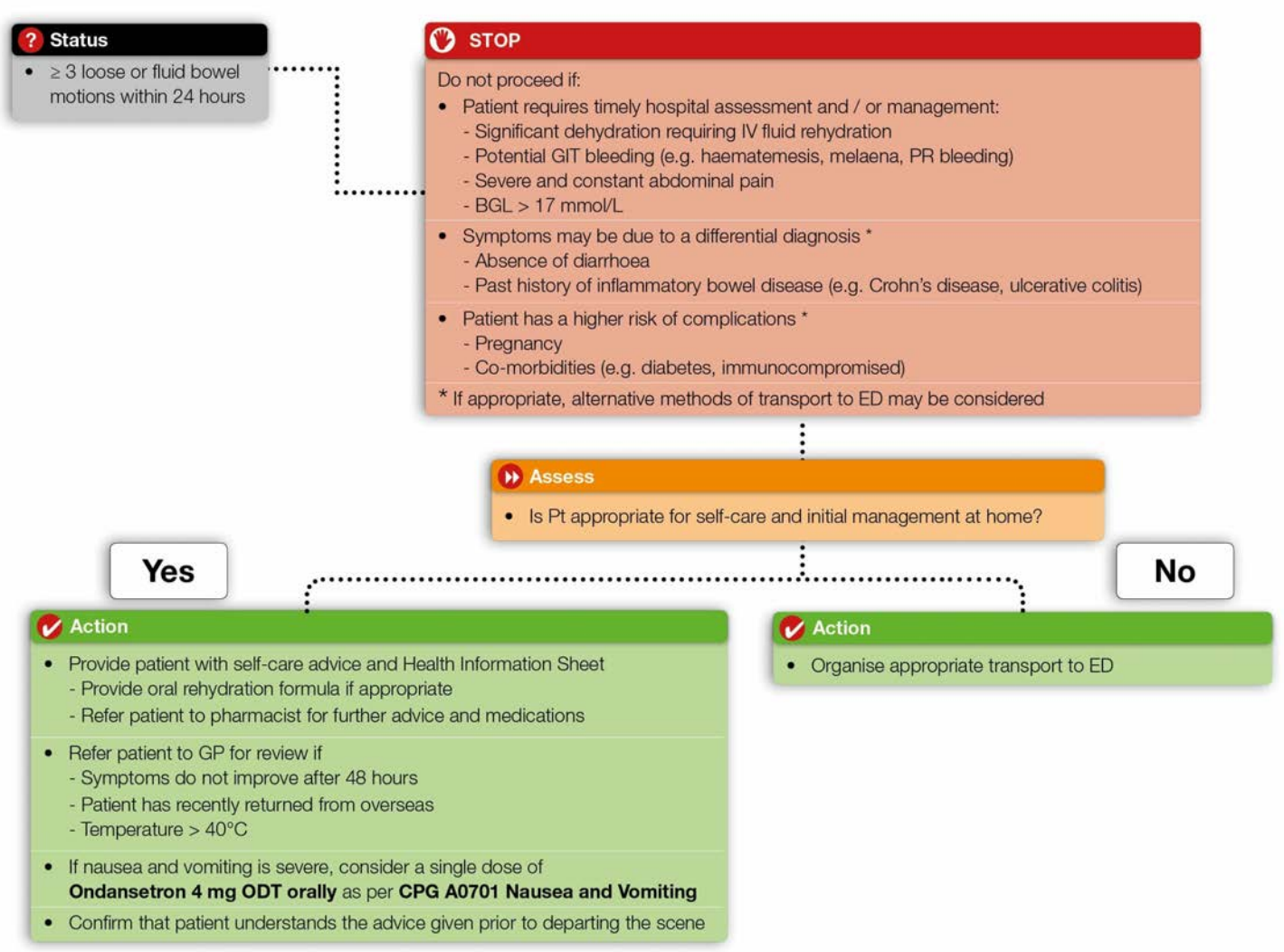
- For the purpose of this CPG, a patient can be suspected to have gastroenteritis because they present with acute onset of diarrhoea (≥ 3 loose or fluid bowel motions over 24 hours). Associated symptoms may include nausea and vomiting, abdominal cramping, lethargy and fever.
- Examples of signs of significant 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°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

Minor Burns CPG TR0205

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

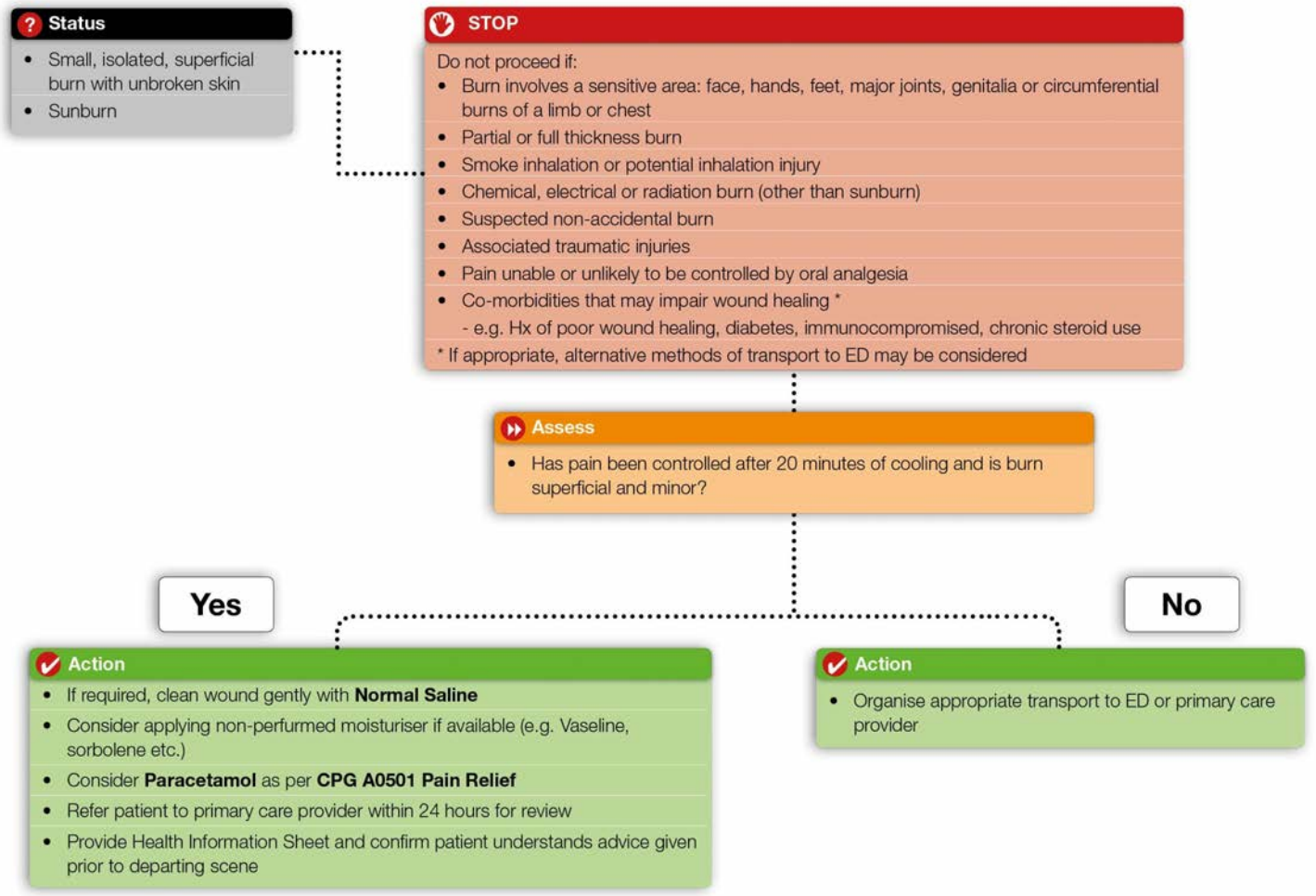
- **Partial or full-thickness** burns have the following characteristics:
  - **Appearance:** Pale pink / white / black
  - **Sensation:** Increased sensation to no sensation
  - **Circulation:** Rapid capillary refill to no circulation
  - **Colour:** Pink / white / charred / black
  - **Blisters:** 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 MAy 2015 Treat and Refer - Minor burns.pdf

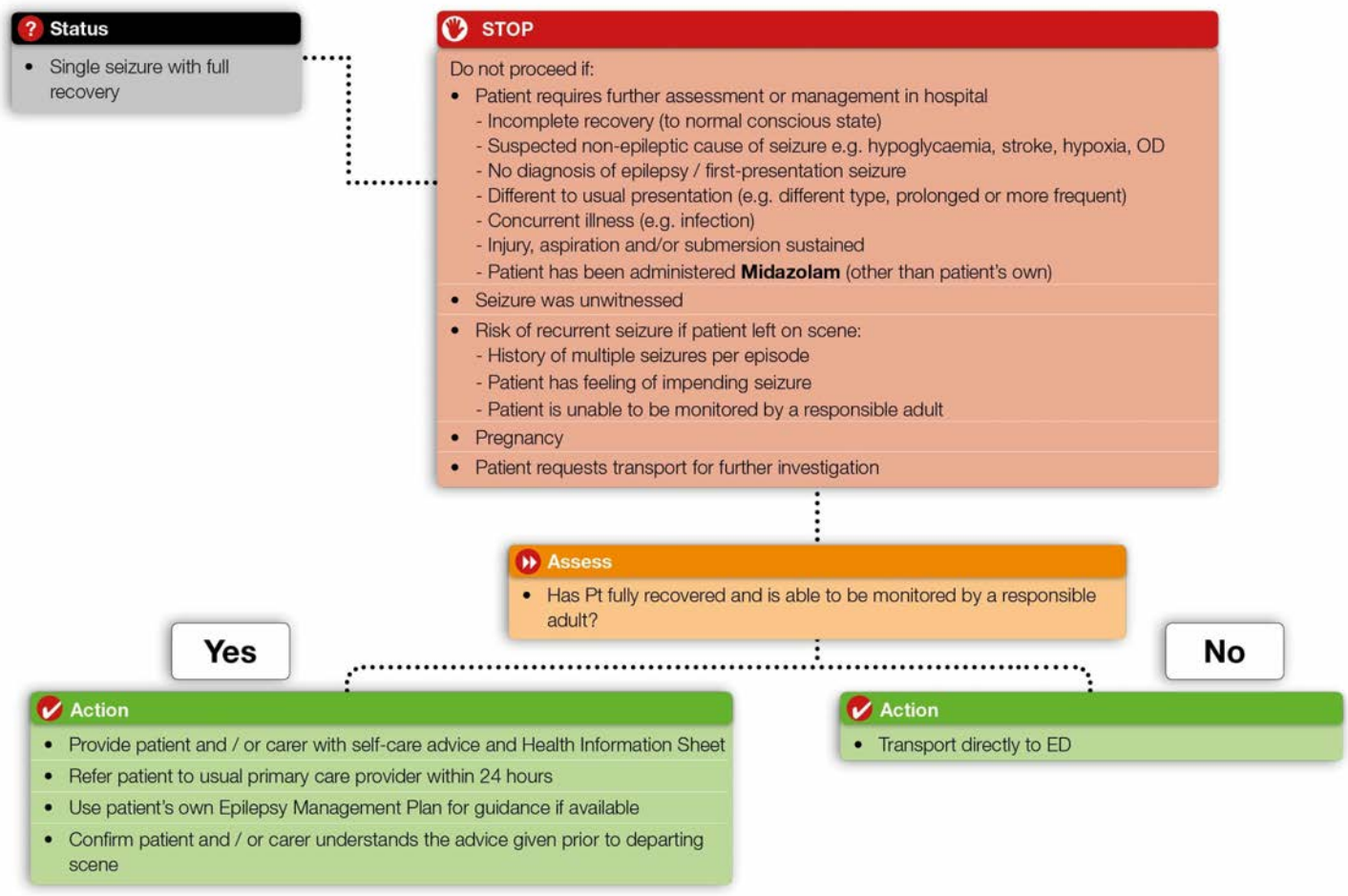
Special Notes

- 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

Lower Back Pain CPG TR0209

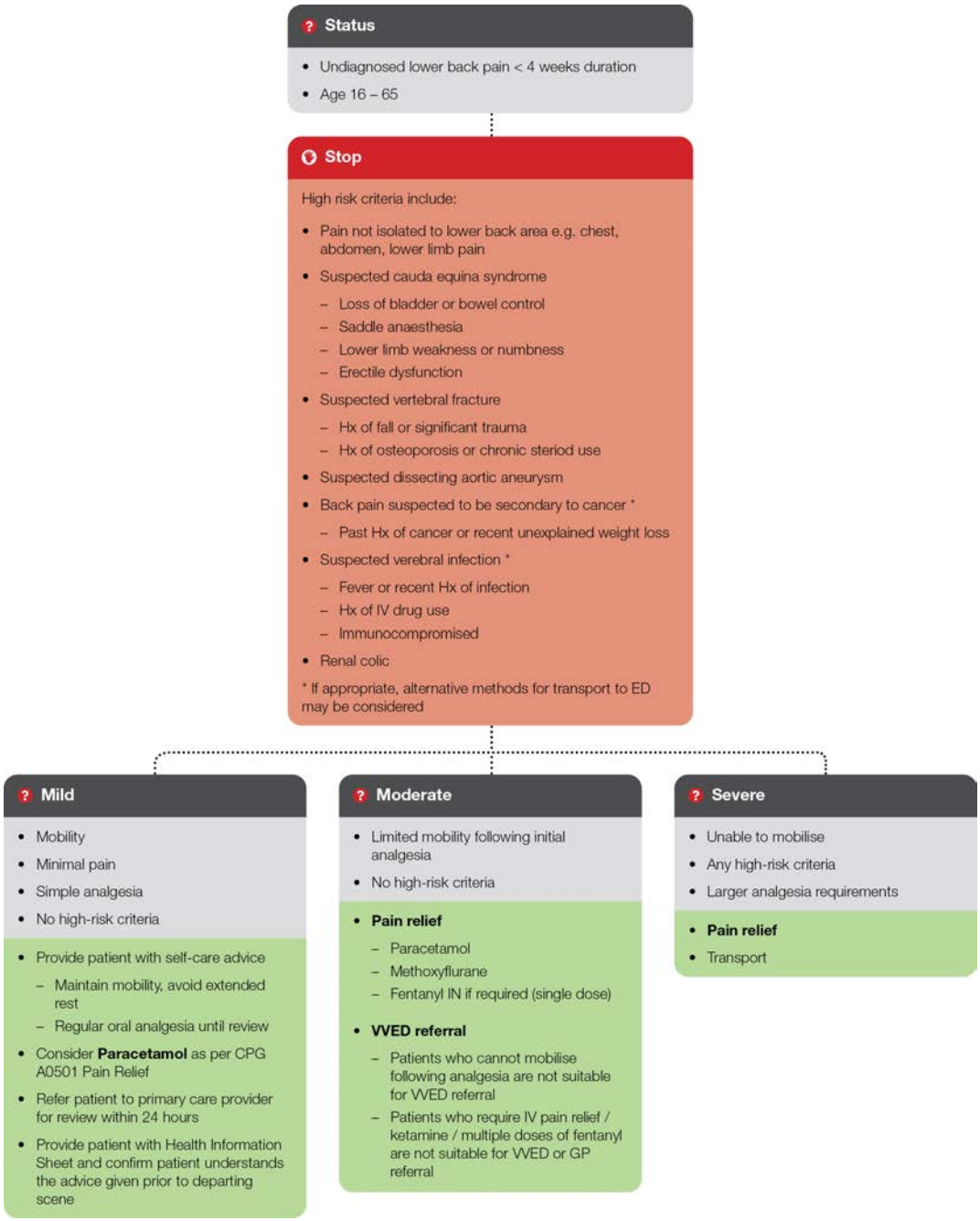
Special Notes

- This CPG is intended for adult patients aged 16 – 65 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.
  - VVED will be able to support care planning for these patients.
- Patients with mild pain that can be managed with paracetamol may not require VVED and can be referred to their local doctor for follow-up.
- Patients who require IV pain relief / ketamine / multiple doses fentanyl are not suitable for VVED or local doctor referral.

General Care

- Most cases of acute non-specific lower back pain can be managed in the primary care setting.
- Refer patients with moderate to severe pain to VVED for physiotherapy and analgesia advice.
- VVED may prescribe ibuprofen and/or other agents to support pain management.

Flowchart



Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC May 2015 Treat and Refer - Lower Back Pain.pdf

Adenosine CPG D032

Presentation	**6 mg in 2 mL glass ampoule**
Pharmacology	A naturally occurring purine nucleoside found in all body cells Actions: • 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	**1. AVNRT with adequate or inadequate perfusion but not deteriorating rapidly** **2. AVRT and associated Wolff-Parkinson-White (WPW) or other accessory tract SVT with adequate or inadequate perfusion but not deteriorating rapidly**
Contraindications	**1. Second degree or third degree A-V block (may produce prolonged sinus arrest / A-V blockade)** **2. AF** **3. Atrial flutter** **4. Ventricular tachyarrhythmias** **5. Known hypersensitivity**
Precautions	**1. Adenosine may provoke bronchospasm in the asthmatic patient** **2. 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	• 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

Adrenaline CPG D002

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: • 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	**1. Cardiac arrest - VF/VT, Asystole or PEA** **2. Shock** **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: **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	• Sinus tachycardia • Supraventricular arrhythmias • Ventricular arrhythmias • Hypertension • Pupillary dilatation • May increase size of MI • Feeling of anxiety/palpitations in the conscious patient
Special notes	IV **Adrenaline** should be reserved for life threatening situations. **IV effects:** **Onset:** 30 seconds **Peak:** 3 – 5 minutes **Duration:** 5 – 10 minutes **IM effects:** **Onset:** 30 – 90 seconds **Peak:** 4 – 10 minutes **Duration:** 5 – 10 minutes

Amiodarone CPG D003

Mode of action

- Class III anti-arrhythmic – prolongs cardiac action potential and delays refractory period

Indications

- VF / Pulseless VT refractory to defibrillation
- Sustained or recurrent VT

Contraindications

- Tricyclic Antidepressant toxicity
- QTc > 500 milliseconds
- VT following ondansetron administration
- Pregnancy **(if not in cardiac arrest)**

Precautions

- Older patients are more susceptible to bradycardia post-infusion

Adverse effects

- CV: Rebound bradycardia, hypotension, phlebitis
- GI: Nausea, vomiting, metallic taste

Significant interactions

- Infusion only compatible with dextrose 5% (sodium chloride 0.9% can be used to flush line for administration during cardiac arrest)
- Flush the line thoroughly prior to administration if the same line has previously been used to administer dexamethasone, heparin, hydrocortisone or sodium bicarbonate

Pregnancy

- Maternal use of amiodarone has been associated with congenital hypothyroidism or hyperthyroidism and neurologic abnormalities

Breastfeeding

- Child should not be breastfed following amiodarone administration without first consulting specialist physician

Details

- **Presentation:** 150 mg in 3 mL ampoule
- **Route:** IV / IO
- **Onset of action:** 2 minutes
- **Duration of action:** 2 hours

Notes

- An amiodarone infusion may be required during interhospital transfers. This is most commonly a dose of 10 -20 mg / kg run over 24 hours. Confirm with sending physician and consult with ARV if any concerns exist.

References

1. Australian Medicines Handbook
2. Australian Injectable Drugs Handbook
3. Royal Women's Hospital Pregnancy and Breastfeeding Medicines Guide

Aspirin CPG D001

Presentation	**300 mg chewable tablets** **300 mg soluble or water dispersible tablets**
Pharmacology	An analgesic, antipyretic, anti-inflammatory and antiplatelet aggregation agent Actions: • 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	• 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: • 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: – 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: – 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	• 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.

Calcium Gluconate CPG D041

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

- Hyperkalaemia (including in the setting of cardiac arrest)
- Following transfusion of packed red blood cells
- Calcium channel blocker toxicity

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:** 931mg in 10 mL (equivalent to 2.2 mmol)
- **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

Ceftriaxone CPG D005

Mode of action

- Cephalosporin antibiotic – interferes with bacterial cell wall peptidoglycan synthesis by binding to penicillin-binding proteins, leading to cell lysis and death.

Indications

- Meningococcal septicaemia
- Sepsis
  - Adults: Transport time > 60 minutes
  - Paediatric: Consult only

Contraindications

- Cephalosporin allergy
- Preterm neonates (< 41 weeks corrected gestational age)

Precautions

- Penicillin allergy

Adverse effects

- GI: Diarrhoea, nausea, vomiting
- CV: May result in irritation at injection site
- Other: Rash

Significant interactions

- Do not mix with IV solutions containing calcium (Hartmann's and Ringer's)
- Do not administer at the same time as calcium-containing drugs (calcium gluconate or chloride, magnesium sulphate)

Pregnancy

- Considered safe to use for approved AV indications

Breastfeeding

- Considered safe to use for approved AV indications

Details

- **Presentation:** 1 g or 2 g as ceftriaxone sodium
- **Route:** IM / IV / IO
- **Onset of action:** 5 minutes (IV) or up to 3 hours (IM)
- **Duration of action:** Up to 9 hours

Notes

- **Intramuscular Preparation:** 1g vial: Dilute with 3.5 mL lignocaine 1% to 4 mL. 2g vial: Dilute with 7 mL lignocaine 1% to 8 mL. Administer each 1-gram dose separately into lateral upper thigh.
- **Intravenous Preparation:** 1g vial: Dilute with 9.5 mL water for injection to 10 mL. 2g vial: Dilute with 19 mL water for injection to 20 mL. Administer total dose over 4 minutes.

References

1. Australian Medicines Handbook
2. Australian Injectable Drugs Handbook

Dexamethasone CPG D007

Presentation	**8 mg in 2 mL glass vial**
Pharmacology	A corticosteroid secreted by the adrenal cortex Actions: • Relieves inflammatory reactions • Provides immunosuppression
Metabolism	By the liver and other tissues; excreted predominantly by the kidneys
Primary emergency Indications	**1. Bronchospasm** • **Severe (Adult) or Critical (Paediatric) Asthma** • **Anaphylaxis as additional therapy** **2. Croup** **3. Acute exacerbation of COPD** **4. Adult stridor (non-foreign body obstruction)** **5. Severe COVID-19** **6. Nausea and vomiting (AAV only)**
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, IM
Side effects	• 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

Dextrose 5% CPG D008

Presentation	**100 mL infusion soft pack**
Pharmacology	An isotonic crystalloid solution Composition: • Sugar – 5% dextrose • Water Actions: • Provides a small source of energy • Supplies body water
Metabolism	• Dextrose: – Broken down in most tissues – Stored in the liver and muscle as glycogen • Water: – 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	• Nil of significance in the above indication
Special notes	**IV half life:** Approximately 20 - 40 minutes

Dextrose 10% CPG D008/9

Mode of action

- Restores blood glucose levels by providing carbohydrates and calories while minimising glycogen depletion.

Indications

- Hypoglycaemia (BGL < 4 mmol/L) with altered conscious state, or unresponsive to oral glycaemic agents

Contraindications

- None

Precautions

- None

Adverse effects

- CV: May result in vein irritation, damage, or thrombosis in rare cases. Monitor for thrombophlebitis.

Significant interactions

- Should not be administered through same administration set as blood products due to possibility of haemolysis

Pregnancy

- Considered safe to use for approved AV indication

Breastfeeding

- Considered safe to use for approved AV indication

Details

- **Presentation:** 25 g in 250 mL infusion soft pack
- **Route:** IV / IO
- **Onset of action:** 3 minutes
- **Duration of action:** Variable

Notes

- Solution should be clear and colourless

References

1. Australian Medicines Handbook
2. Baxter Product Information – NaCl + Glucose, available from: IV Fluid Therapy | Baxter Professional Australia

Droperidol CPG D042

Mode of action

Dopamine antagonist – antipsychotic medication with sedative effects. Also blocks α-adrenoceptors

Indications

- Moderate agitation or behavioural disturbance
- Nausea and vomiting (AAV only)

Contraindications

- Nil

Precautions

- Elderly / frail patients are more susceptible to adverse effects[1]
- Parkinson's disease. May experience worsening of Parkinson related symptoms[1-3]
- Lewy body dementia. May experience increase in agitation[1]
- QT prolongation has been reported rarely. Where possible provide ECG monitoring after sedation has been achieved

Adverse effects

- CNS: Oversedation, dizziness[1,2]
- CVS: hypotension, tachycardia, QT prolongation (see above)[1,2]
- Extrapyramidal symptoms (rare)

Significant interactions

- Sedative medications / alcohol – may cause oversedation[1].
- Co-administration with ondansetron or prochlorperazine increases the risk of QT prolongation. Ensure that ECG monitoring is provided.

Pregnancy

- Administer only if benefits outweigh risk.[4]

Breastfeeding

- Administer only if benefits outweigh risk. Droperidol is excreted into breast milk and monitoring of the infant is required[4]

Details

- **Presentation:** 10mg in 2mL vial
- **Route:** IM, IV
- **Onset of action:** 3-10 minutes[2] Peak sedation is usually achieved within 20-30 minutes[5]
- **Duration of action:** 2 – 4 hours[2]

Notes

- Patients < 16 years old - consult with AV Clinician / AV Medical Advisor prior to sedation
- Consider other agents as per Acute Behavioural Disturbance CPG for Patients with Parkinson's disease and Lewy body dementia

Infusion

None

References

1. Australian Medicines Handbook
2. Product Information
3. Therapeutic Guidelines
4. RWH Pregnancy and Breastfeeding Medicines Guide
5. Colin B. Page, Lachlan E. Parker, Stephen J. Rashford, Emma Bosley, Katherine Z. Isoardi, Frances E. Williamson & Geoffrey K. Isbister (2018) A Prospective Before and After Study of Droperidol for Prehospital Acute Behavioral Disturbance, Prehospital Emergency Care, 22:6, 713-721, DOI: 10.1080/10903127.2018.1445329

Fentanyl CPG D010

Mode of action

- Synthetic opioid analgesic – mainly acts on mu-opioid receptors in the CNS to reduce transmission of the pain impulse and by modulating the descending inhibitory pathways from the brain.

Indications

- Analgesia
- Sedation to facilitate or maintain:
  - Intubation
  - Transthoracic pacing
  - Synchronised cardioversion

Contraindications

- Serotonin syndrome
- Monoamine oxidase inhibitors (MAOIs) within the previous 14 days
- Late second stage of labour

Precautions

- Elderly / frail patients
- Impaired hepatic function
- Respiratory depression
- Current asthma presentation
- Rhinitis, rhinorrhoea, or facial trauma (IN route)

Adverse effects

- CV: Bradycardia
- Respiratory: Respiratory depression, rigidity of diaphragm and intercostal muscles
- GI: nausea, vomiting (less common than morphine)
- Other: Rash, erythema

Significant interactions

- Not compatible with hydroxocobalamin

Pregnancy

- Considered safe to use during pregnancy at the lowest effective dose for the shortest duration possible, **aside from during late second stage labour**

Breastfeeding

- Considered safe to use for AV indications

Details

- **Presentation:** 100 mcg in 2 mL ampoule
- **Route:** IN / IM / SC / IV / IO
- **Onset of action:** Immediate
- **Duration of action:** 30 – 60 minutes

Notes

- The risk of rigidity of diaphragm and intercostal muscles can be mitigated by providing doses as a slow IV push
- Patients who chronically use opioids may be expected to have a degree of tolerance and may require higher cumulative doses than opioid naïve patients. As the degree of tolerance is unpredictable, careful titration is required.

References

1. Australian Medicines Handbook
2. Australian Injectable Drugs Handbook
3. Royal Women's Hospital Pregnancy and Breastfeeding Medicines Guide

Furosemide CPG D011

Presentation	**20mg in 2mL glass ampoule**
Pharmacology	A diuretic Actions: • 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	• Hypotension
Special notes	The effect of vasopressor drugs will often be reduced after treatment with **Furosemide**. **IV effects:** **Onset:** 5 minutes **Peak:** 20 - 60 minutes **Duration:** 2 - 3 hours

Glucagon CPG D012

Mode of action

- Increases blood glucose concentration by activating hepatic glucose production.
- Also increases cyclic AMP independent of beta-receptors or calcium flux, resulting in a positive chronotropic and inotropic effect.

Indications

- Hypoglycaemia (BGL < 4 mmol/L) with altered conscious state, or unresponsive to oral glycaemic agents where IV access unable to be obtained
- Anaphylaxis with persistent hypotension after two doses of adrenaline where patient has a history of heart failure **OR** is taking beta blockers

Contraindications

- Known pancreatic tumours [1]
- Known phaeochromocytoma (tumour of adrenal gland) [1]

Precautions

- May have reduced effect in patients with adrenal insufficiency, alcohol-induced hypoglycaemia, prolonged exercise, recent administration of glucagon, chronic liver disease, ketogenic diets, and patients with frequent episodes of hypoglycaemia [1]
- If administering glucagon, patient should be managed laterally to mitigate the risk of nausea and vomiting secondary to administration

Adverse effects

- GI: nausea & vomiting

Significant interactions

- None

Pregnancy

- Safe to administer [1, 2]

Breastfeeding

- Safe to use [1, 2]

Details

- **Presentation:** Vial containing 1 mg (1 IU) of glucagon hydrochloride with glass syringe containing 1 mL of water for injection
- **Route:** IM / IV
- **Onset of action:** 5 – 10 minutes
- **Duration of action:** 12 – 25 minutes

Notes

- Prior to reconstitution the powder should be white or nearly white
- Solution should be clear and colourless once reconstituted

References

1. Australian Medicines Handbook
2. Royal Women's Hospital Pregnancy and Breastfeeding Medicines Guide

Glyceryl Trinitrate CPG D013

Mode of action

Organic nitrate – relaxes vascular smooth muscle

Venodilaton promotes venous pooling and reduces venous return to the heart (reduces preload)

Arteriodilation reduces systemic vascular resistance and arterial pressure (reduces afterload)

Effects include:

- Reduced myocardial O_2 demand
- Reduced systolic, diastolic and mean arterial blood pressure, whilst usually maintaining coronary perfusion pressure
- Mild collateral coronary artery dilation may improve blood supply to ischaemic areas of myocardium
- Mild tachycardia secondary to slight fall in BP
- Preterm labour: uterine quiescence in pregnancy

Indications

- Chest pain in acute coronary syndrome
- Hypertension associated with acute coronary syndrome
- Acute cardiogenic pulmonary oedema
- Autonomic dysreflexia
- Preterm labour

Contraindications

- BP < 100 mmHg
- HR > 150 bpm
- HR < 50 bpm (except in autonomic dysreflexia)
- Ventricular tachycardia
- PDE5 inhibitors (current/recent use)
- Riociguat (current use)
- Bleeding in pregnancy

Precautions

- Use lower doses (i.e. 300 mcg) in patients who are elderly (age > 60), have no previous exposure to GTN, or with recent MI, as they may be more susceptible to adverse effects
- Right ventricular MI or inferior STEMI with systolic BP < 160 mmHg - use cautiously due to risk of severe hypotension from preload reduction
- Preterm labour - concurrent use with other tocolytics

Adverse effects

- CV: hypotension, tachycardia, bradycardia (occasionally)
- CNS: headache, dizziness, syncope
- Other: skin flushing

Significant interactions

- Phosphodiesterase 5 (PDE5) inhibitors including avanafil (Spedra), sildenafil (Viagra), tadalafil (Cialis) and vardenafil (Levitra). GTN increases the effects of PDE5 inhibitors resulting in profound hypotension. Do not administer GTN within:
  - 12 hours since the last dose of avanafil OR
  - 24 hours for sildenafil or vardenafil OR
  - 48 hours for tadalafil
- Riociguat (Adempas) – used for pulmonary arterial hypertension. GTN increases the hypotensive effects of riociguat. Do not administer to patients currently taking this medication

Pregnancy

- Considered safe to use

Breastfeeding

- Monitoring required – use lowest effective dose and observe infant for adverse effects such as flushing or discomfort after breastfeeding

Details

- **Presentation:** 0.3 mg tablet (*Nitrostat*). 50 mg patch (releases 0.4 mg/hr or 10 mg/24 hours)
- **Route:** Sublingual (S/L) – place tablet under tongue and allow to dissolve. Patients may experience a mild tingling or burning sensation

  Transdermal – write date/time onto patch and apply to clean, dry, unbroken skin on chest or upper arm.
- **Onset of action:** 1 - 3 minutes (S/L); up to 30 minutes (transdermal)
- **Peak:** 5 minutes (S/L); 2 hours (transdermal)
- **Duration of action:** at least 25 minutes (S/L). Patch continually releases GTN until removed

Notes

- GTN is also known as nitroglycerin
- GTN tablets should be stored in the original bottle, with the lid tightly closed after each use to prevent loss of potency.
- Due to uncontrolled storage conditions inside an ambulance, unused GTN tablets should be discarded 6 months after first opening. Mark the expiry date on the bottle with a pen or permanent marker.
- Do not administer the patient's own GTN tablets or spray (Nitrolingual) unless unavoidable, as its storage may have been sub-optimal or it may be expired.
- PDE5 inhibitors are used for multiple indications including sexual dysfunction, pulmonary arterial hypertension and benign prostatic hypertrophy. Both male and female patients should be asked about recent use prior to GTN administration

Infusion

- None

Mode of action

- Isotonic crystalloid solution.
- Composition: Electrolytes (sodium, potassium, calcium, chloride, bicarbonate as lactate)

Indications

- Rehydration
- Resuscitation

Contraindications

- Nil

Precautions

- Traumatic head injury. Where available use normal saline in preference.

Adverse effects

- Nil where indicated

Significant interactions

- Do not use to prime or flush an IV line where blood products are being administered.[2]
- Do not give simultaneously in the same line as blood products.[2]
- Do not administer ceftriaxone to neonates < 28 days who are receiving or have received Hartmann's (including via a second IV line). [2]
- Ceftriaxone must not be administered simultaneously with Hartmann's through the same infusion line including via Y-connector (any patient > 28 days). [2]

Pregnancy

- Safe

Breastfeeding

- Safe

Details

- **Presentation:** 500 mL and 1000 mL soft pack
- **Route:** IV, IO, central line.
- **Onset of action:** N/A
- **Duration of action:** N/A

Notes

- Introduced to AV during a national IV fluid shortage (2024). Use where IV normal saline is indicated in the AV CPGs using the same volumes and rates.
- Also known as Compound Sodium Lactate or Ringer's lactate
- Do not use to reconstitute powdered medicines (ceftriaxone, hydrocortisone or parecoxib). There is no literature to support this in the product information.
- Do not use to transduce arterial or central lines which may provide incorrect sampling.

Infusion

- N/A

References

1. Australian Injectable Drugs Handbook, 9th Edition
2. Lifeblood [accessed 11 July, 2024] https://www.lifeblood.com.au/health-professionals/clinical-practice/transfusion-process/administration

Heparin CPG D038

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	**1. Known allergy or hypersensitivity** **2. Active bleeding (excluding menses)** **3. Oral anticoagulants** **4. Bleeding disorders** **5. History of Heparin-Induced Thrombocytopaenia (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	• Bleeding • Bruising and pain at injection site • Hyperkalaemia • Thrombocytopaenia (mild to severe)
Special notes	Do not inject IM due to risk of causing haematoma Onset: immediate Duration: 3-6 hours. 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.

Ipratropium Bromide CPG D014

Presentation	**250 mcg in 1 mL nebule or polyamp**
Pharmacology	Anticholinergic bronchodilator Actions: • Allows bronchodilatation by inhibiting cholinergic bronchomotor tone (i.e. blocks vagal reflexes which mediate bronchoconstriction)
Metabolism	Excreted by the kidneys
Primary emergency Indications	**1. Severe respiratory distress associated with bronchospasm** **2. Exacerbation of COPD irrespective of severity**
Contraindications	**1. Known hypersensitivity to Atropine or its derivatives**
Precautions	**1. Glaucoma** **2. Avoid contact with eyes**
Route of administration	Nebulised (in combination with Salbutamol)
Side effects	• Headache • Nausea • Dry mouth • Skin rash • Tachycardia (rare) • Palpitations (rare) • Acute angle closure glaucoma secondary to direct eye contact (rare)
Special notes	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. The nebuliser mask must therefore be fitted properly during inhalation and care taken to avoid **Ipratropium Bromide** solution entering the eyes. **Ipratropium Bromide** must be nebulised in conjunction with **Salbutamol** and is to be administered as a single dose only. **Onset:** 3 - 5 minutes **Peak:** 1.5 - 2 hours **Duration:** 6 hours

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 use[1]

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**
- **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

- Anti-epileptic – exact mechanism of action is unknown but may involve binding to synaptic vesicle protein 2A[1]

Indications

- Status epilepticus – second-line medication if insufficient response to two doses of midazolam (IV + IM)

Contraindications

- Nil

Precautions

- Nil

Adverse effects

- **CNS:** drowsiness, dizziness, weakness[2]

Significant interactions

- Nil

Pregnancy

- Monitoring required – limited safety information available[3]

Breastfeeding

- Monitoring required – observe the infant for potential adverse effects (drowsiness, irritability, poor feeding, restlessness)[3]

  (Unlikely scenario in context of emergency indication)

Details

- **Presentation:** 500 mg in 5 mL vial
- **Route:** IV (Dilute the dose to 50 mg / mL with sodium chloride 0.9% and infuse over 5 minutes)[4]

Notes

- N/A

Infusion

1. Dilute the dose to 50 mg / mL with sodium chloride 0.9% and infuse over 5 minutes[4]

References

1. Australian Medicines Handbook (online). Available from: https://amhonline.amh.net.au/
2. Martindale: The Complete Drug Reference (online).
3. The Women's Pregnancy and Breastfeeding Medicines Guide (online). Melbourne: The Royal Women's Hospital. Available from: https://thewomenspbmg.org.au
4. Australian Injectable Drugs Handbook (online).

Lidocaine (Lignocaine) CPG D015

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
  - Needle thoracostomy in adult patients responsive to voice / alert (MICA only)
  - Intraosseous administration of medication or fluid in a conscious patient (MICA only)
- VF / Pulseless VT refractory to defibrillation

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: ceftriaxone reconstitution only
  - Local tissue infiltration: chest decompression
  - IO: local anaesthetic in conscious patients, infuse slowly over 120 seconds and allow to dwell for 60 seconds (flush IO catheter with normal saline: 5 – 10 mL for adults, 2 – 5 mL for paediatrics)
  - IV / IO: VF / pulseless VT, administer as bolus dose
- **Onset of action:** 1-5 minutes (infiltration); 2-4 minutes (IV); 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 2025.

Infusion

- None

Lidocaine (Lignocaine) – AVOID-2 CPG D015B

Mode of action

Sodium channel blocker – interrupts impulse conduction in peripheral nerves and stabilises excitable cell membranes

Indications

- **Investigational agent – for patients enroled 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

Methoxyflurane CPG D017

Mode of action

- Inhaled anaesthetic – produces analgesia at low concentrations, however the exact mode of action is unknown

Indications

- Analgesia

Contraindications

- Pre-existing renal disease (see Notes below)
- Known (or genetic susceptibility) to malignant hyperthermia

Precautions

- Patients should not be administered > 6 mL of methoxyflurane in a 24 hour period, due to increased risk of nephrotoxicity
- To limit occupational exposure, methoxyflurane should not be administered in a confined space. Ensure adequate ventilation in ambulance. Place used Penthrox inhalers in a closed plastic bag when not in use.

Adverse effects

- CNS: Dizziness, drowsiness
- CV: Hypotension
- GIT: Nausea and vomiting

Significant interactions

- Unlikely when administered as directed

Pregnancy

- Considered safe to use

Breastfeeding

- Considered safe to use

Details

- **Presentation**: 3 mL bottle
- **Route**: Self-administered via inhalation using Penthrox inhaler device. Can be used intermittently or continuously as required
- **Onset of action**: Within 6 to 10 breaths
- **Duration of action**: Effects last 3-5 minutes after stopping the inhalation. One vial provides up to 25 minutes of analgesia with continuous use

Notes

- Managed as a restricted medication in AV
- Pre-existing renal disease includes previously diagnosed renal impairment or failure. Kidney stones and/or renal colic are not contraindications to methoxyflurane therapy within the context of this guideline

Infusion

- None

Midazolam CPG D019

Presentation	**5 mg in 1 mL glass ampoule** **15 mg in 3 mL glass ampoule**
Pharmacology	Short acting CNS depressant Actions: • Anxiolytic • Sedative • Anti-convulsant
Metabolism	In the liver; excreted by the kidneys
Primary emergency Indications	**1. Status epilepticus** **2. Sedation to maintain intubation** **3. Sedation to facilitate intubation *(RSI - modified or Paediatric IFS)*** **4. Sedation to facilitate synchronised cardioversion** **5. Sedation to facilitate transthoracic pacing** **6. Sedation in the agitated patient** **7. Sedation in psychostimulant OD** **8. Alcohol withdrawal syndrome**
Contraindications	**1. Known hypersensitivity to benzodiazepines**
Precautions	**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	• 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

Presentation	**10 mg in 1 mL glass ampoule**
Pharmacology	An opioid analgesic Actions: • CNS effects: – 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: – Vasodilatation – Decreases conduction velocity through the A-V Node
Metabolism	By the liver; excreted by the kidneys
Primary emergency Indications	**1. Pain relief** **2. Sedation to maintain intubation** **3. Sedation facilitate intubation (where fentanyl not appropriate for *RSI - modified or Paediatric IFS*)**
Contraindications	**1. History of hypersensitivity** **2. Renal impairment / failure** **3. Late second stage of labour**
Precautions	**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	• CNS effects: – Drowsiness – Respiratory depression – Euphoria – Nausea, vomiting – Addiction – Pin-point pupils • Cardiovascular effects: – Hypotension – Bradycardia
Special notes	**Morphine** is a Schedule 8 drug under the Poisons Act and its use must be carefully controlled with accountability and responsibility. Side effects of **Morphine** can be reversed with **Naloxone**. Occasional wheals are seen in the line of the vein being used for IV injection. This is not an allergy, only a histamine release. **IV effects:** **Onset:** 2 – 5 minutes **Peak:** 10 minutes **Duration:** 1 – 2 hours **IM effects:** **Onset:** 10 – 30 minutes **Peak:** 30 – 60 minutes **Duration:** 1 – 2 hours

Naloxone CPG D021

Presentation	**0.4 mg in 1 mL glass ampoule**
Pharmacology	An opioid antagonist Actions: • 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: • Sweating, goose flesh, tremor • Nausea and vomiting • Agitation • Dilatation of pupils, excessive lacrimation • Convulsions

Special notes	The duration of action of **Naloxone** is often less than that of the opioid used, therefore repeated doses may be required. **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. Following an opioid associated cardiac arrest **Naloxone** should not be administered. Maintain assisted ventilation. Following head injury **Naloxone** should not be administered. Maintain assisted ventilation if required. **IV effects:** **Onset:** 1 – 3 minutes **Peak:** n/a **Duration:** 30 – 45 minutes **IM effects:** **Onset:** 1 – 3 minutes **Peak:** n/a **Duration:** 30 – 45 minutes

Normal Saline CPG D022

Presentation	**10 mL polyamp** **500 mL and 1000 mL infusion soft pack**
Pharmacology	An isotonic crystalloid solution Composition: • Electrolytes (sodium and chloride in a similar concentration to that of extracellular fluid) Action: • Increases the volume of the intravascular compartment
Metabolism	Electrolytes: • Excreted by the kidneys Water: • Excreted by the kidneys • Distributed throughout total body water, mainly in the extracellular fluid compartment
Primary emergency Indications	**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

- 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: Extrapyramidal 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

Mode of action

- 5-HT_3 antagonist – exact mode of action is not fully understood. Release of serotonin (5-HT) is thought to trigger a vomiting reflex in both the peripheral (GIT) and central nervous system.

Indications

- Undifferentiated nausea and vomiting
- Prophylaxis where vomiting could be clinically detrimental (e.g. spinally immobilised, penetrating eye trauma)

Contraindications

- Apomorphine (see *Significant Interactions*)

Precautions

- Pregnancy 1st trimester – consult with receiving hospital
- Congenital Long QT syndrome – ondansetron causes QT prolongation (dose-dependent effect) and increases the risk of Torsades de pointes in patients with a prolonged QT interval (QTC > 500 ms). Unlikely when administered at approved doses but avoid if patient has a history of congenital Long QT syndrome.[1]
- Severe hepatic disease (e.g. cirrhosis) – limit total daily dose to a maximum of 8 mg (all routes of administration)
- Ondansetron ODT may contain aspartame which should be avoided in patients with phenylketonuria. Ondansetron injection can be administered if appropriate

Adverse effects

- CNS: Headache, dizziness
- CV: QT prolongation (rare)
- GI: Constipation
- Other: Visual disturbance, including transient loss of vision (rare, associated with rapid IV administration)

Significant interactions

- Apomorphine (injection used in the treatment of severe Parkinson's disease) – reports of profound hypotension and loss of consciousness. Do not administer ondansetron to patients currently receiving apomorphine[2]
- Co-administration with droperidol or prochlorperazine increases the risk of QT prolongation. Ensure that ECG monitoring is provided.

Pregnancy

- 1st trimester – consult with receiving hospital
- 2nd and 3rd trimester – administer only if vomiting is very severe and benefits outweigh risk[3]
- Consider IV fluid rehydration **as per CPG A0701**

Breastfeeding

- Considered safe[3]

Details

- **Presentation:** 4 mg ODT; 8 mg in 4 mL glass ampoule
- **Route:** Oral ODT – dissolve in mouth then swallow

  IV – slow injection over at least 30 seconds (preferably over 3-5 minutes) reduces risk of adverse effects

  IM – only if other routes of administration are unsuitable, due to large volume
- **Peak:** 10 minutes (IV, IM); 30 minutes (oral)
- **Duration of action:** Several hours

Notes

- Be aware of potential to confuse with Olanzapine ODT due to similarity in name and presentation

Infusion

- N/A

References

1. Ondansetron ODT-DRLA Australian approved product information. Melbourne: Dr Reddy's Laboratories (Australia); 2020 Jul. Available from https://www.tga.gov.au
2. Australian Medicines Handbook 2020 (online). Adelaide: Australian Medicines Handbook Pty Ltd; 2020 July. Available from: https://amhonline.amh.net.au
3. The Women's Pregnancy and Breastfeeding Medicines Guide (online). Melbourne: The Royal Women's Hospital. Available from: https://thewomenspbmg.org.au

Oxytocin CPG D031

Mode of action

- Synthetic pituitary hormone – stimulates uterine muscle contraction. Uterine atony is the most common cause of PPPH

Indications

- Primary postpartum haemorrhage (PPPH)

Contraindications

- None, provided all babies have been delivered prior to administration

Precautions

- Nil

Adverse effects

- GI: Nausea and vomiting

Significant interactions

- Nil

Pregnancy

- Safe to use for third-stage labour, but only indicated for PPPH in AV

Breastfeeding

- Safe

Details

- **Presentation:** 10 units (IU) in 1 mL glass ampoule
- **Route:** IM
- **Onset of action:** 2 – 4 minutes
- **Duration of action:** 30 – 60 minutes

Notes

- Check AV pharmacy or product information in regards to storage requirements. Some brands of oxytocin require refrigeration.

Infusion

- N/A

Paracetamol CPG D036

Mode of action

Analgesic and antipyretic – exact mechanism of action is unclear; thought to inhibit prostaglandin synthesis in the CNS

Indications

- Mild pain, or pain relief in combination with other analgesics
- Headache

Contraindications

- Children < 1 month of age

Precautions

- Hepatotoxicity can occur with overdose.

  Do not administer if paracetamol has already been given within past 4 hours, or if total paracetamol intake within past 24 hours exceeds 4g (adults) or 60 mg/kg (children)
- Risk of hepatotoxicity is increased in the following circumstances:
  - Impaired hepatic function or liver disease
  - Elderly / frail patients
  - Malnourishment

Adverse effects

- Hypersensitivity reactions including severe skin rashes (rare)
- Haematological reactions (rare)
- Hypotension has been reported with IV infusion, particularly in critically ill patients

Significant interactions

Nil

Pregnancy

- Safe to use

Breastfeeding

- Safe to use

Administration advice

- Presentation: 500 mg tablets, 120mg in 5 mL oral liquid (24 mg/mL), 1000 mg/100 mL IV infusion (AAV only). The IV solution should be clear, but the solution may range from colourless to slightly yellow, brown, pink or orange (depending on the brand).
- Route: Oral, IV infusion (AAV only)
- Onset **of action**: 30 minutes (oral), 5-10 minutes (IV)
- Duration **of action**: 4 hours

Notes

- There are several brands of Paracetamol available, and it is also found in many combination medicines, both prescription and over-the-counter. Carefully determine previous Paracetamol intake prior to dose administration.
- The usual dose of Paracetamol for children is 15 mg/kg per dose. The maximum total dose of 60 mg/kg equates to four doses within a 24 hour period.
- Paracetamol is not indicated for the treatment of fever in the emergency setting.
- There does not appear to be a clinically significant difference in efficacy between IV and oral paracetamol. IV paracetamol should be limited to clinical circumstances where the oral route is not appropriate.

Infusion

- Adults – infuse undiluted over 15 minutes
- Paediatrics – draw up required dose in a syringe and administer over 15 minutes. Do not hang the entire bag to prevent risk of overdose

Plasma-Lyte CPG D049

Mode of action

- Isotonic crystalloid solution.
- Composition: Electrolytes (sodium, potassium, magnesium, chloride, acetate, gluconate)

Indications

- Rehydration
- Resuscitation

Contraindications

- Nil

Precautions

- Nil

Adverse effects

- Nil where indicated

Significant interactions

- Amiodarone – incompatible
- Propofol – incompatible

Pregnancy

- Safe

Breastfeeding

- Safe

Details

- **Presentation:** 500 mL and 1000 mL soft pack
- **Route:** IV, IO, central line.
- **Onset of action:** N/A
- **Duration of action:** N/A

Notes

- Introduced to AV during a national IV fluid shortage (2024). Use where IV normal saline is indicated in the AV CPGs using the same volumes and rates.
- Do not use to reconstitute powdered medicines (ceftriaxone, hydrocortisone or parecoxib). There is no literature to support this in the product information.
- Do not use to transduce arterial or central lines which may provide incorrect sampling.

Infusion

- N/A

References

1. Australian Injectable Drugs Handbook, 9th Edition

Prochlorperazine CPG D024

Mode of action

Dopamine antagonist – antiemetic effects are primarily due to D2 receptor blockade. Also acts on other neurotransmitter systems including histaminic, cholinergic and α-adrenergic receptors

Indications

- Nausea and vomiting in patient ≥ 21 years of age; specifically for
  - Known allergy or C/I to ondansetron
  - Vestibular nausea
- Headache (irrespective of nausea / vomiting)

Contraindications

- CNS depression (i.e. unconscious or severely intoxicated)
- Patients < 21 years of age.

  Children and young adults are more susceptible to extrapyramidal reactions with prochlorperazine.

Precautions

- Elderly patients

  More susceptible to adverse effects
- Parkinson's disease

  Can worsen symptoms of Parkinson's disease, avoid if possible

Adverse effects

- CNS: Sedation, blurred vision
- CV: Postural hypotension, QT prolongation (rare)
- Other: Extrapyramidal reactions

Significant interactions

- Co-administration with ondansetron or droperidol increases the risk of QT prolongation. Ensure that ECG monitoring is provided.

Pregnancy

- Considered safe

  High doses or prolonged use in late pregnancy may be associated with an increased risk of withdrawal effects in the newborn

Breastfeeding

- Considered safe

Details

- **Presentation:** 12.5 mg in 1mL glass ampoule
- **Route:** IM
- **Onset of action:** 10-20 minutes
- **Duration of action:** 3-4 hours

Notes

- IV administration of prochlorperazine is not currently approved in AV due to the increased risk of adverse effects.
- Prochlorperazine ampoules require protection from light. The solution should be colourless or very pale yellow. Solutions that are dark yellow in colour should not be administered.

Infusion

- N/A

Rocuronium

CPG D039

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

- Paralysis not to be used with the intent of terminating seizure. See **Airway Maintenance CPG A0305**.

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).

Salbutamol CPG D025

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: • Causes bronchodilatation
Metabolism	By the liver; excreted by the kidneys
Primary emergency Indications	**1. Respiratory distress with suspected bronchospasm:** • **asthma** • **severe allergic reactions** • **COPD** • **smoke inhalation** • **oleoresin capsicum spray exposure** **2. Hyperkalaemia**
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	• Sinus tachycardia • Muscle tremor (common)
Special notes	**Salbutamol** nebules / 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 Although infrequently used, **Salbutamol** by IV infusion may be required during interhospital transfers of some women in premature labour The dose is to be prescribed and signed by the referring hospital medical officer **Nebulised effects:** **Onset:** 5 – 15 minutes **Peak:** n/a **Duration:** 15 – 50 minutes

Sodium Bicarbonate 8.4% CPG D026

Presentation	**50 mL prepared syringe** **8.4g (100 mmol sodium bicarbonate) in 100mL glass bottle**
Pharmacology	A hypertonic crystalloid solution Composition: • Contains sodium and bicarbonate ions in a solution of high pH Actions: • 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 toxicity or hyperkalaemia** **2. Symptomatic TCA toxicity** **3. Sodium channel blockade secondary to other drug toxicity (e.g. Propanolol) - VPIC Consult** **4. Hyperkalaemia with strong suspicion of metabolic acidosis - AV Medical Advisor Consult**
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	• 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

Sodium Chloride 3% CPG AAV D16

Mode of action

- Reduces blood viscosity, improving microcirculatory flow and reducing cerebral blood volume.

Indications

- Intubated traumatic brain injury with signs of elevated intracranial pressure

Contraindications

- Nil relevant to AV indications

Precautions

- May produce vascular irritation and damage – administer through large vein

Adverse effects

- Hypersensitivity reactions: hypotension, pyrexia, tremor, chills, urticaria, rash
- CVS: volume overload, pulmonary or peripheral oedema
- Endocrine: acid-base imbalance, dilution of serum electrolytes, osmotic demyelination syndrome

Significant interactions

- Do not administer simultaneously through same vascular access as blood products

Pregnancy

- Considered safe to use for the AV approved indication

Breastfeeding

- Considered safe to use for the AV approved indication

Details

- **Presentation:** 250 mL infusion soft pack
- **Route:** IV / IO

Notes

- Where available, consider pre- and post-measurement of acid-base balance & electrolytes

Infusion

- Although administered as a “bolus”, the nature of the medication preparation generally necessitates an infusion over 5 – 10 minutes
- Monitor closely for signs of extravasation during the infusion

Tenecteplase CPG D035

Mode of action

- Fibrinolytic – a modified form of tissue plasminogen activator (tPA) that binds to fibrin and converts plasminogen to plasmin

Indications

- STEMI
- Witnessed arrest and known or strongly suspected PE **(AV Medical Advisor Consult)**

Contraindications

- Major surgery in past 3 months
- Significant head injury in past 3 months
- Major trauma in past 3 months
- Stroke / TIA in past 3 months
- ICH at any time
- GI or genitourinary bleed in past month
- Current bleeding disorder, active bleeding (excluding menses) or bleeding tendencies
- Anticoagulants or glycoprotein IIb / IIIa inhibitors
- Allergy to tenecteplase or gentamicin

Precautions

- Age ≥ 75 years
- Non-compressible vascular puncture
- History of liver disease
- SBP > 160 mmHg or DBP > 110mmHg
- Low body weight
- Active peptic ulcer
- Anaemia
- Acute pericarditis or subacute bacterial endocarditis
- Traumatic or prolonged (> 10 minutes) CPR
- Pregnant or within 1-week post-partum
- HR > 120 BPM

Adverse effects

- CV: Bleeding (including injection site, ICH, internal bleeding), transient hypotension, vasculitis
- Allergic: Fever, chills, rash, nausea, headache, bronchospasm, anaphylaxis
- Rare: Cholesterol embolism

Significant interactions

- Not compatible with glucose solutions

Pregnancy

- May be associated with placental abruption, preterm delivery, abortion, peripartum uterine bleeding and postpartum haemorrhage. **Consult with AV Clinician prior to administration.**

Breastfeeding

- Considered safe to use for AV indications

Details

- **Presentation:** 50 mg in vial with weight marked and pre-filled syringe containing water for IV administration
- **Route:** IV / IO
- **Onset of action:** 11 minutes
- **Duration of action:** 25 minutes

Notes

- Weight optimised dosing improves efficacy and safety outcomes in drugs with narrow therapeutic index, such as fibrinolytics.
- Other drugs which affect the clotting process may increase risk of bleeding associated with tenecteplase.

References

1. Australian Medicines Handbook
2. Australian Injectable Drugs Handbook
3. Royal Women's Hospital Pregnancy and Breastfeeding Medicines Guide

Tranexamic Acid CPG D046

Mode of action

Antifibrinolytic – binds to plasminogen, decreasing conversion to plasmin, and thereby prevents fibrin degradation

Indications

- Severe postpartum haemorrhage
- Severely injured patients at risk of acute traumatic coagulopathy

Contraindications

- Injury occurred > 2 hours prior to administration

Precautions

- Rapid administration increases the risk of adverse effects [1,2]

Adverse effects

- CNS: Seizures [1,2]
- CVS: Hypotension, dizziness [1,2]
- GIT: Nausea, vomiting, diarrhoea [1,2]

Significant interactions

- Do **NOT** administer concurrently through the same IV/IO as blood products [1,2]
- Not compatible with penicillins – administer through separate line or flush thoroughly between administration [1,2]

Pregnancy

- Likely safe, limited evidence [3]

Breastfeeding

- Safe [3]

Details

- **Presentation:** 1 g / 10 mL
- **Route:** IV/IO, IM
- **Onset of action:** 5 – 15 minutes
- **Duration of action:** 3 hours

Notes

- An infusion is the preferred and more practical administration method. However, it may be administered undiluted as a “slow push” over 10 minutes if required. Rapid administration may cause hypotension.
- The IM route is a reasonable alternative if IV/IO access is likely to be significantly delayed or attempting access is likely to delay transport.[4-6] Administer as two separate 5 mL injections preferably into the lateral upper thigh.
- Evidence regarding tranexamic acid administration for non-traumatic haemorrhage (other than PPH) is unclear and is not recommended currently

Infusion

Add **1 gram Tranexamic acid** to **100 mL Dextrose 5%** or **Normal Saline** and infuse over **10 minutes** (approx. 3 drops per second). Flush the infusion line by attaching a new bag of normal saline once the infusion has finished.

Note: Precise infusion rate is not required.

References

1. Australian Medicines Handbook.
2. Australian Injectable Drugs Handbook.
3. RWH Pregnancy and Breastfeeding Medicines Guide.
4. Shakur-Still H, Roberts I, Grassin-Delyle S, Chaudhri R, Geer A, Arribas M, et al. Alternative routes for tranexamic acid treatment in obstetric bleeding (WOMAN-PharmacoTXA trial): a randomised trial and pharmacological study in caesarean section births. BJOG: An International Journal of Obstetrics & Gynaecology. 2023;130(10):1177-86.
5. Shakur-Still H, Grassin-Delyle S, Muhunthan K, Ahmadzia HK, Faraoni D, Arribas M, et al. Alternative routes to intravenous tranexamic acid for postpartum hemorrhage: A systematic search and narrative review. International Journal of Gynecology & Obstetrics. 2022;158(S1):40-5.
6. Grassin-Delyle S, Shakur-Still H, Picetti R, Frimley L, Jarman H, Davenport R, et al. Pharmacokinetics of intramuscular tranexamic acid in bleeding trauma patients: a clinical trial. British Journal of Anaesthesia. 2021;126(1):201-9.

Water for Injection CPG D029

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

Magnesium Sulfate CPG AAV D15

Presentation	**2.5g (10 mmol magnesium) in 5mL glass ampoule**
Mode of action	Bronchodilation via relaxation of bronchial smooth muscle
Primary emergency indications	Severe acute asthma unresponsive to other treatment
Contraindications	Heart Block (may be exacerbated by magnesium) Renal Failure (increased risk of hypermagnesaemia)
Precautions	Patients with myasthenia gravis – magnesium interferes with neuromuscular transmission, may exacerbate condition
Severe drug interactions (if applicable)	Neuromuscular blockers including rocuronium – effects can be increased and prolonged by magnesium sulfate. Monitor and reduce dose if required
Adverse effects	Adverse effects may indicate hypermagnesaemia, however this is unlikely with a single dose: • Nausea, vomiting, flushing, blurred vision • Hypotension • CNS depression • Muscle weakness and loss of reflexes More severe magnesium toxicity may result in respiratory depression, coma, arrhythmias and cardiac arrest
Administration advice	Route of administration: IV infusion, IO infusion Onset of action: Immediate Time to peak effect: Duration of action: 30 minutes
Pregnancy & breastfeeding category	Safe to Use in both Pregnancy and Breastfeeding.
Special notes	
Infusion information	Dilute Magnesium Sulfate 2.5g to 25 mLs with Normal Saline. Administered via infusion pump over 20 minutes.

Nifedipine

CPG AAV D01

Presentation	**10 mg or 20 mg tablet**
Pharmacology	A calcium channel blocker Actions: • Relaxes uterine smooth muscle
Metabolism	Metabolised by the liver
Primary emergency Indications	Premature labour
Contraindications	Hypotension (systolic BP < 100 mmHg)
Precautions	Since Nifedipine causes hypotension, care must be taken to avoid hypovolaemia
Route of administration	Oral
Usual Dose	20 mg tablet
Side effects	• Hypotension • Tachycardia
Special notes	Onset time: 10 minutes Peak: 12 minutes Duration: 240 minutes **Administer only on advice of a physician for premature labour**

Noradrenaline

CPG AAV D03

Mode of action

- Synthetic sympathomimetic amine.[2]
- α1-adrenergic agonist (+++++)[2*]
  - Peripheral vasoconstriction
  - Increased BP (systolic and diastolic)
- β1-adrenergic agonist (+++)[2*]
  - Positive inotrope / chronotrope

* Receptor activity: + (minimal) to +++++ (maximal).

Indications

- Management of acute hypotension

Contraindications

- Nil

Precautions

- Hypotension due to uncorrected hypovolaemia

Adverse effects[3]

- CV – Reflex bradycardia, arrhythmia
- Local soft tissue necrosis
- Myocardial, mesenteric, renal or peripheral (digital) ischaemia (at extremely high doses)

Significant interactions

- Monoamine oxidase inhibitors (e.g. moclobemide, phenelzine, tranylcypromine) and tricyclic antidepressant (e.g. amitriptyline)[4]

  Potentiate the effects of noradrenaline. Dose noradrenaline conservatively

Pregnancy

- Safe to use.[5]

Breastfeeding

- Safe to use.[5]

Details

- Presentation: 4 mg / 4 mL
- Route: IV
  As infusion via syringe pump only

  If a central venous line is not inserted, noradrenaline should preferably be administered through an 18G cannula or larger in a large proximal vein (e.g. antecubital fossa)
- Onset **of action**: 1 – 2 min[3]
- Duration **of action**: 5 – 10 min[3]

Notes

- Noradrenaline must only be given as a continuous infusion and never as a bolus.
- If running as a co-infusion with adrenaline, the adrenaline must not be bolused from the infusion pump to avoid an inadvertent noradrenaline bolus.
- Monitor the access site every time patient observations are recorded – at least every 15 minutes.[3]
- Continuous cardiac monitoring required due to risk of arrhythmia.

Infusion

- Dilute Noradrenaline 3 mg (3 mL) to 50 mL with Normal Saline or Dextrose 5% = 60 mcg/mL

  1 mL/hr = 1 mcg/min
- Noradrenaline must be administered via a dedicated vasopressor IV infusion line

References

1. Australian Injectable Drugs Handbook, 8th Edition. (Accessed 08/12/2021.)
2. Standardised inotrope and vasopressor guidelines. Safer Care Victoria. ISBN 978-1-76069-729-7.
3. Noradrenaline (Clinical guideline). Safer Care Victoria. https://www.bettersafercare.vic.gov.au/clinical-guidance/critical/noradrenaline-norepinephrine. (Accessed 8/12/2021.)
4. Noradrenaline (Product Information). Therapeutic Goods Administration. Revision: 2/12/2020.
5. Royal Women's Hospital Pregnancy and Breastfeeding Medicines Guide https://thewomenspbmg.org.au.acs.hcn.com.au/medicines/noradrenaline-norepinephrine/

Packed Red Blood Cells (PRBC) CPG D047

Presentation	**300ml pack (Blood group O Rhesus negative)**
Pharmacology	Human blood product Actions • Increases oxygen transport
Metabolism	
Primary emergency Indications	• Shock in major trauma • Hypovolaemic shock and measured anaemia (Hct < 30) • Measured anaemia (Hct < 27) in patients with cardiac or neurological injury/disease • Severe measured anaemia (Hct < 21)
Contraindications	• Known religious objection to blood products • Children < 18 years old without parental consent who are not married
Route of administration	Intravenous
Usual Dose	1-5 units (300- 1500 ml)
Side effects	• Anaphylaxis • Infection • Hypothermia
Special notes	If available, a fluid warming device should be used to administer this product

Parecoxib Sodium

CPG AAV D05

Mode of action

Non-steroidal anti-inflammatory drug (NSAID)

Cyclooxygenase-2 (COX-2) is an enzyme involved in the production of prostaglandins following tissue damage, resulting in an inflammatory response. Parecoxib is a COX-2 specific inhibitor.

Indications

- Moderate - severe traumatic or post-operative pain (except post CABG), as an adjunct to opioid analgesia

Contraindications

- Known hypersensitivity to any NSAID, aspirin or sulfonamides
- Post-operative analgesia following coronary artery bypass graft (CABG) or major vascular surgery

Precautions

- Severe renal impairment, or at risk of acute renal failure (e.g. hypovolaemia)

Adverse effects

- Acute renal failure (rare)
- Hypersensitivity reactions (rare)

Significant interactions

- Nil

Pregnancy

- Withhold – limited safety information[1]

Breastfeeding

- Considered safe to use[1]

Administration advice

- **Presentation:** 40 mg powder for injection in glass vial. Reconstitute powder with 2 mL of sodium chloride 0.9%. The reconstituted solution should be clear and colourless. Do not use water for injection
- **Route:** IV
- **Onset of action:** 15 minutes
- **Peak:** 2 hours
- **Duration of action:** 6 – 24 hours

Notes

- Nil

Infusion

- N/A

References

1. The Women's Pregnancy and Breastfeeding Medicines Guide (online). Melbourne: The Royal Women's Hospital. Available from: https://thewomenspbmg.org.au

Potassium Chloride CPG AAV D043

Mode of action

- Electrolyte – replaces depleted potassium

Indications

- Hypokalaemia

Contraindications

- Nil

Precautions

- Pain or phlebitis may occur with higher concentrations

Adverse effects

- Stop or slow the infusion rate if the patient shows signs or symptoms of hyperkalaemia: nausea, vomiting, abdominal discomfort, hypotension, paraesthesia of the extremities, listlessness, flaccid paralysis, mental confusion, weakness, and heaviness of the legs.[1]
- Potassium toxicity. Monitor for ECG changes including loss of the P-wave, tall peaked T-waves and prolongation of QT intervals.[1]

Significant interactions

- Nil

Pregnancy

- Considered to be safe

Breastfeeding

- Considered to be safe

Details

- **Presentation:** Potassium Chloride 10 mmol in 100 mL bag
- **Route:** IV infusion
- **Onset of action:** N/A
- **Duration of action:** N/A

Notes

- ALERT: Intravenous potassium can be fatal if given inappropriately
- Do not bolus potassium chloride under any circumstance
- Potassium must only be administered by infusion pump
- Do not use chemical symbols on infusion labels e.g. KCl
- A maximum of 20 mmol/hr is mandated regardless of measured serum potassium
- Infuse into a large peripheral vein.
- Monitor injection site carefully and stop administration immediately if extravasation occurs.

Infusion

Administer via IV infusion via infusion pump

Mild to moderate hypokalaemia with Serum K+ 2.5 - 3.5 mmol/L

- Potassium infusion 10 mmol/hr (100 mL/hr)

Severe hypokalaemia with Serum K+ < 2.5 mmol/L

- Potassium infusion 20 mmol/hr (200 mL/hr)

References

1. Australian Injectable Drugs Handbook 2021

Propofol CPG AAV D09

Presentation	**200mg in 20ml ampoule**
Pharmacology	A sedative/anaesthetic agent
Metabolism	By the liver
Primary emergency Indications	• Induction of anaesthesia with GCS ≥ 13 – Airway burns – Non trauma • Sedation during mechanical ventilation • Intracranial haemorrhage with hypertension
Contraindications	• Allergy to Propofol or component parts (egg, soybean or glycerol) • Sedation or anaesthesia in children < 3 years • Hypotension BP < 100mmHg
Precautions	Since Propofol may cause hypotension, care must be taken to avoid hypovolaemia
Route of administration	Intravenous
Side effects	• Hypotension • Respiratory depression • Bradycardia
Special notes	Since Propofol has no analgesic properties, a Morphine or Fentanyl infusion may be required in addition to Propofol infusion for post operative and trauma patients Intravenous effects (bolus): Onset: 1 minutes Peak: 2 minutes Duration: 5 minutes


1800
MANERS
1800 626 377
Option
1
Peer Support
2
VACU Counselling Line
3
AV Chaplain
4
Bullying & Harassment
5
Police Statements &
Court Attendance
6
Alcohol and Other Drugs
Advice and Support

Clinical Care Outside Scope of Practice

CPG F0027

Care Objectives

- Provide appropriate clinical care in consultation with a credentialed staff member or in accordance with treatment that has been prescribed.
- Provide rapid clinical care where the need is urgent and any absence or delay in this care will very likely lead to patient harm and / or suffering.

General Notes

Intended patient group

- All adult and paediatric patients.

Introduction

The care outlined in the AV paramedic CPGs and ACO/CERT CPPs is appropriate for most patients and conditions. However, in some circumstances a more tailored approach may be required to meet the clinical needs of the patient. In order to meet urgent and life-saving needs, a varied approach may need to be considered in some cases. Approval for care that is not presented in the AV CPGs or which may be outside of the staff's usual scope of practice should be guided by the following principles and workflows.

Case type 1

Treatment is authorised in the CPGs, but is not in the scope of practice of attending staff

Action	**Consult the AV Clinician or a paramedic on scene with the appropriate scope of practice** The AV Clinician will link in further support where required such as the AV Medical Advisor.

More information

The first category involves AV operational staff administering care under the instruction of an appropriately credentialed AV staff member who possesses the scope of practice being provided.

More specifically, examples might include:

- ACO/CERT, paramedic student or ALS paramedic receiving instruction from a more senior paramedic on scene or via the AV Clinician.
- ALS / MICA / ACO / CERT receiving instruction from an ARV medical doctor or Victorian Poisons Information Centre (VPIC), e.g. the administration of an antidote.
- ALS / MICA / ACO / CERT receiving instruction from the AV Medical Advisor, endorsed medical consultation line (e.g. cardiology, palliative care) or a medical doctor from the receiving hospital.
- ALS / MICA / ACO / CERT receiving instruction from the AV Medical Advisor to perform a

skill for paediatric care that is usually only approved for adult based clinical care.

- AV staff receiving instruction from a medical doctor at scene or via VVED. Please note that VVED guidelines, medicines, or medicine doses can vary from AV practice. This is acceptable, however can be checked with the AV Medical Advisor if there are concerns. If this occurs, document the doctor's name and phone number in the patient care record.

In these circumstances the treating staff member must ensure there is clear instruction about how to deliver the care and the required procedural skills are reasonably within the staff member's usual skill set or training. e.g. credentialed to cannulate for IV based therapy.

See PRO/QPE/009 Patient Care Documentation Standard for full documentation requirements.

Case type 2

Treatment is not authorised in the CPGs, but is medically prescribed for the patient.

Inclusion criteria

- Exacerbation of pre-existing illness
- Patient's medical practitioner has provided a treatment directive related to the condition (i.e. prescribed medication or treatment / action plan with clear instructions)
- Clear benefit to patient, where a delay will most probably lead to clinical deterioration or harm to the patient

Exclusion criteria

- Voluntary assisted dying

Action	**Administration of care is permissible** Consultation is not mandatory but may assist clinical decision-making

More information

This category relates to exacerbation of a patient's pre-existing illness where the patient's medical practitioner has provided a treatment directive related to the condition. This is usually in the form of prescribed medication and may also include detailed treatment or action plans. Many patients and carers are well informed about their illness and the treatments required.

In these circumstances, the indications for timely care will include clear patient benefit where a delay will most probably lead to clinical deterioration or harm to the patient.

Examples of this may be the care of a patient with:

- Migraine who has been prescribed anti-inflammatory medicines or Triptan based therapy
- Bradykinin-mediated angioedema who has been prescribed tranexamic acid, icatibant or ecallantide

In some circumstances, the patient care plan may be registered in Ambulance Victoria's Special Patient (SPPT) information. See PRO/OPS/230.

As per **CPG A0712 Palliative Care**, this care principle also relates to palliative care patients who require support within a prescribed care plan. This may include administering medicines such as an anti-emetic or analgesia. (NOTE: this does not include administration of medicines associated with voluntary assisted dying).

Clear instructions must accompany the medicine including at a minimum, the name of the person the medicine is prescribed for, the medicine's indications and how to administer the medicine.

Consultation with the AV Clinician in these circumstances may assist clinical decision-making but is not mandatory.

Case type 3

Treatment is not authorised in the CPGs, but is immediately available

Inclusion criteria

- Cannot wait until hospital management
- Will likely avoid or minimise patient deterioration and critical illness
- Clear instructions accompanying the medicine (indications and how to administer) OR ability to source this information via AV Medical Advisor.
- Practical skills reasonably within staff member's usual skill set or training or credentialed
- Life threat
- Required therapy is available

Action	**Administration of care is permissible** Consult with the AV Clinician / AV Medical Advisor where possible

More information

A circumstance where this can occur is in an industrial environment where there is a risk of toxic exposure to a poison. In this context where there is a known risk, a company may have made arrangements to have a specific antidote available in case of accidental exposure. e.g. hydroxocobalamin for cyanide poisoning, or calcium gluconate for hydrofluoric acid exposure.

In these circumstances it is anticipated that the care required will hold a level of urgency (i.e. cannot wait until hospital management) and will likely avoid or minimise patient deterioration and critical illness. Where there are clear instructions such as the medicine's indications and how to administer the medicine, it is permissible to administer the medicine providing the required practical skills are reasonably within the staff member's usual skill set or training e.g. credentialed to cannulate for IV-based therapy. Note that instructions in how to administer the information may accompany the medicine or can be accessed via the AV Medical Advisor.

In the context of toxic exposure, consultation with VPIC via the AV Clinician is encouraged.

This principal is not limited to this example but may be applied where there is a life-threat and the required therapy and instruction is available.

Consult with AV Clinician / AV Medical Advisor where possible.

When you should not administer treatment outside scope of practice:

- Where you have not been trained or you are not currently credentialled in a practical procedure. This would include techniques such as IV cannulation, IV medicine preparation and administration, intubation and cricothyroidotomy.
- Where you are instructed to deliver care that you believe is inconsistent with good clinical practice.
- Where medicine administration information is not available and you are not familiar with the medicine.

Documentation and case follow-up

Following a case where treatment has been provided which is outside of the AV CPGs, care **must be documented and reported for audit purposes**. This includes entering the case information into Riskman. This reporting process helps to ensure the required supports are in place for your clinical practice including review of potential gaps in current clinical guidelines and systems of care. Document the situation and rationale for care in the patient care record. The person providing the treatment is responsible for ensuring the information is submitted for review. The exception is as per 'Case Type 1' where treatment is authorised through consultation or care is provided by a student under supervision.

Decision Support Checklist

Is there a need?

- Clinical need is urgent and the absence or delay in this care will very likely lead to patient harm and / or suffering

Is it doable?

- Care option available / instruction and potential adverse effects information available.
- Required skills

Approval

- Consult – AV Clinician / AV Medical Advisor where possible

Related Resources

- POL/OPS/030 Clinical Credentialling
- PRO/QPE/009 Patient Care Documentation Standard
- PRO/OPS/230 Special Patient (SPPT) information
- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC paper - Non CPG management.pdf

Secondary Triage Assessment CPG ST0001

Purpose

- This assessment guide outlines criteria to guide Secondary Triage assessment.
- There are two components to this guide:
  1. Initial life-threatening emergency (LTE) check
  2. Secondary Triage Clinical Flags assessment.
- These tools aim to identify care priorities and ensure appropriate provision of care within the context of the clinical picture.

Life Threatening Emergency Check

- The Secondary Triage LTE check aims to systematically identify life threatening illness and urgently initiate an appropriate resource response. While Triage Practitioners (TPs) are faced with the unique challenge of having to assess patients remotely, identifying critical illness and responding appropriately remains a priority. This step also acknowledges the patient's dynamic condition and potential change in acuity since the initial Triple Zero Victoria (TZV) assessment.
- The *LTE Check* should occur after introductions, confirmation of address and explaining the purpose of secondary triage assessment (as per **WIN/OPS/303 Triage Services: Performing Secondary Triage**). It should be brief (ideally less than thirty seconds), though it may take longer where there is difficulty in obtaining clear answers.
- The *LTE Check* aims to rapidly identify likely or possible signs of life-threatening critical illness by assessing verbal and / or visual information of the traditional primary survey: response, airway, breathing and circulation.
- Answers to these questions or information volunteered by patients will fit into one of three categories:
  1. Green (satisfactory): These are reliable responses that indicate that the patient is not compromised. TPs should progress to secondary triage following satisfactory answers relating to all three elements of the primary survey.
  2. Amber (uncertain): Pause and plan - further investigation is required to exclude red flags. These responses indicate the need to focus on clarifying the answer to the question rather than making assumptions about the intent or abandoning the primary survey because of uncertainty. Once clarification has been sought, a pathway into a green or red category should follow.
  3. Red (compromised): The answers indicate that the patient is at risk of having compromised airway, breathing or circulation. This should trigger immediate escalation of care resulting in an upgrade of the event to a REF00 or REF01, depending on the critical illness/injury identified.

	Green (Satisfactory)	Amber (Uncertain)	Red (Compromised)
	Progress to next step	Stop and explore Investigate immediately	Escalate care (REF00 or REF01)

		to exclude red flags	
Alert (Response) "Are you the patient?" "Is the patient awake and talking?"	Awake, able to talk on the phone (preferred). OR Caller is able to clearly confirm the patient is awake / conscious and talking.	*"Not awake"* *"Sort of awake"* *"Asleep"* *"Can't come to the phone"* *"Cannot speak"*	*"Unconscious"* *"Won't wake up"* *"In and out of consciousness"* *"Passed out"* *"Cannot wake them up"*
Breathing "Is the patient breathing normally?" "Turning blue?"	Breathing normally. Speaking in clear, steady sentences. No audible respiratory distress.	Laboured breathing *"Noisy breathing"* *"Gets breathless speaking"* *"Breathing fast or slow"* *"Breathing does not look normal"* *"Blue lips"*	Sounds dyspnoeic on the phone. Speaking in short phrases or unable to speak *"Can't breathe"* *"Struggling to breath"* *"Turning blue"* *"Gasping" / "can't talk."*
Bleeding (Circulation) "Is there any severe bleeding or uncontrolled bleeding?" "Is it controlled?"	There is no bleeding.	Bleeding, but slowed or controlled. Determine approximate volume of blood loss.	The bleeding is not controlled and cannot be controlled with pressure. Severe blood loss.

Alert (response)

- Immediately establish if the patient is alert and responsive. An attempt should always be made to speak directly to the patient. The aim is to quickly establish if the patient is unconscious or in an altered conscious state requiring escalation of care.
- If you are speaking with the patient, you can immediately assess the patient's conscious state and continue to the next step of the *LTE Check* – Breathing, if no concern.
- If the patient cannot speak on the phone, you should attempt to identify the reason for this in

addition to seeking confirmation that the patient is alert and talking. Confirm that this is the patient's normal level of consciousness.

- There may be legitimate reasons that the patient cannot speak on the phone (e.g. disability, infant / small child, known disease / illness affecting speech, injuries to the ears / mouth).
- If you are unable to establish that the patient is conscious and alert and there is no reasonable answer for why the patient cannot come to the phone, prompt escalation of care should occur.
- Once conscious state is deemed satisfactory, move on to assessing breathing.

If you establish the patient is in an altered conscious state or unconscious and / or has airway compromise, promptly escalate care.

Breathing

- If you are speaking with the patient, you can commence assessment of their breathing. The aim is to quickly establish if the patient has compromised breathing.
- If abnormal breathing is identified, stop, explore, and escalate care to REF00 or REF01 if necessary.
- If escalation of care is not indicated, proceed with completion of remaining LTE Check.
- If you are unable to speak to the patient, try to identify other clues that may indicate respiratory distress. This may include audible breathing sounds in the background (wheeze / stridor / gasping / coughing). Ask the caller to describe the patient's breathing pattern / rhythm, assess skin colour (pallor, cyanosis, diaphoresis) and attempt to count the patient's respiratory rate if able.

If the patient's breathing or airway is compromised, promptly escalate care.

Bleeding (circulation)

- Ask the caller / patient if there is any bleeding. The aim is to quickly establish if the bleeding is controlled or uncontrolled.
- If there is evidence of bleeding, determine if the bleeding is controlled or uncontrolled using clinically appropriate questions or visualising the patient.
- Attempt to assess blood loss by key words (i.e. squirting / pumping / spurting / gushing / pulsing) or visually.
- Reports of large amounts of blood require further investigation.

If the bleeding is uncontrolled or significant blood loss has occurred, promptly escalate care as clinically indicated and provide instructions to control bleeding.

Secondary Triage Clinical Flags

- Clinical flags indicate a significant level of risk that should be factored into the overall patient assessment. The clinical flags identify areas of clinical concern which should immediately alert the TP to escalate care.
- While the clinical criteria presented in this guideline represent clinically sound traits of an unwell patient that requires timely care, there are several modifiers which may lead to an alternate care pathway. These situations may include:

- Assessment findings which are considered abnormal in the general population, but are normal for the patient (e.g. altered sensation but with previous nerve injury)
- Assessment findings in palliative patients (e.g. abnormal vital signs)
- Advance care directive specific to the criteria (e.g. patient with an instructional directive specific to CPR or documented patient wishes for care limitations)

Disposition categories

- Each flag is divided into **6 disposition categories** depending on the response they should receive:
  1. **Priority 0 (REF00) - Immediate Life-Threat**
  2. **Code 1 (REF01) - Critical**
  3. **Code 2 (REF02) - Urgent**
  4. **Emergency Department**
     REF02, REF03, NETCOM, Self-present / Taxi to ED
  5. **Virtual Emergency Department**
     Appropriate referral to the Victorian Virtual Emergency Department (VVED)
  6. **Urgent Clinical Review**
     Appropriate referral to an Alternate Service Provider
- The first three outcomes (REF00, 01, 02) will prompt the TP to consider the emergency response specified in that section. *For example, a patient with cardiac chest pain and Acute Coronary Syndrome symptoms would prompt a REF01 response.*

Upgrades and Downgrades based on clinical assessment

- Cases may be upgraded at the judgement of the TP. *For example, the clinical flags recommend a REF02, but the TP determines the patient requires a higher response (i.e. REF01).*
- Cases can be downgraded when a comprehensive secondary triage assessment has been completed and consultation has occurred with another TP or Team Leader.
- TPs should not adjust a triage outcome to manage operational delays. Secondary triage assessments should be completed as per the clinical process and not influenced by AV demand or capacity to respond.

Priority 0 (REF00) – Immediate life-threat

Principle

- Suspected / possible cardiac arrest.

Criteria

- Cardiac arrest (or pre-arrest)
- Unconscious with ineffective breathing
- Respiratory arrest

Code 1 (REF01) – Critical

Principle

- Critical or severe illness / injury that requires immediate escalation of care.

Criteria

- Abnormal vital signs
  - Any deviation from normal perfusion values is a source of concern.
  - Consider the overall clinical picture and vital signs if escalating patient care response.

Age	HR (bpm)	Respiratory rate	Systolic BP (mmHg)	SpO_2	GCS
Adult	> 120	> 30	< 90	< 90% Unless chronic hypoxemia	< 13
Adolescent (12 - 15 years)	< 60 or > 120	< 14 or > 26	< 90	< 96%	< 15
Medium Child (5 - 11 years)	< 70 or > 135	< 16 or > 34	< 80	< 96%	< 15
Small Child (1 - 4 years)	< 85 or > 150	< 20 or > 40	< 70	< 96%	< 15
Large Infant (3 - 12 months)	< 105 or > 165	< 25 or > 55	< 65	< 96%	< 15
Small Infant (< 3 months)	< 110 or > 170	< 25 or > 60	< 60	< 96%	< 15
Newborn (< 24 hours)	< 110 or > 170	< 25 or > 60	< 60	< 96%	< 15

Reference Clinical Flags / Patient Safety CPG A0108

Injury / illness

- Stridor (or drooling with distress)
- Airway risk / compromise
- Severe respiratory distress
- Signs of inadequate perfusion

- Severe blood loss (symptomatic)
- Sepsis
  Two or more of:
  - Hypotension (SBP ≤ 100 mmHg)
  - Altered conscious state
  - Tachypnoea (RR ≥ 22)
- Post tonsillectomy bleeding with airway compromise or significant bleeding
- Chest pain with Acute Coronary Syndrome symptoms
- Acute Stroke - MASS Positive < 24 hours
- Major trauma
  All patients meeting the Victorian Prehospital Major Trauma Triage Guidelines
- Snake bite
- Anaphylaxis
  Acute onset illness (usually < 30 min or up to 4 hrs) with typical skin features AND involvement of respiratory / cardiovascular / gastrointestinal symptoms

  Acute onset hypotension / bronchospasm / upper airway obstruction where anaphylaxis is considered possible even if skin features are absent.
- Dissecting aortic aneurysm (confirmed or suspected)
- Pulmonary embolism – symptomatic
- Ectopic pregnancy (ruptured)
- Childbirth / imminent delivery
- Pre-eclampsia- Severe hypertension
  SBP > 170mmHg and / or DBP 110 mmHg and Pre-eclampsia S&S

  Symptoms can include headache, visual disturbance, cerebral irritation / agitation, hyperreflexia, heartburn / epigastric or abdominal pain, nausea and / or vomiting
- Patient is in imminent danger / life threat
- Autonomic dysreflexia
  History of spinal cord injury at T6 or above AND severe headache and / or SBP > 160 mmHg.
- Patient on train / tram and unable to get off due to injury or illness (as dictated by AV and VicRoads)
- Adrenal Crisis
  Hx of Addison's Disease, Primary Adrenal Insufficiency (PAI), Prolonged Steroid Therapy

  Symptoms include hypotension, altered conscious state, delirium, seizure, fatigue, severe weakness, severe abdominal pain, severe vomiting and diarrhoea, hypoglycaemia.
- Intracranial haemorrhage (confirmed or suspected)
- Maternity Emergency
  Including placental abruption, eclampsia, primary postpartum haemorrhage and secondary postpartum haemorrhage.

- Limb threatening injury - limb or digit fracture / dislocation with neurovascular compromise or severe deformity.

  May consider safe taxi / self-present in isolated injury.

- Head strike (high risk)

Adult	≤ 15 year old

– Moderate – Severe TBI (GCS < 13)
– Penetrating head injury
– Dangerous mechanism of injury
– High risk features:
  – LOC > 5 minutes
  – Skull fracture
  – Neurological deficit
  – Seizure
  – Worsening signs and symptoms
  – Vomiting more than once
	– Altered mental status
	  – GCS < 15
	  – Agitation
	– Penetrating head injury
	– Dangerous mechanism of injury
	– High risk features:
	  – LOC > 5 minutes
	  – Skull fracture
	  – Seizure (not including at time of impact)
	  – Worsening signs and symptoms
	  – Neurological deficit: Numbness, weakness, abnormal gait, ataxia, clumsiness, double vision

Reference CPG A0803 & P0805

- Syncope (high risk) symptomatic with risk factors
  - Absence of symptoms prior to collapse
  - Associated with palpitations
  - Cardiac device
  - Chest pain / ischaemia or structural heart disease
  - Exertional onset or occurring when supine
  - Severe headache and / or neurological deficits
  - Family history of young sudden cardiac death (<50 years)
  - If available, persistent hypotension and / or abnormal ECG

NB: Syncope patients with high-risk features require prolonged observation, monitoring and / or definitive care in the Emergency Department (not suitable for VVED / outpatient management). If the patient is **asymptomatic**, the dispatch code / disposition should take into consideration their clinical presentation, medical history and goals of care.

Code 2 (REF02) – Urgent

Principle

- Serious conditions that may progress to life threatening, or may lead to significant morbidity

OR

- Presentation complicated by environmental exposure or positioning of patient

Criteria

- First presentation seizure (now post-ictal)
  - Consider upgrade for high-risk presentations
- Severe pain
  - Acute distress including speech difficulties / screaming, diaphoresis, shortness of breath.
  - Include behavioural cues in non-verbal or paediatric patients (e.g. grimacing, moaning, withdrawing from touch, guarding).
- Diabetic Ketoacidosis (DKA) / Hyperosmolar Hyperglycaemic State (HHS)
  - History of diabetes
  - BGL > 11 mmol/L **and**
  - Clinical features of DKA / HHS (confusion, signs of dehydration, Kussmaul breathing)
- Unable to walk (when usually able to walk and cause unknown)
  - Explore reason for inability to ambulate
- Head strike (moderate risk)

Adult	≤ 15 year old
– Altered mental status (from baseline) – Amnesia ≥ 30 min – Intoxication – Age ≥ 65 – Coagulopathy / anti-coagulant / antiplatelet (not aspirin) ***NB:*** Consider VVED if age and / or coagulopathy / anti-coagulant / antiplatelet are the only risk factors and no other concerning features	– Repetitive questioning – Slow response to verbal communication – Acting abnormally per the parent / carer (age < 2) – Coagulopathy / anti-coagulant / antiplatelet (not aspirin) – Intoxication – Severe headache – Vomiting more than once – Loss of consciousness – Non-frontal scalp haematoma (age < 2) – Age < 6 months – VP shunt – Neurodevelopmental disorder ***NB:*** Consider VVED if any of the following are the only risk factors and there are no other concerning features: – Multiple vomits – Scalp haematomas – Neurodevelopmental disorders

Reference CPG A0803 & P0805

- Ectopic pregnancy (confirmed or highly suspected)

Emergency Department

Principle

- Immediate attendance to an emergency department (ED) is required.

Criteria

- Known or suspected infection (high risk)
  Risk factors:
  - Severe immunocompromise, for example:
    - Chemotherapy (within past four weeks)
    - Neutropenia
    - Transplant
  - Recent surgery / critical illness (~ 6 weeks)
  - Pregnant / recently pregnant (~ 6 weeks)
  - Indwelling medical devices (central access, urinary catheters, VP shunts)
- Testicular pain
  Testicular torsion is a surgical emergency
- Post tonsillectomy bleeding (of any amount within 14 days)
- Raised troponin (asymptomatic > 24 hrs)
  Consider recency of result and treatment for self-present / taxi to ED
- Febrile (> 38°C) neonate and small infants (newborn to 3 months)
- Ingestion of a dangerous foreign body – asymptomatic / normal vital signs (including button batteries and magnets)
  Patients with suspected ingestion of a button battery require prompt medical review and diagnostics (most expedient means to ED < 30 minutes)
- Febrile convulsion first presentation (post ictal) (consider VVED if appropriate)

There are several acceptable ways to achieve timely attendance in an ED:

- Self-present / taxi to ED
- NETCOM < 60
- NETCOM > 90
- REF03
- REF02

Virtual Emergency Department

- VVED provides an ‘ED-in-the-Home’ service, using video telehealth technology to connect patients

to emergency physicians at their home or residential facility. TPs are strongly encouraged to refer patients who require a timely medical review now but do not present with high acuity symptoms or conditions that require time critical transport to ED. TPs should continue to refer patients directly to an appropriate low acuity Alternate Service Provider (i.e. their GP) for low acuity presentations.

Principle

- Immediate attendance to an ED is required.

Criteria

- Consider Triage Services VVED **inclusion / exclusion criteria** prior to referral
  - Adults in RACF with borderline abnormal vital signs
  - Paediatrics > 3 months with a temperature of > 38°C who is otherwise well at the time of triage
  - Adults with COPD / chronic lung disease and a Sp02 ≥88%

Conditions accepted by VVED

- Abdominal
  - Nausea and / or vomiting
  - Diarrhoea
  - Constipation
  - Urinary tract infections
- Cardiovascular
  - Palpitations
  - Hypertension
- Chronic conditions
  - Diabetes
  - Back pain
  - Cancer
  - Dementia
- Ear, nose, throat & eye
  - Foreign body: ear, nose, or eye
  - Epistaxis
  - Suspected tonsilitis
- General
  - Falls or mobility concerns
  - Wound dressings
  - Abnormal pathology results
- Infection

  - Fever
  - Skin or wound
  - Urinary
  - Respiratory

- Mild respiratory illness
  - Asthma
  - COPD / chronic hypoxemia ≥ 88%
  - Mild breathing problems: bronchiolitis / croup
  - Influenza
  - COVID19

- Neurological
  - Mild head injury
  - Seizure
  - Dizziness or fainting < 65 years old

- Non-critical injury
  - Non-complex fracture
  - Lacerations and skin tears
  - Minor burns
  - Soft tissue

- Pain
  - Abdominal < 65 years old
  - Limb
  - Back
  - Headache

- Skin, mild allergies & insect bites
  - Rash
  - Oedema
  - Insect sting
  - Spider bite

- Women’s health and obstetric
  - Early pregnancy bleed
  - Menstrual issues
  - Early mastitis

Urgent Clinical Review

Principle

- Timely review by a medical doctor or other appropriate specialist provider (e.g. midwife) is required.
  - **Within 2 hours.** *NB. Exception - Contacting Victorian Poisons Information Centre (VPIC) must be done immediately at the time of triage.*

Criteria

- Ongoing carer concern
- Syncope (low risk)
  Reflex syncope (including vasovagal syncope)

  Uncomplicated orthostatic hypotension

  Low risk where episode associated with prolonged standing, fear, heat exposure, pain or history of vagally mediated syncope
- Mild to moderate unexplained pain
- Overdose, injection, ingestion or inhalation of a toxic substance, bites or stings, medication errors
  VPIC must be consulted for advice, support and management at time of triage.
- Headache (mild to moderate)
- Primary obstetric issues
  If no immediate concern, consult with maternity / obstetric services provider available.
- Head strike (low risk) < 65 years
  Non-severe mechanism of injury, no LOC, no seizure, no vomiting, conscious, alert and cooperative, normal behaviour.

  Minor injury includes small lacerations with controlled bleeding, small haematomas, etc.

  Competent adult available to monitor for 4 hours.

  Concussion symptoms (e.g. mild headache, nausea or fatigue) but not including symptoms in the high and moderate risk criteria).
- Known or suspected infection (low risk)

Disposition

- There are several acceptable ways to achieve an urgent clinical review depending on the presentation. The choice of disposition is at the judgement of the TP:
  - GP appointment
  - Locum attendance
  - Medical telehealth
  - Transfer to other appropriate service.
  - NETCOM (if required)
  - Victorian Virtual Emergency Department (if required)
- Victorian Poisons Information Centre (VPIC)
- Self-present / taxi to ED (if required)

Abbreviations

ACS	Acute coronary syndrome
ASP	Alternate service provider
BGL	Blood glucose level
BP	Blood pressure
BPM	Beats per minute
CPR	Cardiopulmonary resuscitation
DKA	Diabetic ketoacidosis
ED	Emergency department
GCS	Glasgow coma score
HHS	Hyperosmolar hyperglycaemic syndrome
LTE	Life threatening emergency
NETCOM	Non-emergency patient transport
PE	Pulmonary embolism
TP	Triage Practitioner
SOB	Shortness of breath
SpO2	Oxygen saturation
TZV	Triple Zero Victoria

Further resources

- https://av-digital-cpg.web.app/assets/pdf/Secondary Triage Assessment CPG Quick Reference Guide v3.00 - Final.pdf

Appendix - Example

- Introduction

- Hello, did you call for an Ambulance today? (unless warm transfer from TZV)
- My name is ..... I'm a Paramedic/Registered Nurse from Ambulance Victoria. I need to get further information to determine the best way to help you.
- Can I confirm the address/location of the patient (compare the CAD address)

- Are you the patient?
- If no, can I speak to the patient?

NOTE: use caution if you are unable to speak to the patient, assess capacity of the caller.

- LTE Check Questions

- Is the patient:

A	conscious and alert, talking
B	Breathing normally
C	Any severe or uncontrolled bleeding

NOTE: Escalate care if required

- Demographics

- Can I have the name and birth date of the patient?
- What is the patient's presenting problem?

- Odyssey Question sets

- Complete relevant question set/s.
- Including relevant past medical history, medications and allergies.
- Summarise the triage and disposition you have reached with the patient and provide your solution options for their current situation. Allow the patient to voice their opinion or concerns with the outcome.
- Is the outcome achievable for the patient? Pain, mobility, logistical issues, safety concerns.

- Closing Scripts

- Provide closing script based on level of escalation and means of transport.
- Always complete your triage with the necessary care advice and call back Triple Zero (000) if the patient's condition changes or deteriorates.

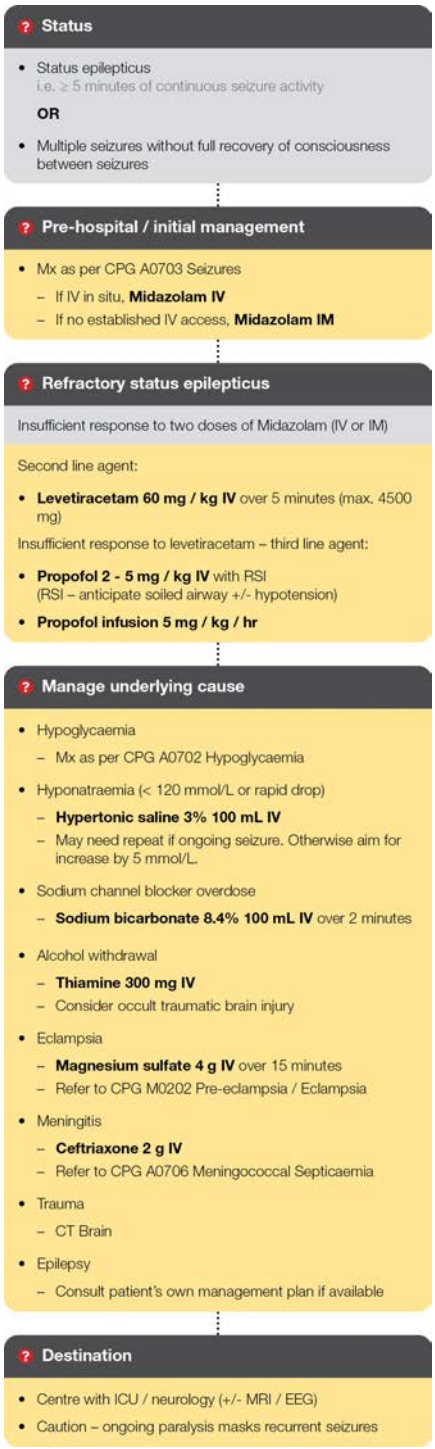
Seizures CPG ARV 0701

Purpose

This CPG provides guidance on the management of adult patients with convulsive status epilepticus who have not responded to initial management with midazolam.

For initial management of seizures, refer to **CPG A0703 Seizures**.

Flowchart



Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Seizures (ARV) 2024.pdf

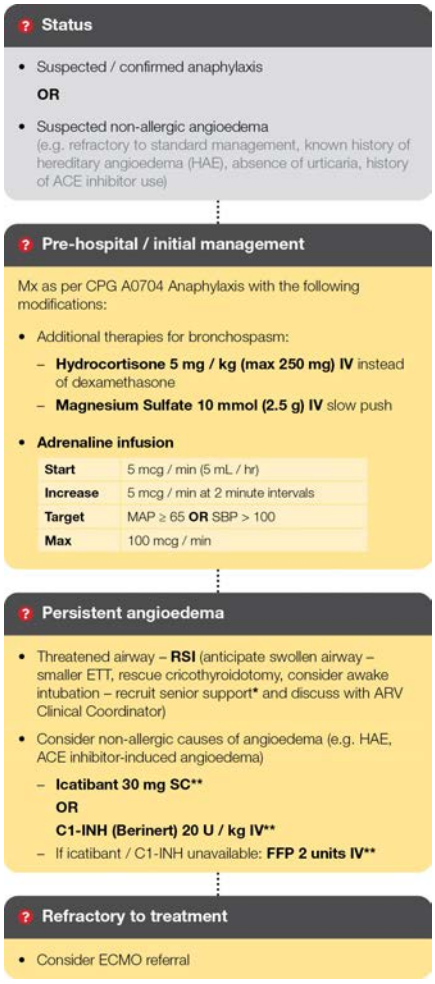
Anaphylaxis and Angioedema CPG ARV 0702

Purpose

This CPG provides guidance on the management of adult patients with anaphylaxis refractory to standard therapy, or with suspected non-allergic angioedema.

For initial management of anaphylaxis, refer to **CPG A0704 Anaphylaxis**.

Flowchart



* If intubation is considered necessary for any of these conditions, a conference call between the ARV retrieval clinician, the ARV Clinical Coordinator, and a specialist anaesthetist, intensivist or ECMO specialist as appropriate is mandatory. Specialist staff can be sourced from the referring hospital, receiving hospital, or internally via ARV Retrieval Administration Support Officers.

** Icatibant, C1-INH and fresh frozen plasma (FFP) are not stocked at ARV. A list of health services that stock icatibant and C1-INH can be downloaded from the VicTAG website: https://www.victag.org.au/programs/register-of-emergency-and-life-saving-medicines

Key References

1. Safer Care Victoria – Anaphylaxis (adults)
2. ASCIA Guidelines – Acute Management of Anaphylaxis

Related Resources

- https://av-digital-cpg.web.app/assets/pdf/MAC/MAC Paper - Anaphylaxis (ARV) 2024.pdf

Variation in Care ARV REF01

The Clinical Practice Guidelines (CPGs) for ARV are approved by the AV Medical Advisory Committee and provide evidence-based guidance on best practice management in the pre-hospital and retrieval environment.

It is recognised that variation from the CPGs may be required from time-to-time to suit the clinical situation. ARV doctors may vary their practice accordingly, provided that the care provided is in line with the current best evidence and consistent with the principles of good medical practice.

Where variation in care is required, ARV doctors are encouraged to discuss their plan with a senior colleague (e.g. ARV Clinical Coordinator), clearly document the care provided in the Patient Care Record (PCR) and consider entering the case into Riskman for data collection purposes. Suggestions for updates to ARV CPGs can also be forwarded to the ARV Clinical Lead.