Section 2

Emergency
Section 2.
Emergency

Contents
• Resuscitation
• Cardiovascular emergencies
• Neurological emergencies
• Trauma and injuries
• Fractures, dislocations and sprains
• Acute wounds
• Burns
• Environmental emergencies
• Gastrointestinal emergencies
• Genitourinary emergencies
• Poisoning and drug emergencies
• Toxinology (bites and stings)
DRS ABCD resuscitation / the collapsed patient
adult / child / infant

Recommend
- Always call for help
- Always consult the MO as soon as circumstances allow
- See Immediate management

Background
- Principles of management of the collapsed or injured patient [1]:
  - prevention of further harm or injury
  - checking response to verbal and tactile stimuli
  - care of airway, breathing, circulation
  - calling for help
  - control of bleeding
  - protection from the environment
  - maintenance of normal body temperature
  - protection of skin / nerves by protection of bony prominences from hard objects
  - other first aid measures depending on the circumstances
  - reassurance
  - continued observation of the collapsed patient

Related topics
- Toxinology (bites and stings)
- Poisoning / overdose - opiates
- Basic life support - adult / child / infant flow chart
- Cardiorespiratory arrest - adult / child / infant
- Unconscious / altered LOC

1. May present with
- Sudden collapse
- As part of clinical picture seen in conditions that can be regarded as emergencies

2. Immediate management [2]

| D | Check for danger - hazards / risks / safety of victim and staff |
| R | Check for response |
| S | Send for help |
| A | Open the airway |
| B | Check breathing - if not breathing / abnormal breathing |
| C | Give 30 compressions (almost 2 compressions / second) followed by 2 breaths |
| D | Attach an AED (automated external defibrillator) if available and follow the prompts |

3. Clinical assessment
- Perform rapid history and assessment

4. Management
- Follow basic life support - adult / child / infant flow chart
- Follow advanced life support - adult / child / infant flow chart

5. Follow up
  - According to patient’s condition / presentation

6. Referral / consultation
  - Always call a MO as soon as circumstances allow
Resuscitation

References

Basic life support flowchart
adult / child / infant

| D | Dangers? |
|   | Check for hazards / risks / safety |

| R | Responsive? |
|   | Verbal & tactile stimuli (touch and talk) |
|   | Give simple commands such as: |
|   | “open your eyes”, “squeeze my hand”, “let it go” |
|   | Grasp and squeeze the shoulders firmly to elicit a response |

| S | Send for help |

| A | Open airway |
|   | Leave patient on back or position found, unless submersion injury or where airway is obstructed with fluid (vomit or blood) in which case roll onto side |
|   | Adult and children > 1 year - use head tilt / chin lift manoeuvre |
|   | Infant - use head neutral position |

| B | Normal breathing? |
|   | Look for movement of the upper abdomen and lower chest |
|   | Listen for the escape of air from nose and mouth |
|   | Feel for movement of the chest and upper abdomen |

| C | Start CPR |
|   | 30 compressions : 2 breaths |

| D | Attach defibrillator |
|   | If AED follow prompts |
|   | If defibrillator not automatic see cardiorespiratory arrest |

Continue CPR until responsiveness or normal breathing returns

Used with permission of the Australian Resuscitation Council
Recommend
- Defibrillate ventricular fibrillation (VF) or pulseless ventricular tachycardia (VT) [1]
- Commencement of good CPR and early defibrillation is critical in achieving successful outcomes
- Early identification of potentially reversible conditions that if unrecognised or left untreated during cardiac arrest may prevent successful resuscitation - 4H’s and 4 T’s

Background
- There is evidence that good CPR and early defibrillation saves lives
- In children, the majority of cardiorespiratory emergencies are due to either a primary respiratory problem e.g. inhaled foreign body, anaphylaxis or lack of adequate tissue perfusion e.g. blood loss, severe dehydration. Once cardiorespiratory arrest has occurred, the chances of survival for the child are low
- The aim is to recognise and provide appropriate and rapid treatment to the critically ill child to prevent cardiorespiratory arrest
- Effective basic life support (BLS) may increase the likelihood of successful defibrillation and buys time until reversible causes are diagnosed and / or treated [2]
- Advanced life support (ALS) is BLS with the addition of invasive techniques e.g. manual defibrillation, advanced airway management, intravenous access and drug therapy as set out below [2]

Related topics
- Chest pain (Acute coronary syndrome)
- Basic life support
- DRS ABCD resuscitation / the collapsed patient
- Cardiac arrhythmias
- Electrocution / electric shock

1. May present with
   - Sudden collapse
   - As complication of heart attack
   - As part of clinical picture seen in conditions that can be regarded as emergencies

2. Immediate management
   - Perform rapid history and assessment
   - Commence CPR - 30 compressions: 2 breaths See Basic life support
   - Attach defibrillator
     - if AED, follow prompts
     - if manual defibrillator, assess rhythm - determine if shockable rhythm (VF or pulseless VT) or non-shockable rhythm
     - deliver shock if indicated

Shockable rhythm
- Ventricular fibrillation
- Ventricular tachycardia (pulseless)
3. **Clinical assessment**
   - **See Immediate management**
   - Monitor response to defibrillation, medication and improved oxygenation
   - Consider reversible causes in all cases of cardiac arrest

<table>
<thead>
<tr>
<th>Reversible causes (4H’s and 4T’s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management in these situations involves considering and correcting the possibilities outlined below</td>
</tr>
<tr>
<td>• Hypoxaemia</td>
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<tr>
<td>• Hypovolaemia</td>
</tr>
<tr>
<td>• Hypo / hyperthermia</td>
</tr>
<tr>
<td>• Hypo / hyperkalaemia (and other metabolic disorders)</td>
</tr>
<tr>
<td>• Tamponade (cardiac)</td>
</tr>
<tr>
<td>• Tension pneumothorax</td>
</tr>
<tr>
<td>• Toxins / poisons / drugs</td>
</tr>
<tr>
<td>• Thrombosis (pulmonary / coronary)</td>
</tr>
</tbody>
</table>

4. **Management**
   - Contact MO as soon as circumstances allow

**Shockable rhythms** [3]

**VF and pulseless VT**
   - Administer a single shock
     - adults and children > 8 years
       - biphasic 200 joules (J)
       - monophasic 360 J [4]
     - infants and children 1 - 8 years 4 J / kg
   - Immediately resume CPR for 2 minutes after delivery of shock (do not delay commencing CPR to assess the rhythm)

<table>
<thead>
<tr>
<th>Cycles of CPR are 2 minutes before doing a rhythm check and shocking</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Airway and breathing</td>
</tr>
<tr>
<td>- bag and mask with high flow O_2  See Basic life support</td>
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<tr>
<td>- consider airway adjunct (e.g. laryngeal mask airway ) though this should not interrupt CPR for more than 20 seconds</td>
</tr>
<tr>
<td>• Vascular access</td>
</tr>
<tr>
<td>- insert IV / IO cannula</td>
</tr>
</tbody>
</table>
• **Drugs**
  - adrenaline
    - child - adrenaline 10 microgram / kg, IV / IO after 2nd shock, then every 2nd cycle
    - adult - adrenaline 1 mg, IV / IO after 2nd shock, then every 2nd cycle
  - amiodarone (on MO / NP order only)
    - child - amiodarone 5 mg / kg / dose, IV / IO after 3rd shock
    - adult - amiodarone 300 mg, IV / IO bolus after 3rd shock. Additional dose of 150 mg could be considered, followed by an infusion 15mg / kg over 24 hours
  - magnesium, potassium may be ordered by MO / NP

• Identify and correct reversible causes for all rhythms [1]

### Non-shockable cardiac rhythms

#### Asystole, bradycardiac arrest
- do not defibrillate

**Airway and breathing:**
- bag and mask with high flow O<sub>2</sub> [See Basic life support]
- or laryngeal mask airway (LMA)

**Vascular access:**
- insert IV / IO cannula

**Drugs:**
- adrenaline
  - child - adrenaline 10 microgram / kg, IV / IO immediately, then every 2nd cycle
  - adult - adrenaline 1 mg, IV / IO immediately, then every 2nd cycle

• Identify and correct reversible causes for all rhythms [1]

### Pulseless Electrical Activity (PEA)
- The presence of a cardiac rhythm on the monitor, with no palpable pulse also known as electromechanical dissociation (EMD) [6]

PEA can either occur:
- In a heart with little functional viable myocardium i.e. dying heart
- Secondary to reversible medical conditions including the 4H’s and 4T’s

The history will often guide to the possible causes:
- If trauma e.g. motor vehicle accident (MVA), hypovolaemia, tension pneumothorax or pericardial tamponade should be considered early
- If known to be on a calcium antagonist or beta blocker medication, appropriate management needs to be considered early
- do not defibrillate
- **Airway and breathing:**
  - bag and mask with high flow O<sub>2</sub> [See Basic life support]
  - or laryngeal mask airway (LMA)
- **Vascular access:**
  - insert IV / IO cannula
  - give IV / IO fluid bolus of normal saline up to 20 mL / kg (adult and child)
- **Drugs:**
  - child - adrenaline 10 microgram / kg, IV / IO
  - adult - adrenaline 1 mg, IV / IO
  - adrenaline can be repeated every 3 minutes if no response
- consult MO and discuss what further intervention is required

• Identify and correct reversible causes for all rhythms [1]
Symptomatic bradycardia / peri-arrest situation
Inadequate cardiac output in the presence of bradycardia. There may be a palpable pulse with each beat, but poor cardiac output associated with slow HR

- Do not defibrillate
- Airway and breathing:
  - bag and mask with high flow $O_2$ See Basic life support
  - or laryngeal mask airway (LMA)
- Vascular access:
  - insert IV / IO cannula

In a child with bradycardia it is almost always a pre-terminal event. Airway, breathing and circulation should always be assessed and treated if needed before pharmacological management of bradycardia is given

- Drugs:
  - child - atropine 0.02 mg / kg, IV / IO (MO / NP must order)
  - adult - atropine 0.5 mg - 0.6 mg, IV / IO (MO / NP must order)
  - can be repeated every 3 - 5 minutes on MO / NP order to a max. of 3 mg (adult) [7]
- If still no response, but alive when evacuating / attending MO arrives, will require external cardiac pacing (adult)
- Identify and correct reversible causes [1]

Cessation of resuscitation may not always follow a definite timeframe but will obviously be determined by response to treatment. Usually asystole will intervene and generally 20 minutes of asystole after resuscitative efforts would be sufficient for a MO to advise stopping CPR

5. Follow up
   - Post resuscitation care - if return of spontaneous circulation occurs it is essential to continue to maintain airway, breathing and circulation [8]
   - Provide support for family members

6. Referral / consultation
   - Always contact MO as soon as circumstances allow in cardiac arrest

References
During CPR
- Airway adjuncts (LMA / ETT)
- \( \text{O}_2 \)
- Waveform capnography
- IV / IO access
- Plan actions before interrupting compressions e.g. charge manual defibrillator

Drugs for shockable rhythms
- Adrenaline 1 mg after 2nd shock (then every 2nd cycle)
- Amiodarone 300 mg after 3rd shock

Drugs for non-shockable rhythms
- Adrenaline 1 mg immediately (then every 2nd cycle)

Consider and correct
- Hypoxia
- Hypovolaemia
- Hyper / hypokalaemia / metabolic disorders
- Hypo / hyperthermia
- Tension pneumothorax
- Tamponade
- Toxins
- Thrombosis (pulmonary / coronary)

Post Resuscitation Care
- Re-evaluate ABCDE
- 12 lead ECG
- Treat precipitating causes
- Re-evaluate oxygenation and ventilation
- Temperature control (cool)
During CPR
- Airway adjuncts (LMA / ETT)
- $O_2$
- Waveform capnography
- IV / IO access
- Plan actions before interrupting compressions e.g. charge manual defibrillator to 4 J / kg

Drugs for shockable rhythms
- Adrenaline 10 microgram / kg after 2nd shock then every 2nd cycle
- Amiodarone 5 mg / kg after 3rd shock

Drugs for non shockable rhythms
- Adrenaline 10 microgram / kg immediately then every 2nd cycle

Consider and correct
- Hypoxia
- Hypovolaemia
- Hyper / hypokalaemia / metabolic disorders
- Hypo / hyperthermia
- Tension pneumothorax
- Tamponade
- Toxins
- Thrombosis (pulmonary / coronary)

Post resuscitation care
- Re-evaluate ABCDE
- 12 lead ECG
- Treat precipitating causes
- Re-evaluate oxygenation and ventilation
- Temperature control (cool)
Oxygen delivery systems
adult / child

O₂ therapy
Frequent clinical assessment is required in all patients receiving O₂ therapy [1]. In the primary clinical care setting arterial O₂ saturation is measured via a non-invasive technique - pulse oximetry, documented as SpO₂.

Delivery methods
Delivery systems include nasal prongs, simple face masks and non-rebreathing masks which deliver O₂ concentrations (%) that may vary considerably [2]. In selecting the proper delivery device, consideration should be given to the clinical condition of the patient and the amount of O₂ needed [1]. See O₂ delivery systems.

Target range
- SpO₂ > 93 % for most acutely ill patients (adults) and children > 95% [3]
- SpO₂ 88 - 92 % for patients with chronic hypoxaemia [4]
- Utilise O₂ delivery system to optimise patient’s clinical outcome

Definitions

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SpO₂</td>
<td>O₂ saturation measured via pulse oximetry [5]</td>
</tr>
<tr>
<td>Hypoxaemia</td>
<td>low O₂ tension in the blood [5]</td>
</tr>
<tr>
<td>SaO₂</td>
<td>O₂ saturation obtained from arterial blood. SaO₂ and SpO₂ are often used interchangeably. Equipment provided at primary health centre levels only measure SpO₂</td>
</tr>
<tr>
<td>FiO₂</td>
<td>Fraction of inspired O₂ concentration (%)</td>
</tr>
<tr>
<td>High flow O₂</td>
<td>O₂ delivered at &gt;10 L/min via a partial or full non-rebreather mask [6]</td>
</tr>
<tr>
<td>Oxygen delivery systems</td>
<td>User guide</td>
</tr>
<tr>
<td>-------------------------</td>
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</tr>
<tr>
<td>Nasal cannulae (prongs)</td>
<td>Low flow device Nasal cannulas are very comfortable for patients and are the most common low flow O₂ delivery device [1] If need more than 4 litre per minute use a face mask</td>
</tr>
<tr>
<td>Children &lt; 2 years</td>
<td>Min. 0.125 L / min</td>
</tr>
<tr>
<td>Max. 2 L / min</td>
<td>2</td>
</tr>
<tr>
<td>Children &gt; 2 years / adults</td>
<td>Min. 0.125 L / min</td>
</tr>
<tr>
<td>Max. 4 L / min</td>
<td>4</td>
</tr>
<tr>
<td>Simple face mask</td>
<td>Low flow device Available in 2 sizes - paediatric and adult Ensure good mask fit for max. O₂ Inspired FiO₂ varies as this is dependant on O₂ flow rate, mask size and fit and the patient’s ventilation rate If require more than 10 L / min use non rebreathing mask</td>
</tr>
<tr>
<td>5 L / min - 6 L / min</td>
<td>1</td>
</tr>
<tr>
<td>6 L / min - 10 L / min</td>
<td>2</td>
</tr>
<tr>
<td>Venturi face mask</td>
<td>High flow device Select the appropriate coloured diluter (insert) and O₂ flow rate according to manufacturer’s instructions</td>
</tr>
<tr>
<td>Colour coded diluters delivering:</td>
<td>24 %</td>
</tr>
<tr>
<td>28 %</td>
<td>31 %</td>
</tr>
<tr>
<td>40 %</td>
<td>50 %</td>
</tr>
</tbody>
</table>
### Oxygen delivery systems

<table>
<thead>
<tr>
<th>Non rebreathing mask</th>
<th>Partial non rebreathing face mask with reservoir bag</th>
<th>High flow device</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8 L / min - 12 L / min delivers approximately 70 - 85% $O_2$ [10]</td>
<td>Ensure the flow from the wall to the mask is adequate to maintain a fully inflated reservoir during the whole respiratory cycle i.e. inspiration and expiration</td>
</tr>
<tr>
<td></td>
<td>10 L / min - 15 L / min delivers approximately 80 - 95+ % $O_2$</td>
<td>8 to 15 L / min</td>
</tr>
</tbody>
</table>

Full non rebreathing face mask with reservoir bag

**O$_2$ flow meters** - high and low flow meters are available

Low flow ranges from 0 - 3 L / min and high flow ranges from 4 L / min - 15 L / min

### References

5. The Royal Children's Hospital. $O_2$ delivery 2010 [cited 2011 March].
Insertion of laryngeal mask airway (LMA)

- Pre-oxygenate patient using bag-valve-mask technique
- Check LMA cuff for leaks
- Deflate cuff so folds back from aperture and lubricate back of LMA
- Extend the head and flex the neck. Take precaution if suspected cervical spine injury
- Using the non-dominant hand behind head keep patient neck flexed

- Press the tip of cuff against hard palate and advance into the pharynx
- Push down into the pharynx as far as possible

- Continue to advance the LMA until a definite resistance is felt
• Immediately inflate the cuff without holding the tube

• Once resistance is felt double check the LMA position then proceed to next step

• Attach bag-valve ensuring $O_2$ is attached
• Insert an oropharyngeal airway to prevent patient biting LMA

Photos demonstrate Supreme® LMA. Technique Cairns Skills Centre, 2011 Cairns Base Hospital
Intraosseous infusion provides a route for the administration of parenteral fluids and drugs in life threatening situations. Use this route when intravenous access is unable to be established or is likely to be difficult and time consuming. Intraosseous infusion can be used in any age.

Generally intravenous access should be established within 2 to 3 hours and the intraosseous infusion ceased.

Bilateral intraosseous lines with pressure infusion cuffs are effective in delivering large volumes quickly in cases of severe shock.

**Location**

- **Proximal tibia site:**
  - insert needle into the anterior (flat) medial surface of the proximal tibia 1 - 3 cms below the tibial tuberosity
  - insert needle at 90° degrees to skin surface

- **Distal tibia site:**
  - use in any age
  - insert needle into the medial surface of the tibia, proximal to the medial malleolus (2 - 3 cms above the medial malleolus)
  - insert in the anterolateral surface of the tibia in the midline, 3 cms above the lateral condyle
  - insert needle at 90° to skin surface

- **Humerus [1]:**
  - in adults, using the drill the humerus is the preferred site, anterolateral proximal humerus as it is closer to central circulation

Note: Do not insert needle into either site if the bone is broken or if it has been made brittle by disease or if the tissue over the bone is burnt or infected

**Manual and battery powered hand held drill insertion technique**

Standard precautions and aseptic technique should always be employed. If the patient is responsive consider using local anaesthetic for insertion and ensure they have adequate systemic analgesia, as administration of fluid (via infusion or push) can be extremely painful [2]. Consult MO for local anaesthetic order into the IO site. It is recommended that clinicians familiarise themselves with the device available and follow manufacturer's recommendations on correct usage and safe work practices.

In a medical emergency / resuscitation situation allow 2 minutes or 2 attempts to insert an IV then immediately attempt IO insertion.

**Procedure**

1. Prepare injection site using aseptic technique. Clean skin with antiseptic solution
2. Anaesthetise the skin, subcutaneous tissue and periosteum with 1% Lignocaine. If the patient is unresponsive, this step can be omitted
3. Stabilise and support the leg on a firm surface
4. Palpate landmarks to identify distal tibia or proximal tibial site
5. Check the needle / battery powered handheld drill to ensure that the bevels of the outer needle and the internal stylet are properly aligned
6.1 Manual insertion

- Push the intraosseous needle (or 16-18 g needle with stylet) into the bone with a rotary clockwise and anticlockwise motion whilst maintaining a perpendicular approach until a sudden loss of resistance is felt

- This means the bony cortex has been penetrated and the needle is now in the intra-medullary cavity / marrow or cancellous bone and marrow

- The IO should be stable and stand rigidly in the bone without support - in a child, this is rarely more than 1 cm from the skin surface

- Aspiration of blood and marrow and / or easy injection of 5 mL of normal saline confirms the needle is correctly placed. Utilise aspirate to collect blood sample if required

- If IV fluids do not flow via gravity be wary as the fluid is likely to be extravasating

- **Do not attach a syringe directly to the IO hub** - risk of dislodgement

- If flow is good and extravasation is not evident, connect the intravenous (IV) line extension set with a 3 way stopcock at the luer lock, and secure the needle with a clear dressing and tape. Although fluid may run in via the IV line by gravity, the rate is too slow for resuscitation. Faster rates of infusion occur by drawing up 20 mL aliquots from the intravenous bag and administering manual fluid boluses via the 3 way stopcock
6.2 Battery powered handheld drill / driver

- Position the drill at insertion site with needle set at a 90° angle to the bone
- Gently press through the skin and tissue until needle tip touches the bone
- There must be at least 0.5 cm of space visible between the skin and the needle hub. Note this, as this is the depth of insertion. For large or obese patients a longer needle is recommended
- Penetrate the bone cortex by squeezing the drill trigger and applying gentle steady downward pressure. Release drill trigger and stop insertion process when a sudden give or pop is felt upon entry into the intra-medullary space and the desired depth is obtained
- The needle cap is unscrewed and the stylet is removed from the needle

7. Aspiration of blood and marrow and / or easy injection of 5 mL of normal saline confirms the needle is correctly placed. Utilise aspirate to collect blood sample if required

8. Attach an extension set to the IO hub with a 3 way stopcock at the proximal end, and secure the needle with gauze pads and tape, or the specific stabiliser dressing. Once the IO is inserted connect the intravenous line and begin the infusion. If flow is good and extravasation is not evident, faster rates of infusion can be performed by drawing up 20 mL from the intravenous bag and administering manual fluid boluses via the 3 way stopcock. The rate of the infusion may also be accelerated by the use of a pressure infusion cuff

9. To prevent dislodgment, the needle is secured by attaching the recommended extension set to the IO hub’s luer lock and apply stabiliser dressing or taping to the skin. The IV / IO line is taped to the leg. The site must be observed for signs of extravasation

<table>
<thead>
<tr>
<th>Schedule</th>
<th>4</th>
<th>Lignocaine</th>
<th>DTP</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>IHW / SM R&amp;IP</td>
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</tbody>
</table>

Authorised Indigenous Health Workers must consult MO / NP

Scheduled Medicines Rural & Isolated Practice Registered Nurses may proceed

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
</table>
| Ampoule | 1% 50 mg / 5 mL | Subcutaneous | Adult 3 mg / kg to total max. infiltration of 200 mg  
Child 3 mg / kg / dose to max. 5 mg / kg / dose | Stat  
Do not repeat the total max. dose at intervals of < 1.5 hours |

Provide Consumer Medicine Information

Management of associated emergency: consult MO

[3] [4]

References

2. Bailey P. Intraosseous cannulation. UpToDate 2010 [cited 2011 January ]; Available from: www.uptodate.com/online/content/topic.do?topicKey=pedproc/4947&selectedTitle=1%7E150&source=searchresult
Unconscious / altered level of consciousness
adult / child / infant

Recommend
- If possible never leave an unconscious / altered LOC patient alone
- The Glasgow coma scale (GCS) or AVPU are measures of consciousness
- Discuss all patients who have GCS <15 with MO - urgently if patient is a child
- Discuss with MO urgently if GCS drops 2 or more points since last assessment
- Consider intubation if GCS < 9
- A person who fails to respond is managed as if unconscious. A person who shows only a minor response, such as groaning without opening eyes, should be managed as if unconscious [1]
- Care of the airway takes precedence over any injury, including the possibility of spinal injury [1]

Background
- There are many causes of altered level or loss of consciousness. The most common causes are alcohol and drug misuse, stroke, post seizure, hypoglycaemia and sepsis (especially in the elderly)
- Fainting is a common cause of unconsciousness and may occur when the person’s HR is too slow to maintain sufficient blood pressure for the brain [1]
- Most clues to the cause will be gained through taking a thorough history from friends or relatives

Related topics
- Fits / convulsions / seizures
- Cardiac arrest
- Poisoning / overdose
- Toxinology (bites and stings)
- Trauma and injuries / head injury
- TIA / stroke
- Meningitis
- Hypoglycaemia

1. May present with
   - Confusion, drowsiness, poor response to stimulation, unresponsiveness
   - Fainting
   - As part of clinical picture of most conditions that can be regarded as emergencies
## 2. Immediate management

<table>
<thead>
<tr>
<th>D</th>
<th>Check for <strong>danger</strong> - hazards / risks / safety of victim and staff</th>
</tr>
</thead>
</table>
| R | Check for **response**  
Assess verbal and tactile response - talk and touch. Give a simple command “open your eyes”, squeeze my hand”. Then grasp and squeeze the shoulders firmly to elicit a response [1] |
| S | Send for help |
| A | • Assess **airway** patency and consider cervical spine protection  
  - Position the patient - handle gently and avoid twisting movement of the head and neck  
    - if breathing and unconscious turn onto side to establish and maintain clear airway [1]  
    - if not breathing and unconscious lie patient flat, open airway using the head tilt, chin lift manoeuvre or jaw thrust if suspicion of cervical spine injury. In infants (less than 1 year of age) head is kept in the neutral position [2]  
  • Give O₂ to maintain O₂ saturation > 93% - adults / 95% - child. See O₂ delivery systems  
  • Maintain cervical spine in-line immobilisation and if available have 2 people apply rigid cervical spine collar if known or suspected history of trauma (appropriate to size) |
| B | • Assess **breathing** - look, listen and feel  
  • Check respiratory rate, effort, O₂ saturation |
| C | • Insert large bore IV / IO cannula. Insert the largest you can in the circumstances  
  • Check BP, HR and capillary refill |
| D | • **Dysfunction of the central nervous system** - check Glasgow coma scale or AVPU, pupil size and reaction. Consider intubation if GCS is <9 |

- Take emergency patient history from relatives / friends, if present  
- BGL, temperature  
- Attach monitor and perform ECG  
- Consult MO as soon as circumstances allow

## 3. Clinical assessment

- Obtain a history from friend or relative including circumstances leading to unconscious state. Look for clues which may indicate reason for unconscious state e.g.:  
  - trauma, overdose (suicidal), alcohol or illegal drugs, infection - especially elderly  
  - past history - especially epilepsy, diabetes, cancer  
- Expose and examine the patient systematically starting at the head and progressing downwards to the toes  
  - remove all clothing as you move down, maintaining privacy  
  - do not let the patient get cold, cover with a blanket after examination  
  - whilst performing examination look for clinical signs which point to reason for altered level of consciousness See Differential diagnosis for unconsciousness
Resuscitation

4. Management
   • Consult MO who will advise further assessment and management depending on clinical circumstances
   • Maintain temperature
   • If BGL less than 4 mmol / L. See Hypoglycaemia
   • There are a large number of possible causes for altered level of consciousness, however most are relatively rare. There causes can be classified into four broad groups [1]:
     - blood oxygenation problems
     - blood circulation problems
     - metabolic problems (diabetes, overdose)
     - central nervous system problems (head injury, stroke, tumour, epilepsy)

5. Follow up
   - According to possible cause for unconsciousness
   - Patient will need evacuation / hospitalisation in suitably equipped facility

6. Referral / consultation
   - Always contact MO as soon as possible if patient presents with altered level of consciousness or unconsciousness or this occurs during the course of care
   - Discuss all patients who have GCS <15 with MO - urgently if patient is a child
   - Discuss with MO urgently if GCS drops 2 or more points since last assessment
   - Consider intubation if GCS <9

References
Resuscitation

Shock

**Recommend**
- The aim of management is to increase tissue oxygenation by improving tissue perfusion. This may be achieved by replacing lost intravascular fluid and / or increasing vascular tone and / or increasing cardiac output. Achieve systolic BP > 100 mmHg and treat the cause
- $\text{O}_2$ saturation readings in shock can be unreliable due to poor peripheral perfusion

**Background**
- Shock is a clinical state in which hypotension occurs, due to haemorrhage / cardiac failure / decreased vascular tone, resulting in inadequate tissue perfusion. The patient in shock looks pale and the body tries to make sure enough blood reaches vital organs such as the brain, heart and liver, by diverting it from e.g. the skin and the kidneys. Many organs can stop working
- There are different types of shock:
  - hypovolaemic shock - due to a large amount of blood or fluid loss from the circulation e.g. from severe bleeding, major or multiple fractures or major trauma, severe burns or scalds, severe diarrhoea and vomiting, severe sweating and dehydration
  - cardiogenic shock e.g. myocardial infarction
  - obstructive shock e.g. tension pneumothorax, cardiac tamponade, pulmonary embolism
  - distributive shock e.g. severe infection, allergic reactions, severe brain / spinal injuries [1]

**Related topics**
- Trauma and injuries
- Burns
- Fractures, dislocations and sprains
- Acute wounds
- Nosebleed
- Anaphylaxis
- Acute coronary syndrome
- Gastroenteritis / dehydration
- Cardiorespiratory arrest - adult / child
- DRS ABCD resuscitation / the collapsed patient
- Acute upper airway obstruction and choking
- Upper gastrointestinal bleeding
- Rectal bleeding
- Tubal / ectopic pregnancy

1. May present with
- Hypotension with increased HR (tachycardia)
- Pale, cool and clammy (cool and moist) skin with poor capillary return (> 2 secs)
- Increased respiratory rate (tachypnoea) - “air hunger”
- Shortness of breath
- Decreased urine output
- Altered mentation, irritability, confusion, drowsiness, unconsciousness
- Very low or high temperature
- Warm peripheries in distributive shock
- As part of clinical picture of most conditions that can be regarded as emergencies e.g. trauma and injuries, burns, fractures, acute wounds, nosebleed, gastrointestinal bleeding, septicaemia, heart attack, tubal / ectopic pregnancy, anaphylaxis
2. Immediate management

**DRS ABCD resuscitation / the collapsed patient**

- Call for help if available
- Diagnostic evaluation should occur at the same time as resuscitation
- Take emergency history from patient, relatives and / or friends, if present
- Give $O_2$ to maintain $O_2$ saturation >93% (adults) and 95% (child). If saturation not maintained consult MO. See $O_2$ delivery systems
- In case of fracture or bleeding wound, stop any external bleeding by direct pressure with a bandage and / or apply traction and splinting of fracture(s) if possible
- Check and monitor BP, HR, respiratory rate, $O_2$ saturation, BGL, body and skin temperatures
- Check and monitor conscious state - Glasgow Coma Scale / AVPU
- Insert large bore IV / IO cannula (14 g or 16 g if possible)
- If intravenous access is unable to be established or is likely to be difficult and time consuming, intraosseous infusion provides a route for the administration of parenteral fluids and drugs in life threatening situations. This technique is applicable to both adults and children. See Intraosseous infusion
- If unable to access IV or IO consult MO immediately
- Insert urinary catheter and monitor hourly urine output
- For all causes of shock except for cardiogenic shock it is usual to start with IV / IO normal saline or Hartmann’s solution. MO will advise quantities and rate. The aim is to keep:
  - adults
    - HR <120 / min
    - systolic BP >90 - 100 mm Hg
    - urine output >0.5 mL / kg / hr
  - children compensate very well in the early stages of shock, but can decompensate rapidly. Consult MO as soon as possible and administer 10 - 20 mL / kg bolus of normal saline IV / IO if signs of shock present then reassess. This bolus may need to be repeated

3. Clinical assessment

- Obtain patient history including circumstances that may suggest the cause of shock including medications
- Perform standard clinical observations +
  - $O_2$ saturation
  - capillary refill
  - conscious state. See Glasgow Coma Scale / AVPU
  - note particular attention to the trends in vital signs

4. Management

- Consult MO as soon as possible, who will organise evacuation / hospitalisation
- Monitor clinical status and response to intervention - BP and HR, respirations, $O_2$ saturation, BGL, temperature, capillary refill, Glasgow Coma Scale / AVPU, urine output
- Use caution when treating elderly patients and those on beta blockers
- If injured and shocked and not obvious where blood has been lost, suspect internal bleeding:
  - abdomen (ruptured spleen / liver / kidneys) See Abdominal injuries
  - fractured femur (thigh), pelvis See Fractures, dislocations and sprains
  - chest (haemothorax) See Chest injuries
Resuscitation

- Consider early antibiotic therapy in consultation with MO in distributive shock
- Manage in consultation with MO as per:
  - severe chest, abdominal and spinal injuries. See Trauma and injuries
  - burns. See Burns
  - fractures, dislocations and sprains. See Fractures, dislocations and sprains
  - acute wounds. See Acute wounds
  - nosebleed. See Nosebleed / epistaxis
  - upper gastrointestinal bleeding. See Upper gastrointestinal bleeding
  - anaphylaxis. See Anaphylaxis
  - acute coronary syndrome. See Chest pain / acute coronary syndrome
  - acute gastroenteritis. See Acute gastroenteritis and dehydration

5. Follow up
   - According to possible cause for shock
   - Patient will need evacuation / hospitalisation in suitably equipped facility

6. Referral / consultation
   - Consult MO on all occasions of shock

Reference
Acute upper airway obstruction and choking

Recommend
- Perform chest thrusts or back blows to relieve inhaled foreign body in the conscious patient or child > 1 year of age [1]
- For non-breathing patient with airway obstruction See Unconscious / altered LOC

Background
- Upper airway obstruction in the conscious person may be due to inhalation of foreign body, trauma to the airway, anaphylactic reaction, angioedema, croup, epiglottitis or mass (tumour or abscess) [1]
- Obstruction can be complete or partial
- Children often put objects into their mouths. There is risk of inhalation or swallowing. Most commonly occurs aged 6 months to 4 years

Related topics
- Trauma and injuries
- Allergic reaction / anaphylaxis
- DRS ABCD resuscitation / the collapsed patient
- O₂ delivery systems
- Unconscious / altered LOC
- Croup / epiglottitis

1. May present with
   - Extreme anxiety, agitation, gasping sounds
   - Coughing or loss of voice (hoarseness)
   - Clutching the neck with thumb and finger
   - Stridor (high pitched noise caused by inspiration)
   - Drooling
   - Ineffective respiratory effort
   - Cyanosis

2. Immediate management
   - Choking adult or child See Choking flow chart
   - Acute upper airway obstruction - unconscious See Unconscious / altered LOC
   - Acute upper airway obstruction - conscious
     - allow patient to posture themselves - leave child on parent's lap
     - do not examine airway
     - do not lie patient down

Choking flowchart [1]

Assess severity

- Ineffective cough
  - Severe airway obstruction
  - Unconscious See Unconscious / altered LOC
  - Commence CPR

- Effective cough
  - Mild airway obstruction
  - Conscious
  - Encourage coughing
  - Stay with person until recovered

If not effective
- Give up to 5 back blows
- Give up to 5 chest thrusts
3. **Clinical assessment**
   - Take emergency patient history - with particular attention to circumstances which occurred leading to choking
   - Perform standard clinical observations
   - Assess effectiveness of cough
   - Observe chest for expansion and drawing in of the spaces between ribs and the collar bones during inspiration
   - Listen to chest for air entry and added sounds (crackles or wheezes)

4. **Management**
   - Choking / upper airway obstruction
   - Conscious adult or child
     - sit patient up bending forward, an infant may be placed in a head down position on parent or health professional lap
     - try to calm patient and encourage to breathe deeply
     - encourage to cough
   - Consult MO
   - Perform chest x-ray if available and MO orders

5. **Follow up**
   - If the choking episode is minor and cause is a foreign body, which has been dislodged and removed, the patient is asymptomatic and chest findings are normal, the patient can be allowed home after a period of observation
   - Review after one day and consult MO if the patient has any symptoms, an increased HR, increased temperature or any chest findings
   - Evacuation / hospitalisation will be required

6. **Referral / consultation**
   - Consult MO on all occasions of choking (except minor choking episode as above) and / or acute upper airway obstruction
Choking - conscious patient

• Adults and children may be treated in a standing or sitting position
• Infants may be placed in a head downwards position prior to delivering back blows

Effective cough
(Mild airway obstruction)
• Patient positions themselves
• Keep coughing until foreign body is expelled

Ineffective cough
(Severe airway obstruction)
• Perform 5 sharp back blows
• This is done with the heel of the hand in the middle of the back between the shoulder blades
• Check to see if each back blow has relieved the obstruction
• The aim is to relieve the obstruction with each blow rather than to give all five blows
• If back blows are unsuccessful perform up to 5 chest thrusts
• To perform chest thrust, identify the same compression point as for CPR and give up to five chest thrusts. These are similar to chest compressions but sharper and delivered at a slower rate
• If the obstruction is still not relieved, continue alternating five back blows with five chest thrusts

Reference

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Resuscitation

### Anaphylaxis and severe allergic reaction

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**Recommend**
- Rapid assessment of conscious state, airway (risk or evidence of obstruction), adequacy of respiratory effort and circulation (including HR, BP, and capillary refill) is essential to guide treatment
- The intramuscular injection of adrenaline is first line drug treatment in life threatening anaphylaxis [1]
- People with diagnosed allergies e.g. nuts, bees and / or medication, should avoid trigger agents and have a readily accessible anaphylaxis action plan, medication and medical alert device [1]

**Background**
- Anaphylaxis encompasses a variety of symptoms and signs. Diagnosis is largely based on history and physical findings. Onset can range from minutes to hours of exposure to a substance. It can be caused by many agents but the most common ones are:
  - food - especially nuts, eggs and seafood
  - drugs e.g. penicillin
  - venom of stinging animals e.g. bees, wasps or ants [1]

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**Related topics**
- Mild and moderate allergic reaction
- Toxinology (bites and stings)
- Acute asthma
- Acute coronary syndrome
- DRS ABCD resuscitation / the collapsed patient
- O₂ delivery systems

---

1. **May present with**
   - Skin symptoms (itch) or signs (generalised redness or hives), 90% of cases [2]
   - Signs of upper airway obstruction, such as hoarseness and stridor
   - Indications of lower airway obstruction, such as subjective feelings of retrosternal tightness, dyspnoea or wheeze
   - Hypoxia and cyanosis (SpO₂ ≤93% - adults / ≤95% - child)
   - Swelling of the lips and / or tongue, uvula [2]
   - Profound hypotension (systolic BP less than 90 mm Hg in adults) [2] in association with tachycardia, and/or other signs of cardiovascular disturbance, such as sinus tachycardia or severe bradycardia
   - Loss of consciousness and / or collapse
   - Limpness or pallor, which are signs of severe anaphylaxis in children
   - Abdominal cramps, diarrhoea and / or vomiting

2. **Immediate management** [3]
   - If you are giving a drug injection, or an infusion of a drug or blood product, stop administration immediately
   - If patient is unconscious, lay patient down on left side to keep the airway clear
   - If the patient is conscious, lay patient down, unless this results in breathing difficulties
   - **Give adrenaline by intramuscular injection without delay.** See drug box for dosage. Look for any signs or symptoms of anaphylaxis and / or cardiovascular collapse. Although adrenaline is not required for generalised non anaphylactic reactions, such as skin rash, without other signs or symptoms, administration of intramuscular adrenaline is safe
   - If there is no improvement in the patient’s condition by 3 - 5 minutes, repeat doses of adrenaline every 3 - 5 minutes until improvement occurs
Resuscitation

- Administer O₂ by face mask 10 - 15 L / minute
- Consult MO as soon as circumstances allow. Do not leave the patient alone
- If apnoeic commence resuscitation see DRS ABCD resuscitation / the collapsed patient
- Insert IV cannula - if possible, a 14 - 16 gauge if hypotensive
- If hypotensive give normal saline 20 mL / kg over 1 - 2 minutes under pressure [4]
- If airway obstruction see Acute upper airway obstruction and choking and consider need for needle cricothyroidotomy

<table>
<thead>
<tr>
<th>Schedule</th>
<th>3</th>
<th>Adrenaline</th>
<th>DTP</th>
<th>IHW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authorised Indigenous Health Workers may proceed with first dose</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Form</td>
<td>Strength</td>
<td>Route of administration</td>
<td>Recommended dosage</td>
<td>Duration</td>
</tr>
<tr>
<td>Ampoule</td>
<td>1:1,000</td>
<td>Deep IM Anterior lateral thigh Not in buttock or deltoid In 1 mL syringe (not insulin syringe) with 23 gauge needle</td>
<td>10 kg - 100 microgram (0.1 mL) 15 kg - 150 microgram (0.15 mL) 20 kg - 200 microgram (0.2 mL) 25 kg - 250 microgram (0.25 mL) 30 kg - 300 microgram (0.3 mL) 40 kg - 400 microgram (0.4 mL) <strong>Child &gt; 50kg and adult</strong> 500 microgram (0.5 mL)</td>
<td>Repeat adrenaline every 3 - 5 minutes as determined by BP and bronchospasm</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: adrenaline may cause restlessness, anxiety, headache and palpitations in conscious patients

Management of associated emergency: consult MO

<table>
<thead>
<tr>
<th>3. Clinical assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Obtain emergency patient history (from relatives or friends if present)</td>
</tr>
<tr>
<td>- circumstances leading up to the severe allergic reaction and potential contact with irritants - plant, animal, marine creatures</td>
</tr>
<tr>
<td>- known allergies of any kind</td>
</tr>
<tr>
<td>- any previous episodes, treatment used and effect</td>
</tr>
<tr>
<td>- current medications including an EpiPen®</td>
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<tr>
<td>• Perform standard clinical observations +</td>
</tr>
<tr>
<td>- O₂ saturation</td>
</tr>
<tr>
<td>- conscious state See Glasgow Coma Scale / AVPU</td>
</tr>
<tr>
<td>• Perform physical examination</td>
</tr>
<tr>
<td>- inspect, auscultate and palpate all affected body systems e.g. skin changes, face, throat, breathing, HR, neurological state. Document all changes</td>
</tr>
</tbody>
</table>

4. Management

- Consult MO who may order in addition to IM adrenaline |
  - salbutamol nebulised with O₂ for bronchospasm. See Acute asthma |
  - adrenaline nebulised with O₂ for upper airway obstruction [4] |
- Give promethazine if indicated for symptomatic relief of the diffuse, urticarial skin reaction i.e. generalised itchy red rash |
- Hydrocortisone IV stat (2 - 4 mg / kg, max. 200 mg)
- if patient is on beta blockers such as metoprolol or atenolol, they may be resistant to adrenaline and may need:
  - glucagon IV adults 1 - 5 mg loading dose. Repeat at 5 - 10 minutes for 3 doses then infuse at 1 - 5 mg / hour if needed [2] on MO order
- **BP and respiratory rate and conscious state should be checked every 15 minutes for 2 hours then hourly for a minimum of 4 hours**
- After the resolution of all symptoms and signs, observe for a minimum of 4 hours after the last dose of adrenaline or until daylight hours [4]
- Those with severe reactions (hypoxia, hypotension, and / or neurological compromise), delayed or inadequate response to initial therapy, poorly controlled asthma or a history of life-threatening reactions and those who present late in the evening, require longer observation [4]
- Those with severe reactions who have had a 12 hour period of being symptom free and have required no further adrenaline, may be discharged in consultation with MO

<table>
<thead>
<tr>
<th>Schedule</th>
<th>4</th>
<th>Promethazine DTP IHW / SM R&amp;IP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authorised Indigenous Health Workers must consult MO / NP</td>
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<td></td>
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<tr>
<td>Scheduled Medicines Rural &amp; Isolated Practice Registered Nurses may proceed</td>
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<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampoule 25 mg / mL</td>
<td>IM</td>
<td>Adult 25 mg</td>
<td>Child &gt; 2 years 0.5 mg / kg to a max. of 25 mg</td>
<td>Stat</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information

Management of associated emergency [6]

5. **Follow up**
   - It is important to find out exactly what happened before the episode - food or drug ingestion, bites and stings etc. Make sure this is documented in the notes, as well as what treatment was required
   - Patient must be advised to avoid re-exposure
   - Advise patient to carry an alert e.g. Medic Alert
   - Document in medical record “Allergic to…..”
   - If the adverse event follows an immunisation / medication notify the Adverse Drug Reaction Advisory Committee (ADRAC) by completing the ADRAC form or by telephone
   - Review the next day and if no symptoms or findings, review at next MO clinic
   - All patients are to be referred to MO for prescriptions for EpiPen®

6. **Referral / consultation**
   - Consult MO on all occasions
Resuscitation

Fits / convulsions / seizures

Febrile convulsions

Recommend
- Do not attempt to open teeth or wedge mouth open during a seizure
- Consider meningitis in all children presenting with convulsions / fits and fever until proven otherwise
- Children younger than 6 months of age who present with convulsions and fever, may have a serious underlying medical condition

Background
- First seizure can occur at any age, but new onset epilepsy is more common in young children and elderly
- In a patient with known epilepsy, they are at risk of seizures if they:
  - do not take epilepsy medications regularly
  - drink excess alcohol
  - are in alcohol withdrawal and / or
  - are sleep deprived
- Usually fits cause no damage (unless the patient injures themselves or drowns). The vast majority of fits last less than two minutes and stop on their own. However fits lasting longer than five minutes (status epilepticus) need to be treated urgently, as prolonged fitting can cause damage to the brain. Multiple seizures with incomplete recovery between also need to be stopped urgently
- Febrile convulsions (fits associated with fever) usually occur in children aged between 3 months and 6 years of age and are associated with a temperature >38°C
- Clinical signs of fits in children may be subtle. In infants
  - flicking eye movements
  - smiling inappropriate for age
- Some conditions can mimic a fit:
  - faints (syncope) - episodes of low systemic blood pressure possibly due to pain, fear, dehydration or drugs
  - cardiac arrhythmia - causing a drop in blood pressure
  - hypoglycaemia / hyperglycaemia - for example in a diabetic

Related topics
- Hypoglycaemia
- Alcohol withdrawl
- DRS ABCD resuscitation / the collapsed patient
- Child with fever
- Meningitis

1. May present with
   - Generalised - tonic-clonic seizure (convulsion)
   - Reported history of “having a fit”
     - ‘falling and shaking all over’
     - ‘eyes roll back’ and ‘froth at the mouth’
     - ‘biting tongue’ during the seizure
   - Typically patients can not remember the fit, although they may recall some warning signs (aura). Patients may be:
     - drowsy, confused, incontinent or possibly agitated after the fit for about 10 minutes (post-ictal phase). Patient may have been incontinent. During this phase breathing often sounds heavy, with loud ‘snoring’, due to partial obstruction of the airway
- **Focal seizures**
  - localised area of jerking (may reflect a TIA or brain tumour)

- **Partial - complex partial seizures**
  The patient has impaired consciousness, but may remain standing / sitting, although behaving oddly. Usually lasts a minute or two. Signs include:
  - may lick lips repetitively, or fidget with hands
  - may have focal jerking of one limb
  - head and eyes may turn to one side. May stare blankly
  - patient will usually have no memory and may deny episodes are occurring

- **Special syndromes - febrile convulsions**
  - common in young children (3 months to 6 years). Mostly benign temperature over 38 °C
  - most commonly associated with viral URTI, otitis media
  - prolonged febrile convulsions (greater than five minutes) need to be stopped urgently
  - fits in older children and adults cannot be put down to ‘febrile convulsions’, even if the patient has a temperature. Another cause should be considered

### 2. Immediate management

<table>
<thead>
<tr>
<th>DRSCABCD resuscitation / the collapsed patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Protect person from injury, especially the head</td>
</tr>
<tr>
<td>• Turn onto side in recovery position</td>
</tr>
<tr>
<td>• Time the duration of the fit and note characteristics of fit</td>
</tr>
<tr>
<td>• Draw up midazolam or prepare diazepam</td>
</tr>
<tr>
<td>• If fitting i.e. jerking, is lasting longer than five minutes treat with midazolam</td>
</tr>
<tr>
<td>• After the seizure has stopped O₂ may be administered via Hudson mask, to maintain O₂ saturation &gt;93 % - adults / &gt;95 % - child. See O₂ delivery systems</td>
</tr>
<tr>
<td>• If O₂ saturation not maintained consult MO</td>
</tr>
<tr>
<td>• In the postictal phase an oropharyngeal airway will help protect airway if it can be inserted easily. While the patient is still jerking it is usually better not to try to put anything into the mouth</td>
</tr>
</tbody>
</table>

### 3. Clinical assessment

- Take emergency patient history from witnesses. Once patient has recovered obtain more detailed history regarding presenting and previous fits
- Check patient is taking their regular anticonvulsant medication
- Consider possibility of alcohol or drug related seizure caused by withdrawal
- Perform standard clinical observations +
  - BGL
  - O₂ saturation
  - conscious state. See Glasgow Coma Scale / AVPU
- Perform physical examination checking for any injury which may have occurred if patient fell or hit themselves during the seizure
- Check for skin rashes

### 4. Management

- Consult MO
- Insert IV cannula
- If BGL less than 3 mmol / L
  - adults - give 50 % dextrose
  - children - 10 % dextrose or glucagon as per health management protocol. See Hypoglycaemia
- If capillary BGL is within normal limits and/or fit continuing give midazolam or diazepam [9]
- For people with known alcohol use or who are malnourished - give thiamine 100 mgs IV (made up to 10 mL with normal saline, give slowly over 10 minutes). If IV access difficult should be given undiluted IM
- If seizure continues in a child despite 2nd dose (on MO orders) of midazolam/diazepam, MO may advise to give IM phenobarbitone 15 - 20 mg / kg
- If febrile child, once fit has finished, give oral (if fully conscious) or rectal paracetamol. Tepid sponging, baths and fans are ineffective in lowering core temperature and are not recommended [8]

See [Simple analgesia back cover]

### Schedule 4 Midazolam

<table>
<thead>
<tr>
<th>Schedule</th>
<th>4</th>
<th>Midazolam</th>
<th>DTP</th>
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<td>IHW / SM R&amp;IP</td>
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<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampoule</td>
<td>Ampoule 5 mg / 1 mL</td>
<td>IM or IV (IHW may not administer IV)</td>
<td>Adult&lt;br&gt;IM 5 mg with second 5 mg dose if required to a max. of 10 mg&lt;br&gt;IV up to 10 mg in 2.5 mg increments Give over 2 - 5 minutes</td>
<td>Stat</td>
</tr>
<tr>
<td></td>
<td>Ampoule 5 mg / 5 mL</td>
<td>BUCCAL&lt;br&gt;Insert syringe between the inside of the lower cheek and teeth and gently squeeze the contents until contents given</td>
<td>Adult&lt;br&gt;5 mg with second 5 mg dose if required to a max. of 10 mg&lt;br&gt;Child&lt;br&gt;0.2 mg / kg to a max. of 5 mg&lt;br&gt;IV 0.15 mg / kg to a max. of 10 mg</td>
<td>Further doses on MO / NP order</td>
</tr>
<tr>
<td></td>
<td>Intranasal via mucosal atomisation device (MAD) or gently squeeze contents into nostril</td>
<td>Adult&lt;br&gt;5 mg with second 5 mg dose if required to a max. of 10 mg&lt;br&gt;Child&lt;br&gt;0.2 mg / kg to a max. of 5 mg</td>
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</tbody>
</table>

Provide Consumer Medicine Information: midazolam response is highly variable. Caution should be observed with the elderly, in the presence of hypotension or narcotics and in children less than 8 years. Patients should be regularly monitored for at least 4 hours after last administration in case of excessive sedation, respiratory depression or hypotension.

Management of associated emergency: see Poisoning / overdose - opiates

[9] [10]
Resuscitation

• or

### Schedule 4 Diazepam

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectal solution</td>
<td>5 mg / 5 mL</td>
<td>Per rectum</td>
<td>Adult 10 mg</td>
<td>Stat</td>
</tr>
<tr>
<td>Suppository</td>
<td>10 mg</td>
<td></td>
<td>Child 0.3 - 0.5 mg / kg to a max. of 10 mg</td>
<td>Further doses on MO / NP order</td>
</tr>
</tbody>
</table>

Authorised Indigenous Health Workers must consult MO / NP
Scheduled Medicines Rural & Isolated Practice Registered Nurses may proceed

Provide Consumer Medicine Information
Management of associated emergency: consult MO

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5. **Follow up**

- Any patient who presents with their first fit / convulsion / seizure needs full investigation including EEG and CT scan
- MO may order electrolytes, calcium and magnesium and serum anticonvulsant levels
- Usually allowed home after a period of four hours observation, if patient has returned to normal level of awareness. Must be in care of a responsible person
- Review next day
- See MO at next clinic
- The MO will advise the family on how to manage a fit should one occur, including medication

6. **Referral / consultation**

- Consult MO on all occasions
- Any patient with recurrent seizures despite anticonvulsant medications needs MO and specialist medical review
Diabetic ketoacidosis

Recommend
- Check capillary BGL and ketones in any patient with altered consciousness or a neurological abnormality
- Commence initial treatment as early as possible as may progress to coma, and death [12]

Background
- Diabetic ketoacidosis (DKA) occurs primarily in type 1 diabetes mellitus [12]
- Results in three primary metabolic derangements - hyperglycaemia, severe dehydration and acidosis
- DKA may occur
  - at the onset of type 1 diabetes mellitus and therefore lead to its diagnosis
  - as a result of infection, omitted insulin doses, acute myocardial infarction, trauma etc. [12]

Related topics
- Acute coronary syndrome (chest pain / angina / heart attack)
- Fits / convulsions / seizures

1. May present with
   - High blood glucose levels
   - High blood ketone level
   - Large ketones in urine
   - Dehydrated - excessive thirst and urination
   - Odour of breath - fruity / acetone
   - Breathing patterns altered - deep slow laboured breathing (Kussmaul breathing)
   - Rigid abdomen
   - Nausea and gastrointestinal problems
   - Recent weight loss (in undiagnosed type 1 diabetes)
   - Hypotensive, tachycardiac, hypothermic
   - Altered level of consciousness

2. Immediate management
   - Take emergency patient history if possible
   - Perform standard clinical observations +
     - BGL
     - $O_2$ saturations
     - Conscious state. See Glasgow Coma Scale / AVPU
   - Insert IV cannula
     - commence IV fluids, MO will advise type and rate
     - commence with normal saline. Give 15 - 30 mL / kg / hour for 2 hours (adults) [12]
     - in children fluid replacement which is too rapid can result in cerebral oedema and worsening of situation. Consult MO
   - Always contact MO if DKA in child
     - MO will advise a short acting insulin IV
     - if unable to access IV route IM or SC may be used
3. **Clinical assessment**
   - Take comprehensive patient history when able with particular attention to current diabetes status, insulin, food intake, exercise, recent alcohol intake, chest pain, infections or possible injury, urine output, fluid intake, possible dehydration
   - Perform and monitor standard clinical observations +
     - capillary BGL
     - O₂ saturations
     - conscious state. See Glasgow Coma Scale / AVPU
     - ECG - look for large T waves
     - urinalysis for blood and ketones
       - record blood ketone level as a number e.g. “0.6” or “1.4” [13]
       - record urine result as neg, +, ++, [13]
   - Collect urine for MC/S
   - Collect blood for gases and electrolytes

4. **Management**
   - Consult MO as soon as possible who will organise / advise:
     - evacuation / hospitalisation to appropriately equipped facility
     - administer IV fluids, insulin, glucose
     - K⁺ (potassium) replacement will be needed early in treatment to prevent hypokalaemia. K⁺ may initially be high or normal but will decrease when rehydration commenced
     - observe closely and document patient’s vital signs and conscious state
   - Record fluid balance (all input and output) on a fluid balance chart
   - BGL, blood gases (particularly pH) and electrolytes should be examined regularly (initially every hour) where possible

5. **Follow up**
   - 3 monthly review by a Diabetes Specialist / Endocrinologist
   - Intensive one on one education by Diabetes Educator and Dietitian
   - If new diagnosis of type 1 diabetes, patient will need blood tests for Islet cell antibodies and GAD antibodies. These may only be positive for 70% of people with type 1, therefore the other 30% will have no detectable antibodies
   - Check for thyroid disease (TFT’s) and coeliac disease, if family history or clinical suspicion

6. **Referral / consultation**
   - Consult MO as soon as possible on all occasions of DKA
### Hypoglycaemia

**Recommend**
- Check capillary BGL in any patient with altered consciousness or a neurological abnormality
- Consult MO for people with known alcohol use or who are malnourished, as IV dextrose can precipitate serious brain damage (Wernicke’s encephalopathy)

**Background**
- Hypoglycaemia or low blood glucose level e.g. BGL < 4.0 mmol/L, may occur:
  - in people with diabetes taking tablets or insulin
  - as a result of heavy alcohol intake
  - in newborns and sick children
  - as a result of some rare medical conditions

**Related topics**
- Fits / convulsions / seizures
- Diabetes

**1. May present with**
- Capillary BGL less than 4 mmol / L
- Sweating, tremor, rapid HR, anxiety
- Hunger, headache, dizziness, irritability
- Aggressive behaviour, may appear drunk
- Confusion, drowsiness, unconscious or fitting
- Neurological abnormality

**2. Immediate management**

**See Fits / convulsions / seizures**
- **If confused or drowsy**
  - check capillary BGL
  - do not give any oral fluid or food
  - give glucagon IM or SC

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-filled syringe</td>
<td>1 mg</td>
<td>IM (can also be given S/C)</td>
<td>Adult / child &gt; 13 years 1 mg</td>
<td>Further doses on MO / NP order</td>
</tr>
</tbody>
</table>

**Schedule 3 Glucagon DTP IHW**

Authorised Indigenous Health Workers may administer one dose then consult MO / NP

Consumer Medicine information: Unconscious patients should wake within 6 minutes following glucagon administration [14]. Recovery should occur in 5 - 15 min

Management of associated emergency: consult MO

- If no improvement in BGL within 10 minutes:
  - insert IV cannula
  - check capillary BGL, if < 3 mmol / L
    - **adult** give 50 % dextrose 20 - 30 mL IV slow push until fully conscious [14]
    - **child** give 10 % dextrose 2 mL / kg IV bolus then 3 - 5 mL / kg / hr until fully conscious [21]
Resuscitation

- recovery should be almost immediate within 6 minutes [14]
- check BGL every 15 minutes until within normal limits

• Consult MO for people with known alcohol use or who are malnourished as IV dextrose can precipitate serious brain damage (Wernicke’s encephalopathy). These patients must also have thiamine 100 mg given IV (made up to 10 mL with normal saline and given slowly over 10 minutes). If IV access difficult should be given undiluted IM

3. Clinical assessment
• Obtain comprehensive patient history when able with particular attention to current diabetes status, insulin, food intake, exercise, recent alcohol intake, illness or injury
• Perform standard clinical observations +
  - capillary BGL
  - urinalysis
  - conscious state. See Glasgow Coma Scale / AVPU

4. Management
• If conscious and able to swallow - give rapidly absorbed form of oral sugar (carbohydrate)
  - 3 teaspoons or sachets of sugar either straight or added to a non-sweetened drink or
  - ½ cup ordinary soft drink or cordial or sweetened juice or
  - 5 - 6 jelly beans or other chewable sweets or
  - 2 - 3 sweet biscuits
• Follow with a sandwich, a piece of fresh or dried fruit or a meal
• Check BGL in 15 minutes
  - if greater than 4.0 mmol / L, check again in another 15 minutes and if still greater than 4.0 mmol / L, patient can go home, depending on cause, and in consultation with MO
  - if less than 4.0 mmol / L, repeat above treatment, check in 15 minutes and 15 minutes later and if greater than 4.0 mmol / L at these 2 checks, patient can go home, depending on cause, and in consultation with MO
• Review next dose of insulin / diabetes medication
• Review events with patient which may have lead to hypoglycaemic episode
  - was too much diabetes medication or insulin taken?
  - unplanned exercise?
  - not enough carbohydrate food / forgot to eat meal?
  - had too much alcohol? People consuming alcohol are advised to limit their consumption and ensure that they eat carbohydrate to reduce the risk of hypoglycaemia
  - patient has end stage kidney failure?

5. Follow up
☞ Review signs and symptoms of hypoglycaemia with the patient
☞ Review treatment of hypoglycaemia with the patient. Patients should know how to recognise and treat a ‘hypo’ themselves
☞ See Diabetes for additional information, and cycle of care checks that could be opportunistically carried out at this visit

6. Referral / consultation
☞ Consult MO on all occasions and prior to discharge
☞ Refer to Diabetes Educator
Acute asthma
adult / child

Recommend
- If the adult or child is acutely distressed give salbutamol with O₂ immediately after taking a brief history and physical examination [15]
- Beware of the patient with asthma in distress who is unable to speak and without audible wheeze, this indicates severe asthma
- Cyanosis, impaired conscious state and a quiet chest indicate a life threatening episode

Related topics
- Chronic asthma
- Acute pulmonary oedema
- Anaphylaxis
- Breathlessness
- O₂ delivery systems

1. **May present with**
   - Breathlessness
   - Wheeze / cough
   - Speaking in short sentences
   - In distress
   - Tiredness / exhaustion
   - Cyanosis
   - O₂ saturation < 90 %
   - Symptoms continue despite ‘reliever’ medication

2. **Immediate management**
   **Adult [15]**
   - Take an emergency history
   - Perform rapid clinical assessment +
     - O₂ saturation
   - If acutely distressed, sit patient up to assist with breathing
   - Give salbutamol immediately - nebulised with O₂
   - Consider if adrenaline is needed - consult MO
   **Children [15]**
   - Take an emergency history from parent / carer
   - Perform rapid clinical assessment +
     - O₂ saturation
   - Give salbutamol immediately - nebulised with O₂
   - Consider if adrenaline is needed - consult MO
### Resuscitation

#### Schedule 4 Salbutamol

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nebule</td>
<td>2.5 mg / 2.5 mL</td>
<td>Nebulised with O₂ (at least 8 L / min) Three doses in first hour then hourly</td>
<td>Adult and child &gt; 6 years 5 mg mixed with normal saline to a volume of 3 - 4 mL</td>
<td>May be repeated up to every 10 min or even given continuously on MO / NP orders</td>
</tr>
<tr>
<td>Solution</td>
<td>5 mg / mL in 30 mL</td>
<td>Nebulised with O₂ (at least 8 L / min) Three doses in first hour then hourly</td>
<td>Child &lt; 6 years 2.5 mg mixed with normal saline to a volume of 3 - 4 mL</td>
<td>Note: in infants &lt; 1 yr response to bronchodilators may be minimal and if so should not be repeated</td>
</tr>
<tr>
<td>MDI (metered dose inhaler) S3</td>
<td>100 microgram per dose</td>
<td>MDI with spacing device</td>
<td>Adult and child &gt; 6 years 5 mg mixed with normal saline to volume of 3 - 4 mL</td>
<td>May be repeated up to every 10 min or even given continuously on MO / NP orders</td>
</tr>
</tbody>
</table>

**Provide Consumer Medicine Information**

Management of associated emergency: consult MO

#### 3. Clinical assessment

- Obtain complete patient history of this episode and previous episodes of asthma. Of particular importance is severity of previous episodes including need for hospitalisation and / or steroids
- Perform standard clinical observations +
  - O₂ saturation
  - conscious state. See Glasgow coma scale / AVPU
- Inspect for the use of accessory muscles chest and neck, nasal flaring, intercostal recession and sternal retraction
- Listen to the chest for air entry and wheezes. Air entry can often be unequal in asthma due to mucous plugging and does not always mean pneumothorax or pneumonia
- Check spirometry (FEV1). If no spirometry and patient is not distressed, use peak expiratory flow (PEF) rate before and after salbutamol administered
### Management of adult with acute asthma [15] [17]

#### Signs and symptoms

<table>
<thead>
<tr>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Able to speak in sentences</td>
<td>• Able to speak in phrases only</td>
<td>• Able to speak in single words only</td>
</tr>
<tr>
<td>• Pulse rate &lt;100 bpm</td>
<td>• Pulse rate 100 - 120 bpm</td>
<td>• Pulse rate &gt;120 bpm</td>
</tr>
<tr>
<td>• Central cyanosis absent</td>
<td>• Central cyanosis may be present</td>
<td>• Central cyanosis likely</td>
</tr>
<tr>
<td>• Wheeze variable</td>
<td>• Wheeze moderate to loud</td>
<td>• Wheeze often quiet</td>
</tr>
<tr>
<td>• No physical exhaustion</td>
<td>• No physical exhaustion</td>
<td>• Physically exhausted</td>
</tr>
</tbody>
</table>

#### Management

<table>
<thead>
<tr>
<th>Mild</th>
<th>Moderate</th>
<th>Severe - evacuate / hospitalise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplementary O₂ to achieve &gt; 90% saturation</td>
<td>O₂ to achieve &gt;90% saturation Monitor SpO₂</td>
<td>O₂ to achieve &gt; 90% saturation Monitor SpO₂</td>
</tr>
</tbody>
</table>

| Supplemental O₂ to achieve > 90% saturation | Salbutamol (MDI / spacer) 8 - 12 puffs or Salbutamol nebulize (2.5 mg / 2.5 mL or 5 mg / 2.5 mL) nebulized with O₂ 3 - 4 hourly or Salbutamol solution 5 mg / mL mixed with normal saline to a volume of 3 - 4 mL nebulized with O₂ | Salbutamol solution 1 mL (5 mg / mL) mixed with normal saline to a volume of 3 - 4 mL nebulized with O₂ every 15 minutes [15] (can be used continuously on MO order) If no response, give salbutamol 250 microgram (0.5 mL of 500 mcg / mL solution) IV bolus over one minute then IV 5 - 10 microgram / kg / hour [15] |

| • Nebulised Ipratropium bromide not required | • Ipratropium bromide optional | • Ipratropium bromide 500 microgram by nebulised with O₂ (at least 8 L / min) 2 - 4 hourly |

| Corticosteroids e.g. prednisone - consider oral corticosteroids | 50 mg prednisone orally | IV hydrocortisone 100 mg 6 hourly for 24 hrs then review Oral prednisone 50 mg |
### Management of child with acute asthma [15] [16]

#### Signs and symptoms

<table>
<thead>
<tr>
<th>Signs and symptoms</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Increased respiratory rate but not distressed</td>
<td>• Respiratory distress, using accessory muscles</td>
<td>• Respiratory distress, using accessory muscles</td>
<td></td>
</tr>
<tr>
<td>• No difficulty talking in sentences</td>
<td>• Some sentences interrupted</td>
<td>• Speaking in single words or not at all</td>
<td></td>
</tr>
<tr>
<td>• Wheezes in chest</td>
<td>• Wheezes in chest</td>
<td>• Wheezing not heard</td>
<td></td>
</tr>
<tr>
<td>• O₂ saturation &gt; 93 %</td>
<td>• O₂ saturation 90 - 93 %</td>
<td>• Cyanosed</td>
<td></td>
</tr>
<tr>
<td>• Normal HR (&lt; 100 bpm)</td>
<td>• Increased HR (100 - 200 bpm)</td>
<td>• O₂ saturation &lt; 90 %</td>
<td></td>
</tr>
</tbody>
</table>

#### Management

<table>
<thead>
<tr>
<th>Management</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Supplementary O₂ if required</td>
<td>O₂ may be required</td>
<td>Monitor SpO₂</td>
<td>Monitor SpO₂</td>
</tr>
<tr>
<td>• Salbutamol with spacer &lt; 6 years 4 - 6 puffs ≥ 6 years 8 - 12 puffs Review in 20 minutes [15]</td>
<td>Salbutamol with spacer &lt; 6 years 6 puffs ≥ 6 years 12 puffs Repeat every 20 minutes x 2 then administer 1 - 4 hourly [15]</td>
<td>Salbutamol with spacer &lt; 6 years 6 puffs ≥ 6 years 12 puffs. Repeat every 20 minutes for 3 doses in 1st hour [15] or Salbutamol 5 mg mixed with normal saline to a volume of 3 - 4 mL nebulised with O₂ at least 8 L / min every 20 minutes for 3 doses or continuously [16] If no response, bolus IV salbutamol 15 microgram / kg over 10 minutes then 1 microgram / kg / min thereafter [16]</td>
<td></td>
</tr>
<tr>
<td>• Ipratropium bromide not required</td>
<td>Ipratropium bromide &lt; 6 years 1 puff ≥ 6 years 2 puffs</td>
<td>Ipratropium bromide 250 microgram nebulised with O₂ at least 8 L / min every 20 minutes for 3 doses</td>
<td></td>
</tr>
<tr>
<td>• Corticosteroids e.g. prednisone</td>
<td>Oral prednisone 1 mg / kg up to 50 mg daily for 3 days then cease abruptly without tapering</td>
<td>Hydrocortisone 4 mg / kg to a max. of 100 mg IV 6 hourly on day 1 Oral prednisone 1 mg / kg / dose daily for up to 5 days</td>
<td></td>
</tr>
<tr>
<td>• Consider oral corticosteroids</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Resuscitation

<table>
<thead>
<tr>
<th>Schedule</th>
<th>4</th>
<th>Ipratropium bromide</th>
<th>DTP IHW / SM R&amp;IP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authorised Indigenous Health Workers may administer one dose then must consult MO / NP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scheduled Medicines Rural &amp; Isolated Practice Registered Nurses may proceed</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nebule and solution</td>
<td>250 microgram / mL</td>
<td>Nebulised with O₂ (at least 8 L / min)</td>
<td>Adult or child ≥ 6 years 500 microgram mixed with 2 mL normal saline</td>
<td>Adults or child ≥ 6 years</td>
</tr>
<tr>
<td></td>
<td>500 microgram / mL</td>
<td></td>
<td>Child &lt; 6 years 250 microgram mixed with 2 mL normal saline</td>
<td>Children &lt; 6 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 - 4 hourly</td>
<td>20 mins for 3 doses</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Further doses on MO / NP orders</td>
<td></td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information

Management of associated emergency: consult MO

5. Follow up

☞ If mild and no fever and wheeze settles with initial salbutamol, can go home after 1 hour with advice to continue usual asthma medications, including salbutamol every 4 hours if needed

☞ Review the next day and if still no wheeze see MO at clinic on next visit within 4 weeks

☞ If returns earlier because requiring salbutamol more than every 4 hours or if wheeze on review, consult MO

☞ All asthmatics should have an “Asthma action plan” so that everyone knows what to do to optimise management. See Chronic asthma for additional advice, information and ongoing care

☞ Beware of labelling infants asthmatic. Viral chest infections may also cause wheeze in infants and may not respond to bronchodilators

☞ Patients, relatives and friends of people with asthma should know asthma 4 X 4 first aid. See Chronic Disease Guidelines at www.health.qld.gov.au/cdg or www.nationalasthma.org.au

6. Referral / consultation

☞ If mild and first attack or has fever or doesn’t settle with initial dose of salbutamol, consult MO

☞ If moderate / severe asthma consult MO on all occasions (as above) and see at next MO clinic

☞ People with severe asthma require Specialist referral
**Resuscitation**

### Drowning Submersion

#### Recommend
- The aim of management is to reverse hypoxia - lack of $O_2$ to body tissues [18]
- Consider head and neck injury, alcohol and drugs, hypoglycaemia, seizures, heart attack, stroke as precipitating events [18]

#### Related topics
- Cardiorespiratory arrest - adult / child
- DRS ABCD resuscitation / the collapsed patient
- Unconscious / altered LOC

### 1. May present with
- History of submersion with no symptoms
- Cardiorespiratory arrest
- Respiratory arrest, distress, cyanosis, crackles or wheezes in the lungs (pulmonary oedema - fluid on the lung)
- Altered consciousness - unconscious from hypoxia - decreased $O_2$ to the brain
- Very low temperature (hypothermia)
- Hypotension

### 2. Immediate management

#### DRS ABCD resuscitation / the collapsed patient
- Cardiorespiratory arrest - adult / child

- Consult MO as soon as possible
- Give high flow $O_2$ via non-rebreathing mask. A Hudson mask is not sufficient See $O_2$ delivery systems
- Continue CPR. Do not stop CPR, unless in consultation with MO and patient's body temperature is above 32°C or cannot be raised despite every measure taken
- Remove all wet clothing and dry patient
- Keep patient warm with blankets and space blankets

### 3. Clinical assessment
- Obtain a complete patient history including circumstances of submersion
- Perform standard clinical observations +
  - $O_2$ saturation
  - core temperature (if possible)
  - conscious state. See Glasgow Coma Scale / AVPU
- Listen to chest for added sounds - crackles or wheezes
- Take chest x-ray if available for other injuries
- Expose and examine the patient systematically for other injuries, starting at the head and progressing downwards to the toes. Maintain privacy. Do not let the patient get cold, cover with a blanket after examination

### 4. Management
- Consult MO
- If conscious, continue $O_2$ therapy [19]. Intubation may be required [18]
- Encourage to cough and take deep breaths
- The MO may advise insertion of a nasogastric tube to empty the stomach of swallowed water
- If patient receiving CPR - do not stop
5. Follow up
   - If the patient did not lose consciousness, is asymptomatic and chest findings are normal, the patient may be allowed home in consultation with the MO
   - Review after 6 hrs, the next day and in 2 days and consult MO if the patient has any symptoms, an increased HR, increased temperature or any chest findings

6. Referral / consultation
   - Consult MO on all occasions
   - Any patient who has lost consciousness or has chest symptoms or signs or had submersion in contaminated water, will need evacuation / hospitalisation because of the risk of developing adult respiratory distress syndrome (ARDS) or cerebral oedema

---

**Breathlessness**

**Recommend**
- Nearly all patients with breathlessness require $O_2$ in high concentrations
- For patients with chronic obstructive pulmonary disease (COPD), an $O_2$ saturation of 88 - 92% may be normal and $O_2$ in high concentration may put the patient at risk by decreasing their breathing effort. However CO$_2$ retention is not a contraindication to $O_2$ therapy. Rather it demands that the clinician administer $O_2$ carefully and recognise the potential for respiratory acidosis and clinical deterioration [20]

**Background**
- Breathlessness occurs when the body receives inadequate $O_2$ to tissues because of lung, heart or other problems. The body’s first response is to breathe faster to increase the amount of air passing through the lungs

---

**Related topics**
- Acute pulmonary oedema
- Pneumonia - adult / child
- Acute asthma
- COPD
- Chest injuries
- Chest injuries

---

1. May present with
   - Breathing fast and often frightened
   - Increased HR
   - Fever
   - Chest pain, dull or sharp
   - Cough with purulent, frothy or blood stained sputum
   - Chest wheezes or crackles
   - Hypotension
   - Cyanosis
   - Confused, drowsy

2. Immediate management
   - Sit the patient up
   - Give $O_2$. See $O_2$ delivery systems
     - for all patients except known COPD: give high flow $O_2$ to maintain $O_2$ saturation >93% - adult / 95% - child. If not maintained consult MO
     - for severely distressed patients with known COPD: it may be necessary to give high flow $O_2$, however, patient with COPD should receive lower maintenance $O_2$ therapy, as soon as clinical condition allows - consult MO
- for patients with known COPD give $O_2$ 28 % by Venturi mask or nasal cannula to maintain $O_2$ saturation 88 - 92% - if not maintained, consult MO. If Venturi mask not available, give $O_2$ by Hudson mask at 5 L / min only, or by nasal prongs at 2 L / min only.

3. **Clinical assessment**
   - Obtain a complete patient history including this and any previous episodes of acute or chronic breathlessness
   - Perform standard clinical observations +
     - $O_2$ saturation
   - Assess quality of respirations and note signs of accessory muscle use i.e. nasal flaring, sternal retraction, intercostal recession
   - Inspect chest for expansion
   - Auscultate the chest for air entry and added sound (crackles or wheezes)

4. **Management**
   - Consult MO using the following table as a guide

<table>
<thead>
<tr>
<th>Probable cause</th>
<th>Symptoms and signs</th>
<th>What to do</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulmonary oedema (fluid in the lungs) / heart failure</td>
<td>History of heart trouble (angina, acute coronary syndrome, heart failure)</td>
<td>See Acute pulmonary oedema</td>
</tr>
<tr>
<td></td>
<td>Worse when lying down</td>
<td></td>
</tr>
<tr>
<td></td>
<td>May start suddenly waking up at night short of breath</td>
<td></td>
</tr>
<tr>
<td></td>
<td>May have pink frothy sputum</td>
<td></td>
</tr>
<tr>
<td></td>
<td>May have wheezes and crackles at the bottom of the lungs or all over the lungs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>May have ischaemic chest pain</td>
<td></td>
</tr>
<tr>
<td>Chest infection</td>
<td>Fever, cough and looks unwell</td>
<td>See Pneumonia</td>
</tr>
<tr>
<td></td>
<td>May have reduced air entry or wheezes and crackles in the lungs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>May have sharp chest pain, worse on deep breath</td>
<td></td>
</tr>
<tr>
<td>Acute asthma</td>
<td>Known asthmatic (usually)</td>
<td>See Acute asthma</td>
</tr>
<tr>
<td></td>
<td>Usually wheezing, difficulty breathing out</td>
<td></td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease (COPD)</td>
<td>History of chronic chest problems</td>
<td>See COPD</td>
</tr>
<tr>
<td></td>
<td>Usually no fever</td>
<td></td>
</tr>
<tr>
<td></td>
<td>More than the usual amounts of coloured sputum</td>
<td></td>
</tr>
<tr>
<td>Pulmonary embolus (blood clot in the lungs) secondary to deep vein thrombosis (DVT)</td>
<td>Sharp chest pain, may be worse with breathing, may cough up blood</td>
<td>Consult MO urgently Evacuating / attending MO may consider heparinisation</td>
</tr>
<tr>
<td></td>
<td>Think of it in pregnant women or post natal women, people who have had an operation in the past 2 months, and older people who have spent a long time without much movement (e.g. after a long journey sitting down or after a long time in bed in hospital) especially if they have a painful or swollen leg</td>
<td></td>
</tr>
<tr>
<td>Spontaneous pneumothorax / traumatic pneumothorax</td>
<td>Starts suddenly (usually)</td>
<td>See Chest injuries</td>
</tr>
<tr>
<td></td>
<td>Can occur in a young fit and healthy person (tall and thin) or in someone with a history of asthma</td>
<td></td>
</tr>
</tbody>
</table>
5. **Follow up**
   - See acute pulmonary oedema, pneumonia, acute asthma, COPD, chest injuries

6. **Referral / consultation**
   - Consult MO

**References**
Acute coronary syndrome / unstable angina / myocardial infarct

**Recommend**
- Management is determined by clinical presentation, results of the ECG and blood tests.
- Consider acute coronary syndrome (myocardial infarct or unstable angina) in all people who present with chest pain that is new, recurrent, increasingly frequent or long lasting [1].
- Early reperfusion (percutaneous coronary intervention [PCI] or thrombolysis) provides the best outcomes for patients with ST elevation myocardial infarct (STEMI). Contact MO immediately who will promptly discuss management options with Cardiologist.
- The Heart Foundation and Australian Resuscitation Council have released separate statements about the routine use of O₂ in acute coronary syndrome, recommending that “supplemental O₂ should be initiated for breathlessness, hypoxaemia (O₂ saturation < 93%) or signs of heart failure or shock” [2] [3].
- Acute coronary syndrome (ACS) clinically is divided into syndromes that are characterised by the absence or presence of ST elevation on the ECG. They are further subdivided into [4]:
  - ST elevation myocardial infarction (STEMI) - is a medical emergency for which urgent reperfusion therapy needs to be considered.
  - non ST elevation acute coronary syndrome (NSTEACS) - patients without ST elevation are initially described as having NSTEACS until subsequent investigation divides them into:
    - Non ST elevation myocardial infarction - NSTEMI
    - Unstable angina - those without myocardial infarction

---

**Related topics**
- Cardiorespiratory arrest
- Cardiac arrhythmias
- Acute pulmonary oedema
- Trauma and injuries
- Alcohol related epigastric pain
- Acute abdominal pain

- DRS ABCD resuscitation / the collapsed patient
### 1. May present with
- Chest pain
- Hypotension
- Collapse / cardiac arrest
- Irregular heart beat
- Breathlessness
- Confusion (especially if elderly)
- Beware unusual presentation in older patients, people with diabetes and women

<table>
<thead>
<tr>
<th>Probable cause of chest pain</th>
<th>Symptoms and signs</th>
<th>What to do</th>
</tr>
</thead>
</table>
| Acute coronary syndrome (unstable angina, myocardial infarct) | • Central retrosternal pain described as a tightness or crushing feeling in chest  
• Pain may radiate to the arm or neck or jaw and may have associated nausea, vomiting, pallor, sweating and / or breathlessness | • O₂ if patient has  
- O₂ saturation < 93%  
- is breathless  
- has signs of heart failure or shock [2]  
• ECG and fax to MO  
• Aspirin  
• Morphine  
• GTN  
• Thrombolysis / PCI may be necessary  
• See under Management |
| Chest infection with pleurisy | • Sharp chest pain, worse on deep breath  
• May have reduced air entry or wheezes / crackles in the lungs | • See Pneumonia |
| Pericarditis | • A history of fever and malaise, sharp retrosternal or left sided chest pain  
• Pain is often eased by leaning forward and is worse in the supine position  
• Friction rub on examination, often transient  
• Tachycardia (often)  
• Evidence of underlying cause e.g. viraemia, uraemia or recent myocardial infarction [5] | • ECG then fax to MO  
• Consult MO urgently  
• MO will recommend:  
  - bloods  
  - chest x-ray  
  - NSAID and  
  - admission to hospital |
| Pulmonary embolus (PE) (blood clot in the lungs) secondary to deep vein thrombosis (DVT) | • Sharp chest pain, may be worse with breathing and may cough up blood  
• Think of PE in:  
  - pregnant / postnatal women  
  - people who have had surgery in the past 2 months  
  - older people who have had a period of inactivity e.g. after a long journey sitting down or after a long time in bed in hospital, especially if they have a painful or swollen leg | • Consult MO urgently  
• Evacuating / attending MO may consider heparinisation |
### Probable cause of chest pain

<table>
<thead>
<tr>
<th>Probable cause of chest pain</th>
<th>Symptoms and signs</th>
<th>What to do</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest injuries</td>
<td>Chest pain associated with chest injuries</td>
<td>See Chest injuries</td>
</tr>
</tbody>
</table>
| Oesophageal pain            | • Burning retrosternal pain, worse on lying down  
• May by associated with a sensation of fluid in the back of the throat ("water brash")  
• Often associated with pregnancy, obesity, alcohol and / or a history of "indigestion" | ECG then fax to MO  
• Consult MO who may advise antacid 20 mL stat and / or metoclopramide 10 mg IM stat  
• See Alcohol related epigastric pain |
| Abdominal pain Biliary colic| Chest / lower abdominal pain, associated with abdominal symptoms or tenderness | ECG then fax to MO  
• See Acute abdominal pain |
| Dissecting thoracic aortic aneurysm | • Severe chest pain begins suddenly  
• Pain described as sharp, stabbing, tearing or ripping, felt below the chest bone, then moves under the shoulder blades or to the back, neck, arm, jaw, abdomen or hips  
• Pain moves to the arms and legs as the aortic dissection gets worse  
• May be found in young otherwise well people  
• May display differences between left and right arm blood pressure readings | Consult MO immediately  
• No thrombolysis, anticoagulant or antiplatelet medication |

### 2. Immediate management of chest pain

**DRS ABCD resuscitation / the collapsed patient**

- Supplemental $O_2$ if patient has $O_2$ saturation $< 93\%$, is breathless, has signs of heart failure or shock [2] or diagnósis is uncertain
- Perform standard clinical observations +  
  - note strength, rate and regularity of HR  
  - $O_2$ saturation
- Connect to continuous cardiac monitor
- Do 12 lead ECG within 10 minutes, fax to MO. (Send copy of previous ECG - if available - this should not delay sending new ECG to MO)
- Insert IV cannula
- Consult MO as soon as possible

### 3. Clinical assessment

- As part of patient history identify:  
  - previous history of similar episodes of pain  
  - past medical and surgical history, particularly note heart disease, hypertension, dyslipidaemia, diabetes  
  - note any family history of angina, heart attacks, stents or coronary bypass surgery, elevated cholesterol  
  - smoking status
• Take medication history - current medications, aspirin? warfarin? allergies?
• Perform standard clinical observations +
  - take BP on both arms (a difference of > 20 mmHg between right and left arm suggests dissection)
  - heart rhythm - note palpations / irregular HR
  - listen to heart and breath sounds
  - $O_2$ saturation
• Assess the pain [6] [7]:
  - site - where is the pain? e.g. retrosternal, (L) chest, epigastric, interscapulae?
  - onset - when did it start? sudden or gradual onset?
  - characteristics - what is the pain like? (pressure, tightness, heaviness, cramping, burning, ache, sharp, dull, stabbing, fullness, squeezing)
  - radiation - does it spread anywhere else? neck, jaw, shoulder, one or both arms, into hands and wrists, back
  - associated symptoms e.g. breathlessness, nausea, vomiting, sweating, dizziness / light headedness, fever, cough with purulent or pink frothy sputum or blood?
  - timing - how long did it last? constant or intermittent? what, if anything, changed the pain? ever had this pain before? how often does it occur?
  - exacerbating or relieving factors - what brought on pain? (activity, foods, cold, stress). What makes the pain better / worse? (rest, medications [anginine, antacids], eating, position changes, deep inspiration). Any analgesia taken?
  - severity - how bad is the pain? (Scale of 0 to 10, with 0 being none and 10 being the worst)
• Perform physical examination - use the table to guide possible causes of chest pain:
  - auscultate the chest for air entry and added sounds (wheezes and crackles)
  - note any chest tenderness
  - palpate the abdomen for tenderness: acute abdominal problems can present as chest pain and vice versa, see Acute abdominal pain
• Report findings to MO
• Repeat ECG will be required (if pain is cardiac in origin)

4. **Management**

**Acute coronary syndrome**

• Continue $O_2$ if patient has $O_2$ saturation < 93%, is breathless, has signs of heart failure or shock [2] and continuous cardiac monitoring
• Give aspirin 300 mg (provided not already given or contraindicated)
• Ongoing monitoring of BP, HR, respiration rate and $O_2$ saturation. Observe and monitor the patient closely in a suitably equipped room
• Insert two IV cannula - collect blood for baseline troponin levels. Recurrent testing may be required [8]
• Give sublingual GTN provided not hypotensive. Note: do not give GTN if patient has taken phosphodiesterase 5 inhibitors e.g. sildenafil (Viagra®), vardenafil (Levitra®) in the last 24 hours or tadalafil (Cialis®) in the last 48 hours
• Give morphine IV if pain not relieved by GTN. Consult MO if allergic to morphine
• If nauseated or vomiting, give metoclopramide
**Cardiovascular emergencies**

**ST elevation myocardial infarct (STEMI)**
- If ECG shows STEMI acute coronary syndrome, early reperfusion must be considered. MO will assess and promptly discuss options with Cardiologist
- Reperfusion options include:
  - PCI (invasive procedure, requiring admission to specialist hospital service) or
  - thrombolysis (non-invasive procedure using IV medications e.g. tenecteplase)
- Options for reperfusion will depend on:
  - time since onset of pain
  - time of assessment and STEMI diagnosis
  - availability and time to PCI (appropriately equipped facility)
  - contraindication to PCI or thrombolysis therapy See NON DTP box Tenecteplase and
  - availability of appropriate transport
- If thrombolysis is required the MO may advise use of:
  - enoxaparin 30 mg IV loading dose, unless contraindicated followed by
  - thrombolytic agent e.g. tenecteplase. See NON DTP box Tenecteplase followed by
  - clopidogrel orally 300 mg - 600 mg followed by
  - enoxaparin up to 1 mg / kg subcutaneously (15 minutes after first dose of enoxaparin)
  - note: close monitoring must follow use of thrombolysis particularly looking for evidence of bleeding. See Management post thrombolysis
- Notify MO if pain recurs or abnormal cardiac rhythm
- Note: Follow local protocols for thrombolysis or PCI in collaboration with MO as variance may be needed on an individual patient basis

**NSTEACS (includes NSTEMI and unstable angina)**
- Management of patients with NSTEACS is based on risk assessment and treatment ordered according to high, intermediate and low risk stratification. Follow local protocols in collaboration with MO
- Management may include [9]:
  - continuous cardiac monitoring
  - repeat ECG every 15 minutes to exclude evolving infarction with regular MO review
  - frequent HR, respiratatory rate, rhythm check, BP, heart sounds, breath sounds, O₂ saturations, circulation and neurological observations as per MO order
  - administration of aspirin 300 mg unless contraindicated or already given
  - administration of clopidogrel 300 - 600 mg as per MO order
  - check resolution of pain and for recurrent pain
- Strict rest in bed for 12 hours post NSTEMI
- Prepare for evacuation / hospitalisation
- MO may order GTN patch if patient has ongoing chest pain
## Cardiovascular Emergencies

<table>
<thead>
<tr>
<th>Schedule</th>
<th>2</th>
<th>Soluble Aspirin</th>
<th>DTP IHW</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Authorised Indigenous Health Workers may proceed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Form</strong></td>
<td><strong>Strength</strong></td>
<td><strong>Route of administration</strong></td>
<td><strong>Recommended dosage</strong></td>
</tr>
<tr>
<td>Tablet</td>
<td>300 mg</td>
<td>Oral</td>
<td><strong>Adults only</strong>&lt;br&gt;300 mg Dissolve in small amount of water or chewed</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information

Management of associated emergency: consult MO

- Note: do not give GTN if has taken phosphodiesterase 5 inhibitors e.g. sildenafil (Viagra®), vardenafil (Levitra®) in the last 24 hours or tadalafil (Cialis®) in the last 48 hours

<table>
<thead>
<tr>
<th>Schedule</th>
<th>3</th>
<th>Glyceryl trinitrate (GTN)</th>
<th>DTP IHW</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Authorised Indigenous Health Workers may proceed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Form</strong></td>
<td><strong>Strength</strong></td>
<td><strong>Route of administration</strong></td>
<td><strong>Recommended dosage</strong></td>
</tr>
<tr>
<td>Tablet</td>
<td>0.6 mg</td>
<td>Sublingual</td>
<td><strong>Adults only</strong>&lt;br&gt;0.3 - 0.6 mg provided not hypotensive i.e. systolic BP not &lt;100 mmHg</td>
</tr>
<tr>
<td>Spray</td>
<td>400 microgram</td>
<td></td>
<td><strong>Adults only</strong>&lt;br&gt;1 - 2 sprays</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information

Management of associated emergency: consult MO

---

[1]
## Cardiovascular emergencies

### Schedule 8 Morphine sulphate

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampoule</td>
<td>10 mg / mL</td>
<td>IV</td>
<td><strong>Adults only</strong> 2.5 mg increments slowly, repeated every 10 min if required to a max. of 10 mg</td>
<td>Stat Further doses on MO / NP order</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: advise can cause nausea and vomiting, drowsiness.

Management of associated emergency: caution - in the elderly and those with significant renal / liver disease. Respiratory depression is rare - if it should occur give naloxone. See Poisoning / overdose - opiates NB: as naloxone counteracts the narcotic, it may cause the return of severe pain.

### Schedule 4 Metoclopramide

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampoule</td>
<td>10 mg / 2 mL</td>
<td>IV</td>
<td><strong>Adults only</strong> 10 mg</td>
<td>Stat Further doses on MO / NP order</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: not for use in patients with Parkinson's disease or children and use caution in women < 20 years of age.

Management of associated emergency: dystonic reactions e.g. oculogyric crisis are extremely rare (unless repeated doses or in children). If oculogyric crisis develops give benztropine 2 mg IM or IV. See Mental health behavioural emergencies.

### Schedule 4 Tenecteplase (Metalyse) NON DTP

Tenecteplase must be ordered by a MO. The efficacy is greatest given in the first 3 hours of the onset of symptoms.

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vial</td>
<td>50 mg</td>
<td>IV</td>
<td>30 - 50 mg (over 10 seconds) (up to 50 mg on basis of body weight)</td>
</tr>
</tbody>
</table>

**Contraindications for fibrinolysis** The decision to thrombolysse a patient is made on an individual basis by the MO taking into account absolute and relative contraindications and individual risk factors for bleeding. If a patient’s only contraindication is hypertension please contact MO with a view to giving Tenecteplase. Discuss with coronary care unit as necessary.
Cardiovascular emergencies

**Absolute contraindications**
- Haemorrhagic stroke or stroke of unknown origin at any time
- Ischaemic stroke in the preceding 6 months
- Central nervous system damage, neoplasms or structural vascular lesions e.g. arteriovenous malformation
- Recent major trauma / surgery / head injury (within the preceding 3 weeks to 3 months)
- Gastro-intestinal bleeding within the last month
- Known bleeding disorder (excludes menses)
- Aortic dissection

**Relative contraindications**
- Transient ischaemic attack in preceding 6 months
- Dementia
- Oral anticoagulant therapy
- Pregnancy within 1 week post partum
- Non-compressible vascular punctures
- Traumatic resuscitation
- Refractory hypertension (Systolic BP >180 mmHg)
- Advanced liver disease
- Infective endocarditis
- Active peptic ulcer

**Side effects:** consult MO immediately
- reperfusion cardiac arrhythmias, including ventricular fibrillation and have defibrillator ready. See [Cardiac arrhythmias](#)

---

**Management post thrombolysis [13]**
- All patients given thrombolytic agent e.g. tenecteplase, should be under direct observation until evacuated
- Continuous cardiac monitoring required. As the vessels re-open, the patient may have reperfusion arrhythmias e.g. VT and bradycardia. These are generally managed conservatively (without drugs) as they are usually self limiting
- Clinical observations - initially every 15 minutes, HR, respiration rate, BP, heart sounds, breath sounds, $O_2$ saturations, circulation and neurological observation as per MO order
- Do not move for 15 minutes [14]
- Avoid IM injections and other invasive procedures during thrombolytic treatment. In case of severe bleeding not controlled by local pressure, stop infusion of thrombolytic agent [15]
- ECG must be taken at 90 minutes, 6 hours and 12 hours
- Reduction (greater than 50%) in ST segments expected within 90 minutes
- Relief of symptoms expected
- Haemodynamic stability achieved
- Complete rest in bed while awaiting evacuation / hospitalisation and observe for cardiac arrhythmias, recurrence of chest pain, episodes of shortness of breath
- Keep patient nil by mouth

5. **Follow up**
   - As directed by MO

6. **Referral / consultation**
   - Consult MO on all occasions of chest pain
Cardiovascular emergencies

Acute pulmonary oedema
Left ventricular failure / heart failure

Recommend
See immediate management below

Related topics
Chest pain
Breathlessness

1. May present with
- Breathlessness (may start suddenly waking up at night, worse when lying down)
- Increased HR
- Cough, with or without wheezes
- Pink frothy sputum (in severe cases)
- Crackles especially in lung bases
- Lethargy, confusion
- Oedema of the ankles or sacrum and an enlarged liver may co-exist as a sign of right heart failure
- These patients can look pre-terminal
- Seen in conjunction with renal failure
- Cyanosis
- Ischaemic chest pain

Nearly all patients with breathlessness require $O_2$ in high concentrations. For the few patients with chronic obstructive pulmonary disease (COPD), an $O_2$ saturation of 88 - 92% may be normal for them and $O_2$ in high concentration may put them at risk by decreasing their breathing effort. However it may be necessary to use high flow $O_2$ when patient is acutely distressed for a short time only, MO will advise.

2. Immediate management

DRS ABCD resuscitation / the collapsed patient

- Sit the patient up. See $O_2$ delivery systems
  - for all patients (except known COPD): give $O_2$ at 15 L / minute via non re-breather mask to maintain $O_2$ saturation >93%. If not maintained consult MO
  - for patients with known COPD give $O_2$ 28 % by Venturi mask or nasal cannula to maintain $O_2$ saturation 88 - 92%, if not maintained consult MO. If no Venturi mask available, give $O_2$ by Hudson mask at 5 L / min only, or by nasal prongs at 2 L / min only
- Perform rapid clinical assessment +
  - $O_2$ saturation
  - conscious state See Glasgow Coma Scale / AVPU
- If hypotension / shock or irregular HR (fast or slow) consult MO urgently
- Obtain IV access
- Consult MO as soon as possible
3. **Clinical assessment**

- Obtain patient history - include in history this episode and previous heart trouble  
  - angina, heart attack, heart failure?  
  - have they had heart palpitations?
- Current medications
- Perform standard clinical observations +  
  - note HR and rhythm - is it irregular  
  - note respiratory rate - is it fast?  
  - O₂ saturation  
  - conscious state - monitor See Glasgow Coma Scale / AVPU
- Perform physical examination:  
  - inspect and palpate the skin - what is the colour? ashen, cyanosed, sweaty?  
  - are peripheries cool?  
  - check the capillary return? is it reduced?  
  - auscultate the chest for air entry and added sounds - are there crackles or wheezes?  
  - palpate the abdomen for enlarged liver  
  - inspect and palpate the ankles, front of legs, sacrum - is oedema present?

4. **Management**

- Connect to ECG monitor / defibrillator
- Insert IV cannula - take bloods for electrolytes, troponin level and renal function
- Do 12 lead ECG then fax to MO
- Consult MO who may advise:  
  - topical (patch). GTN is very beneficial in severe pulmonary oedema even if no chest pain because it reduces blood pressure, which is often raised, and reduces the work of the heart and vasodilates vessels  
  - frusemide IV stat  
  - GTN infusion  
  - CPAP / BiPap - can reduce the need for intubation. Intubation and ventilation may be needed if above not available or successful
- Continue rest in bed, sitting up with legs hanging down, until patient settles or evacuated / hospitalised

<table>
<thead>
<tr>
<th>Schedule</th>
<th>4</th>
<th>Frusemide</th>
<th>DTP IHW / SM R&amp;IP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Schedule</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Authorised Indigenous Health Workers must consult MO / NP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scheduled Medicines Rural &amp; Isolated Practice Registered Nurses may proceed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Form</strong></td>
<td><strong>Strength</strong></td>
<td><strong>Route of administration</strong></td>
<td><strong>Recommended dosage</strong></td>
</tr>
<tr>
<td>Ampoule</td>
<td>20 mg / 2 mL</td>
<td>IV</td>
<td>Adults only 40 mg</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information
Management of associated emergency: consult MO

5. **Follow up**

- Keep patient under close supervision until evacuated / hospitalised
- As per MO instructions

6. **Referral / consultation**

- Consult MO on all occasions of pulmonary oedema (left ventricular failure / heart failure)
Cardiac arrhythmias

Recommend
- Avoidance of caffeine in tea / coffee / chocolate / coke / colas, nicotine in cigarettes and alcohol in those predisposed to arrhythmias

Background
- Sinus tachycardia (increased HR with a normal ECG) can occur secondary to most injuries and illnesses:
  - anxiety, fever, infection, blood loss / shock, dehydration
- Algorithms for bradycardia and tachycardia are available from the Australian Resuscitation Council [www.resus.org.au](http://www.resus.org.au)

Related topics
- Chest pain
- Acute coronary syndrome
- Acute pulmonary oedema

1. May present with
- Hypotension / shock
- Chest pain
- Heart failure
- Fast, slow or irregular HR / palpitations
- Asymptomatic

2. Immediate management

<table>
<thead>
<tr>
<th>DRS ABCD resuscitation / the collapsed patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Give O₂ to maintain O₂ saturation &gt;93% adults / 95% child. If not maintained consult MO. <a href="http://www.resus.org.au">See O₂ delivery systems</a></td>
</tr>
<tr>
<td>Attach monitor / defibrillator - send copy of rhythm to MO</td>
</tr>
<tr>
<td>Perform rapid assessment +</td>
</tr>
<tr>
<td>- rhythm</td>
</tr>
<tr>
<td>If hypotensive / shocked consult MO urgently</td>
</tr>
</tbody>
</table>

3. Clinical assessment
- Do 12 lead ECG then fax to MO
- Include in patient history contributing factors to this episode, previous episodes, history of heart trouble
- Perform standard clinical observations +
  - heart rhythm
  - O₂ saturation
- Perform physical examination - listen to the chest for air entry and added sounds - crackles or wheezes
- Palpate the abdomen for enlarged liver
- Inspect and palpate the ankles, front of legs and sacrum for oedema

4. Management
- Connect to ECG monitor / defibrillator
- Insert IV cannula (unless asymptomatic and incidental finding). Collect blood for FBC, electrolytes and troponin levels
• Consult MO who may advise
  - atropine for slow ± irregular heart beat
  - other drug treatment for fast ± irregular heart beat
  - evacuation / hospitalisation
  - management of any underlying cause

5. Follow up
   ➔ If patient not evacuated / hospitalised, review next day and see next MO clinic with:
     - further tests e.g. repeat ECG, blood tests, chest x-ray as ordered by MO

6. Referral / consultation
   ➔ Consult MO on all occasions of arrhythmia

Electrocution / electric shock

Recommend
  ❖ See Immediate management
  ❖ The severity of the injury and risk of death is greatest with:
    - high voltage electricity e.g. lightning and power lines
    - low resistance e.g. wet skin
    - electrical pathway across the heart
    - prolonged exposure [17]

Background
  ❖ The electrical charge causes an entry wound (burn) that is often full thickness, with potential underlying tissue damage that may be extensive and not immediately apparent. There may be a similar exit (earthing) burn
  ❖ If the charge crosses the heart, arrhythmias including cardiac arrest (ventricular fibrillation) may occur, and if it crosses the brain, unconsciousness may occur

Related topics
  ➤ Trauma and injuries
  ➤ Burns
  ➤ DRS ABCD resuscitation / the collapsed patient

1. May present with
   • History of exposure to high or low voltage electricity (household or industrial)
   • Superficial cutaneous burns [17]
   • Deep tissue injury [17]
   • Seizures, confusion, drowsiness, loss of consciousness
   • Cardiac arrest (due to ventricular fibrillation)

2. Immediate management
   ➤ DRS ABCD resuscitation / the collapsed patient
   • Remove patient from injury (only approach patient or surroundings after power is turned off at mains)
   • Give O₂ to maintain O₂ saturation >93 % - adult / 95% - child. If not maintained consult MO. See O₂ delivery systems
   • Connect to ECG monitor / defibrillator
   • Rapid clinical assessment +
     - O₂ saturation
     - conscious state. See Glasgow Coma Scale / AVPU
   • Insert IV cannula
   • Consult MO
Cardiovascular emergencies

3. **Clinical assessment**
   - Obtain emergency patient history - circumstances of injury, type of electrical exposure, any cardiorespiratory resuscitation measures implemented
   - Perform standard clinical observations
   - Monitor and act on any changes in conscious state. See Glasgow coma scale / AVPU
   - Perform physical examination
     - inspect skin for entry wound (burn) and exit (earthing) burn

4. **Management**
   - Do 12 lead ECG then fax to MO
   - See Burns

5. **Follow up**
   - If there has been no history of altered consciousness or cardiac arrhythmia and the ECG is normal, the patient need not be evacuated/hospitalised and can be allowed home after a few hours of observation provided only minor burn(s)
   - Review daily initially for 2 - 3 days. See Burns
   - See next MO clinic

6. **Referral / consultation**
   - Consult MO on all occasions of:
     - electrocution / electric shock / electrical burns
   - Refer patients with suspected deep tissue electrical injury to Specialist Burns Unit
Acute hypertensive crisis

**Recommend**
- Aim to reduce blood pressure by no more than 25% within the first 2 hours, then toward 160 / 100 mm Hg within 2 to 6 hours [18]
- Avoid lowering blood pressure too rapidly as this can cause decreased blood supply (ischaemia) to kidney, heart or brain [18]

**Background**
- Severe hypertension (often defined as systolic blood pressure of ≥ 180 mmHg and / or diastolic blood pressure ≥ 120 mmHg) can produce a variety of acute, life threatening complications such as encephalopathy, acute heart failure, aortic dissection, subarachnoid haemorrhage, retinal haemorrhages, papilloedema, and acute kidney failure. These are hypertensive emergencies
- BP cuff size is critical and must be appropriate to the arm size

**Related topics**
- Acute coronary syndrome
- Acute pulmonary oedema
- Hypertension
- Acute post streptococcal glomerulonephritis
- Irukandji syndrome

1. **May present with**
   - Dizziness / feeling faint
   - Confused, drowsy, unconscious, fitting
   - Headache, visual disturbance
   - Chest pain (angina / heart attack)
   - Breathlessness / heart failure
   - Papilloedema, retinal haemorrhages on looking into the back of the eyes (fundoscopy)
   - Haemorrhagic stroke See TIA / Stroke
   - Asymptomatic

2. **Immediate management**
   - DRS ABCD resuscitation / the collapsed patient

3. **Clinical assessment**
   - Obtain emergency patient history - previous medical history, including previous blood pressure readings and episodes of acute hypertensive crisis and current medications
   - Perform standard clinical observations +
     - note blood pressure (with correct size cuff), record with patient lying and standing and on both arms
     - conscious state. See Glasgow Coma Scale / AVPU
     - capillary BGL
     - height and weight (if possible)
     - urinalysis
     - urine pregnancy test (with consent) if female of childbearing age (12 - 52 years). Pregnancy should be considered as a cause in women of childbearing age, who present with symptomatic hypertension. See Pre-eclampsia
     - 12 lead ECG - fax to MO
     - take blood for electrolytes
Cardiovascular emergencies

- Perform physical examination:
  - auscultate the chest for air entry and added sounds (crackles or wheezes)
  - palpate the abdomen for enlarged liver
  - inspect and palpate the ankles, shins and sacrum for oedema

4. Management

- If the patient is conscious with no evidence of complications
  - insert IV cannula
  - administer sublingual glyceryl trinitrate (GTN)
  - consult MO who may advise:
    - GTN patch or infusion for patient
    - labetalol tablet
    - hydralazine IV
    - oral treatment with antihypertensive such as metoprolol, ace-inhibitor
    - evacuation / hospitalisation

- Rapid reduction in BP is not recommended. Aim to lower BP to not less than systolic BP of 160 and diastolic BP of 100. Be wary of lowering the BP if there is any acute neurological deficit

- Note: do not give GTN if patient has taken phosphodiesterase 5 inhibitors e.g. sildenafil (Viagra®), vardenafil (Levitra®) in the last 24 hours or tadalafil (Cialis®) in the last 48 hours

5. Follow up

- If patient not evacuated / hospitalised, review next day
- Next MO clinic
- Hypertension may be due to other conditions e.g. intracranial haemorrhage, raised intracranial pressure, chronic kidney failure - manage as per MO directions
- Offer advice and information about lifestyles contributing to hypertension (alcohol, obesity, lack of exercise) and how compounded by others (smoking, increased blood lipids, diabetes, family history) they can greatly increase risk of ischaemic heart disease (angina / heart attack) and cerebrovascular disease (TIA / stroke).
  See Hypertension

6. Referral / consultation

- Consult MO on all occasions BP ≥ 160 / 110
- Review next day and see next MO clinic on all occasions BP ≥ 140 / 90
### Acute arterial occlusion

<table>
<thead>
<tr>
<th>Recommend</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urgent evacuation for surgery</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Background</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acute peripheral arterial occlusion is caused by a blockage (blood clot / foreign body) of an artery cutting off blood supply to a limb. The blockage can be partial or complete</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Usually occurs in patients without a history of atherosclerosis</strong></td>
<td></td>
</tr>
</tbody>
</table>

1. **May present with**
   - In affected limb: pain, pallor, pulselessness, paraesthesia, paralysis

2. **Immediate management**
   - Rest the affected limb
   - Contact MO immediately to arrange evacuation for surgical management
   - Administer analgesia

3. **Clinical assessment**
   - Standard clinical observations +
     - note if HR is regular or irregular
   - Compare affected limb with the other limb, checking particularly for colour, warmth, movement (active and passive movement), sensation, pulses

4. **Management**
   - Give analgesia
   - Prepare for evacuation / surgery
   - Ensure patient is nil by mouth
   - Rest affected limb
   - Consult MO urgently
   - The MO will:
     - arrange urgent evacuation / hospitalisation to a facility with appropriate surgical capability
     - advise ongoing analgesia (IM / IV morphine and metoclopramide)
     - advise on heparinisation

### Schedule 8 Morphine sulphate DTP IHW / SM R&IP

<table>
<thead>
<tr>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
</tr>
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<table>
<thead>
<tr>
<th align="left">Morphine sulphate</th>
<th align="left">DTP IHW / SM R&amp;IP</th>
</tr>
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<tbody>
<tr>
<td align="left"><strong>Authorised Indigenous Health Workers must consult MO / NP</strong></td>
<td align="left"></td>
</tr>
<tr>
<td align="left"><strong>Scheduled Medicines Rural &amp; Isolated Practice Registered Nurses may proceed</strong></td>
<td align="left"></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampoule</td>
<td>10 mg / mL</td>
<td>IM</td>
<td><strong>Adults only</strong> 0.1 - 0.2 mg / kg up to a max. of 10 mg</td>
<td>Stat Further doses on MO / NO order</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IV (IHW may not administer IV)</td>
<td><strong>Adults only</strong> 2.5 mg increments slowly, repeated every 10 min if required to max. of 10 mg</td>
<td></td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: advise can cause nausea and vomiting, drowsiness

Management of associated emergency: caution - in the elderly and those with significant renal / liver disease. Respiratory depression is rare - if it should occur give naloxone. See Poisoning / overdose - opiates NB: as naloxone counteracts the narcotic, it may cause the return of severe pain
Cardiovascular emergencies

<table>
<thead>
<tr>
<th>Schedule</th>
<th>4</th>
<th>Metoclopramide</th>
<th>DTP IHW / SM R&amp;IP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authorised Indigenous Health Workers must consult MO / NP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scheduled Medicines Rural &amp; Isolated Practice Registered Nurses may proceed</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampoule</td>
<td>10 mg / 2 mL</td>
<td>IM or IV (IHW may not administer IV)</td>
<td>Adults only 10 mg</td>
<td>Stat Further doses on MO / NP order</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: not for use in patients with Parkinson's disease or children and use caution in women < 20 years of age

Management of associated emergency: dystonic reactions e.g. oculogyric crisis are extremely rare (unless repeated doses or in children). If oculogyric crisis develops give benztropine 2 mg IM or IV. See Mental health behavioural emergencies

5. **Follow up**
   - As advised by discharging MO

6. **Referral / consultation**
   - MO will notify the referring hospital of situation

References
Subarachnoid haemorrhage (SAH)

Recommend
- Suspect subarachnoid haemorrhage (SAH) in all patients presenting with a headache, especially if severe and of sudden onset. Immediately consult MO

Background
- Any awake patient who complains of the most severe headache they have ever had must be regarded as having a subarachnoid haemorrhage
- It is usually due to an aneurysm on an intra-cerebral artery. It is important to suspect SAH as a subsequent recurrent bleed will be associated with a poor outcome [1]

1. May present with
   - Sudden onset headache often severe
   - Headache often occipital - patient may feel they have been hit in the back of the head (described as a “thunder clap” headache)
   - May have a history of headache, 7 - 10 days earlier
   - Nausea / vomiting
   - Stiff neck
   - A short period of loss of consciousness and focal neurology, especially of the cranial nerves
   - Altered level of consciousness or unconscious

2. Immediate management
   - Give high flow O₂
   - Perform rapid clinical assessment +
     - conscious state. See Glasgow Coma Scale / AVPU

3. Clinical assessment
   - Take emergency patient history
   - Perform standard clinical assessment +
     - conscious state. See Glasgow Coma Scale / AVPU
     - BGL
     - O₂ saturations
   - Check neck for stiffness (put hand under the patient’s head and gently flex neck or ask patient to put chin on chest)

4. Management
   - Consult MO immediately
   - Beware of lowering elevated BP if there is any neurological deficit
   - Arrange urgent evacuation / hospitalisation even if suspected

5. Follow up
   - Evacuation / hospitalisation to appropriately equipped and staffed facility
   - Investigation will include non-contrast CT and / or lumbar puncture

6. Referral / consultation
   - Consult MO urgently in all cases of suspected subarachnoid haemorrhage

References
Transient ischaemic attack (TIA) and stroke

Recommend
- Acute stroke is a medical emergency. Appropriate initial management can reduce disability and mortality resulting from stroke.
- Consult MO as soon as possible if patient presents with signs / symptoms of TIA / stroke. It is essential the patient is transferred to a suitably equipped and staffed facility as soon as possible. All patients with suspected stroke should have urgent brain CT or MRI - within 24 hours [1].
- All patients over 45 years (40 years for Aboriginal and Torres Strait Islander peoples) should be screened for risk factors for TIA / stroke [2].
- Inform about warning signs and need for immediate medical attention for stroke in the community. FAST stands for:
  F - Facial weakness
  A - Arm and / or leg weakness
  S - Speech difficulty
  T - Time to act fast [3]

Background
- A stroke occurs when the arteries to the brain become blocked (ischaemic stroke / cerebral infarction) or rupture (haemorrhagic stroke), resulting in disrupted blood supply and death of brain tissue.
- A transient ischaemic attack (TIA) is sometimes termed a minor stroke or 'mini' stroke. When the signs of stroke present but go away within 24 hours the term TIA is used [4].
- Dysphagia (swallow) screening training module for generalists health practitioners is available at www.sdc.qld.edu.au/e-learningprograms.php

Related topics
- Acute and chronic headache
- Subarachnoid haemorrhage

1. May present with
- Neurological symptoms consistent with stroke / TIA almost always come on suddenly. Neurological symptoms or signs are often localised.
- Common:
  - unilateral weakness / clumsiness or altered sensation of limbs and/or face, e.g. drooping on one side of the face, clumsy hand
  - difficulty speaking and understanding speech
  - trouble seeing in one or both eyes, double vision
  - difficulty walking, loss of balance or coordination
  - dizziness,
  - severe headache with no known cause
- Atypical presentation:
  - confusion
  - sudden onset vertigo
  - nausea or vomiting
  - stupor or coma
  - difficulty swallowing
  - collapsed
2. Immediate management

**DRS ABCD resuscitation / the collapsed patient**

- Give $O_2$ to maintain $O_2$ saturation $>93\%$. If not maintained consult MO. If $O_2$ saturation is $>93\%$ on room air then do not give $O_2$[1] See $O_2$ delivery systems
- Take standard clinical observations +
  - BGL
  - conscious state See Glasgow Coma Scale / AVPU
- Consult MO as soon as possible

3. Clinical assessment

- Document:
  - date and time when signs / symptoms were first noted and how long they lasted
  - when the patient was last known to be well
- Take as complete a patient history as possible allowing for severity of condition. Obtain information from family and friends of patient if patient unable to provide
  - note previous history of TIA / stroke
  - document - risk factors such as hypertension, diabetes, smoker, obesity, dyslipidaemia, is the patient usually physically active?
  - is there a history of atrial fibrillation (irregular heart beat)?
  - do they or did they have a headache? Do they feel dizzy?
  - has the patient's vision changed in one eye or both? Do they have double vision?
  - take medication history - does the patient take aspirin or warfarin?
- Perform standard clinical observations +
  - $O_2$ saturation
  - conscious state. See Glasgow Coma Scale / AVPU
  - note pupil size and reaction [1]
  - 12 lead ECG [5]
- Perform physical examination:
  - can the patient speak normally? speech slurred / altered in any way?
  - does the patient understand questions and obey commands?
  - does the patient have any weakness or altered sensation of limbs and / or face, usually on one side of the body, e.g. drooping on one side of the face, clumsy hand. Does the patient have a symmetrical smile?
  - did the patient walk in? describe their gait. Do they have difficulty walking, loss of balance or have poor coordination?
- Score patient according to ABCD² tool

<table>
<thead>
<tr>
<th>ABCD² tool [4]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
</tr>
<tr>
<td><strong>B</strong></td>
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<td><strong>C</strong></td>
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<tr>
<td></td>
</tr>
<tr>
<td><strong>D</strong></td>
</tr>
<tr>
<td><strong>E</strong></td>
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</tbody>
</table>

**ABCD² interpretation** $>4$ high risk; $<4$ low risk (max 7)
4. Management
• Consult MO as soon as possible giving history of signs, symptoms and ABCD² score. MO will advise:
  - maintain $O_2$ saturation $>93\%$. If not maintained consult MO. If $O_2$ saturation is $>93\%$ on room air then do not give $O_2$ [1]
  - insert IV cannula - collect FBC, electrolytes, renal function, cholesterol levels
  - arrange evacuation / hospitalisation
• Keep acute patients with neurological symptoms nil by mouth

<table>
<thead>
<tr>
<th>Situation</th>
<th>Recommended action</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients with suspected stroke</td>
<td>Urgent transfer to appropriate facility for urgent imaging and management, including possible thrombolysis * urgently means immediately if imaging facilities available but at most within 24 hrs</td>
</tr>
</tbody>
</table>
| Patients with suspected TIA need full assessment, including ABCD² score and clinical history / examination. Action depends on both ABCD² score and clinical history / examination | Patients at **high risk**
  e.g. ABCD² $>3$ or AF, or carotid territory symptoms or crescendo TIA
  
  Patients classified as **low risk**:
  ABCD² score $<4$ without AF or carotid territory symptoms, or who present within one week of last symptoms
| Need transfer to appropriate facility for brain and carotid imaging (if indicated) as soon as possible (within 48 hours) |

5. Follow up
☞ Patients with stroke / TIA will require evacuation / hospitalisation for neurological assessment and / or treatment
☞ All patients with suspected stroke and high risk TIA should have urgent brain CT or MRI - within 24 hours [1]
☞ Aspirin therapy (unless contraindicated) and statins are recommended for patients found to have an ischaemic stroke [1]
☞ Antihypertensive therapy (ACEI) is recommended for patients with ischaemic / haemorrhagic stroke
☞ Anticoagulation therapy for patients with atrial fibrillation [1]
☞ Rehabilitation program commenced in referring facility once back in the community
☞ Community and carer support is essential during the recovery period and ongoing
☞ For post stroke care plan see Chronic disease guidelines at: www.health.qld.gov.au/cdg/default.asp

6. Referral / consultation
☞ Consult MO on all occasions of suspected TIA / stroke

References
2. The Royal Australian College of General Practitioners, Guidelines for preventive activities in general practice. 7th ed. 2009, South Melbourne: RACGP.
Trauma and injuries

Chest injuries, head injuries, spinal injuries, abdominal injuries

Recommend
- The management of the seriously injured patient should have three main parts:
  1. primary survey of patient and resuscitation
  2. secondary survey (more detailed)
  3. preparation for evacuation / hospitalisation
- See Criteria for Early Notification of Trauma for Interfacility Transfer
- Ideally one or more assistants are needed
- Protect yourself e.g. from body fluids, traffic or the perpetrators of a crime
- Prevent further damage caused by hypoxia and hypotension and rapidly treat life threatening complications such as airway obstruction and tension pneumothorax
- Keep all trauma patients warm
- Consult MO for pain relief medication in children

1. Primary survey [3] and resuscitation
   • Airway and cervical spine protection
   • Breathing and ventilation - give $O_2$
   • Circulation, stop external bleeding with pressure
   • Disability - evaluation of central nervous system
   • Expose and examine (complete visualisation) and environmental control (prevent hypothermia)

2. Secondary survey

3. Preparation for evacuation / hospitalisation

Related topics
- Insertion of laryngeal mask airway
- Needle thoracentesis
- Chest injuries
- O$_2$ delivery systems
- Fractures, dislocations and sprains
- Héad injuries
- Acute wounds
- Abdominal injuries
- Burns
- DRS ABCD resuscitation / the collapsed patient
- Spinal injuries

1. May present with
   - History of injury
   - Pain
   - Increased HR
   - Acute upper airway obstruction / choking
   - Respiratory distress, cyanosis
   - Hypotension / shock / pale / sweaty
   - Altered consciousness - confused, drowsy, unconscious, not breathing
   - Wounds, fractures, burns

2. Primary survey and resuscitation - immediate management

   DRS ABCD resuscitation / the collapsed patient
   • Obtain emergency patient history from patient / witnesses
   • A Airway and cervical spine protection
     - assess airway patency (look, listen, feel)
     - establish clear airway - use head tilt / chin lift / jaw thrust and / or oropharyngeal airway (caution if suspected cervical spine injury)
     - if unable to secure airway consider inserting laryngeal mask airway

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Controlled copy V 1.0
See Insertion of laryngeal mask airway (LMA) or performing needle cricothyroidotomy
- maintain cervical spine in line immobilisation and apply rigid cervical collar (appropriate to size) now
- assess SpO₂

• **B** Breathing, give O₂
  - assess efficacy of breathing i.e. respiratory rate, chest movements, air entry, tracheal deviation, rib tenderness or visible flail segments, circumferential burns or airway burn
  - assess threats to breathing - conscious state, bleeding to upper airway
  - pulse oximetry
  - give O₂ either through non-rebreather mask, LMA, ETT See O₂ delivery systems

• **C** Circulation, stop external bleeding with pressure
  - stop any external haemorrhage by direct pressure / pressure bandaging
  - check BP and HR, colour and perfusion, capillary refill time
  - insert largest bore IV cannula possible (14 g or 16 g). Use intraosseous route if indicated
  - generally 10 - 20 mL / kg of fluid is usual. Start with IV normal saline or Hartmann’s solution. MO will advise quantities and rate. In an adult the aim is to keep:
    - HR <120 / min
    - systolic BP > 100 mmHg
    - urine output > 0.5 mL / kg / hr
  - attach cardiac monitor

• **D** Disability of the central nervous system - conscious state
  - check capillary response. See Glasgow Coma Scale / AVPU
  - talk to the patient and if they reply with a normal voice and give sensible answers, you know that the airway is not obstructed and the brain is getting enough blood

• **E** Expose and examine - identify life threatening injury, preventing hypothermia
• Consult MO as early as possible
• If patient has history of trauma and meets any of the criteria in the following table consult your retrieval service urgently

Begin secondary assessment only after any life saving interventions / management initiated in the primary assessment

3. **Secondary survey - clinical assessment**

• **F** Perform a full set of vital signs and monitor BP, HR, respiratory rate, O₂ saturation, conscious state - Glasgow Coma Scale / AVPU
  - check pain score (0 - 10) if conscious

• **G** Give pain relief to patient and comfort measures to patient and family

• **H** Obtain patient history from patient / witnesses and perform head to toe assessment
  - time of symptom onset or injury, GCS (or loss of consciousness) immediately after the incident
  - circumstances and mechanism of injury - blunt or penetrating, velocity
  - duration of any altered level of consciousness from witnesses
  - first thing remembered by patient after injury
  - headache, nausea or vomiting, double or blurred vision, drowsiness
  - any neck pain, or weakness, numbness or pins and needles in arms or legs
  - any mind altering substances - alcohol or drugs consumption
- medication history - is patient taking anticoagulation therapy e.g. aspirin, warfarin, clopidogrel
- medical history - does the patient have any medical condition contributing to coagulopathy e.g. alcohol misuse, previous hospitalisations and surgery
- allergies
- when was the last meal
- elicit other relevant information such as domestic violence
- last menstrual period (for women)

- **Tetanus**
  - check tetanus vaccination history.  See Tetanus immunisation

**Head to toe assessment** [5]

- **Observe**
  - body position, posture, any guarding or self protection movements
  - remove all clothing as you move down, maintaining privacy. Do not let the patient get cold, cover with blanket after examination
  - look and feel for any abnormalities
  - note any unusual odours: alcohol, petrol, chemicals, vomitus, urine or faeces
  - use other diagnostic tools such as x-ray and ultrasound in consultation with MO

- **Eyes**
  - assess pupils for size, equality and reactivity to light
  - check eye movements, double vision (if conscious)
  - determine gross visual acuity
  - inspect for periorbital bruising (raccoon's eyes) subconjunctival haemorrhage

- **Skull, facial bones, ears and nose**
  - inspect for deformities, haematomas, fractures, wounds, bleeding, ecchymosis (small haemorrhagic spots in the skin or mucous membrane), impaled object or fluid discharge from ears or nose
  - check for “Battle sign” (bruising / haematoma behind the ear indicating base of skull fracture)
  - see Head injury

- **Oral cavity**
  - look for broken teeth, wounds, jaw fracture / mobility
  - see Fractured mandible / jaw

- **Neck, trachea and cervical spine** - on MO order only and if sufficient number of assistants
  - remove rigid collar gently and manually examine neck with patient’s head immobilised by an assistant
  - look for deformity, tenderness, step in spine. Replace collar
  - palpate trachea to determine position (midline, deviated)
  - if any findings see Spinal injuries

- **Chest**
  - inspect for wounds, bruising, local tenderness, subcutaneous emphysema, impaled object, oedema and scars
  - inspect chest movement on respiration and note any paradoxical breathing or use of accessory muscles
  - auscultate chest for air entry and adventitious sounds (wheezes and crackles)
  - auscultate heart sounds for murmurs, friction rubs and muffled sounds
  - if any findings see Chest injuries
Trauma and injuries

- **Clavicles and shoulders**
  - inspect for fractures, crepitus and deformities
  - inspect for paradoxical breathing
  - increasing respiratory distress and HR, with falling BP and falling Glasgow coma scale may indicate tension pneumothorax

Tension pneumothorax is a life threatening emergency and is a treatable cause of potential death in the severely injured patient. Check for bilateral air entry. Is there a fractured rib? Tension pneumothorax requires urgent treatment. Consult MO unless circumstances do not allow. Perform chest decompression / needle thoracentesis. See Chest injuries

- **Abdomen**
  - inspect for wounds, bruising including “seat-belt sign”, tenderness, rigidity, distention, evisceration, lacerations, impaled objects, oedema and scars
  - auscultate for bowel sounds
  - palpate all 4 abdominal quadrants
  - urinalysis: test for blood
  - if any findings see Abdominal injuries

- **Pelvis**
  - inspect for wounds, bruising, deformity, tenderness, fracture see Fractured pelvis, puncture wounds, avulsions, lacerations, impaled objects, oedema and scars
  - check pelvic stability by gently palpating along the bony margins

- **Perineum / genitalia**
  - inspect for blood at the urethral meatus: if present do not pass a urethral catheter without MO consultation
  - inspect for blood at the vagina and rectum
  - inspect penis for priapism (persistent and often painful erection)
  - Note: pain and / or urge but inability to void

- **Limbs**
  - check previously applied splint(s) if present. Do not remove if appropriately applied and neurovascular function is intact
  - inspect for tenderness, deformity, fracture, puncture wounds, avulsions, lacerations, impaled objects, oedema and scars
  - palpate pulses in all four limbs
  - check neurovascular function: colour, warmth, movement, sensation
  - check joints - range of movements and determine the motor strength of the limbs
  - if any findings see Fractures, dislocations and sprains

- **Inspect posterior surfaces**

- **Back**
  - log roll patient, with assistance, if there is no evidence of head / cervical spine injury. Log roll only with MO orders and with adequate number of available assistants
  - maintain cervical spine in-line immobilisation and support extremities with suspected injuries
  - inspect and palpate for deformity and tenderness
  - assess touch and sensation at perineum
  - for log roll technique see Spinal injuries and management if any findings

- **Jot it down**
  - document findings of assessment fully
  - report abnormal findings to MO
4. Management

Criteria for Early Notification of Trauma for Interfacility Transfer [4]

<table>
<thead>
<tr>
<th>Vital signs</th>
<th>Adult</th>
<th>Newborn &lt; 2 weeks</th>
<th>Infant &lt; 1 year</th>
<th>Child 1 - 8 years</th>
<th>Child 9 - 15 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory rate / min</td>
<td>&lt; 10 or &gt; 30</td>
<td>&lt; 40 or &gt; 60</td>
<td>&lt; 20 or &gt; 50</td>
<td>&lt; 20 or &gt; 35</td>
<td>&lt; 15 or &gt; 25</td>
</tr>
<tr>
<td>O₂ saturation in room air</td>
<td>&lt; 90 %</td>
<td>&lt; 95 %</td>
<td>&lt; 95 %</td>
<td>&lt; 95 %</td>
<td>&lt; 95 %</td>
</tr>
<tr>
<td>Systolic BP mmHg</td>
<td>&lt; 90</td>
<td>n/a</td>
<td>&lt; 60</td>
<td>&lt; 70</td>
<td>&lt; 80</td>
</tr>
<tr>
<td>HR / min</td>
<td>&gt; 120</td>
<td>&lt; 100 or &gt; 170</td>
<td>&lt; 90 or &gt; 170</td>
<td>&lt; 75 or &gt; 130</td>
<td>&lt; 65 or &gt; 100</td>
</tr>
<tr>
<td>GCS</td>
<td>&lt; 14</td>
<td>Altered LOC</td>
<td>Altered LOC</td>
<td>Altered LOC</td>
<td>Altered LOC</td>
</tr>
</tbody>
</table>

Note: if outside these ranges continue with normal assessment

and / or

Injuries

- All penetrating injuries
  - head / neck / chest / abdomen / pelvis / axilla
- Blunt injuries
  - patients with significant injuries to a single region - head / neck / chest / abdomen / pelvis / axilla
  - patients with injuries involving 2 or more of these body regions
- Specific injuries
  - limb amputation / life threatening injuries
  - suspected spinal cord injuries
  - serious crush injury
  - major compound fractures or open dislocation
  - fracture to 2 or more - femur, tibia, humerus or fractured pelvis

and / or

Mechanism of injury

- Ejection from vehicle
- Motorcyclist impact > 30 kph
- High speed motor vehicle collision > 60 kph
- Vehicle roll over
- Fatality in same vehicle
- Prolonged extrication > 30 minutes
- Pedestrian impact
- Fall from height > 3 metres
- Struck on head by falling object > 3 metres
- Explosion

If patient meets any of the criteria in either / or Vital signs Injuries or Mechanism of injury above consult your retrieval service urgently
• After providing immediate management keep patient nil by mouth and warm
• Patients with severe pain require adequate analgesia. Intravenous is the preferred route of administration for narcotic analgesics for severely injured patients (burns, spinal injuries, chest injuries, abdominal injuries, major fractures). Narcotic analgesics should not be given to patients with head injuries because of their potential effects on conscious state and pupil size, except on MO orders
• If not allergic, give morphine (preferable) or if allergic to morphine give fentanyl
• Give metoclopramide (adult) if nauseated or vomiting
• Children with pain require adequate analgesia. Early and appropriate doses of analgesia should be given including morphine or intranasal fentanyl with adequate reassessment and monitoring. Consult MO for opioid analgesia in children with trauma and injuries
• Children should not receive metoclopramide (Maxolon) or prochlorperazine (Stemetil) because of the high risk of dystonic reactions. If an antiemetic is required for a child the MO may advise 4 mg ondansetron wafer
• Note: in some circumstances administration of methoxyflurane is appropriate if no other options available
• Collect blood for FBC, electrolytes, LFT, cross match and BGL
• Insert indwelling urethral catheter (unless suspected urethral injury and / or blood present at urethral meatus). Continuous measurement of urine output
• Do ECG
• Consider nasogastric tube in discussion with MO
• Referring MO will arrange evacuation as needed

See Simple analgesia back cover

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Ampoule</td>
<td>IM</td>
<td>Adults only 0.1 - 0.2 mg / kg up to a max. of 10 mg</td>
<td>Stat</td>
</tr>
<tr>
<td></td>
<td>10 mg / mL</td>
<td>IV (IHW may not administer IV)</td>
<td>Adults only 2.5 mg increments slowly, repeated every 10 min if required to a max. of 10 mg</td>
<td>Further doses on MO / NP order</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: advise can cause nausea and vomiting, drowsiness
Management of associated emergency: caution - in the elderly and those with significant renal / liver disease. Respiratory depression is rare - if it should occur give naloxone. See Poisoning / overdose - opiates NB: as naloxone counteracts the narcotic, it may cause the return of severe pain

• If allergic to morphine or significant renal disease give fentanyl: N.B. fentanyl has a rapid onset of action
## Trauma and injuries

**Schedule 8 Fentanyl DTP**

**IHW / SM R&IP**

- Authorised Indigenous Health Workers must consult MO / NP
- Scheduled Medicines Rural & Isolated Practice Registered Nurses may proceed

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampoule</td>
<td>100 microgram / 2 mL</td>
<td>IM</td>
<td>Adults only 1.5 microgram / kg to a max. of 100 microgram</td>
<td>Stat Further doses on MO / NP order</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IV (IHW may not administer IV)</td>
<td>Adults only 25 microgram increments slowly, repeated every 10 min if required to a max. of 100 microgram</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intranasal</td>
<td>Adults only 1.5 microgram / kg undiluted to a max. of 100 microgram</td>
<td></td>
</tr>
</tbody>
</table>

Administration instructions for intranasal fentanyl. Draw up dose into 1 mL or 2 mL syringe. If using a mucosal atomisation device (MAD) attach to the syringe. Position patient sitting up at a 45° angle or with head resting to one side. Position the atomiser or syringe into the nostril loosely, aiming for the centre of the nasal cavity. Depress the syringe plunger quickly. If 100 microgram / 2 mL is being used split the dose between both nostrils to minimise loss due to sneezing or swallowing. Intranasal fentanyl may be unreliable if patient has blocked nose [7]

Provide Consumer Medicine Information: advise can cause nausea and vomiting, drowsiness

Management of associated emergency: respiratory depression is rare. If it should occur give naloxone. See Poisoning / overdose - opiates  NB: as naloxone counteracts the narcotic, it may cause the return of severe pain

---

## Schedule 4 Metoclopramide DTP

**IHW / SM R&IP**

- Authorised Indigenous Health Workers must consult MO / NP
- Scheduled Medicines Rural & Isolated Practice Registered Nurses may proceed

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampoule</td>
<td>10 mg / 2 mL</td>
<td>IM or IV (IHW may not administer IV)</td>
<td>Adults only 10 mg</td>
<td>Stat Further doses on MO / NP orders</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: not for use in patients with Parkinson's disease or children and use caution in women < 20 years of age

Management of associated emergency: dystonic reactions e.g. oculogyric crisis are extremely rare (unless repeated doses or in children). If oculogyric crisis develops give benztropine 2 mg IM or IV. See Mental health behavioural emergencies [8]
## Trauma and injuries

<table>
<thead>
<tr>
<th>Schedule</th>
<th>4</th>
<th>Methoxyflurane</th>
<th>DTP IHW / SM R&amp;IP</th>
</tr>
</thead>
</table>

Authorised Indigenous Health Workers must consult MO / NP

Scheduled Medicines Rural & Isolated Practice Registered Nurses may proceed

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid (for inhalation)</td>
<td>3 mL</td>
<td>Self administered inhalation under observation</td>
<td>Adult 3 mL</td>
<td>May be repeated after 20 minutes to total of 6 mL</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: caution in people with history of liver or renal disease or who are affected by alcohol or drugs. Can lead to altered conscious state

Management of associated emergency

5. **Follow up**

   - As per findings. Reassess primary survey and manage any life saving interventions / management initiated in the primary assessment

6. **Referral / consultation**

   - Consult MO as soon as possible with any findings from examination
   - Prepare patient for evacuation via air or road to facility with capability to address trauma and injuries. See Criteria for Early Notification of Trauma for Interfacility Transfer
Chest injuries

Recommend
- Do not remove any object sticking out of wound e.g. knife
- Suspect tension pneumothorax in all patients where there is unexplained respiratory distress or shock [11]
- Tension pneumothorax is a life threatening emergency and is a treatable cause of potential death in the severely injured patient
- See Criteria for Early Notification of Trauma for Interfacility Transfer

Background
- Chest injuries include:
  - damage to the chest wall from:
    - broken ribs
    - flail chest (where ribs have broken in two places leaving a broken “island” of chest wall)
    - if penetrating, an open chest wound
  - damage to blood vessels lining the chest wall causing:
    - blood to collect outside the lungs, inside the chest cavity (haemothorax)
  - damage to the lungs causing:
    - breathing difficulties
    - bruising of the lung tissue (lung contusion)
    - air to escape from the lungs into the chest cavity (pneumothorax)
    - if this air is under pressure, it can cause deviation of the mediastinum - this is called “tension pneumothorax”
    - “surgical emphysema” occurs if air spreads into the tissues

Related topics
- Trauma and injuries
- DRS ABCD resuscitation / the collapsed patient
- Needle thoracentesis
- O₂ delivery systems
- Shock

1. May present with
   - Isolated chest injury secondary to blunt or penetrating trauma
   - Pain
   - Increased HR, respiratory distress, cyanosis
   - Hypotension / shock

2. Primary survey and resuscitation - immediate management
   - Follow ABCDE  See Trauma and injuries
   - Give O₂ See O₂ delivery systems
   - Perform rapid clinical assessment +
     - O₂ saturation
   - Insert largest possible bore IV cannula (14 g or 16 g)
   - Consult MO
   - Begin secondary assessment only after any life saving interventions / management initiated in the primary assessment
3. **Secondary survey - clinical assessment**

- Follow FGHIJ  [See Trauma and injuries](#)
- Inspect for wounds, bruising or abrasions over chest
- Inspect chest movement on respiration e.g. uneven or paradoxical movement (paradoxical movement is where an area of chest wall moves in while the rest of the chest moves out and vice versa. This indicates a “flail chest” and multiple fractured ribs)
- Auscultate the chest - is the air entry equal?
- Position of trachea - is it midline or to one side?
- The presence of local tenderness is adequate to diagnose fractured ribs. Do not spring rib cage
- “Surgical emphysema” - under the skin of the chest wall, clavicle area or neck (it feels like bubbles or “crackling”). If present, suspect serious injury
- Perform chest x-ray if available
- Suspect the following injuries:

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<table>
<thead>
<tr>
<th>Differential diagnosis table</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non penetrating causes (no open wounds)</strong></td>
</tr>
</tbody>
</table>

| Patient in pain and increasing respiratory distress | Increasing HR, falling BP, falling GCS, unequal chest movement, trachea deviated away from the affected side, decreased air entry and hyper-resonance on percussion noted on affected side, distended neck veins | Suspect tension pneumothorax  
Consider performing needle thoracentesis |
<table>
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</thead>
<tbody>
<tr>
<td>Patient in pain and some breathlessness but not increasing respiratory distress</td>
<td>May be unequal chest movement, trachea may be deviated towards the affected side, may be decreased air entry and increased percussion noted on affected side</td>
<td>Suspect simple pneumothorax</td>
</tr>
<tr>
<td>Chest pain, coughing up blood, breathlessness, hypoxaemia</td>
<td>Increased HR, respiratory distress and crackles in chest. Often associated with haemothorax and pneumothorax</td>
<td>Suspect lung contusion</td>
</tr>
<tr>
<td>Patient in pain and respiratory distress with hypotension/shock</td>
<td>May be unequal chest movement, trachea may be deviated away from the affected side, may be decreased air entry and dull percussion on affected side</td>
<td>Suspect haemothorax</td>
</tr>
<tr>
<td>Patient in pain and respiratory distress with paradoxical movement of an area of the chest wall</td>
<td>This means part of the chest wall moves in when the patient breathes in, and out when patient breathes out</td>
<td>Suspect flail chest</td>
</tr>
<tr>
<td>Patient in pain worse on breathing in and coughing, not breathless</td>
<td>Localised chest wall, swelling and tenderness</td>
<td>Suspect broken rib</td>
</tr>
</tbody>
</table>
| Patient in pain and respiratory distress | An obvious wound to the chest with or without an object sticking out | Possible haemothorax  
Do not remove any object sticking out of wound e.g. knife |
| Patient in pain and respiratory distress | Air sucking into chest | Open chest wound |
Other possible complications include cardiac tamponade, aortic disruption, tracheo-bronchial disruption, oesophageal disruption

4. Management
   • Consult MO in all cases
   • Give analgesia. See Trauma and injuries

Tension pneumothorax
   • Tension pneumothorax is a life threatening emergency and is a treatable cause of potential death in the severely injured patient. Tension pneumothorax requires urgent treatment. Consult MO unless circumstances do not allow in which case notify MO as soon as circumstances allow
   - perform immediate decompression by needle thoracentesis
   - insert a 14 g IV cannula through upper chest wall (2nd intercostal space, midclavicular line) into thoracic cavity just above the upper edge of the rib below (see diagram)
   - if tension pneumothorax is present, air will escape with a rush from the pleural space under pressure with an easing of respiratory distress
   - if patient has only partly improved, or gets worse, check the cannula has not kinked or the tension pneumothorax may have recurred, or there may be a tension pneumothorax on the other side. Consult MO as may need to try again on the other side
   - MO will insert a formal intercostal catheter prior to evacuation / hospitalisation and attach to Heimlich valve or Portex ambulatory chest drainage system

Simple pneumothorax
   - monitor and await transfer
   - MO will insert a formal intercostal catheter prior to evacuation / hospitalisation

Haemothorax
   - treat hypovolaemia, if respiratory distress ensues then treat as tension pneumothorax
   - MO will advise quantities and rates of IV fluids to be given. It is usual to start with normal saline or Hartmann’s solution and follow with blood
Trauma and injuries

- the MO will insert a formal intercostal catheter prior to evacuation / hospitalisation
  - see Shock

• **Flail chest**
  - if a small segment - chest wall may be stabilised by rolling the patient on to the affected side
  - continue to provide airway and ventilation support as per MO instructions
  - if large, will require intubation and ventilation by MO prior to evacuation / hospitalisation in a facility with intensive care capability

• **Broken rib**
  - consult MO who will likely advise oral analgesia, and review next day if no other injury

• **Penetrating - open injuries** - (sometimes called open pneumothorax) including gunshot and stab wounds:
  - do not remove any object sticking out of wound e.g. knife. Pack around with gauze soaked in normal saline and secure
  - in the case of sucking chest wounds, seal the wound with tape on three sides

• Consult MO who will advise antibiotics / analgesia and arrange evacuation
  - MO will insert a formal intercostal catheter prior to evacuation / hospitalisation in a facility with appropriate surgical capability

• Keep patient nil by mouth
• Keep patient warm

Dressing for treatment of open pneumothorax

Promptly close the defect with a sterile occlusive dressing that is large enough to overlap the wound’s edge. Tape it securely on three sides to provide a flutter-type valve effect [12]

5. **Follow up**
   - MO will advise ongoing management

6. **Referral / consultation**
   - In all cases consult MO
   - Prepare patient for evacuation via air or road to facility with capability to address chest injuries. See Criteria for Early Notification of Trauma for Interfacility Transfer
**Head injuries**

**Recommend**
- Assume all head injuries have an associated neck injury
- Do not give narcotic analgesics to patients with head injuries because of their potential effects on conscious state and pupil size, except on MO orders
- **Always**
  - notify MO immediately if altered level of consciousness [13]
  - act on Glasgow coma scale (GCS) less than 15 or falling GCS
  - escalate immediately a drop of 2 or more in GCS since the last assessment interval
  - prepare for intubation if GCS is 9 or less
- Patients (adult) with closed head injuries are assessed as high risk or low risk head injuries. The classification is used to assess for urgent transfer for CT scan if indicators for urgent transfer met. See Decision Making for Escalation and CT Scanning - adult / child Be wary of the patient who appears to be intoxicated - a head injury may coexist

**Background**
- Blows to the head can cause damage to the brain without signs of injury on the outside. This is because the brain is fairly soft and is poorly anchored within the skull so that it can move. Injuries can be severe, often with internal bleeding, or mild and reversible when it is known as “concussion”. A significant brain injury can occur without loss of consciousness

**Related topics**
- Trauma and injuries
- Eye injuries
- Fractured mandible / jaw
- Tetanus immunisation
- Subarachnoid haemorrhage
- DRS ABCD resuscitation / the collapsed patient
- Glasgow Coma Scale / AVPU

1. **May present with**
   - Isolated head injury secondary to blunt (closed) or penetrating (open) trauma
   - Headache, nausea and vomiting, blurred or double vision
   - Confused, drowsy, unconscious or fitting
   - Increased HR and BP

2. **Primary survey and resuscitation - immediate management**

   **DRS ABCD resuscitation / the collapsed patient**
   - Follow ABCDE  See Trauma and injuries
   - Give $O_2$ to maintain $O_2$ saturation >93% - adult / >95% child.  See $O_2$ delivery systems
   - Assume cervical spine injury - maintain cervical spine in-line immobilisation and apply rigid cervical collar (appropriate to patient size)
   - Perform rapid clinical assessment +
     - conscious state.  See Glasgow Coma Scale / AVPU
     - pupil size
   - Insert largest bore IV cannula possible (14 g or 16 g)
   - Consult MO
   - Maintain temperature
   - If GCS 9 or less, patient will need intubation and ventilation by MO prior to evacuation / hospitalisation to an appropriate facility with intensive care and neuro-surgical capability. These patients are unable to control their airway and are at risk from aspiration. Provide airway, breathing and circulation support until
MO arrives
• Begin secondary assessment only after any life saving interventions / management initiated in the primary assessment

3. Secondary survey - clinical assessment
• Follow FGHIJ See Trauma and injuries
• Obtain emergency patient history (from witnesses if possible):
  - time of symptom onset or injury, GCS (or loss of consciousness) immediately after the incident?
  - circumstances and mechanism of injury - blunt or penetrating, velocity of patient or objects
  - duration of any altered level of consciousness
  - first thing remembered by patient after injury
  - headache, nausea or vomiting, double or blurred vision, drowsiness
  - any neck pain, weakness, numbness or pins and needles (arms or legs)
  - any mind altering substances - alcohol or drug consumption
  - medication history - is patient taking anticoagulation therapy e.g. aspirin, warfarin, clopidogrel
  - medical history - does the patient have any medical condition contributing to coagulopathy e.g. alcohol misuse
• Perform standard clinical observations +
  - conscious state. See Glasgow Coma Scale / AVPU
  - monitor blood pressure closely. Maintain BP as advised by MO. BP maintenance should be higher for patients with head injuries and abdominal injuries compared to patients with isolated injuries without head injuries

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<tbody>
<tr>
<td>A</td>
<td>Alert</td>
</tr>
<tr>
<td>V</td>
<td>Responds to Verbal statement</td>
</tr>
<tr>
<td>P</td>
<td>Responds to Painful stimuli</td>
</tr>
<tr>
<td>U</td>
<td>No response (Unresponsive)</td>
</tr>
</tbody>
</table>

• Check pupil size and reaction to light:
  - assess the pupil size
  - are both the pupils the same size?
  - see if the pupils get smaller when you shine a light on them
  - do both pupils react equally?
• If a patient with a head injury is also intoxicated, the intoxicated state should not be assumed to have caused any physical signs, such as reduced level of consciousness
• Inspect and palpate for:
  - open wound with underlying skull fracture (compound) including gunshot or stab wounds
  - do not remove any object sticking out of wound, e.g. knife. Pack around with gauze soaked in normal saline and secure
  - a depressed skull fracture: a boggy swelling of scalp
• Check for signs of a basal skull fracture:
  - bruising around the eyes "raccoon eyes"
  - bruising behind the ears “Battle's sign”
  - clear or bloodstained fluid from the ears, nose, mouth
  - blood in the ear or behind the ear drum
- subconjunctival haemorrhage that extends behind the eyeball

• Check for a facial fracture:
  - nose: flattening or angulation, occlusion of nostrils
  - orbit: there may be a palpable step and numbness under the eye and/or restriction of eye movement and double vision
  - numbness of the cheek or teeth
  - face: the bone holding the upper teeth (maxilla) may be able to be moved when held by thumb and forefinger relative to the skull steadied by the other hand
  - jaw fracture: suggestive if teeth do not close properly or unable to open mouth widely

• See Glasgow Coma Scale / AVPU

4. Management

• Consult MO as soon as possible
• If open / penetrating head injury MO will arrange urgent evacuation
• Monitor GCS at a minimum of half hourly for 6 hours in consultation with MO. Notify MO immediately if altered level of consciousness [13]
• Act on:
  - Glasgow coma scale (GCS) less than 15
  - falling GCS
  - report (escalate) immediately a drop of 2 or more in GCS since the last assessment
  - prepare for intubation if GCS is 9 or less
• If there is a compound or basal skull fracture the MO will order antibiotics
• Aggressively manage any fall in BP. Maintain BP as advised by MO. BP maintenance should be higher for patients with head and / or abdominal injuries compared to patients with isolated injuries without head injuries
• Keep patient warm
• If there is a rapid deterioration in GCS of 2 or more, and / or if one pupil becomes fixed and dilated, suggestive of expanding (extradural) haemorrhage, the MO may order IV mannitol 20 %
• Narcotic analgesics should not be given to patients with head injuries because of their potential effects on conscious state and pupil size, except on MO orders
• If the skin is broken, check tetanus vaccination history, if had < 3 doses or uncertain of the number of doses received consider tetanus immunoglobulin for immediate protection. Give DTPa, DTPa-combinations dT, dTpa as appropriate. Refer to current edition of the NHMRC The Australian Immunisation Handbook for guide to tetanus prophylaxis in wound management

5. Follow up

发热 Consider urgent transfer for CT scanning in high risk mild head injury. See Decision Making for Escalation and CT Scanning - adult / child After minimum of 6 hours observation, if GCS is 15, in consultation with MO, patient may be discharged into care of responsible person who should be given appropriate instructions and / or a head injury advice sheet at end of this guideline

发热 Review next day and at next MO clinic

6. Referral / consultation

发热 Consult MO with any findings above or if at high risk of severe injury because of circumstances See Criteria for Early Notification of Trauma for Interfacility Transfer

发热 Referral to Occupational Therapist for post traumatic amnesia test (PTA)
### Decision Making for Escalation and CT Scanning - adult / child

**Patient presentation - head injury**

- **Closed head injury**
  - **GCS < 15 on arrival**
    - Consult MO immediately
  - **GCS = 15**
    - Perform routine clinical assessment

- **Open / penetrating head injury**
  - **Medical emergency**
    - Consult MO immediately to arrange evacuation

**Review patient against risk factors for children / adults**
*See following page*

**Any high risk factors?**

- **No to all**
  - **Monitor for minimum of 6 hrs using minimum of half hourly neuro observations**
    - If observations remain in normal range for 6 hrs post injury:
      - Patient may be discharged
      - Into care of responsible person
      - With head injury advice sheet
    - Arrange MO review next clinic

- **Yes to any**
  - **CT scan is required**
    - **CT not available**
      - Consult MO
      - Perform CT
    - **CT available**
      - **Consult MO immediately**
        - Will organise evacuation

**Any of the following?**

- Persistent GCS <15 at 2 hrs post injury
- Deterioration in GCS
- Focal neurological deficit
- Clinical suspicion of skull fracture
- Persistent abnormal mental status
- Vomiting or severe headache at 4 hrs post time of injury

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Primary Clinical Care Manual 2011
### Head injury ‘high risk’ factors for adults [1]

- Age over 65 years
- On anticoagulant / antiplatelet therapy
- Known coagulopathy e.g. liver disease, factor deficiency
- Loss of consciousness >5 minutes
- Persistent GCS <15 at 2 hours post injury
- Deterioration in GCS
- Focal neurological deficit
- Clinical suspicion of skull fracture
- Persistent vomiting
- Persistent headache
- Persistent abnormal level of alertness, behaviour and / or cognition
- Multi-system trauma
- Unwitnessed head injury
- Significant mechanism of injury
- Re-presentation
- Known previous neurosurgery and / or neurological impairment
- Intoxicated (alcohol and / or other drugs)
- Delayed onset of symptoms
- Post traumatic seizure [1]
- Multiple co-morbidities or combination of worrying factors

### Head injury ‘high risk’ factors for children [2]

- GCS < 14
- Abnormal drowsiness
- 2 vomits
- History of amnesia of 5 minutes duration
- Witnessed loss of consciousness of > 5 minutes duration
- Focal neurology
- Signs of a basal skull fracture
- Seizure after head injury in patient who has no history of epilepsy
- Suspicion of penetrating head injury or depressed skull fracture or tense fontanelle
- If less than 1 year old, the presence of > 5 cm of bruising, swelling or laceration
- High speed injury from a projectile or an object
- Suspicion of non-accidental injury
- Fall of > 3 metres in height
- High speed road traffic accident either as a pedestrian, cyclist or occupant
Advice to patients who have received an injury to the head [13]

- Rest quietly for the day
- Use “ice packs” over swollen or painful areas. Wrap ice cubes, frozen peas or a sports ice pack in a towel. Do not put ice directly on the skin
- Take simple pain killers (such as paracetamol) for any headache. Check the packet for the right dose and use only as directed
- If an injured person is discharged in the evening, make sure they are woken several times during the night. Set the alarm. Ensure the injured person walks to the toilet or does an activity that allows you to assess their coordination
- Do not let the injured person drive home
- Do not leave them alone for the next 24 hours
- Do not let them drink alcohol for at least 24 hours
- Do not let them eat or drink for the first six to 12 hours (unless advised otherwise by the MO). Then offer them food and drink in moderation
- Do not let them take sedatives or other medication unless instructed
- Return to the clinic immediately if the person has repeated vomiting, 'blacks out' or a seizure (fit), or cannot be woken or is not responsive
- Return to the clinic immediately if you have any symptoms you are concerned about
Spinal injuries

Recommend
- Suspect cervical spine (neck) injuries in anyone involved in a motor vehicle accident, a dive into shallow water, motor bike accident, sport injury, fall from height, sudden acceleration / deceleration, fall in the elderly, anyone with a head injury and in anyone with an injury above the clavicle (collar-bone) or who has a history of pins and needles of arms / leg, no matter how transient
- In a person with thoracolumbar injuries suspect spinal injuries and treat the whole spine
- Treat as though there is a cervical spine injury if there is any possibility of one, as they are easily and often missed which can have serious consequences
- Any patient who has any midline cervical spine pain or tenderness following injury, requires cervical spine x-rays including C7 - T1 space (anteroposterior, lateral, and peg views, all of C7 must be visualised) to exclude cervical spine fracture or slip
- See Criteria for Early Notification of Trauma for Interfacility Transfer

1. May present with
   • History of injury
   • Isolated spinal injury:
     - spinal pain, tenderness
     - muscular weakness or paralysis of the arms or legs, numbness or pins and needles in arms or legs, no matter how transient
     - weak / shallow (diaphragmatic) breathing
     - "neurogenic hypotension" - low BP with a normal HR
     - loss of bladder or bowel control, urinary retentio
     - priapism (persistent and painful erection)

2. Primary survey and resuscitation - immediate management
   - Follow ABCDE  See Trauma and injuries
   - Maintain cervical spine in-line immobilisation and apply rigid cervical collar (appropriate to size)
   - Give $O_2$ to maintain saturation >93% - adult / 95% - child. If not maintained consult MO. See $O_2$ delivery systems
   - Perform rapid clinical assessment +
     - conscious state. See Glasgow Coma Scale / AVPU
     - $O_2$ saturation
     - peripheral perfusion
     - note in particular efficacy of breathing
   - Insert large bore IV cannula (14 g or 16 g)
   - Do not move patient unless absolutely necessary or MO orders and sufficient assistants available to immobilise spine and log roll patient. See Log roll
   - It is preferable for the patient to be stabilised and evacuated from the scene rather than transported in less than ideal circumstances. Lie flat on back on a hard surface. Maintain head in neutral position using towel rolls / rigid cervical collar and ensure neck is in alignment with body
   - Consult MO as soon as possible
### Log roll
If necessary to move patient or examine patient’s spine on MO orders:
- minimum of three, preferably five people are required
- one person at the head of the patient should control the patient's head and shoulders (in rigid cervical collar)
- log roll maintaining spinal alignment, especially avoiding flexion and rotation (keep the patient's nose in line with the belly button at all times)
- log roll on to scoop stretcher
- place towel rolls either side of the head to prevent head rotation

• Begin secondary assessment only after any life saving interventions / management initiated in the primary assessment

### 3. Secondary survey - clinical assessment
- Follow FGHIJ  See Trauma and injuries
- Obtain emergency patient history including circumstances and mechanism of injury - blunt or penetrating, velocity
- Perform comprehensive trauma survey if indicated. See Trauma and injuries
- Perform standard clinical observations +
  - conscious state. See Glasgow Coma Scale
  - note particular attention to respirations and use of respiratory muscles
- Record movement / strength arms and legs
- Check for numbness / sensation: note the body level where the numbness starts
- Note evidence of loss of bladder or bowel control, urinary retention
- Do not check cervical or thoracolumbar spine for tenderness or a step defect unless MO orders and sufficient assistants are available to immobilise spine and log roll patient. See Log roll

### 4. Management
- Give analgesia. See Trauma and injuries
- Keep patient nil by mouth
- Keep patient warm
- Prepare patient for evacuation
- The MO may ask for the patient to be catheterised
- Severely injured patients will require analgesia. Intravenous is the preferred route of administration for narcotic analgesics. Consult MO

### 5. Follow up
Any patient who has any midline cervical spine pain or tenderness following injury requires cervical spine x-rays including C7 - T1 space (all of C7 must be visualised) to exclude cervical spine fracture or slip

### 6. Referral / consultation
Consult MO with any findings above or at risk of serious injury because of circumstances. See Criteria for Early Notification of Trauma for Interfacility Transfer
**Trauma and injuries**

**Abdominal injuries**

**Recommend**
- Urgently evacuate all patients with hypotension / shock as a result of abdominal injury to an appropriate facility with surgical capability, [15] as abdominal bleeding can lead to shock
- See Criteria for Early Notification of Trauma for Interfacility Transfer

**Background**
- Blunt or non-penetrating abdominal trauma (e.g. after a fall from a horse, seat belt injury or punch to the abdomen) can cause serious bleeding from ruptured spleen, liver or kidneys and serious injury to abdominal viscera e.g. bowel perforation, bowel infarction
- Penetrating wounds (including gunshot and stab wounds) can also perforate the bowel and cause serious infection. Associated damage to the chest can occur with any wound above the umbilicus
- If mechanism of injury indicates high forces - closely monitor for abdominal injuries

**Related topics**
- Trauma and injuries
- Chest injuries
- Fractured pelvis

**1. May present with:**
- Isolated abdominal injury secondary to blunt or penetrating trauma
- Pain
- Increased HR, hypotension / shock

**2. Primary survey and resuscitation - immediate management**

**DRS ABCD resuscitation / the collapsed patient**
- Follow ABCDE  See Trauma and injuries
- Give O₂ to maintain O₂ saturation >93% - adult / 95% - child. If not maintained consult MO.  See O₂ delivery systems
- Perform rapid clinical assessment +
  - conscious state.  See Glasgow coma scale
- Insert 2 largest bore IV cannulas (14 g or 16 g)
- It is normal to start with IV normal saline or Hartmann’s solution. MO will advise quantities and rate. In an adult, the aim is to keep the:
  - HR < 120 / min
  - maintain BP as advised by MO. BP maintenance should be higher for patients with head injuries and abdominal injuries compared to patients with isolated injuries without head injuries
  - urine output > 0.5 mL / kg / hr
- Consult MO as soon as possible
- Begin secondary assessment only after any life saving interventions / management initiated in the primary assessment

**3. Secondary survey - clinical assessment**
- Follow FGHIJ  See Trauma and injuries
- Obtain emergency patient history - circumstances of the injury, time of occurrence and method of injury - blunt or penetrating
4. Management

- **Give analgesia. See Trauma and injuries**

  - **Blunt or non-penetrating injury:**
    - consult MO who will advise IV fluid quantities and rate and arrange evacuation / hospitalisation in an appropriate facility with surgical capability. If hypotensive / shocked with intra-abdominal injury in the absence of head injury - fluid resuscitation may be conservative. Excessive fluid resuscitation may dilute clotting factors and dislodge clots resulting in fatal intra-abdominal haemorrhage

  - **Penetrating wound including gunshot and stab wounds:**
    - do not remove any object sticking out of wound e.g. knife. Pack around with gauze soaked in normal saline and secure, as may dislodge haematoma or damage vessels
    - pack open wound with normal saline soaked pack
    - do not replace exposed bowel or omentum. Cover with normal saline soaked packs
    - consult MO who will advise IV fluid quantities / rate and antibiotics, and arrange evacuation / hospitalisation in an appropriate facility with surgical capability
    - keep patient nil by mouth
    - keep patient warm
    - MO may advise to pass nasogastric tube if easy and no signs of facial or basal skull fractures. Allow free drainage and aspirate periodically
5. **Follow up**
   - If no findings as above, in consultation with MO the patient may be allowed home
   - Review the next day and consult MO if the patient has any symptoms, an increased HR, increased temperature or any abdominal findings
   - Some patients may present in 7 - 10 days with signs of delayed rupture of spleen and signs of acute abdomen

6. **Referral / consultation**
   - Consult MO with any findings as above or if at high risk of serious injury because of circumstances.  See Criteria for Early Notification of Trauma for Interfacility Transfer

**References**
13. Reed D., *Adult Trauma Clinical Practice Guidelines, Initial Management of Closed Head Injury in Adults*. 2007, NSW Institute of Trauma and Injury Management.
**Fractures, dislocations and sprains**
Simple, complicated, pelvis, mandible / jaw

**Recommend**
- Remember with pelvic or long bone fractures there can be significant blood loss into tissues
- Always examine for other injuries
- Check pulses and sensation below limb fractures, as the blood or nerve supply of the limb may be damaged by the fracture. Repeatedly monitor circulation
- The aim of management is adequate splinting and immobilisation to avoid long term disability [1]
- Use cold tap water for wetting plaster of paris

**Background**
- Fractures (buckle or break in the bone) - often occur following direct or indirect injury e.g. twisting, violence to bones. Clinically fractures are either:
  - simple, where the skin is intact, or
  - compound where there is a break in the overlying skin
- Dislocation is a complete disruption of one bone relative to another at a joint [1] Often results from injuries away from the affected joint e.g. elbow dislocation after falling on an outstretched hand
- Sprain is a partial disruption of a ligament or capsule of a joint [1]

---

**Simple fracture of limbs**

**Related topics**
- Trauma and injuries

1. **May present with**
   - As part of Trauma and injuries
   - History of injury
   - Pain
   - Loss of function
   - Tenderness, swelling, bruising and deformity
   - Asymmetry with the other side of the body

2. **Immediate management**
   - Stop any external haemorrhage by pressure bandaging or direct pressure
   - Immobilise the affected area
   - Provide pain relief
   - With pelvis or long bone fractures, insert IV cannula. It is usual to start with normal saline or Hartmann’s solution. MO will advise quantities and rate

3. **Clinical assessment**
   - Obtain complete patient history including circumstances and method of injury
     - medication history; ask about anticoagulation use e.g. warfarin?
   - Perform standard clinical observations +
     - examine and record colour, warmth, movement and sensation of hands and feet of injured limb(s)
   - Perform physical examination - carefully examine:
     - all places where it is painful
     - is the limb out of shape? compare one side with the other
     - any wounds or swelling
- colour of the whole limb (especially paleness or blue colour)
- are the peripheral pulses palpable? is the limb warm?
- skin over the fracture. Does it look normal or damaged, or is it stretched and pale?
- if the limb is swollen, is it throbbing or getting bigger?
- check range of movement
- joint function above and below the injury site - compress gently from end to end - the patient will feel pain [1]
- if there is a fracture but the injury involved seems minor or trivial, suspect a pathological fracture. This is a fracture through a diseased area of bone, e.g. osteoporosis or cancer, and will need further investigation
- in the elderly always examine carefully for fractures and other injuries after a fall

4. Management

- Remove any constrictions on the limb, such as rings and watches
- Check colour, pulses and sensation before and after doing anything to the injured limb
- Consult MO
- Consult MO urgently:
  - if the limb is deformed and skin over the fracture site is stretched and pale, the limb will need straightening or the skin will break down and make the fracture compound
  - if pulses or sensation are absent, weak or disappear
- Splint the site of the fracture / dislocation to reduce pain. See Volar slab splint to the forearm / Leg back slab splint
- Elevate the limb; a sling for arm injuries, on pillows for leg injuries
- If in doubt over an injury, treat as a fracture
- Patients with severe pain require adequate analgesia. Intravenous is the preferred route of administration for narcotic analgesics for severely injured patients
- Patients should be given pain relief if severe pain and if not allergic, give morphine (preferable) or if allergic to morphine give fentanyl. Contact MO for analgesia order in children
- Give metoclopramide (adults) if nauseated or vomiting. Children should not receive metoclopramide (Maxolon) or prochlorperazine (Stemetil) because of the high risk of dystonic reactions. If an antiemetic is required for a child the MO may advise ondansetron wafer 4 mg
- If requires operative treatment keep nil by mouth
- Consider compartment syndrome where pain is severe and unrelieved by splinting and elevation or two doses of analgesia - consult MO
- Consider sprain (soft tissue) injury if no fracture. See Sprain (soft tissue injury)
Fractures dislocations and sprains

<table>
<thead>
<tr>
<th>Schedule</th>
<th>8</th>
<th>Morphine sulphate DTP</th>
<th>IHW / SM R&amp;IP</th>
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Authorized Indigenous Health Workers must consult MO / NP
Scheduled Medicines Rural & Isolated Practice Registered Nurses may proceed

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampoule</td>
<td>10 mg / mL</td>
<td>IM</td>
<td>Adults only 0.1 - 0.2 mg / kg to a max. of 10 mg</td>
<td>Stat Further doses on MO / NP order</td>
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<tr>
<td></td>
<td></td>
<td>IV (IHW may not administer IV)</td>
<td>Adults only 2.5 mg increments slowly, repeated every 10 min if required to a max. of 10 mg</td>
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</tbody>
</table>

Provide Consumer Medicine Information: advise can cause nausea and vomiting, drowsiness
Management of associated emergency: caution - in the elderly and those with significant renal / liver disease. Respiratory depression is rare - if it should occur give naloxone. See Poisoning / overdose - opiates NB: as naloxone counteracts the narcotic, it may cause the return of severe pain

- If allergic to morphine or significant renal disease give fentanyl: Note: fentanyl has a rapid onset of action

<table>
<thead>
<tr>
<th>Schedule</th>
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<tbody>
<tr>
<td>Ampoule</td>
<td>100 microgram / 2 mL</td>
<td>IM</td>
<td>Adults only 1.5 microgram / kg to a max. of 100 microgram</td>
<td>Stat Further doses on MO / NP order</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IV (IHW may not administer IV)</td>
<td>Adults only 25 microgram increments slowly, repeated every 10 min if required to a max. of 100 microgram</td>
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<tr>
<td>Intranasal</td>
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<td></td>
<td>Adults only 1.5 microgram / kg undiluted to a max. of 100 microgram</td>
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</tbody>
</table>

Administration instructions for intranasal fentanyl. Draw up dose into 1 mL or 2 mL syringe. If using a mucosal atomisation device (MAD) attach to the syringe. Position patient sitting up at a 45° angle or with head resting to one side. Position the atomiser or syringe into the nostril loosely, aiming for the centre of the nasal cavity. Depress the syringe plunger quickly. If 100 microgram / 2 mL is being used split the dose between both nostrils to minimise loss due to sneezing or swallowing. Intranasal fentanyl may be unreliable if patient has blocked nose [3]

Provide Consumer Medicine Information: advise can cause nausea and vomiting, drowsiness
Management of associated emergency: Respiratory depression is rare. If it should occur give naloxone. See Poisoning / overdose - opiates NB: as naloxone counteracts the narcotic, it may cause the return of severe pain

[2] [3] [9]
• If nauseated or vomiting

<table>
<thead>
<tr>
<th>Schedule</th>
<th>4</th>
<th>Metoclopramide</th>
<th>DTP</th>
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<td></td>
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</table>

| Authorised Indigenous Health Workers must consult MO / NP |
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<th>Recommended dosage</th>
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<tbody>
<tr>
<td>Ampoule</td>
<td>10 mg / 2 mL</td>
<td>IM or IV (IHW may not administer IV)</td>
<td>Adults only 10 mg</td>
<td>Stat Further doses on MO / NP order</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: not for use in patients with Parkinson's disease or children and use caution in women < 20 years of age

Management of associated emergency: dystonic reactions e.g. oculogyric crisis are extremely rare (unless repeated doses or in children). If oculogyric crisis develops give benztropine 2 mg IM or IV. See Mental health behavioural emergencies

• X-rays (if available)
• If a patient is to be evacuated they usually do not need x-ray locally, as it can be done at the receiving hospital
• Usually an x-ray is needed only if it will change what you do for the patient e.g. to decide whether they are evacuated or not
• X-rays can be helpful where the diagnosis is difficult, but a normal x-ray does not always exclude a fracture
• Crush or impacted fractures do not have a typical appearance on x-ray and may be difficult to see
• After a fall on an outstretched hand, the scaphoid (of wrist) is particularly at risk. Fractures here are not often seen on normal wrist x-rays, and may not be visible for 7 - 10 days even on special x-rays. After such a fall, all people with tenderness on the wrist at the base of the thumb should be discussed with the MO and a follow up x-ray arranged
• Immobilisation of limb should be considered until check x-ray is done
• In children normal growth plates can mimic fractures or be damaged and associated fractures missed

5. Follow up
   • All fractures and dislocations should be reviewed at 24 hours. Record and report colour, sensation and pain in limb [5]
   • If pain has not improved, a complication should be considered [1]
   • If pain and swelling persist in a patient with a sprain beyond a week then suspect a fracture
   • Patients with fractures who are not evacuated/hospitalised should be seen by a MO within a week
   • Advise patient that fractures take at least 4 - 6 weeks to heal

6. Referral / consultation
   • Consult MO on all occasions for management of individual fractures
   • Stiffness of joints is a common problem with immobilisation in plaster / slings [1]. Refer to Physiotherapist where possible
Fractures, dislocations and sprains

### Volar slab splint to the forearm / leg back slab splint

The volar slab splint to the forearm is used:
- As a temporary splint (designed to last a max. of 7 days)
- In acute trauma (to immobilise the distal forearm, wrist and hand) to accommodate swelling (crepe bandage should be tightened when swelling subsides)
- Sometimes used for soft tissue injuries

**Materials**
- plaster of paris of appropriate size - 7.5 or 10 cm width
- undercast cotton padding of appropriate size e.g. velband
- crepe bandage
- sling

Leg back slab splint follows the same principles

**Instructions**
- Keep plaster clean and dry and cover with plastic bag during bath or shower
- Apply arm sling for at least 24 hours
- Elevate limb when resting during the first 24 hours
- If plaster becomes cracked or wet and pliable, return to clinic for reapplication
- Do not insert anything under plaster to relieve itching

#### Technique

- Measure a length of velband from the tip of the middle finger along the palm to along the under surface of the forearm. Width should be 2 - 3 cm more than the width of the distal forearm. Lay this on a flat surface
- Select a roll of plaster the same width as the velband. Measure a length of plaster 1 cm shorter at each end. Fold the roll in about ten layers to the same length
- Immerse the layered plaster in a bowl of cold tap water holding on to each end. Gently squeeze out the excess water
- Lay the wet plaster slab on top of the length of velband and squeeze out excess water with side of hand
- Lay the slab, velband side down, from the finger tip, over the palm and along the volar aspect of the forearm
- Lightly mould the slab to the contours of the arm and hand
- The wrist should be moderately extended, the MCP joints flexed at 60° and the interphalangeal joints are almost fully extended
- Do not apply pressure over bony prominences
- Lay another strip of velband over the top of the drying slab. This will prevent the plaster from sticking to the crepe bandage, which is applied firmly. The arm is placed in a sling
- A stronger slab can be made by manufacturing two raised “railway tracks” running longitudinally down the slab while it is still wet. These corrugations should be 1 cm high and 1 cm from each edge
- Instruct person that plaster does not dry for 24 - 48 hours, so to prevent breaking during this time not to apply any force to plaster [5]
Complicated fractures
(compound fractures)

Recommend
- Reduce fracture as soon as possible
- Provide antibiotic cover to prevent infection in the bone
- Evacuate to facility with appropriate surgical capability

Background
- There does not have to be bone visible from wound to be classified as a compound fracture

Related topics
- Trauma and injuries
- Fractures, dislocations and sprains
- Tetanus immunisation

1. May present with
- History of injury
- Broken bone with break in the overlying skin

2. Immediate management
- Stop any external bleeding by external pressure / pressure bandage
- Provide pain relief  See Simple fracture of limbs
- Immobilise the affected area, apply pelvic binding. See Pelvic fracture
- If pelvis or long bone fractures, insert IV cannula. It is usual to start with normal saline or Hartmann’s solution. MO will advise quantities and rate
- Consult MO as soon as possible

3. Clinical assessment
- See Simple fractures

4. Management
- See Simple fractures and in addition:
  - do not suture any wounds
  - clean wounds by irrigating copiously with normal saline. Cover with a normal saline soaked dressing
  - check tetanus status. See Tetanus immunisation
  - if in doubt whether there is a fracture underlying a wound, x-ray if available
  - consult MO who will advise:
    o IV fluid quantities and rate. It is usual to start with normal saline or Hartmann’s solution
    o IV antibiotics if the wound is contaminated, extensive or there is dead tissue
    o evacuation / hospitalisation in an appropriate facility with surgical capability

5. Follow up
- As per MO advice

6. Referral / consultation
- Consult MO on all occasions
- All compound fractures need antibiotics, and may need surgery for cleaning and the removal of dead tissue
Fractured pelvis

Recommend
- Always examine for other injuries as fracture of the pelvis takes a large amount of force, and there are likely to be other injuries, both internal and external
- If unstable pelvic fracture - wrap sheet or binder around pelvis and tighten - secure sheet with safety pins. Apply early [6]. This will help with pain on movement

Background
- Patients with unstable pelvic fractures may experience internal bleeding of over 2 litres of blood leading to shock and loss of consciousness
- Fractures to the pelvis are either stable (a single fracture) or unstable (break at two sites) or associated with fracture [1]

Related topics
- Trauma and injuries
- O₂ delivery systems
- Fractures, dislocations and sprains
- Shock

1. May present with
- As part of Trauma and injuries
- History of fall, especially in the elderly
- Pain around the hips, especially on moving, or when pressing the bony parts of the hips and groin
- Abnormal positioning of legs
- Abnormal neurology (unilateral)
- Abdominal pain and tenderness
- Hypotension / shock
- Blood out of the urethra or in the urine

2. Immediate management
- Give O₂ to maintain O₂ saturation >93% - adult / 95% - child. If not maintained consult MO. See O₂ delivery systems
- Insert largest possible IV cannula (14 g or 16 g)
- It is usual to start with normal saline or Hartmann’s solution. MO will advise quantities and rate
- Apply pelvic binder or wrap sheet tightly around pelvis

3. Clinical assessment
- Obtain complete patient history including circumstances of injury
- Perform standard clinical observations +
  - note particular attention to signs of shock
    o low BP
    o fast HR
    o poor capillary refill
  - pain score (0 - 10)
  - inspect for blood at urethral opening especially in males
  - collect urine - check for obvious blood / blood on dipstick
- Perform physical examination:
  - inspect for signs of pelvic instability - tenderness of symphysis pubis, irregular angulation of legs
4. **Management**
   - Consult MO
   - Give analgesia. See Simple fracture of limbs
   - If stable pelvic fracture [1] MO may advise:
     - give analgesia
     - bed rest as pain symptoms dictate
     - attempt walking with aid as soon as comfortable
   - If unstable pelvic fracture the MO will:
     - organise evacuation / hospitalisation in an appropriate facility
     - only ask the patient be catheterised if proved no bladder neck injury (no blood out of the urethra or in the urine; normal findings on rectal examination)
     - x-ray if available: if the pelvic fracture has resulted in the pelvic cavity opening up so increasing its volume, e.g. an “open book fracture”, it is advisable for the evacuating / attending MO to try and reduce this larger volume by binding the pelvis. Wrap sheet or binder around pelvis and tighten. Secure sheet with safety pins. Apply early. This procedure can be very painful

5. **Follow up**
   - As per MO advice

6. **Referral / consultation**
   - Urgent consult with MO on all occasions of suspected fractured pelvis

**Fractured mandible / jaw**

<table>
<thead>
<tr>
<th>Recommend</th>
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<tbody>
<tr>
<td>❖ Consider associated cervical spine injury with all jaw injuries</td>
</tr>
<tr>
<td>❖ Be aware of risk of airway obstruction from bleeding or extensive swelling from fractures to the jaw</td>
</tr>
<tr>
<td>❖ Multiple fractures of the jaw are common e.g. bilaterally after a blow to one side only</td>
</tr>
</tbody>
</table>

**Related topics**

- Trauma and injuries
- Trauma to teeth
- Tetanus immunisation

**Upper airway obstruction and choking**

**Spinal injuries**

**Head injuries**

1. **May present with**
   - As part of Trauma and injuries
   - History of punch / fight
   - Pain, swelling and tenderness along the jaw
   - Bleeding from the mouth
   - Pain and movement of fragments on opening the mouth
   - Unable to open mouth widely
   - Teeth do not close properly
   - Broken / loose teeth

2. **Immediate management**
   - Acute upper airway obstruction / choking
3. **Clinical assessment**
   - Obtain complete patient history including circumstances of injury
   - Perform standard clinical observations
   - Perform physical examination:
     - check the patient’s airway and bite
     - ask the patient to clench their teeth together and whether they “fit together” as usual. If not, this is malocclusion, and a fracture is likely
     - if patient unable to maintain bite on tongue depressor (or similar object) whilst twisted, they are likely to have a fracture [1]
   - Inspect for a visible and / or palpable step in the jaw. This may be on the outside, or as a step in the teeth on the inside
   - Lacerations inside or outside the mouth make this a compound fracture. The mouth has so many bacteria, that even the smallest cut or bleeding associated with a fracture should be considered compound
   - Check cervical spine for pain or tenderness. See Spinal injuries
   - Are there avulsed (torn away), displaced or broken tooth / teeth secondary to injury? Never discard tooth / teeth. See Trauma to teeth

4. **Management**
   - Consult MO who will advise:
     - diet - either nil to eat or drink, or clear fluids only, depending on severity and urgency of evacuation / surgery
     - analgesia (oral or parenteral)
     - antibiotics if compound (any wound or bleeding); oral amoxycillin or IM penicillin, add metronidazole if large wound
   - If possible replace permanent teeth / tooth, wash if dirty without touching root (never discard tooth)
   - Check tetanus immunisation status
   - Immobilise fractured jaw with four-tailed bandage [1]

5. **Follow up**
   - If not evacuated / hospitalised, the patient should be with a responsible adult for at least the first 24 hours due to the potential risk to the airway from bleeding and swelling
   - Review next day

6. **Referral / consultation**
   - Consult MO on all occasions of suspected fractured mandible / jaw
   - Dental or faciomaxillary assessment is usually necessary, and the patient often requires repair by wiring or internal fixation
Dislocations

Recommend
- Realign / reduce dislocation as soon as possible as the limb will become compromised e.g. for fracture around elbow
- Consult MO. Minor dislocations may be realigned locally

Related topics
- Trauma and injuries
- Fractures, dislocations and sprains

1. May present with
- History of injury
- As part of Trauma and injuries
- Pain, swelling and deformity of the joint
- Unwilling to move the joint; upper limb dislocations, the patient often walks in supporting the limb with the opposite one

2. Immediate management
- Provide analgesia / sedative to assist realignment. See Simple fracture of limbs

3. Clinical assessment
- Obtain complete patient history, including circumstances of injury
- Perform standard clinical observations +
  - check colour, pulses, sensation and temperature of the limb
- Perform physical examination:
  - inspect and palpate movement of joints above and below the affected joint
  - examine bones above and below the joint for tenderness to suggest fracture
  - inspect and palpate for other injuries

4. Management
- Support the dislocated area using pillows, sling or bandaging if possible
- Give analgesia if not previously given. See Simple fracture of limbs
- Consult MO who will advise if dislocation can be realigned locally
- If dislocation is to be realigned locally:
  - x-ray before and after manipulation, including to look for associated fractures
  - examine pulses and sensation before and after manipulation and continue to monitor circulation
  - for shoulder dislocations, specifically check sensation over deltoid muscle prior to reduction, as this nerve can be damaged during reduction
- Keep patient nil by mouth
- Insert IV cannula
- Be aware that after realignment the patient’s pain will lessen dramatically. This may accentuate sedation and respiratory depression caused by analgesics

5. Follow up
  - If realigned locally - as per MO orders

6. Referral / consultation
  - Consult MO on all occasions. Dislocations will require full review
Fractures dislocations and sprains

1. **Sprains**
   - **Soft tissue injury**

2. **May present with**
   - History of injury
   - Pain
   - Swollen joint
   - Unable to weight bear
   - No fracture seen on x-ray

3. **Immediate management** Not applicable

4. **Clinical assessment**
   - Obtain patient history
   - Perform standard clinical observations +
     - examine and record colour, warmth, movement and sensation of hands and feet of injured limb(s)
   - Perform physical examination See Simple fracture of limbs

5. **Management**
   - For mild and moderate sprains [1]:
     - **R** Rest the injured part for 48 hours, depending on disability
     - **I** Ice pack for 20 minutes every 2 - 4 hours when awake for the first 48 hours then cease
     - **C** Compression bandage e.g. crepe bandage
     - **E** Elevate to hip level to minimise swelling (ankle sprain)
   - Analgesia e.g. paracetamol
   - Review in 48 hours and then in 7 days
   - Strap / bandage
   - For ankle sprain, use partial weight bearing crutches for 48 hours or until standing is no longer painful, then encourage full weight bearing and full range of movement
   - For severe sprain:
     - as above
     - MO may advise temporary splint e.g. plaster of paris until review
     - consult MO / Physiotherapist if available

6. **Follow up**
   - For mild / moderate sprains review patient in 48 hours and again in one week to check progress. Consult MO if required
   - For severe sprain consult MO

7. **Referral / consultation**
   - In mild / moderate sprains - if pain free movement not achieved in 6 weeks refer to MO / Physiotherapist if available
**Compartment syndrome**

**Recommend**
- Urgent evacuation to facility with appropriate surgical capability

**Background**
- In compartment syndrome limb swelling compromises blood supply to the limb due to increased pressure in muscle and fascial compartment. If not released patient’s limb is compromised
- Limb is not always fractured, crush injury may cause compartment syndrome

**Related topics**
- Trauma and injuries
- Complicated fractures
- Tetanus immunisation

1. **May present with**
   - Pain disproportionate to injury
   - Severe pain on distal movement of limb e.g. great toe
   - In conjunction with crush injury to arm or leg
   - Often is associated with lower limb (tibial) fractures

2. **Immediate management**
   - Rest and elevate the limb
   - Consult MO as soon as possible
   - The severe pain is due to limb ischaemia and requires urgent surgical treatment
   - Insert IV cannula

3. **Clinical assessment**
   - See Simple fractures
   - Look for signs of compartment syndrome - is patient able to actively extend their great toe?
   - Patient experiences severe pain on passive extension or flexion of great toe by examiner
   - In the arm, movement of any finger causes severe pain
   - Are peripheral pulses present? Peripheral pulses may or may not be palpable
   - May affect arm or leg compartments
   - Any altered sensation distal to injured area?

4. **Management**
   - Consult MO urgently
   - If not allergic, give morphine (preferable) or if allergic to morphine give fentanyl. Contact MO for children
   - Give metoclopramide (adult) if nauseated or vomiting
   - Children should not receive metoclopramide (Maxolon) or prochlorperazine (Stemetil) because of the high risk of dystonic reactions. If an antiemetic is required for a child the MO may advise ondansetron wafer 4 mg
   - Arrange urgent evacuation for surgical release
Fractures dislocations and sprains

<table>
<thead>
<tr>
<th>Schedule</th>
<th>8</th>
<th>Morphine sulphate</th>
<th>DTP</th>
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Authorised Indigenous Health Workers must consult MO / NP

Scheduled Medicines Rural & Isolated Practice Registered Nurses may proceed

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
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<tbody>
<tr>
<td>Ampoule</td>
<td>10 mg / mL</td>
<td>IM</td>
<td>Adults only</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>0.1 - 0.2 mg / kg up to a max. of 10 mg</td>
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<tr>
<td></td>
<td></td>
<td>IV</td>
<td>Adults only</td>
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<td></td>
<td></td>
<td></td>
<td>2.5 mg increments slowly, repeated every 10 min if required to a max. of 10 mg</td>
<td>Further doses on MO / NP order</td>
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</tbody>
</table>

Provide Consumer Medicine Information: advise can cause nausea and vomiting, drowsiness

Management of associated emergency: caution - in the elderly and those with significant renal / liver disease. Respiratory depression is rare - if it should occur give naloxone. See Poisoning / overdose - opiates NB: as naloxone counteracts the narcotic, it may cause the return of severe pain

• If allergic to morphine or significant renal disease give fentanyl. Note fentanyl has a rapid onset of action

<table>
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<tr>
<th>Schedule</th>
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<td>Ampoule</td>
<td>100 microgram / 2 mL</td>
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<td></td>
<td></td>
<td></td>
<td>1.5 microgram / kg to max. of 100 microgram</td>
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<td></td>
<td></td>
<td>IV</td>
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<td>25 microgram increments slowly, repeated every 10 min if required to a max. of 100 microgram</td>
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<td></td>
<td>Intranasal</td>
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<td></td>
<td>1.5 microgram / kg undiluted to a max. of 100 microgram</td>
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Administration instructions for intranasal fentanyl. Draw up dose into 1 mL or 2 mL syringe. If using a mucosal atomisation device (MAD) attach to the syringe. Position patient sitting up at a 45° angle or with head resting to one side. Position the atomiser or syringe into the nostril loosely, aiming for the centre of the nasal cavity. Depress the syringe plunger quickly. If 100 microgram / 2 mL is being used split the dose between both nostrils to minimise loss due to sneezing or swallowing. Intranasal fentanyl may be unreliable if patient has blocked nose

Provide Consumer Medicine Information: advise can cause nausea and vomiting, drowsiness

Management of associated emergency: respiratory depression is rare. If it should occur give naloxone. See Poisoning / overdose - opiates NB: as naloxone counteracts the narcotic, it may cause the return of severe pain

[7]

[3] [9]
• If nauseated or vomiting and not allergic give metoclopramide

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<th>Metoclopramide</th>
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<td>10 mg / 2 mL</td>
<td>IM or IV (IHW may not administer IV)</td>
<td>Adults only 10 mg</td>
<td>Stat Further doses on MO / NP order</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: not for use in patients with Parkinson's disease or children and use caution in women < 20 years of age

Management of associated emergency: dystonic reactions e.g. oculogyric crisis are extremely rare (unless repeated doses or in children). If oculogyric crisis develops give benztropine 2 mg IM or IV. See Mental health behavioural emergencies

5. **Follow up**
   - As per MO advice

6. **Referral / consultation**
   - Consult MO on all occasions of suspected compartment syndrome

**References**
Acute wounds

Recommend
- Examine all wounds for foreign bodies, bony injuries, damage to vessels, nerves and tendons, and for injury to surrounding structures
- Do not remove any large penetrating objects. Consult MO
- Never:
  - use lignocaine with adrenaline in or near fingers, toes, ears, nose, penis, scrotum
  - shave / cut eyebrow when repairing wound

Background
- The aim of proper wound care is to achieve healing without infection, scarring and deformity
- Wounds are produced by two basic injuries:
  - sharp (cutting) injuries, which produce straight edged wounds that usually heal well or
  - blunt (crush / blow) injuries, which produce jagged irregular wounds, that are more difficult to repair, tend to be dirtier and have a higher risk of infection
- Specific terms:
  - primary closure is the cleaning and repair of wounds within 6-8 hours after injury. This usually leads to the best outcome, with least scarring
  - delayed primary closure is the delay of repair for a few days to allow for proper cleaning, usually seen in dirty or complex wounds
  - healing by secondary intention is leaving the wound to heal naturally, where the only intervention would be proper cleaning, appropriate dressings and/or antibiotics if indicated for infection. There is no formal closure of the wound (i.e. with sutures). Scarring may be more extensive when this method is required
  - debridement is the removal of dead and dying tissue from in and around a wound, usually with a scalpel or scissors. The longer the delay before repair, the greater amount of dead tissue will be present (delayed primary closure involves debridement before closure). Any necrotic tissue in a wound will delay its healing

Related topics
- Trauma and injuries
- Chest injuries
- Tetanus immunisation
- Marine lacerations
- Bacterial skin infections
- Human tooth-knuckle injuries
- Abdominal injuries
- Complicated fractures
- Abdominal injuries
- Dressings for acute wounds / minor burns
- Chronic wounds

1. May present with
   - As part of Trauma and injuries
   - Isolated wound secondary to blunt or sharp trauma

2. Immediate management
   - Stop any bleeding by applying direct pressure and / or pressure bandaging
   - Do not use a tourniquet; if you think one is needed consult MO urgently. Suturing the wound or using hair as a tie [1] is very effective at stopping bleeding, especially small scalp wounds
   - If blood loss is heavy or continuing or there is hypotension / shock, insert largest possible IV cannula (14 g or 16 g)
• It is usual to start with IV normal saline or Hartmann’s solution. MO will advise quantities and rate. In an adult the aim is to keep:
  - HR < 120 bpm - related to age
  - systolic BP > 100 as per MO advice
  - urine output > 0.5 mL / kg / hr

3. Clinical assessment

• Take patient history including circumstances of injury:
  - how and when did the injury happen?
  - type of injury / wound and time until presentation (will impact on the management and healing of the wound)
  - where did the injury occur? dirt, oil, water and other environmental hazards will all affect healing
  - does the patient have peripheral vascular disease - diabetes, smoking, steroid medications which may affect healing?

• When was the last tetanus vaccination? See Tetanus immunisation

• In medication history ask patient if they are on aspirin, warfarin or have any bleeding disorder

• Perform standard clinical observations

• Perform physical examination:
  - site of injury
  - could there be a foreign body? Suspect one if the injury involved:
    ○ stepping on anything (glass, wood / sticks, metal, fish barbs, bones, some grasses)
    ○ projectiles thrown by machinery
    ○ mulga stick
    ○ assault with knives, bottles, glass, spears, arrows etc.
    ○ a limb going through glass such as windscreen injuries
  - try to determine the direction of entry. This will help track the wound
  - explore the wound (this will need to be done after local anaesthetic), with a small probe or forceps - can often feel foreign body before seeing it
  - do not explore deep wounds near large vessels i.e. neck, groin, armpits or with spurting blood - consult MO
  - how long and how deep is the wound?
  - is it still bleeding? Oozing dark blood suggests venous bleeding. Spurting blood is from a severed artery
  - is there visible damage or division of structures e.g. tendons, nerves, bone?
  - is there any skin or tissue loss?
  - inspect the local structures and surrounding area. With wounds on the limbs there is risk of damage to tendons, nerves and vessels which will affect function further down the limb:
    ○ check colour, warmth and pulses below the wound
    ○ check sensation around and below the wound (do this before putting in any anaesthetic)
    ○ get the patient to move the joints above and below the wound; pain in the wound or in the muscles involved suggests tendon or muscle injury. With arm and hand injuries, assess the tendons of the hand through range of movement of any underlying tendons:
      ◊ extensors: straighten the fingers against resistance
      ◊ flexors: squeeze your fingers
      ◊ thumb: raise it to the ceiling (palm up), and also make an ‘O’ with the little finger, both against resistance
  - is there bony tenderness to suggest an underlying fracture?
  - is there increasing swelling to suggest bleeding into the tissues?
Acute wounds

- X-ray, if available
  - if in doubt whether there is a fracture underlying the wound. Needs to be treated as a compound fracture. See Complicated fractures
  - to help localise a foreign body. Metal, bones and most glass are radio-opaque. However some glass is not, and nor is wood, grass, plastic, stone. “No foreign body on x-ray” does not exclude a foreign body in the wound, unless you are sure it would be radio-opaque
  - if in a facility where available, ultrasound with small parts probe is best
- With wounds to the chest and abdomen, be wary of penetration through the body wall. If this is possible, or you are concerned, consult MO. See Chest and / or Abdominal injuries
- Document findings carefully

4. Management

- Consult MO
- Patients with damaged or divided tendons, nerves and vessels will need evacuation / surgery
- Analgesia: oral paracetamol

  See Simple analgesia back cover

- Local anaesthesia, usually after basic wound cleaning:
  - 1% plain lignocaine is used in most wounds. Warn the patient it will hurt as it goes in; inject via the wound and under the skin i.e. don’t go through normal skin, it hurts more
  - 1% lignocaine with adrenaline, consult MO: very useful for wounds on the trunk and scalp, as the anaesthesia lasts longer and the adrenaline cuts down bleeding. However, it should never be used in or near fingers, toes, ears, nose, penis or scrotum

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<td>Scheduled Medicines Rural &amp; Isolated Practice Registered Nurses may proceed</td>
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<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
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</thead>
<tbody>
<tr>
<td>Ampoule</td>
<td>1% 50 mg / 5 mL</td>
<td>Subcutaneous</td>
<td>Adult 3 mg / kg to total max. infiltration of 200 mg Child 3 mg / kg / dose to max. 5 mg / kg / dose</td>
<td>Stat Do not repeat the total max. dose at intervals of &lt; 1.5 hours</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information

Management of associated emergency: resuscitation equipment available. Consult MO
**Preparation for wound repair:**

- Remove rings, watches etc. from the affected limb
- Use a sterile field
- Clean the wound thoroughly using normal saline. Antiseptic can be used for the surrounding skin. If there is a lot of dirt, grass or contamination, running tap water is very effective
- Deeper wounds need irrigation to get dirt out. The patient will need local anaesthetic or pain relief before you do this. Use a blunt drawing up needle or 18g cannula, without the stilette, on a 20 mL syringe and squirt normal saline into the wound. Repeat this a number of times

**Do not close wounds that are:**
- over 8 - 12 hrs old - this is not absolute, consult MO
- dirty, contaminated or infected
- complicated fractures
- bites (consult MO)
- tooth / knuckle injuries
- marine (coral cuts etc.)

**Wound closure:**

There are 5 main options for wounds:

1. Leave it open to the air:
   - for grazes and very superficial cuts in clean dry areas of the body
2. Simple dressings:
   - for grazes and small cuts in moist areas (groins, armpits etc.) and areas of the body prone to getting dirty
3. Adhesive skin strips e.g. Steristrips®:
   - good for children, small lacerations, some facial wounds and finger lacerations, skin tears in the elderly and especially for wounds over the shin (even large ones)
   - don’t work well in larger (>2 - 3 cm) or gaping wounds, those under tension, or wounds in very mobile parts of the body (joints). Don’t use them if they are likely to get wet or rub off; suture instead
   - 3M Cavilon® skin barrier wipe on the skin helps them stick
4. Sutures:
   - nylon or silk sutures are used for the skin:
     - 5/0 or 6/0 for the face
     - 4/0 or 5/0 for hands
     - 3/0 for the back, soles and sometimes scalp and calf
     - 4/0 everywhere else
   - absorbable sutures e.g. vicryl rapide, can be used for deeper layers, mucosa of the mouth and vagina
   - sutures cause a normal pink foreign body inflammation around the wound. This is lessened with synthetic sutures
5. Skin glue e.g. Dermabond® glue
   - skin glue is typically used in areas where:
     - 5/0 or 6/0 non absorbable sutures are used i.e. face, torso and extremities
     - the wound is less than 3 cm in length with edges easily held together
     - the wound is an uncontaminated superficial wound

*After repairing the wound, elevation is very important to lessen pain, swelling and risk of infection*
Acute wounds

- **Removal of sutures**
  - scalp 6 days
  - face in 3 - 5 days
  - hands, arms 7 - 10 days
  - trunk and legs in 10 - 14 days
  - Some or all sutures may come out sooner if the wound becomes infected and later if the wound does not look and feel firm yet. It may help to apply adhesive skin strips e.g. Steristrips® after removal

- **Suturing**
  The aim is to eliminate dead space in the wound, evert the skin edges (like puckered lips) and bring skin edges together with the minimum of tension
  - clean and debride the wound first. Take your time
  - hair can be removed from the wound edges with scissors or a scalpel blade, but keep it to a minimum - approximately 1 cm. Never remove eyebrows
  - do not suture a wound that needs a lot of tension to bring it together e.g. where there has been tissue loss. Keep it clean and consult MO
  - enter the skin with the needle about 5 mm from the wound edge; go straight down, across, then straight up and exit the skin about 5 mm from the wounds other edge
  - place the first suture halfway along the wound, and continue to divide the wound in half with the other sutures. This will bring the edges together well. The first suture makes it easier to put all the rest in, but it may lose tension when the others are completed. If so, take it out
  - when suturing a ‘V’ or ‘Y’ shaped wound, align the point of the ‘V’ first
  - if the wound crosses wrinkles or skin creases, these must be lined up as well as possible
  - don’t be afraid to take sutures out again if they are in the wrong place
  - if you are not happy repairing any wound, don’t do it [1]. Consult MO

![Diagram](a)

![Diagram](b)

[1]
• Special lacerations:
  - faces:
    o only repair these if you are confident of getting a good result, as cosmetic outcome is very important. They should be repaired within 6 - 8 hours of injury. A dressing on the repaired wound is not always necessary. Be aware that there may be damage to facial nerves
  - inside the mouth:
    o these heal very well without sutures, unless there is full thickness penetration of the cheek, in which case they need specialised repair, consult MO. It will look grey and sloughy after a few days, but mouth rinses after each meal will help to keep it clean and it should be healed within a week
  - lips:
    o lips swell enormously when wounded. Keep the number of sutures to a minimum or they will cut out of the tissue as it swells. Lips often only need suturing if there is gross displacement of large flaps. Small lacerations will heal without sutures as for ones inside the mouth. Note: if the wound crosses the edge of the lip onto normal skin (the vermilion border) it needs to be realigned exactly to avoid an unsightly cosmetic result
  - eyelid:
    o if these are full thickness they need specialised repair. Consult MO
  - fingers:
    o finger lacerations - check for tendon and nerve damage
    o fingers swell after injury so ensure rings are taken off
    o sutures will pull out of the tissue as the finger enlarges, so keep sutures to a minimum. Alternatively, use steristrips.
    o most finger lacerations can be treated without sutures; use steristrips carefully to keep wound edges approximated. Circumferential or tightly tensioned steristrips can cause vascular occlusion
    o apply a non-adherent dressing e.g. melolin, and bandage the whole finger so that it stays straight (if the finger is straight, the wound edges will stay together and it will heal). Review in 2 - 3 days
  - finger tips:
    o cuts to the finger tips often leave a flap of skin, which may or may not come off
  - skin not lost:
    o reapply the flap over the wound and secure it loosely with steristrips. Cover with a non-adherent dressing, and bandage the finger to keep it straight. Review in 2 - 3 days. Hopefully the flap will ‘take’ and act as a graft onto the wound. More often the flap will die off, but at least it covers the wound well until it heals
  - skin flap lost:
    o fingers regenerate skin very well, especially in children. Clean the wound and apply a vaseline gauze type dressing. If possible follow that with an absorbent foam dressing or a non-adherent dressing, then bandage the finger. Review daily. If large wounds (over 1 sq. cm) consult MO
  - crush injuries:
    o e.g. finger caught in a door - the finger often lacerate the skin and the nail. Leave the nail on if at all possible. Clean and dress the finger, and review daily. Consult MO and x-ray to look for an underlying fracture, which should be treated as a complicated fracture. See Complicated fractures
Acute wounds

- amputations:
  - surgical repair may be possible
  - clean the stump, and apply a simple normal saline dressing to keep it moist
  - put the amputated part in a clean plastic bag and seal it. Put this bag in a mix of crushed ice and water (the amputated part should not get wet or frozen) for transport
  - consult MO who will arrange evacuation / hospitalisation in an appropriate facility
  - don’t forget to send the amputated part with the patient

- Skin glue
  A tissue adhesive glue can be used successfully to close superficial, smooth and clean wounds. Skin glue is typically used in areas where:
  - 5/0 or 6/0 non absorbable sutures are used i.e. face, torso and extremities
  - the wound is less than 3cm in length with edges easily held together
  - the wound is an uncontaminated superficial wound
  - skin glue should not be used in the following:
    - mucosal surfaces, mucocutaneous junctions, hands, feet, or joints
    - areas where wound is under tension
    - areas of high or prolonged moisture or dense hair and
    - in patients who have:
      - peripheral vascular disease
      - diabetes
      - prolonged corticosteroid use
      - a sensitivity to formaldehyde

Skin glue should never be placed in the wound or subcutaneously as it can cause necrosis or foreign body reaction and tattooing. Avoid contact around eyes. Eye should be padded to avoid any glue dripping in the eye or onto the eye lashes [4]

- application method (See diagram on next page)
  - approximate the skin edges (no dead space) and paint the wound line with a small amount of glue
  - apply the glue in multiple thin layers (at least 3), allowing time for drying between each application. Skin glue generates heat and may be uncomfortable if applied too thickly
  - avoid introducing any glue into wound or glueing yourself (including gloves or equipment) to the patient
  - continue to hold the wound edges together for at least 30 seconds after applying the glue. This method prevents pooling or running of the glue
  - subsequent layers can be applied over the top of the initial layer
  - if gluing the forehead or in the vicinity of the eye, the eye should be padded to avoid any glue dripping into the eye or onto eyelashes
  - skin glue does not require removal - sloughs off in 5 to 10 days [4]

• Antibiotics
  - are not needed for recent clean wounds, especially if cleaned properly
  - should be used for:
    - compound fractures. See Complicated fractures
    - marine wounds. See Marine lacerations
    - bites. See Human tooth-knuckle injuries
    - established infection. See Bacterial skin infections
    - people with heart disease affecting the valves - consult MO
Acute wounds

5. Follow up

- All lacerations should be reviewed after 1 - 2 days, and again after 5 - 7 days

6. Referral / consultation

- Consult MO as above and if:
  - tendons, nerves and vessels are involved
  - any wound is not healing
  - infection does not settle. See Bacterial skin infections

Digital nerve block

Digital nerves run along each side of the phalanx. By infiltrating lignocaine around the nerves, the digit is anaesthetised. Thumbs and great toes can be more difficult to anaesthetise

Technique

- Use 1% plain lignocaine. Never use lignocaine with adrenaline
- Use a sterile field
- Clean the digit with alcohol antiseptic
- Infiltrate the lignocaine near the digital nerve on each side of the dorsum of the finger, avoiding the joint. Keep infiltration as close to the bone as possible
- Use approximately 1 - 2 mL of lignocaine on each side (thumbs and great toes may require more)
- Draw back regularly to avoid injecting into a blood vessel
- Wait 5 minutes for the anaesthetic to take effect

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<td>Child 3 mg / kg / dose to max. 5 mg / kg / dose</td>
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Provide Consumer Medicine Information

Management of associated emergency: resuscitation equipment available - consult MO

[2] [3]
**Digital nerve block**

![Digital nerve block illustration]

**Removal of tight ring [1]**

Using 3/0 nylon suture material or other strong fibre e.g. string, dental floss

- Soap the finger first
- Feed one end of fibre under ring (a paper clip makes a good hook)
- Holding one end, wind fibre firmly and closely around the finger
- Keep tension on the fibre
- Unwind the fibre
- Several repetitions of the process may be required. If unsuccessful use ring cutter
Removal of small embedded fish hook
Large hooks may require surgical intervention. Consult MO

Method 1.
1. A length of string or fishing line tied in a loop is looped around the bend in the hook as shown
2. A quick, firm tug on the loop of string is necessary to dislodge the hook
   - in most cases local anaesthesia is unnecessary
   - local anaesthesia may be necessary if the hook is awkwardly placed e.g. the finger is encircled by the bend in the hook making placement of the loop difficult

Method 2.
1. Insert a hypodermic needle along the barbed side of the hook, with the bevelled part of the point towards the inside of the hook’s curve
2. Pull gently on the shank to disengage the barb inside of the hook’s curve
3. Then push the needle gently downwards until its hole locks over the barb
4. Rotate the hook shank slightly downward and the hook curve upwards until the needle and hook are removed through the original wound

Method 3.
1. Always have needle holding forceps holding at least one end of the hook, so as not to lose the hook
2. Grip the hook with needle holding forceps advancing the hook through the tissue until the barb end of the hook penetrates through the skin at a separate location
3. Cut the eye off the hook with a pair of wire cutters. Watch your eyes! Protect them as part of the hook might cause damage when cut with wire cutter
4. Grip it firmly and pull it out
Recommend
- Consult MO:
  - any marine lacerations, stings or wounds that cannot be adequately excised and cleaned
  - wounds over chest or abdomen
  - wound not healing
  - if patient is diabetic
  - if patient has liver disease

Background
- Wounds sustained in salt water e.g. coral cuts, are prone to infection with a wide range of organisms

Related topics
- Acute wounds
- Toxinolgy (bites and stings)
- Tetanus immunisation
- DRS ABCD resuscitation / the collapsed patient

1. May present with
   - Cut / laceration(s) from coral, oysters, bottles on the beach, sharp objects in fresh water or salt water
   - Fish stings
   - Foreign body - imbedded stingray barb, fish spine (from bullrout, catfish, stonefish), glass
   - Fever, cellulitis

2. Immediate management
   - If associated with envenomation may require resuscitation. See DRS ABCD resuscitation / the collapsed patient

3. Clinical assessment
   - See Acute wounds

4. Management
   - Consult MO for / if:
     - any marine lacerations, stings or wounds that cannot be adequately excised and cleaned
     - wounds over chest or abdomen
     - wound not healing
     - if patient is diabetic
     - if patient has liver disease
   - Give analgesia if required

See Simple analgesia back cover

- Thorough wound cleaning is essential. See Acute wounds
- Do not suture. Allow to heal by secondary intention, unless a large wound in which case consult MO as delayed primary closure may be required
- May require incision of wound and removal of foreign body
- Close supervision is required as infection may spread rapidly - instruct patient to return if any signs of infection - redness, swelling, increase in pain
• If marine laceration is infected - if not allergic, treat with cephalaxin + doxycycline
• Take wound swab for MC/S to guide subsequent treatment
• Check tetanus status  See Tetanus immunisation

<table>
<thead>
<tr>
<th>Schedule</th>
<th>4</th>
<th>Cephalaxin</th>
<th>DTP IHW / SM R&amp;IP / IPAP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Form</strong></td>
<td><strong>Strength</strong></td>
<td><strong>Route of administration</strong></td>
<td><strong>Recommended dosage</strong></td>
</tr>
<tr>
<td>Capsule</td>
<td>250 mg 500 mg</td>
<td>Oral</td>
<td>Adult 500 mg qid</td>
</tr>
<tr>
<td>Suspension</td>
<td>125 mg / 5 mL 250 mg / 5 mL</td>
<td>Oral</td>
<td>Child 12.5 mg / kg / dose qid to a max. of 500 mg qid</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information
Management of associated emergency: as for severe allergic reactions.  See Anaphylaxis

<table>
<thead>
<tr>
<th>Schedule</th>
<th>4</th>
<th>Doxycycline</th>
<th>DTP IHW / SM R&amp;IP / IPAP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Form</strong></td>
<td><strong>Strength</strong></td>
<td><strong>Route of administration</strong></td>
<td><strong>Recommended dosage</strong></td>
</tr>
<tr>
<td>Tablet</td>
<td>50 mg 100 mg</td>
<td>Oral</td>
<td>Adult Initial dose 200 mg then 100 mg bd</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Child over 8 yrs Initial dose 5 mg / kg / dose to a max. of 200 mg then 2.5 mg / kg / dose bd to a max. of 100 mg bd</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: take with food.  Do not take at the same time as iron, calcium or antacids.  Avoid excess exposure to sunlight - can cause photosensitivity

Management of associated emergency: consult MO

• If allergic to penicillin treat with clindamycin and doxycycline
Acute wounds

### Schedule 4 Clindamycin DTP

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capsule</td>
<td>150 mg</td>
<td>Oral</td>
<td>Adult: 450 mg tds</td>
<td>7 - 10 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Child: 10 mg / kg / dose / tds, to a max. of 450 mg tds</td>
<td></td>
</tr>
</tbody>
</table>

There is no oral liquid, however a 50 mg / mL clindamycin solution can be made before each dose by:
- dissolving the contents of 1 capsule in 2 mL water
- draw this solution into a syringe and make the volume up to 3 mL
- discard any excess solution so that the correct dose remains in the syringe
- mix the dose in juice or soft food to disguise the taste before giving

Provide Consumer Medicine Information: advise patient the use of clindamycin can lead to severe colitis (inflammation of the bowel). If they experience diarrhoea while taking the drug or up to several weeks after the treatment contact their MO or return to the clinic and have a stool specimen taken for Cl. difficile [8]

Management of associated emergency: consult MO

#### 5. Follow up
- All marine lacerations should be monitored closely as infection may spread rapidly
- instruct patient to return if any signs of infection i.e. redness, swelling, increase in pain
- Review at a minimum 1 - 2 days and again after 5 - 7 days, or earlier if necessary

#### 6. Referral / consultation
- Consult MO as above and if: tendons, nerves and vessels are involved, any wound is not healing, infection, wound over chest or abdomen
**Human (tooth knuckle) and animal bites**

**Recommend**
- Consider dog and cat bites to be usually infected. Human bites are **always** infected.

**Background**
- A tooth-knuckle injury is a bite injury from a punch in the mouth. The wound is very close to joints and tendons, and there is a risk of damage to both, with high risk of infection causing osteomyelitis or septic arthritis. **These can be very serious** and end up in an amputation. If there is tendon involvement or bony tenderness consult MO.

**Related topics**
- Acute wounds
- Tetanus immunisation

1. **May present with**
   - History of fight / punch / bite
   - Injury to hand / knuckles
   - Evidence of human or animal bite to some part of patient’s body

2. **Immediate management**
   - Attend to any bleeding. **See Acute wounds**

3. **Clinical assessment**
   - **See Acute wounds**

4. **Management**
   - Consult MO for all tooth knuckle injuries
   - Low risk wounds:
     - antibiotics may not be necessary for:
       - mild wounds not involving tendons or joints
       - wounds that can be adequately debrided and irrigated
       - that are seen within 8 hours [10]
     - consult MO if presentation is delayed or infection established (swelling, decreased range of movement, or pus), patient will need IV antibiotics e.g. ceftriaxone and oral metronidazole, and likely evacuation / surgical drainage
   - High risk wounds:
     - wounds having a high risk of infection include:
       - wounds with delayed presentation (8 hours or more)
       - puncture wounds unable to be debrided adequately
       - wounds on hands
       - wounds with underlying structures involved e.g. bones, joints, tendons
       - wounds in the immunocompromised patient [10]
   - Assess for need for tetanus prophylaxis. **See Tetanus immunisation**
   - Thorough wound cleaning is essential. **See Acute wounds**
   - Debride dead tissue and irrigate copiously
   - Do not suture. Allow to heal by secondary intention
   - Larger wounds may need delayed primary closure. Consult MO
   - Review daily and dress with non-adherent dressing e.g. melolin
   - If not allergic treat with amoxycillin / clavulanate
## Acute wounds

<table>
<thead>
<tr>
<th>Schedule</th>
<th>4</th>
<th>Amoxycillin / clavulanate</th>
<th>DTP</th>
<th>IHW / SM R&amp;IP / IPAP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>IHW</td>
<td>SM R&amp;IP / IPAP</td>
</tr>
</tbody>
</table>

| Authorised Indigenous Health Workers and Isolated Practice Area Paramedics must consult MO / NP |
| Scheduled Medicines Rural & Isolated Practice Registered Nurses may proceed |

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tablet</td>
<td>875 / 125 mg</td>
<td>Oral</td>
<td>Adult</td>
<td>5 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>875 / 125 mg bd</td>
<td></td>
</tr>
<tr>
<td>Suspension</td>
<td>125 mg / 31.25 mg per 5 mL</td>
<td>Oral</td>
<td>Child</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or 400 mg / 57 mg per 5 mL</td>
<td></td>
<td>22.5 + 3.2 mg / kg / dose to a max. of 875 + 125 mg bd</td>
<td></td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: take immediately before food.

Management of associated emergency: as for severe allergic reactions. See Anaphylaxis.

- If lack of observance is anticipated or delay in commencing oral antibiotics treat with IM procaine penicillin followed by amoxycillin / clavulanate as above [10].

### Procaine penicillin

<table>
<thead>
<tr>
<th>Schedule</th>
<th>4</th>
<th>Procaine penicillin</th>
<th>DTP</th>
<th>IHW / SM R&amp;IP / IPAP</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>IHW</td>
<td>SM R&amp;IP / IPAP</td>
</tr>
</tbody>
</table>

| Authorised Indigenous Health Workers and Isolated Practice Area Paramedic must consult MO / NP |
| Scheduled Medicines Rural & Isolated Practice Registered Nurses may proceed |

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disposable syringe</td>
<td>1.5 g</td>
<td>IM</td>
<td>Adult</td>
<td>Stat</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1.5 g</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Child</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>50 mg / kg / dose to a max. of 1.5 g</td>
<td></td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information

Management of associated emergency: as for severe allergic reactions. See Anaphylaxis.

Administration tips - as per patient preference:
- apply EMLA cream to the injection site 30 - 60 minutes prior to injection and allow medication to warm up to room temperature or
- allow medication to warm up to room temperature, apply pressure with thumb (to the exact injection site) 30 seconds prior to the injection, use 21 gauge needle and deliver injection very slowly (2 minutes)

- If allergic to penicillin, treat with metronidazole and doxycycline.
Acute wounds

Schedule 4 Metronidazole DTP
IHW / SM R&IP / IPAP

Authorised Indigenous Health Workers and Isolated Practice Area Paramedic must consult MO / NP
Scheduled Medicines Rural & Isolated Practice Registered Nurses may proceed

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tablet</td>
<td>200mg 400 mg</td>
<td>Oral</td>
<td>Adult 400 mg bd</td>
<td>5 days</td>
</tr>
<tr>
<td>Suspension</td>
<td>200 mg / 5 mL</td>
<td></td>
<td>Child 10 mg / kg / dose bd to a max. of 400 mg bd</td>
<td></td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: avoid alcohol while taking and for 48 hrs after taking this drug. Take with food or immediately after food
Management of associated emergency: consult MO

• and

Schedule 4 Doxycycline DTP
IHW / SM R&IP / IPAP

Authorised Indigenous Health Workers and Isolated Practice Area Paramedic must consult MO / NP
Scheduled Medicines Rural & Isolated Practice Registered Nurses may proceed

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tablet</td>
<td>50 mg 100 mg</td>
<td>Oral</td>
<td>Adult Initial dose of 200 mg then 100 mg daily</td>
<td>5 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Child over 8 yrs Initial dose 5 mg / kg / dose to a max. of 200 mg then 2.5 mg / kg / dose daily to a max. of 100 mg daily</td>
<td></td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: take with food. Do not take at the same time as iron, calcium or antacids. Avoid excess exposure to sunlight - can cause photosensitivity
Management of associated emergency: consult MO

5. **Follow up**
   - All bites should be reviewed daily, especially tooth knuckle injuries. If swollen, decreased range of movement or pus, consult MO

6. **Referral / consultation**
   - Consult MO for all tooth knuckle injuries and for all bites that are not healing
   - Referral to Physiotherapist for hand therapy
**Subungual (under the fingernail or toenail) haematoma**

Usually caused by a direct blow on to the end of a finger/toe. Blood collects under pressure beneath the nail, throbs and is very painful.

**Procedure for management if necessary for pain control:**

- Release of the blood is needed to ease the pain. The puncture is performed at the base of the nail where there is greater space between the nail and the bed (and more effective drainage) while reducing the chances of accidental (painful) penetration of nail bed.
- Attach a large (18 G) needle to a 3 mL syringe and using gentle downward pressure rotate it back and forth between thumb and forefinger until it drills through the base of the nail and blood seeps up through the hole.
- The nail should be painted or irrigated with betadine daily, then covered with a simple dressing for a few days.
- Heat the end of a straightened paper clip until red hot. Note: candles or gas lighters may deposit carbon on the nail which can result in tattooing.
- Gently push it vertically down into base of the nail over the blood, and the blood will escape through the hole.
- The blood separates the nail from the sensitive bed underneath, so the process will be painless.
- Check last tetanus vaccination. See Tetanus immunisation.
- A large haematoma i.e. almost the whole nail area, is usually caused by much greater force, and may have a significant laceration to the nail bed with fracture of the underlying bone. Consult MO who may order x-ray if available.
- Check daily for a few days.

**References**

Burns

**Recommend**

- Contact MO early for analgesia order in children
- Keep the patient with major burns warm with space blanket (especially children)
- Give analgesia as soon as possible (pain is a major presenting symptom in burns [1]. However patients with full thickness burns may have no pain)
- Provide first aid as soon as possible. Use cool running tap water (never ice or iced water) to stop burning. If chemical burn flush with copious amounts of water. If dry chemical first remove chemical prior to irrigation [1]. Be careful not to cause hypothermia, especially in children
- Cling wrap should be used for initial dressing for major burns [1]
- Consult MO as early as possible for:
  - patient may require intubation - respiratory problems may occur due to breathing in steam, flames, smoke or toxic fumes, or burns to head and neck
  - burns which circle a limb or chest (circumferential) may impair circulation and breathing. Urgent treatment may be required. Skin may need to be incised to restore circulation and breathing. This is called escharotomy and requires urgent consultation with the Burns Unit
  - burns involving face / neck / genitals / hands / feet
  - infant / babies
  - electrical burns as tissue damage may be deeper than it appears
  - chemical burns
  - any concerns / uncertainty with regard to patient or any burn meeting referral criteria
- For assistance with management of burns in North Queensland email pictures of burns to nq_paed_burns@health.qld.gov.au

**Background**

- Remember that burns with no splash marks and with defined lines around perineum, feet or hands in children may indicate non-accidental injury

**Related topics**

- Trauma and injuries
- Tetanus immunisation
- Intraosseous insertion
- DRS ABCD resuscitation / the collapsed patient
- O₂ delivery systems
- Shock
- Dressings for acute wounds and minor burns
- Electrocution / electric shock
- Poisoning - carbon monoxide / cyanide
On presentation of burn patient

First aid for burns
Stop, drop, cover and roll if on fire
Immerse / flush with cool running water for at least 20 minutes
Keep rest of body warm to prevent hypothermia
Remove clothing and jewellery

Perform primary and secondary surveys

Obtain clear history of burn injury
- mechanism of injury - how and when burnt?
- any first aid - what, how long?
- were clothes removed?
Continue cooling if within 3 hours of burn

Give appropriate pain relief

Assess % TBSA (total body surface area) using ‘rule of nines’

Do the patient’s burns meet referral criteria?
- Partial thickness burns >10% TBSA, full thickness >5% TBSA in adults
- Partial / full thickness burns in children >5% TBSA
- Any priority areas are involved i.e. face / neck, hands, feet, perineum, genitalia and major joints
- Caused by chemical or electricity, including lightning
- Any circumferential burn
- Burns with concomitant trauma or pre-existing medical condition(s)
- Burns with associated inhalation injury
- Suspected non-accidental injury
- Pregnancy with cutaneous burns

MO refer to appropriate Burns Unit:
• Qld Adult Burns Centre
  Royal Brisbane and Women’s Hospital
  ☎ 07 36368111
• The Townsville Hospital
  (for North Queensland children with up to 35% TBSA)
  Contact Paediatric Surgeon on call
  ☎ 07 47961111
• Royal Children’s Hospital Brisbane
  ☎ 07 3636 8111

Minor burn:
- Assess burn wound
- Apply appropriate dressing
- Arrange follow up dressing and review
- Prescribe pain relief as required

Yes

No
**Burn referral criteria (Australian and New Zealand Burns Association)** [2]

- Burns greater than 10% total body surface area (TBSA)
- Burns of special areas - face, hands, feet, genitalia, perineum and major joints
- Full thickness burns greater than 5% TBSA
- Electrical burns
- Chemical burns
- Burns with an associated inhalation injury
- Circumferential burns of the limbs or chest
- Burns at the extremes of age - children and the elderly
- Burn injury in patients with pre-existing medical disorders which could complicate management, prolong recovery or affect mortality
- Burn injury in pregnant women
- Any burn patient with associated trauma
- Non-accidental burns

**Assessment of % total body surface area (TBSA)**

**Rule of nines**

**Adult**

**Paediatric**

For every year of life after 12 months take 1% from the head and add ½% to each leg, until the age of 10 years when adult proportions

**Palmar**

Palm + fingers = 1%
## Burn assessment

<table>
<thead>
<tr>
<th>Depth</th>
<th>Pathology</th>
<th>Colour</th>
<th>Circulation</th>
<th>Sensation</th>
<th>Blisters</th>
<th>Healing time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Epidermal burn</strong></td>
<td>involves epidermis only</td>
<td>red (and warm to touch)</td>
<td>normal</td>
<td>present</td>
<td>none or later (days) or desquamation</td>
<td>within a few days</td>
</tr>
<tr>
<td>(erythema) 1st °</td>
<td></td>
<td></td>
<td>increased</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Superficial - mid dermal burn</strong></td>
<td>involves epidermis and upper dermis, most adnexal structures intact</td>
<td>pink</td>
<td>hyphaemic</td>
<td>painful + hypersensitive</td>
<td>yes (hours)</td>
<td>within 2 to 3 weeks by re-epithelialisation from epidermal elements in dermis minimal scarring</td>
</tr>
<tr>
<td>(superficial partial thickness) 2nd °</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mid - deep dermal burn</strong></td>
<td>involves epidermis and significant part of dermis, only deeper adnexal structures intact</td>
<td>pale pink / blotchy red</td>
<td>may be sluggish</td>
<td>decreased sensation</td>
<td>early; usually large and rupture within hours</td>
<td>longer than 2 to 3 weeks high risk of hypertrophic scarring</td>
</tr>
<tr>
<td>(mid - deep partial thickness) 2nd °</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Full thickness</strong></td>
<td>epidermis, dermis and cell adnexal structures destroyed</td>
<td>white and / or charred</td>
<td>nil</td>
<td>nil</td>
<td>no blistering (epidermis destroyed)</td>
<td>no healing granulation and wound contraction leads to chronic ulceration</td>
</tr>
<tr>
<td>3rd °</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[1] [6]
1. **May present with**
   - Pain or painless - patient with full thickness burns may have no pain
   - Visible and/or hidden burns
   - Associated respiratory burns, respiratory distress with stridor and/or wheeze
   - Hypotension
   - Shock
   - Altered level of consciousness from hypotension, head injury or inhalation burn
   - Associated traumatic injuries from fall, blast, structure collapse

2. **Immediate management**

   **DRS ABCD resuscitation / the collapsed patient**
   **Perform primary and secondary surveys**
   - Remove patient from danger (without endangering yourself)
   - Put out burning clothing e.g. rolling patient on the ground covered with a blanket
   - If clothing still smouldering put out with large amounts of cool water
   - Remove clothing as it holds heat against the skin
   - Immediately cool burnt area for 20 minutes under cool running water (can be tap water)
   - Give O\textsubscript{2} to maintain saturation >93% adult / 95% child. See O\textsubscript{2} delivery systems
   - If you suspect inhalation burns, i.e. black soot around the nose, mouth or face, burnt nasal hairs and altered voice, give O\textsubscript{2} via a non-rebreathing mask - a Hudson mask is not sufficient. Contact MO immediately. Consider intubation early as swelling may occur and compromise airway
   - Give analgesia
   - Cling wrap for initial dressing as keeps burn moist and allows easier assessment on arrival at Burns Unit. Do not wrap circumferentially around a limb. Wrap longitudinally to avoid circulatory compromise.[1]
   - Consult MO as soon as possible as patient may require intubation and fluid resuscitation [1]
   - Insert 2 large bore IV cannulas (14 g or 16 g, if possible). Insert the largest possible in the circumstances; through unburnt skin if possible but if necessary through a burnt area

3. **Clinical assessment**
   - Obtain emergency patient history including:
     - circumstances and mechanism of burn i.e. electrical, flame, contact, chemical, scald
     - note the time burns occurred, and
     - how long person was exposed to energy source [4]
     - whether in enclosed or open space - if enclosed greater risk of inhalation burn
     - is there a risk of other injuries such as fall from height, road accident, explosion [4]
     - any first aid measures taken
   - Perform standard clinical observations +
     - O\textsubscript{2} saturation
     - BGL
   - Inspect burnt area and work out the percentage of body surface and depth affected by burns [5]. Do not count areas that are only erythematous with red without blisters or loss of skin See Assessment of % total body surface area and Burn assessment
Burns

- Carefully inspect the mouth, nasal nares and auscultate the chest for air entry and added sounds to determine if respiratory tract burns
- For patchy burns in an adult, the area of patient’s hand is about 1% (roughly work out how many “hands” the burnt area covers)
- If able to, photograph burn wounds and send by email once discussed with relevant MO
- Burns are tetanus prone wounds. Check last tetanus vaccination. See Tetanus immunisation

4. Management
- Consult MO who will arrange retrieval for patients with major burns and advice for patients with minor burns. See Burn referral criteria
- Analgesia
  - MO will give order for analgesia in children
  - intravenous is the preferred route of administration for narcotic analgesics for severely injured patients if IV line insitu
  - give morphine (preferable) or if allergic to morphine give fentanyl. Give metoclopramide (adult) if vomiting or nauseated
  - children should not receive metoclopramide (Maxolon) or prochlorperazine (Stemetil) because of the high risk of dystonic reactions. If an antiemetic is required for a child the MO will likely advise ondansetron wafer

<table>
<thead>
<tr>
<th>Schedule</th>
<th>8</th>
<th>Morphine sulphate</th>
<th>DTP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Authorised Indigenous Health Workers must consult MO / NP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scheduled Medicines Rural &amp; Isolated Practice Registered Nurses may proceed</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampoule</td>
<td>10 mg / mL</td>
<td>IM</td>
<td>Adults only 0.1 - 0.2 mg / kg to a max. of 10 mg</td>
<td>Stat Further doses on MO / NP order</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IV (IHW may not administer IV)</td>
<td>Adults only 2.5 mg increments slowly, repeated every 10 min if required to a max. of 10 mg</td>
<td></td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: advise can cause nausea and vomiting, drowsiness
Management of associated emergency: caution - in the elderly and those with significant renal / liver disease. Respiratory depression is rare - if it should occur give naloxone. See Poisoning / overdose - opiates NB: as naloxone counteracts the narcotic, it may cause the return of severe pain

- If allergic to morphine or significant renal disease give fentanyl: N.B. fentanyl has a rapid onset of action
Burns

Schedule 8  
Fentanyl  
DTP  
IHW / SM R&IP

Authorised Indigenous Health Workers must consult MO / NP
Scheduled Medicines Rural & Isolated Practice Registered Nurses may proceed

<table>
<thead>
<tr>
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<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampoule</td>
<td>100 microgram / 2 mL</td>
<td>IM</td>
<td>Adults only</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1.5 microgram / kg to a max. of 100 microgram</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>IV (IHW may not administer IV)</td>
<td>Adults only 25 microgram increments slowly, repeated every 10 min if required to a max. of 100 microgram</td>
<td>Stat Further doses on MO / NP order</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intranasal</td>
<td>Adult only 1.5 microgram / kg undiluted to max. of 100 microgram</td>
<td></td>
</tr>
</tbody>
</table>

Administration instructions for intranasal fentanyl. Draw up dose into 1 mL or 2 mL syringe. If using a mucosal atomisation device (MAD) attach to the syringe. Position patient sitting up at a 45° angle or with head resting to one side. Position the atomiser or syringe into the nostril loosely, aiming for the centre of the nasal cavity. Depress the syringe plunger quickly. If 100 microgram / 2 mL is being used split the dose between both nostrils to minimise loss due to sneezing or swallowing. Intranasal fentanyl may be unreliable if patient has blocked nose [24]

Provide Consumer Medicine Information: advise can cause nausea and vomiting, drowsiness. Management of associated emergency: respiratory depression is rare. If it should occur give naltroxone. See Poisoning / overdose - opiates NB: as naltroxone counteracts the narcotic, it may cause the return of severe pain [1] [24] [25]

Schedule 4  
Metoclopramide  
DTP  
IHW / SM R&IP

Authorised Indigenous Health Workers must consult MO / NP
Scheduled Medicines Rural & Isolated Practice Registered Nurses may proceed

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampoule</td>
<td>10 mg / 2 mL</td>
<td>IM or IV (IHW may not administer IV)</td>
<td>Adults only 10 mg</td>
<td>Stat Further doses on MO / NP order</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: not for use in patients with Parkinson's disease or children and use caution in women < 20 years of age

Management of associated emergency: dystonic reactions e.g. oculogyric crisis are extremely rare (unless repeated doses or in children). If oculogyric crisis develops give benzoctropine 2 mg IM or IV See Mental health behavioural emergencies [7]

- Monitor clinical observations including urine output
  - MO may ask the patient to be catheterised
  - aim for 0.5 mL / kg / hour urine output in adults and 1 mL / kg / hour in children
- Fluid resuscitation in patients with 10% to 15% burns and above [1]
  - insert 2 largest possible bore IV cannula (14 g or 16 g, if possible). Insert through unburnt skin if possible but, if necessary through a burnt area
  - if intravenous access is unable to be established, intraosseous infusion
Burns provides a route for the administration of parenteral fluids and drugs in life threatening situations. See Intraosseous infusion

- IV Hartmann’s solution [1] is used for the first 24 hours after burns, MO will advise quantities and rate. Calculate fluid replacement as below:
  o modified Parkland formula: 3 to 4 mL x weight (kg) x % TBSA, given in first 24 hours (over and above maintenance fluids for children) [1]
  o half the fluid replacement is given in the first 8 hours, and the rest over the next 16 hours (the fluid replacement requirement must be worked out from the time of the burns, not the time the patient presents for treatment)

• Keep patient warm, wrap in space blanket
• Remove rings, watches, jewellery; cut if required
• Cover burns with cling film (Glad Wrap®); normal saline soaked gauze or non-adherent paraffin. Wrap longitudinally to avoid circulatory compromise
• Tar or bitumen: the cold bitumen will form a waterproof, sterile layer over the burn which will prevent the burn from drying out. Should specialist advice indicate that removal of the bitumen is necessary, the recommended medium for bitumen removal is paraffin oil [8]. See Bitumen burns under chemical burns
• Additional management issues:
  - extensive burns may cause ileus (bowel obstruction) in which case MO may advise to pass a nasogastric tube. Allow free drainage and aspirate periodically
  - remember the respiratory tract can be burnt. Patients can develop altered voice, stridor or wheezing. Early intubation and ventilation could be required. Consult MO urgently
  - antibiotics are only used when infection is proven from skin swab. Patients with major burns generally develop a raised temperature due to skin damage
  - keep the patient warm

5. Follow up
   ⊹ Transfer to Burns Unit
   ⊹ Speech Pathologist may be required for ongoing management of patients with respiratory burns

6. Referral / consultation
   ⊹ Consult MO regarding need for evacuation / hospitalisation in an appropriate facility. See Burn referral criteria
Burns

Burns dressing general principles [1]

- A dressing functions to relieve pain, absorb exudate, promote healing and prevent infection.
- Blisters may be left intact or lanced to remove fluid and decrease pressure on wound bed.
- Be aware of the patient’s medical co-morbidities and social circumstances.
- Commonly used dressing options include:
  - Flamazine cream (silver sulfadiazine cream) with melolin secondary dressing (except on face where paraffin is used) changed daily.
  - Bactigras.
  - Hydrogels - SoloSite® to keep burn moist if looks dry (alternatively dressings can be done daily).
  - Acticoat, can be used, but must be applied moistened with sterile / clean tap water.
  - Specialised burns dressing (Mepilex Ag®, applied under compression dressing).

Dressing for small burns

- If available, apply Acticoat® dressing, use hypoallergenic tape e.g. Hypafix®, for dressing retention, keep moist with sterile / clean tap water, can use a fine mist spray bottle. Review in 3 days. Oil, e.g. olive oil, can be used prior to dressing change to assist removal of tape. A non-adherent dressing, e.g. Duoderm® extra thin or bactigras can be used as an alternative dressing.
- Do not apply open weave retention / fixation sheets e.g. Hypafix® / Fixomull® / Mefix® directly to superficial burn as very painful to remove; can be applied over Duoderm®, Xeroform® or Tricotex® dressing.

Dressing for larger burns (dermal thickness)

- Acticoat® is the preferred dressing for dermal thickness burns, however a paraffin based dressing/ointment can be used.

<table>
<thead>
<tr>
<th>Schedule</th>
<th>4</th>
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</thead>
<tbody>
<tr>
<td>Silver sulphadiazine</td>
<td>DTP</td>
</tr>
<tr>
<td>IHW / SM R&amp;IP / IPAP</td>
<td></td>
</tr>
</tbody>
</table>

Authorised Indigenous Health Workers and Isolated Practice Area Paramedic must consult MO / NP.

Scheduled Medicines Rural & Isolated Practice Registered Nurses may proceed.

<table>
<thead>
<tr>
<th>Form</th>
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<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cream</td>
<td>1 %</td>
<td>Topical</td>
<td>Topically at each dressing change</td>
<td>3 days only</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information.

Management of associated emergency: consult MO.

[10] [11]
Burns

• Analgesia:
  - children and infants respond well to an initial therapeutic dose of intranasal fentanyl especially for superficial burns (intranasal fentanyl preferred as IM morphine absorption may be unreliable) until the pain subsides naturally after 1 - 2 hours. Consult MO
  - Oral analgesia may be adequate for patients with some minor burns

See Simple analgesia back page

5. Follow up
  - If in north Queensland pictures of burns can be emailed to nq_paed_burns@health.qld.gov.au at The Townsville Hospital for assistance with management of dressings
  - Review daily for 2 - 3 days. Change dressings when necessary, every 2 - 3 days if clean / not infected. Recommend daily dressing change for first 2 - 3 days until burn declares itself. Advise patient to try and avoid tank and / or bore water when washing as increases infection risk
  - Infection is indicated by fever, increasing wound pain, redness, swelling and purulent exudate. Take wound swab. Consult MO
  - See next MO clinic for any burns not healed in 10 days

6. Referral / consultation
  - Consult MO including need for transfer / hospitalisation in an appropriate facility.
  See Burn referral criteria
Recommend
- Immediate management with copious irrigation with sterile water or normal saline
- Do not attempt to neutralise the chemical as most resultant reactions produce heat and will exacerbate the injury (except in the case of hydrofluoric acid)
- Consult MO for all chemical burns, especially for any patient with chemical burns involving eyes

Background
- Alkali substances are found in the following: drain cleaners, oven cleaners, denture cleaners, cement, household bleach, pool chlorine, ammonia in cleaners and detergents and dishwashing detergents
- Acid substances include: toilet bowl cleaners, metal cleaners, battery fluid, fertiliser manufacturing, swimming pool cleaners, laboratory chemicals, rust proofing
- Hydrofluoric acid is a chemical compound used in electroplating, stain removal, glass etching, refining and light bulbs

Related topics
- Burns
- DRS ABCD resuscitation / the collapsed patient

1. May present with
   - Visible burns - may be little or no skin changes with hydrofluoric acid burn
   - Pain
   - Hypotension / shock
   - History of exposure to chemical agent
   - Hydrofluoric acid exposure
   - Pain may be extreme and out of proportion to burn appearance due to deeper tissue toxicity
   - Very rarely, low serum calcium, low serum magnesium or high serum potassium leading to cardiac arrest (may follow absorption of hydrofluoric acid by the skin from as little as a 2 % body surface area burn with concentrated 70 % hydrofluoric acid solution)

2. Immediate management
   - Take precautions (gloves, plastic apron, goggles) to prevent contact with spilt chemical directly or off the patient
   - Remove contaminated clothing
   - Irrigate with large amounts of running water (if cement or lime burns, brush off cement/lime dust and remove contaminated clothing before irrigating with large amounts of running water)

3. Clinical assessment
   - Include in history taking circumstances of chemical burn, agent if known, and time injury occurred. See Major burns / minor burns

4. Management
   - Consult MO
   - Do not attempt to neutralise the chemical as most resultant reactions produce heat and will exacerbate the injury (except in the case of hydrofluoric acid). See burns
Burns

• **Hydrofluoric acid burns:**
  - time from exposure to symptoms dependent on concentration of agent (> 40 % within an hour and < 10 % up to 24 hours)
  - burns of 3 - 4 % have caused deaths
  - weak acid that penetrates tissues very well and binds to calcium and magnesium
  - conversion of hydrofluoric acid to the calcium salt is not associated with heat production and is achieved by covering the burn with gauze soaked in 10% calcium gluconate solution. Alternatively 10 mL of 10 % calcium gluconate solution can be combined with 30 mL of water soluble gel and applied [13]
  - consult MO in all hydrofluoric acid burns. If pain and burning persist, MO may advise subcutaneous injection of 10 % calcium gluconate 0.5 mL / cm² area of burn
  - injection is usually very painful and indicated only in small, localised exposures
  - calcium chloride solution should not be used as it may cause tissue necrosis

• **Bitumen burns [8]:**
  - consult MO for all bitumen burns
  - the cold bitumen will form a waterproof, sterile layer over the burn which will prevent the burn from drying out. Should specialist advice indicate that removal of the bitumen is necessary, the recommended medium for bitumen removal is paraffin oil
  - partial thickness bitumen burns - after adequate cooling, the bitumen should be left in place and covered with a tulle dressing containing paraffin or a burn ointment containing paraffin e.g. SSD (silver sulphadiazine)
  - full thickness bitumen burns - active removal of the bitumen should be avoided unless primary surgical treatment is being considered due to the location and depth of the wound. In such cases bitumen removal is best carried out in the operating theatre
  - circumferential bitumen burns - where hot bitumen completely encircles a limb or other body part the cooled and hardened bitumen may cause a constricting effect. In the event of this occurring the adhering bitumen must be softened and / or split to prevent restriction of blood flow
  - bitumen burns to the eye - no attempt should be made to remove the bitumen. Refer urgently for specialist medical assessment and treatment
  - do not use petrol, kerosene or acetone as these can cause toxicity

5. **Follow up**
   - See Major burns / minor burns

6. **Referral / consultation**
   - See Major burns / minor burns
   - In addition consult MO in all hydrofluoric acid burns
## Burns and other wound management dressings [6]

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Silicone</strong> e.g. Mepilex Lite® hydrophilic polyurethane foam + soft silicone layer + waterproof outer layer. Also Mepilex Ag® (silver)</td>
<td>Non-adherent Conformable</td>
<td>Superficial burns</td>
<td>Apply to clean wound bed Cover with fixation / retention dressing</td>
<td>Do not use if any infection</td>
</tr>
<tr>
<td><strong>Hydrocolloid</strong> e.g. Comfeel®, Duoderm® or hydrocolloid wafer</td>
<td>Aids autolysis of devitalised tissue Provides moist wound environment Absorbs exudate</td>
<td>Superficial to mid dermal burns Low to moderately exudating wounds</td>
<td>Allow 2 - 5 cm margin around wound Can remain intact 2 - 3 days Wafers up to 5 days if no signs of infection</td>
<td>Do not use if any infection</td>
</tr>
<tr>
<td><strong>Vaseline gauze</strong> e.g. Bactigras, Chlorhexidine impregnated vaseline gauze Also Jelonet®, Adaptic® etc.</td>
<td>Antiseptic dressing Conformable</td>
<td>Dermal thickness burns</td>
<td>Apply directly to wound 2-3 layers for acute wounds Cover with secondary dressing Change every 2 - 3 days</td>
<td>Avoid if chlorhexidine sensitivity or allergy Soak off if adhered to wound bed</td>
</tr>
<tr>
<td><strong>Silver</strong> e.g. Aquacel ag, sodium carboxymethycellulose (CMC) and 1.2% ionic ag in fibrous material Also Contreet H®</td>
<td>Broad spectrum antimicrobial Facilitates debridement Absorbs exudate</td>
<td>Mid dermal to full thickness burns Moderately exudating wound</td>
<td>Apply to moist wound bed Allow 2 - 5 cm overlap Cover with secondary dressing Review 7 - 10 days Leave intact until healed</td>
<td>Exudate level indicates frequency of dressing change</td>
</tr>
<tr>
<td><strong>Silver</strong> e.g. Acticoat® / Acticoat 7®, 2 layered / 3 layered nanocrystalline ag coated mesh with inner rayon layer Also Contreet H®</td>
<td>Broad spectrum antimicrobial protection Decreases exudate formation</td>
<td>Dermal to full thickness burns Grafts and donor sites Infected wound</td>
<td>Wet Acticoat® with water; drain and apply blue / silver side down Moisten secondary dressing Replace 3 - 4 days (Acticoat®) or 7 days (Acticoat 7®)</td>
<td>Temporary skin staining Avoid if allergy to Silver Avoid hypothermia</td>
</tr>
<tr>
<td><strong>Silver</strong> e.g. SSD silver sulphadiazine cream</td>
<td>Reduces infection</td>
<td>Infected wounds</td>
<td>Apply generous amount to sterile handtowel to ease application</td>
<td>Not recommended for most burns due to changes in wound appearance and frequency of dressing changes required</td>
</tr>
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</tr>
</tbody>
</table>
Decompression illness (DCI)

Recommend
- Always keep patient flat - never head down - if decompression illness (DCI) suspected
- Give 100 % O₂ and continue until patient reaches hyperbaric chamber or ordered by MO to remove
- Consider DCI until proven otherwise with all symptoms occurring up to 48 hours after SCUBA diving in an otherwise fit and healthy person
- Aspirin is no longer recommended [14]

Background
- Decompression illness is due to the changes in pressure while diving resulting in bubble formation in the blood or tissues [15]
- Recompression (in a hyperbaric chamber) is the universally accepted standard for the treatment of DCI [15]
- Australia wide:
  - contact Divers Emergency Service ① 1800 088 200 for advice or
  - Queensland: contact the Hyperbaric Unit, Townsville Hospital ② (07) 4796 1111
  - Royal Brisbane and Women’s Hospital ③ (07) 3636 8111 for advice or accepting patient for hyperbaric chamber treatment
  - NSW: contact Prince of Wales hyperbaric unit ④ (02) 9382 2222 for medical advice and arrange decompression at Prince of Wales or HMAS Penguin
- It is important that any patient evacuated is transported at an altitude of < 300 metres / 1000 ft (road or helicopter) or by an aircraft capable of pressurising the cabin to the equivalent of sea level

1. May present with
   - Signs and symptoms may occur immediately after a SCUBA dive or develop up to 48 hours afterwards
   - Signs and symptoms include:
     - skin itching (“the creeps”), rashes, swelling, marbled appearance of skin
     - joint pain(s) (“the bends”) involving larger joints
     - tiredness, generally feeling unwell
     - chest pain, breathlessness, cough, coughing up blood (“the chokes”)
     - deafness, ringing in the ears, sensation of surroundings spinning (“the staggers”)
     - nausea, vomiting
     - numbness, muscle weakness, paralysis, urinary retention
     - headache, confused, drowsy, unconscious, fitting

2. Immediate management
   - DRS ABCD resuscitation / the collapsed patient
     - Remove patient from water
     - Expired air resuscitation (EAR) should never delay the recovery of a diver to a platform or the shore
     - Assess and treat associated problems. See Drowning and / or Trauma and injuries
     - Lie patient flat; raising the head may cause sudden deterioration and death due to a large gas bubble travelling to the brain
3. **Clinical assessment**
   - Obtain emergency patient history - details of dive(s): number, duration, depth, surface intervals, decompression stops, speed of ascent, date and time of dive
   - Perform standard clinical observations +
     - O₂ saturation level
     - conscious state. **See Glasgow Coma Scale / AVPU**
   - Examination of the nervous system

4. **Management:**
   - Consult MO
   - If to be evacuated:
     - the patient will need to be kept flat until reaches hyperbaric chamber unless MO advises otherwise
     - administer 100% O₂ - must also be continued until patient reaches hyperbaric chamber, unless this takes many hours - MO may advise air breaks
   - Oral clear fluids as advised by MO (if no altered level of consciousness)
   - Insert IV cannula
     - IV normal saline at least 10 - 20 mL / kg over 30 minutes. MO will advise quantities and rate
   - Pain management - patients with severe pain require adequate analgesia
     - IV analgesia is the preferred route of administration for narcotic analgesics for DCI
     - if not allergic, give morphine (preferable) or pethidine and metoclopramide on MO orders
     - nitrous oxide / O₂ mix (“Entonox”) must not be used for DCI
   - IDC if required
   - If seizure occurs see Fits / convulsions / seizures for medication
   - Note. Aspirin should not be used for fear of promoting bleeding in any area of “bubble damage” [14]

5. **Follow up**
   - All patients with symptoms after SCUBA diving should see a MO familiar with diving injuries / illnesses as soon as can be arranged even if decompression illness has been excluded in consultation with MO
   - Other conditions need consideration such as barotrauma of the middle ear, including ruptured ear drum, and inner ear, which can lead to permanent deafness if not diagnosed early and treated. **See Traumatic rupture of ear drum**

6. **Referral / consultation**
   - Consult MO on all symptoms occurring up to 48 hours after SCUBA diving
   - Divers Emergency Service ☎ 1800 088 200
   - If aeromedical transfer required, contact local retrieval service or Retrieval Services Queensland ☎ 1300 799 127
Hypothermia

Recommend
- Do not remove wet clothing if there is no dry blanket or other suitable cover
- Do not place the patient in a warm bath
- Infants and elderly people are at greatest risk of hypothermia

Background
- Definition - hypothermia is when a body’s core temperature falls below 35° C
  - oral 36.8 + or - 0.7°C
  - axilla generally 0.5 - 1.0 °C lower
  - rectal generally 0.5 - 1.0 °C higher

1. May present with:
   Mild hypothermia (rectal temperature 32 ° to 35 ° C)
   - environmental exposure - wet, windy
   - person - shivering, pale, skin cool to touch
   - impaired coordination
   - slurred speech
   - confused or apathetic
   Moderate to severe hypothermia (rectal temperature 29 ° to 32 ° C)
   - absence of shivering
   - increasing muscle stiffness
   - progressive decrease in consciousness
   - slow irregular pulse - atrial fibrillation
   - hypotension
   Very severe hypothermia (rectal temperature < 29 ° C)
   - cardiac arrhythmias
   - severe hypotension
   - cardiac arrest
   - fixed dilated pupils
   - patient appears dead
   - weak slow pulse
   - loss of reflexes

2. Immediate management
   DRS ABCD resuscitation / the collapsed patient
   - Remove from cold environment, wet clothing, contact with cold surfaces, windy environment
   - Dry patient if wet
   - Apply insulation between body and the environment e.g. blanket, space blanket
3. **Clinical assessment**
   - Obtain complete patient history:
     - recent environmental history / exposure to cold, wet and windy conditions;
     - cold water immersion / submersion; exhaustion
     - trauma
     - exposure to alcohol / other drugs / sedatives
     - period of time since exposure
   - Perform standard clinical observations +
     - note HR (slow weak?)
     - BP (is patient hypotensive?)
     - temperature (take rectal [core] temperature if equipment available)
     - conscious state See Glasgow Coma Scale / AVPU
     - capillary BGL
   - Perform physical examination:
     - skin cold? is patient shivering? examine for injuries? signs of infection? malnutrition? pressure areas?

4. **Management**
   - Consult MO
   - If conscious - give warm oral fluids (not alcohol)
   - External warming:
     - passive (rewarming rate 0.5 - 2° C / hour achieved)
       - remove wet clothing (only if there is a dry blanket or other suitable cover)
       - cautiously apply external heat such as heat pack, body to body contact, warm blankets
       - place in a warm environment
       - avoid burns by ensuring any heat source is warm or tepid but not hot
     - active (rewarming 2°C / hour achieved)
       - (where available) use heat sources such as Bair Hugger® or Warm Touch® blankets
   - Generally aim to warm 0.5 - 2° C / hour

5. **Follow up**
   - Consult with MO prior to discharge, despite temperature

6. **Referral / consultation**
   - Consult MO for all patients for advice on management and arrange evacuation / hospitalisation. In severe hypothermia, admission to a high dependency unit is necessary [19] [20] [21] [22]
Recommend

- Immediate management for heat stroke. True heat stroke is a medical emergency and multi-organ failure is common [23]
- Do not induce shivering, as this will result in heat gain
- IV fluids should be used with caution in heat stroke as pulmonary oedema can develop [23]

Background

- Normal ranges of temperature (adults):
  - oral 36.8 ± 0.7°C
  - axilla generally 0.5 - 1.0 °C lower
  - rectal generally 0.5 - 1.0 °C higher
- Definitions:
  - heat exhaustion is a heat-related disorder often known as exercise associated collapse (EAC) and is associated with dehydration
  - heat stroke occurs as a result of impaired thermoregulation (heat loss or heat gain) or exercise [23]

Related topics

- 0 Hypoglycaemia
- DRS ABCD resuscitation / the collapsed patient
- Poisoning / overdose

1. May present with

**Heat exhaustion**

- Temperature not above 40°C [23]
- Headache, nausea or vomiting
- Collapse
- Postural dizziness
- Pale cool / moist skin

**Heat stroke**

- Core temperature of 41°C or above [23]
- Confused, drowsy, seizures, altered consciousness, altered neurological signs [23]
- Hot dry skin
- Abnormal glucose level
- Cardiovascular collapse (cardiac arrhythmias, clotting disorder)
- Muscle weakness, cramps and pain

2. Immediate management

**Heat stroke**

- Aggressively cool:
  - place patient in cool place, with full circulating air, remove unnecessary clothing
  - place ice packs (wrapped) over large blood vessels of axillae (armpits), neck or groin (do not place ice directly against skin)
  - spray or sponge the torso and limbs with tepid water and then fan
  - aim to cool at least 0.1°C /minute
- Consult MO
- High flow O₂ via non-rebreather mask
- Insert IV cannula
- Connect to ECG monitor
Environmental emergencies

- Control shivering - can cause an increase in core temperature:
  - treat by covering patient with a sheet until it stops or small doses of titrated IV diazepam (0.02 mg / kg for adult and child on MO order)
- Check capillary BGL - if <3 mmol / L See Hypoglycaemia
- Insert IDC

3. Clinical assessment
   - Obtain complete patient history:
     - recent environmental history / exposure level of exercise and ambient temperature, snake bite, poisoning / overdose or new psychiatric medications, other illnesses
   - Perform standard clinical observations +
     - take core temperature (if equipment available)
     - skin - moist and cool or hot and dry?
     - conscious state See Glasgow Coma Scale / AVPU
     - capillary BGL
     - urinalysis for blood; if positive could be red blood cells (bleeding) or rhabdomyolysis (muscle breakdown)
   - Perform physical examination

4. Management
   - Heat exhaustion:
     - specific cooling is not required
     - remove person from hot environment / trigger
     - give oral fluids i.e. water (or Gastrolyte® / Hydralyte® if available) unless vomiting is present
     - IV normal saline will provide more rapid recovery, but rarely needed
     - monitor temperature
     - consult MO
   - Heat stroke:
     - see Immediate management of heat stroke
     - consult MO - arrange evacuation / hospitalisation
   - Avoid paracetamol and aspirin as ineffective

5. Follow up
   - Consult with MO prior to discharge, despite temperature

6. Referral / consultation
   - Consult MO for all heat stroke patients to advise on management and arrange evacuation / hospitalisation [21]
References

Gastrointestinal emergencies

Nose bleed - epistaxis

Recommend
- Provide immediate management if nose bleed is profuse or is not stopped. It can easily lead to hypotension / shock, especially in the elderly

Background
- Most common reasons for epistaxis is upper respiratory infection, with mucosal congestion and vasodilatation and trauma (nose picking) [1]
- Most cases occur in children under 10 years [1]
- Usually spontaneous in children, occurring from the anterior part of the nose
- In adults, occurs more posteriorly and may be associated with high blood pressure or a bleeding condition. If a person is very hypertensive consider dropping BP to decrease bleeding. See Acute hypertensive crisis

Related topics
DRS ABCD resuscitation / the collapsed patient
Shock

1. May present with
   - Nose bleed
   - Swallowing or spitting up blood if from posterior part of the nose
   - Increased HR, hypotension / shock if heavy or continuing loss

2. Immediate management
   - Sit patient up, leaning forward
   - Clear clots by blowing nose, then
   - Wear gloves and hold nose firmly between thumb and forefinger to apply pressure on the bleeding point for 10 -15 minutes
   - Instruct patient to breathe through mouth

3. Clinical assessment
   - Obtain complete patient history - include in history taking, past episodes of epistaxis, history of upper respiratory tract infection
   - Medication(s) - is the patient on warfarin, aspirin, NSAID, anticoagulants?
   - Perform standard clinical observations +
     - O₂ saturation
     - capillary refill
   - Perform physical examination
   - Encourage patient to spit blood out and not swallow - swallowing blood often results in nausea

4. Management
   - If bleeding continues, consult MO, who will likely advise insertion of an anterior nasal pack - see diagram on following page
   - If bleeding continues or you suspect blood is coming from the posterior part of the nose, consult MO who will likely advise posterior nasal packing
   - Patients should only be discharged with nasal packing following advice from the MO
   - Patients discharged with nasal packing should be prescribed a penicillin or first-generation cephalosporin to prevent sinusitis - consult MO
   - Oral analgesics should also be prescribed
   - Advise patients to avoid aspirin, aspirin-containing products, and NSAID
Gastrointestinal emergencies

- Remove anterior pack next day; if bleeding recurs, consult MO and replace the packing
- If blood loss is heavy or continuing, or there is increased HR or hypotension / shock, insert largest bore IV cannula possible (14 g or 16 g). Consult MO
- It is usual to start with IV normal saline or Hartmann's solution. MO will advise quantities and rate
- When bleeding has stopped instruct the patient not to sniff or blow or pick their nose
- Consult MO for all epistaxis post surgery
- Evacuation / hospitalisation is necessary if the bleeding does not stop

See Simple analgesia back page

Anterior nasal packing
- A nasal tampon may be used. Do not ever pack both nostrils as this has been known to cause fatal arrhythmias, always wear mask and goggles
- Consult MO before proceeding to insert nasal tampon. Lignocaine + phenylephrine spray may be used to anaesthetise the nasal cavity

Nasal tampon
- Merocel® nasal tampons are the easiest to use [2]. However a Kaltostat® pack or vaginal tampon can be used

- Apply lubricant jelly to the nares (do not apply to tampon as it will cause the tampon to expand) to facilitate placement
- The nasal tampon is inserted carefully along the floor of the nasal cavity, where it expands on contact with blood or other liquid
- After the nasal tampon is inserted it may be necessary to drip saline or water into the nostril to achieve full expansion of the tampon if the bleeding has decreased at the time of insertion
- Tape the string to the nose and trim ends
- Remove nasal tampon after 24 hours
- Moisten the nasal tampon with saline before removing [3]
- Complications include septal hematomas and abscesses from traumatic packing, sinusitis, neurogenic syncope during packing, and pressure necrosis secondary to excessively tight packing
### Gastrointestinal emergencies

**Schedule 2 Lignocaine + phenylephrine**

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spray</td>
<td>5% Lignocaine - 0.5% phenylcaine HCL</td>
<td>Intranasal</td>
<td>Adult up to a max. 5 sprays / nostril</td>
<td>Stat</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Child 2 - 3 years 1 spray / nostril</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4 - 7 years 2 sprays / nostril</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8 - 12 years 3 sprays / nostril</td>
<td></td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information

Management of associated emergency: consult MO

[3]

#### Posterior nasal packing

- Consult MO before proceeding to insert posterior nasal packing. Lignocaine + phenylephrine spray may be used to anaesthetise the nasal cavity
- Rapid temporary control of posterior nose bleed is gained by inserting a foley urinary catheter into the nostril. Sedation may be necessary
- Lubricate the catheter and advance far back along the floor of the nose
- Once the tip passes beyond the palate into the oropharynx, blow up the balloon with 5 mL of air and pull the catheter gently forward until resistance is felt [3]. Inject another 3 - 5 mL of air. The catheter is now lodged in the posterior nose
- There should be enough tension on the catheter to arrest the bleeding
- An anterior pack is then inserted
- The catheter can be held in place by a clip
- If it is unclear which side a posterior epistaxis is coming from or the single catheter fails to arrest the epistaxis, it may be necessary to remove the catheter and insert another catheter into the other nostril

#### 5. Follow up

- Review all patients next day
- Advise to avoid alcohol and hot drinks until review
- Advise patients to avoid aspirin, aspirin-containing products and NSAID. If patient is on regular anticoagulation therapy consult MO
- Next MO clinic for all cases except minor non recurring nose bleeds in children
- Recurrent nose bleeds in children can warrant silver nitrate cautery
- Nose bleeds in adults may need further investigation

#### 6. Referral / consultation

- Consult MO for all cases that require anterior or posterior nasal packing or where blood loss is heavy or continuing or there is increased HR or hypotension / shock
Acute abdominal pain

**Recommend**
- Consider ectopic pregnancy in all women of child bearing age (12 - 52 years) who present with abdominal pain and / or vaginal bleeding

**Background**
- It is not necessary for the Registered Nurse or Aboriginal and / or Torres Strait Islander Health Worker to make a definitive diagnosis. It is more important to recognise cases which are significant, and to be able to present the history and findings in an ordered manner to the MO

**Related topics**
- Vaginal bleeding in early pregnancy
- Lower abdominal pain in female - probable PID
- Renal colic
- Acute retention of urine
- DRS ABCD resuscitation / the collapsed patient
- Upper gastrointestinal bleeding
- Rectal bleeding
- Testicular / scrotal pain
- Bowel obstruction

1. **May present with**
   - Abdominal pain
   - No appetite, nausea, vomiting
   - Can’t pass wind, constipation
   - Vomiting up blood (haematemesis) or passing blood or tar-like (melena) bowel motions. See Upper gastrointestinal bleeding and Rectal bleeding
   - Fever, sweats, rigors
   - Jaundice
   - Abdominal wall pain / lump
   - Scrotal pain. See Testicular / scrotal pain
   - Abdominal distension or mass
   - Inability to pass urine
   - Vaginal bleeding
   - Increased HR
   - Hypotension / shock

2. **Immediate management**
   - **DRS ABCD resuscitation / the collapsed patient**
     - Perform rapid clinical assessment
     - If hypotension / shock insert largest bore IV cannula possible (14 g or 16 g)
     - It is normal to start with IV normal saline or Hartmann’s solution. MO will advise quantities and rate
     - Give patient nil to eat or drink
     - Consult MO urgently who will advise further management and arrange evacuation / hospitalisation

3. **Clinical assessment**
   - If severe acute abdominal pain, assessment may be easier after analgesia is given (IM narcotic or preferably IV titrated to client needs). Consult MO
   - Obtain complete patient history - a careful history and examination will provide enough evidence to establish an appropriate course of management to contend with the likely diagnosis:
     - previous history of similar episodes
Gastrointestinal emergencies

- past medical and surgical history
- current medications and family history
- menstrual history in women - are periods regular? when was the last? was it normal? is the woman taking any contraception?
- alcohol intake - current and past

- Perform standard clinical observations +
  - urinalysis
  - urine pregnancy test (hCG) if childbearing age (12 - 52 years) female. If positive see Vaginal bleeding in early pregnancy and consider possibility of tubal / ectopic pregnancy

- Assessment of the pain:
  - check pain scale (0 - 10), how severe is the pain?
  - where is the pain? does it radiate? if so, where to? shoulder-tip pain?
  - is the pain sharp or dull, cramping?
  - does the patient get some relief by moving about i.e. colic such as renal, biliary or bowel colic; or does relief come from lying very still i.e. peritoneal irritation/peritonitis from any cause?
  - are there any associated symptoms:
    - e.g. no appetite, nausea, vomiting?
    - last bowel movement, any blood observed or black and tar-like stools (melena)?
    - diarrhoea, constipation?
    - fever, sweating, rigors?
    - any blood, cloudy or offensive urine, burning or pain on passing?

- Perform physical examination:

  - inspection (look)
    - is the abdomen distended or not?
    - is the shape of abdomen equal?
    - what is the colour and pigmentation?
    - inspect the hernial areas
    - inspect the scrotum in a male
    - are there scars present?
4. **Management**
   - Consult MO in all cases of acute abdominal pain using diagrams as a guide
   - If board-like rigidity of abdomen, or pulsatile abdominal mass, insert large bore IV cannula and consult MO urgently. MO will advise further management and arrange evacuation / hospitalisation in a facility with appropriate surgical capability
   - Do 12 lead ECG in all cases of upper abdominal pain in case of ischaemic chest pain: angina / heart attack. Consult MO if abnormal or unusual
   - If available MO may order erect chest x-ray (looking for air under diaphragm) and erect and supine abdominal x-ray (looking for dilated bowel loops and air-fluid levels). These are probably the only two reasons to perform plain abdominal x-rays
   - Give patient nil to eat or drink
   - MO may advise to pass nasogastric tube if easy. Allow free drainage and aspirate periodically
   - The MO may ask for the patient to be catheterised

5. **Follow up**
   - If in consultation with MO, patient not evacuated / hospitalised and allowed home, review next day
   - See next MO clinic

6. **Referral / consultation**
   - Consult MO in all cases of acute abdominal pain
Causes of acute abdominal pain

**Right hypochondrial**
- gall bladder - biliary colic or cholecystitis
- hepatitis - alcoholic or infective
- pneumonia
- liver abscess / tumour - rare

**Left hypochondrial**
- pneumonia
- pancreatitis
- ruptured spleen

**Right lumbar**
- urinary tract infection
- renal colic

**Left lumbar**
- urinary tract infection
- renal colic

**Right iliac**
- appendicitis
- tubal / ectopic pregnancy
- ovarian cyst
- PID
- irreducible or strangulated hernia (usually men)

**Left iliac**
- diverticulitis
- tubal / ectopic pregnancy
- ovarian cyst
- PID
- irreducible or strangulated hernia

**Epigastric**
- gastritis or gastric / duodenal ulcer
- pancreatitis
- heart attack
- ruptured aortic aneurysm

**Umbilical**
- irreducible or strangulated pre-umbilical hernia
- ruptured aortic aneurysm
- Other (often central) complaints
- gastroenteritis
- small bowel obstruction
- inflammatory bowel disease
- early appendicitis

**Hypogastric**
- urinary tract infection
- large bowel obstruction
- acute retention of urine
- uterine fibroid complication
- PID
- tubal / ectopic pregnancy

**Hypogastric**
- urinary tract infection
- large bowel obstruction
- acute retention of urine
- uterine fibroid complication
- PID
- tubal / ectopic pregnancy
Alcohol related epigastric pain

Recommend
- See immediate management

Background
- Alcohol can cause epigastric and / or right and / or left upper quadrant pain secondary to gastritis, acute pancreatitis or alcoholic hepatitis, gastric or duodenal ulcer, small bowel obstruction or biliary tract disease [4]
- Epigastric pain associated with alcohol usually occurs during or soon after heavy alcohol intake. Don’t jump to conclusions as to the cause of the epigastric pain (in a person who drinks alcohol)
- Terms - often people use the term gastritis (inflammation of the gastric mucosa - however this diagnosis can only be made on endoscopy or biopsy) for dyspepsia (indigestion)
- Epigastric pain from gastritis / gastro-oesophageal reflux disease (GORD) isn’t necessarily associated with alcohol. GORD can occur in children or adults

Related topics
Glasgow Coma Scale / AVPU
Acute abdominal pain
Upper gastrointestinal bleeding
Shock
Alcohol misuse
Mental health

1. May present with
- Epigastric and/or right upper quadrant and/or left upper quadrant pain
- Off food, nausea, vomiting
- Vomiting up blood (haematemesis) or passing tar like bowel motions (melena)
- Increased HR
- Hypotension / shock

2. Immediate management
- Perform rapid clinical assessment +
  - Glasgow Coma Scale / AVPU
- If hypotension / shock, insert largest bore IV cannula possible (14 g or 16 g)
- It is normal to start with IV normal saline or Hartmann’s solution. MO will advise quantities and rate
- Consult MO urgently who will advise further management and arrange evacuation / hospitalisation

3. Clinical assessment
- See Acute abdominal pain
- Include in history taking [4]:
  - establishment of current alcohol use - have there been changes recently?
  - is the patient concerned about their alcohol intake?
  - assess other alcohol related problems including injuries, mental health status, relationship problems, stress and money worries, sexual problems
- Perform standard clinical observations +
  - pain scale (0 - 10)
Perform physical examination:
- inspect and palpate for tenderness over liver area, upper abdominal pain, left upper quadrant - other causes / associated pain?
- Determine if presentation is mild, moderate or severe

<table>
<thead>
<tr>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annoying pain but not aggravating or distressing Normal BP, HR, respiratory rate, temperature</td>
<td>Patient moving about, restless with aggravating pain HR slightly increased BP slightly increased</td>
<td>Patient keeping still and very distressed with pain HR increased BP raised or low (hypotension / shock)</td>
</tr>
</tbody>
</table>

4. **Management**

The severity of the pain and the other findings of the patient will guide management, e.g. acute pancreatitis may cause hypotension/shock and respiratory distress. The severity of pain is subjective however objective indications such as vital signs and clinical findings will also guide management

- **Mild:**
  - give antacid e.g. Mylanta® 20 mL stat and / or metoclopramide 10 mg IM stat
  - do 12 lead ECG, fax to MO
  - take bloods for LFT (if not done in the last 3 months), check BGL
  - if doesn’t respond to antacid and / or antiemetic within 30 minutes, consider as moderate or severe

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Nil</th>
<th>Antacid e.g. Mylanta® / Gastrogel®</th>
<th>NON DTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>Strength</td>
<td>Route of administration</td>
<td>Recommended dosage</td>
</tr>
<tr>
<td>Suspension</td>
<td>Oral</td>
<td>Adults only 20 mL then 20 mL qid</td>
<td>Stat Additional 20 mL doses can be taken as required</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: avoid if patient has heart failure
Management of associated emergency: consult MO

- and / or

<table>
<thead>
<tr>
<th>Schedule</th>
<th>4</th>
<th>Metoclopramide</th>
<th>DTP IHW / SM R&amp;IP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>Strength</td>
<td>Route of administration</td>
<td>Recommended dosage</td>
</tr>
<tr>
<td>Ampoule</td>
<td>10 mg / 2 mL</td>
<td>IM or IV (IHW may not administer IV)</td>
<td>Adults only 10 mg</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: not for use in patients with Parkinson's disease or children and use caution in women < 20 years of age
Management of associated emergency: dystonic reactions e.g. oculogyric crisis are extremely rare (unless repeated doses or in children). If oculogyric crisis develops give benztropine 2 mg IM or IV See Mental health behavioural emergencies
Gastrointestinal emergencies

- **Moderate:**
  - consult MO who will likely advise:
    - clear fluids only
    - analgesia: paracetamol
    - ranitidine, omeprazole, buscopan
    - do 12 lead ECG
    - send blood for LFT, lipase (more specific for pancreatitis than amylase)
    - check BGL
    - observe and consult MO within 4 - 6 hours of progression
  - If doesn’t respond regard as severe

See *Simple analgesia* back cover

- **Severe:**
  - consult MO who may advise:
    - give nil to eat or drink
    - apply high flow $O_2$ via non-rebreather mask
    - do 12 lead ECG
    - collect FBC U/E and LFTs and check BGL
    - test urine
    - insert IV cannula. It is normal to start with IV normal saline or Hartmann’s solution. MO will advise quantities and rate
    - analgesia (IM narcotic or preferably IV)
    - evacuation / hospitalisation
    - protein pump inhibitor (PPI)

5. **Follow up**
   - If chronic alcohol misuse the MO may order thiamine 100 mg orally daily
   - Be aware of the potential over the following days to develop withdrawal symptoms in a heavy drinker who ceases drinking abruptly. See *Alcohol withdrawal*
   - If allowed home, review next day
   - Offer advice and information regarding the harmful effects of excessive alcohol intake. There is good evidence to show that an MO or Health Care Worker’s advice can be influential in modifying drinking patterns See *Alcohol misuse*
   - See next MO clinic

6. **Referral / consultation**
   - Consult MO as above
   - If referral for chronic alcohol misuse is required See *Alcohol misuse*
Upper gastrointestinal bleeding

Recommend
- See immediate management if patient has a large amount of blood loss

Background
- There are many causes of upper gastrointestinal bleeding which can range from small bleed to very large loss of blood
- Most common are gastric or duodenal ulcer, oesophageal varices / erosion
- Patient may vomit blood, which was swallowed from a nose bleed
- Use of NSAID can predispose to bleeding

Related topics
- Nose bleed / epistaxis
- DRS ABCD resuscitation / the collapsed patient
- Acute abdominal pain
- Rectal bleeding

1. May present with
   - Burning pain in epigastrium or retrosternally
   - Vomiting up blood (haematemesis)
   - Passing black tar-like bowel motions (melena)
   - Fresh blood in the bowel motion (haematochezia)
   - Hypotension / shock

2. Immediate management
   - Perform rapid clinical assessment
   - Analgesia may be required consult MO - IM narcotic or preferably IV is given
   - If hypotension / shock or large haematemesis or melena insert largest bore IV cannula possible (14 g or 16 g)
   - It is normal to start with IV normal saline or Hartmann’s solution. MO will advise quantities and rate. In an adult the aim is to keep:
     - HR < 120 / min
     - systolic BP > 100 mmHg
     - urine output > 0.5 mL / kg / hr
   - Consult MO urgently who will advise further management and arrange evacuation / hospitalisation in an appropriate facility
   - Upper gastrointestinal bleeds can be dramatic and are difficult to manage. Apart from IV access and IV fluids, including early blood if available, the best treatment option is usually to evacuate urgently

3. Clinical assessment
   - See Acute abdominal pain noting in particular:
     - past history of gastric (stomach) or duodenal ulcer or previous episodes
     - current medications especially Aspirin or non steroidal anti-inflammatory drugs (NSAID), anticoagulants
   - Rectal examination
Gastrointestinal emergencies

4. Management
   • Consult MO
     - if haematemesis small or “coffee ground” only in vomitus MO may advise metoclopramide 10 mg IM stat
     - proton pump inhibitor (PPI) such as omeprazole oral or esomprazole IV
   • Arrange evacuation / hospitalisation once haemodynamically stable

5. Follow up
   ☐ If patient settles, review next day
   ☐ See next MO clinic. MO may consider referral for endoscopy

6. Referral / consultation
   ☐ Consult MO on all occasions of upper gastrointestinal bleeding

Rectal bleeding

Recommend
☐ Screen those aged between 50 and 75 years for colorectal cancer with faecal occult blood test (FOBT) every 2 years [8]

Background
☐ The characteristic of rectal bleeding is determined by the location of disease / condition leading to blood loss
☐ The most common cause for rectal bleeding, apart from haemorrhoids (piles) is upper gastrointestinal bleeding e.g. gastric (stomach) or duodenal ulcer. Do not attribute rectal bleeding to haemorrhoids unless more serious causes have been excluded
☐ The most serious cause for rectal bleeding is underlying colonic/rectal cancer

Related topics
Acute abdominal pain
Upper gastrointestinal bleeding

1. May present with
   • Bright red blood loss (haemorrhoids or bowel cancer); dark red blood can be differentiated from melena by mixing it with tap water - changes to red while melena stays black
   • Melena (black, tar-like bowel motion, foul smelling: blood changed by digestion in upper gastrointestinal tract)
   • Anaemia
   • Anorexia / vomiting
   • Weight loss
   • Ineffective urge to pass a bowel motion
   • Abdominal pain
   • Fever
   • Obvious worm infestation
   • Diarrhoea / constipation

2. Immediate management
   • Analgesia may be required consult MO - IM narcotic or preferably IV is given
   • If passing black tar-like bowel motions (melena). See Upper gastrointestinal bleeding
   • If blood loss is heavy or continuing, or there is increased HR or hypotension / shock, insert largest bore IV cannula possible (14 g or 16 g)
• It is normal to start with IV normal saline or Hartmann’s solution. MO will advise quantities and rate
• Consult MO urgently who will advise further management and arrange evacuation / hospitalisation in an appropriate facility

3. Clinical assessment
• See Acute abdominal pain noting in particular:
  - change in bowel habit (mucoid diarrhoea or constipation)?
  - sense of rectal urgency or unsatisfied defecation?
  - external examination of anus looking for evidence of haemorrhoids and bleeding
  - check for bowel sounds
• Perform standard clinical observations +
  - weight
• Collect a stool specimen to check for occult blood or for testing OCP
• Note nutritional status
• Rectal digital examination may be required
• Collect blood test for ESR / C-reactive protein / U and E / FBC

4. Management
• If bleeding not heavy or continuing consult MO who may advise topical treatment for haemorrhoids ± short term laxative
• Treat for worms where clinically indicated
• If heavy blood loss - patient will require evacuation

5. Follow up
☞ Patients with rectal bleeding need to be assessed by a MO at next available opportunity including digital rectal examination / proctoscopy ± sigmoidoscopy
☞ All patients over 50 years to have 2 yearly FOBT until the age of 75 if repeated negative findings

6. Referral / consultation
☞ All patients with rectal bleeding need to be assessed by a MO
Bowel obstruction

Recommend
- Assess as indicated below and consult with MO
- Metoclopramide is contraindicated

Background
- Bowel obstruction can occur in the small or large intestine, it can be partial or complete
- The three most common causes of small bowel obstruction are post-operative adhesions, hernias and cancers
- The most common causes of large bowel / colon obstruction are cancer, twisting of the bowel (volvulus), narrowing of the opening due to diverticulitis

Related topics
Acute abdominal pain

1. May present with
   - Colicky abdominal pain
   - Abdominal distension - soft or rigid
   - Can’t pass wind
   - Bowel sounds may be increased or absent
   - Vomiting may or may not be present - may smell like faeces
   - Fever - may be indicative of peritonitis, late sign
   - Liquid diarrhoea or obstipation (intractable constipation)
   - Increased HR, dehydration, especially in children and elderly
   - Hypotension / shock with perforation and sepsis

2. Immediate management
   - See Acute abdominal pain
   - Analgesia may be required consult MO - IM narcotic or preferably IV is given
   - Perform rapid clinical assessment
   - Collect bloods for electrolytes and potassium
   - If hypotension / shock, insert largest bore IV cannula possible (14 g or 16 g)
   - It is normal to start with IV normal saline or Hartmann’s solution. MO will advise quantities and rate
   - Consult MO urgently who will advise further management and arrange evacuation / hospitalisation

3. Clinical assessment
   - See Acute abdominal pain noting in particular:
     - past surgical history, previous bowel obstruction
     - history of bowel habit
     - abdominal distension
     - absent or tinkling bowel sounds
     - abdominal tenderness, guarding
     - presence of vomiting or diarrhoea

3. Management
   - Consult MO who will advise analgesia (IM narcotic or preferably IV)
   - If board-like rigidity of abdomen, bowel perforation is likely - insert large bore IV cannula and consult MO urgently. MO will advise further management and arrange evacuation / hospitalisation in a facility with appropriate surgical capability
   - MO will likely advise to pass nasogastric tube. Allow free drainage and aspirate
periodically
- If available MO may order erect and supine abdominal x-ray (looking for dilated bowel loops and air fluid levels) and erect chest x-ray looking for gas under the diaphragm
- Keep nil by mouth
- Insert indwelling urinary catheter
- It is normal to start with IV normal saline or Hartmann's solution. MO will advise quantities and rate
- Check potassium (if not already collected)

5. **Follow up**
   - When back in the community: bowel obstruction has a high likelihood of recurrence whether treated conservatively or surgically
   - Refer to Dietitian

6. **Referral / consultation**
   - Consult MO. All cases of suspected bowel obstruction will need to be evacuated/hospitalised

### Renal colic

**Recommend**
- Provide early pain relief [9] [10]
- Consult MO if fever present as an infected obstructed kidney is a urological emergency
- Strain all urine for stones (either through a piece of stocking or tea strainer, or urinate into e.g. white plastic ice cream container and look for stone(s) before discarding in toilet)

**Background**
- Renal colic is the pain caused by kidney stones passing through the ureter from the kidney to the bladder

**Related topics**
- Acute abdominal pain

1. **May present with**
   - Pain - colicky, sharp, burning and localised to the flank or groin [10]. Pain in the tip of the penis is usually due to a stone in the bladder
   - Nausea and vomiting are often associated
   - Fever
   - Blood in the urine (haematuria), visible or on urinalysis

2. **Immediate management**
   - Check pain scale
   - Administer analgesia - IM narcotic or preferably IV is given. NSAID and opioids are drug of choice for renal colic. **If an opioid has to be given, it should not be pethidine** [9]
Genitourinary emergencies

3. Clinical assessment
   • See Acute abdominal pain noting in particular:
     - past history of kidney stones or previous episodes
     - blood visible in urine or positive on testing
     - renal angle tenderness
     - fever
     - consider ruptured aortic aneurysm in patients > 45 years and first presentation
       of this pain
   • Perform standard clinical observations +
     - monitor pain scale
     - urinalysis

3. Management
   • MO will arrange evacuation / hospitalisation if:
     - fever (an infected obstructed kidney is a urological emergency)
     - pain not controlled or persists for more than 24 hours
   • Consult MO who may advise:
     - high oral fluid intake or IV fluids to flush stone(s) through
     - analgesia: paracetamol or indomethacin or if an opioid has to be given it
       should not be pethidine [9]
   • Send MSU for M/CS
   • IV antibiotics if fever

<table>
<thead>
<tr>
<th>Schedule</th>
<th>8</th>
<th>Morphine sulphate</th>
<th>DTP IHW / SM R&amp;IP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Authorised Indigenous Health Workers must consult MO / NP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scheduled Medicines Rural &amp; Isolated Practice Registered Nurses may proceed</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampoule</td>
<td>10 mg / mL</td>
<td>IM</td>
<td>Adults only</td>
<td>Stat</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.1 - 0.2 mg / kg</td>
<td>Further doses on MO / NP order</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>to a max. of 10 mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>IV</td>
<td>Adults only</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(IHW may not administer IV)</td>
<td>2.5 mg increments slowly, repeated every 10 min if required to a max. of 10 mg</td>
<td></td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: advise can cause nausea and vomiting, drowsiness
Management of associated emergency: caution - in the elderly and those with significant renal / liver disease. Respiratory depression is rare - if it should occur give naloxone. See Poisoning / overdose - opiates NB: as naloxone counteracts the narcotic, it may cause the return of severe pain [10]

   • If allergic to morphine or significant renal disease give fentanyl: Note: fentanyl has a rapid onset of action
**Fentanyl**

**Schedule 8**

**DTP**

IHW / SM R&IP

Authorised Indigenous Health Workers must consult MO / NP

Scheduled Medicines Rural & Isolated Practice Registered Nurses may proceed

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampoule</td>
<td>100 microgram / 2 mL</td>
<td>IM</td>
<td>Adults only 1.5 microgram / kg to a max. of 100 microgram</td>
<td>Stat</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IV</td>
<td>Adults only 25 microgram increments slowly, repeated every 10 min if required to a max. of 100 microgram</td>
<td>Further doses on MO / NP order</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intranasal</td>
<td>Adults only 1.5 microgram / kg undiluted to a max. of 100 microgram</td>
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</tbody>
</table>

Administration instructions for intranasal fentanyl. Draw up dose into 1 mL or 2 mL syringe. If using a mucosal atomisation device (MAD) attach to the syringe. Position patient sitting up at a 45° angle or with head resting to one side. Position the atomiser or syringe into the nostril loosely, aiming for the centre of the nasal cavity. Depress the syringe plunger quickly. If 100 microgram / 2 mL is being used split the dose between both nostrils to minimise loss due to sneezing or swallowing. Intranasal fentanyl may be unreliable if patient has blocked nose [13]

Provide Consumer Medicine Information: advise can cause nausea and vomiting, drowsiness

Management of associated emergency: respiratory depression is rare. If it should occur give naloxone. See Poisoning / overdose: opiates. NB: as naloxone counteracts the narcotic, it may cause the return of severe pain

[10] [12] [13]

• or

**Indomethacin**

**Schedule 4**

**DTP**

IHW / SM R&IP

Authorised Indigenous Health Workers must consult MO / NP

Scheduled Medicines Rural & Isolated Practice Registered Nurses may proceed

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suppository</td>
<td>100 mg</td>
<td>Rectal</td>
<td>Adult 100 mg</td>
<td>Stat</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>An additional 100 mg suppository may be given on MO / NP orders</td>
<td></td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: precautions - gastrointestinal irritations, other NSAID, hypertension, heart failure, CVS, infections, platelet aggregation, poor renal function, elderly, pregnancy, breastfeeding

Management of associated emergency: consult MO

[11]

• and / or
Genitourinary emergencies

<table>
<thead>
<tr>
<th>Schedule</th>
<th>4</th>
<th>Metoclopramide</th>
<th>DTP IHW / SM R&amp;IP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authorised Indigenous Health Workers must consult MO / NP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scheduled Medicines Rural &amp; Isolated Practice Registered Nurses may proceed</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Form** | **Strength** | **Route of administration** | **Recommended dosage** | **Duration** |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampoule</td>
<td>10 mg / 2 mL</td>
<td>IM or IV (IHW may not administer IV)</td>
<td>Adults only 10 mg</td>
<td>Stat Further doses on MO / NP order</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: not for use in patients with Parkinson's disease or children and use caution in women < 20 years of age

Management of associated emergency: dystonic reactions e.g. oculogyric crisis are extremely rare (unless repeated doses or in children). If oculogyric crisis develops give benztropine 2 mg IM or IV. See Mental health behavioural emergencies

See Simple analgesia back cover

5. **Follow up**
   - If the pain settles, the patient should be advised to continue high oral fluid intake including through the night, to flush stone(s) through, and to strain all urine (for stones) at home
   - Review the next day
   - Next MO clinic and likely referral for IVP, CT scan, and / or renal ultrasound

6. **Referral / consultation**
   - Consult MO on all occasions

**Acute retention of urine**

**Recommend**
- Provide early and effective pain relief as acute retention of urine can be painful and distressing

**Background**
- Most common in middle aged or elderly men, but can also occur secondary to delay in passing urine, UTI, medication, severe pain e.g. primary genital herpes or spinal injury
- It is usually preceded by a history of hesitancy and dribbling due to prostatic enlargement

**Related topics**
Acute abdominal pain

1. **May present with**
   - Obstruction urinary bladder - dull suprapubic pain
   - Obstruction of ureter - severe suprapubic and flank pain that radiates to the penis, scrotum, or inner aspect of the upper thigh [10]
   - Inability to pass urine or passing dribbles of urine only
   - Distended bladder
   - Constipation
2. **Immediate management**
   - Consult MO who will advise analgesia (IM / IV narcotic) and metoclopramide

3. **Clinical assessment**
   - See Acute abdominal pain noting in particular:
     - preceding history of hesitancy and dribbling
     - palpable bladder, dull percussion (palpation and percussion is associated with urge to urinate)

4. **Management**
   - Adequate analgesia may relieve urethral spasm enough to enable to pass urine spontaneously; encourage to move around if possible, rather than lie in bed
   - Sit patient in warm bath and tell them to try and urinate into the bathwater
   - If does not pass urine spontaneously, MO will request patient be catheterised if easy. It is important not to use excessive force to push the catheter through the obstructed urethra
   - Measure and record all urine output
   - Perform urinalysis
   - Send MSU or catheter catch urine for MC/S
   - If unable to catheterise easily, MO will attempt on evacuation/hospitalisation and if unable may insert suprapubic catheter instead
   - Depending on the clinical circumstances, and the volume of urine drained, the MO may advise the catheter be removed or left in situ

5. **Follow up**
   - If not evacuated / hospitalised, review next day and consult MO
   - See next MO clinic

6. **Referral / consultation**
   - Consult MO on all occasions of acute retention of urine

**Testicular / scrotal pain**

<table>
<thead>
<tr>
<th>Recommend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Testicular torsion is an emergency requiring urgent surgery (within 4-6 hours) to save testes - consult MO immediately</td>
</tr>
<tr>
<td>Use the table on following page to assist with deciding between the two most common conditions which cause acute scrotal pain and swelling - torsion of the testis and acute epididymo-orchitis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other less common causes of acute scrotal pain include mumps, strangulated inguinal hernia and traumatic haematoma</td>
</tr>
</tbody>
</table>

**Related topics**

- Epididymo-orchitis
- Acute abdominal pain

**1. May present with**
   - Gradual or acute onset of pain and/or swelling of testicle(s)
   - Right iliac fossa (RIF) or left iliac fossa (LIF) referred pain
   - Nausea and vomiting, fever
   - History of rapid movement, physical trauma
2. **Immediate management**
   - Consult MO urgently
   - MO will organise immediate evacuation / hospitalisation to facility with appropriate surgical capability for the patient with testicular torsion
   - MO will advise analgesia (IM / IV narcotic) and metoclopramide

3. **Clinical assessment**
   - See Acute abdominal pain noting in particular:
     - tenderness and location of testes, compare with other testicle
     - fever
     - urethral discharge, burning on passing urine (dysuria)
     - urinalysis
     - history of physical trauma, rapid movement

4. **Management**
   - Consult MO using Differential diagnoses table as guide

<table>
<thead>
<tr>
<th>Differential diagnoses</th>
<th>Torsion</th>
<th>Epididymo-orchitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>any age but most commonly in the 10 - 25 years age group</td>
<td>young adults who are sexually active, the elderly who may have prostatic trouble, rare before puberty</td>
</tr>
<tr>
<td>Onset</td>
<td>usually sudden but can be gradual</td>
<td>gradual</td>
</tr>
<tr>
<td>Severity of pain</td>
<td>very severe</td>
<td>moderate</td>
</tr>
<tr>
<td>Fever</td>
<td>absent or slight, less than 37.5°C</td>
<td>significant</td>
</tr>
<tr>
<td>Associated symptoms</td>
<td>abdominal pain, vomiting</td>
<td>abdominal pain, occasional urethral discharge / dysuria</td>
</tr>
<tr>
<td>Examination</td>
<td>swollen, red and tender, affected testis may sit higher than the other and be lying transversely</td>
<td>swollen, red and tender</td>
</tr>
<tr>
<td>Effect of elevating scrotum</td>
<td>no change or worse pain</td>
<td>relief of pain</td>
</tr>
</tbody>
</table>

**Torsion**
- Testicular torsion is an emergency requiring urgent surgery. If there is to be any chance of saving the testis, the MO will arrange urgent evacuation / surgery and advise analgesia (IM / IV narcotic and metoclopramide)
- Keep nil by mouth

**Epididymo-orchitis**
- See Epididymo-orchitis

5. **Follow up**
   - If MO decides to treat as acute epididymo-orchitis and not to evacuate / operate:
     - review next day
     - if the patient is not significantly better, consult MO

6. **Referral / consultation**
   - Consult MO on all occasions of testicular / scrotal pain
References
Poisoning and drug emergencies

**Poisoning / overdose**

**Recommend**
- Consult MO first if a substance is known to be toxic and a toxic quantity is known or suspected to have been taken before the Poisons Information Centre (PIC) 131126 (24 hour)
- Use universal precautions in all poisoning cases where toxins unknown
- Do not undertake any gastrointestinal decontamination until a full risk assessment has been completed
- Consider poisoning in any patient who is confused, drowsy, unconscious or fitting
- Remember that someone who is conscious and talking after taking a poison could still be in the early stages of severe poisoning
- All patients with intentional poisonings require a 12 lead ECG and a paracetamol level
- A recommended source of up to date electronic information on toxicology and toxinology can be found in the therapeutic guidelines section of each state’s website of clinical information e.g.:
  - Qld Clinicians Knowledge Network [sp.cknservices.dotsec.com/ckn/home.php](http://sp.cknservices.dotsec.com/ckn/home.php)
- In cases of severe or complex poisoning where specific expert medical advice is required the PIC can refer health practitioners to a Clinical Toxicologist

**Related topics**

- Fits / convulsions / seizures
- Hypoglycaemia
- Unconscious / altered LOC
- Heat exhaustion / heat stroke / hyperthermia

1. **May present with**
   - Central nervous system depression e.g. confusion, drowsiness, altered level of consciousness or fitting
   - Gastrointestinal tract toxicity e.g. nausea, vomiting
   - Cardiovascular system toxicity e.g. hypotension, bradycardia or tachycardia, arrhythmias
   - Conscious and fully orientated with a history or circumstances suggestive of deliberate or accidental poisoning

2. **Immediate management** [2]

   **DRS ABCD resuscitation / the collapsed patient**

   - Perform rapid assessment +
     - O₂ saturation
   - Correct hypoglycaemia
   - Correct hyperthermia
   - Consider antidotes e.g. naloxone
   - Use universal precautions in all poisoning cases (gloves, plastic gown and mask).
   - Refer to Cyanide, Organophosphates and Parquat / Diquat poisoning for specific advice
   - If breathing, turn on to side in recovery position while obtaining more information (some poisons may cause both vomiting and sedation sufficient enough to result in aspiration)
   - Give O₂ to maintain O₂ saturation. If O₂ saturation is not maintained >93% adult / 95% child, consult MO. See O₂ delivery systems

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Poisoning and drug emergencies

O₂ requirement in patients with abnormal O₂ saturations mandates an assessment of the patient’s ventilation i.e. CO₂.
In patients with ingestions, hypoxia can be due to a number of factors e.g. pre-existing lung disease, aspiration, atelectasis from a decreased loss of consciousness, type 2 respiratory failure (raised CO₂). Type 2 respiratory failure can be masked and therefore unrecognised by the application of O₂. Untreated type 2 respiratory failure in patients with a decreased loss of consciousness can potentially lead to respiratory and cardiac arrest.

Do not undertake any gastrointestinal decontamination until a full risk assessment has been completed

3. Clinical assessment

Undertake a “Risk Assessment” by obtaining a full history including details of poisoning

<table>
<thead>
<tr>
<th>Risk assessment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Agent taken</td>
<td>Name of product, its ingredients/components, manufacturer</td>
</tr>
<tr>
<td></td>
<td>Look for container if possible</td>
</tr>
<tr>
<td></td>
<td>Ask relatives or witnesses</td>
</tr>
<tr>
<td></td>
<td>Overdoses of drugs often involve more than one substance</td>
</tr>
<tr>
<td></td>
<td>Inquire specifically if alcohol has been taken in all instances</td>
</tr>
<tr>
<td></td>
<td>as it may greatly affect the toxicity of other exposures</td>
</tr>
<tr>
<td></td>
<td>Also inquire specifically about paracetamol and any other over-</td>
</tr>
<tr>
<td></td>
<td>the-counter products</td>
</tr>
<tr>
<td>Route of exposure</td>
<td>Oral, topical, eye, inhaled, injected</td>
</tr>
<tr>
<td>Dose</td>
<td>Try to work out exactly how much was taken; this may require</td>
</tr>
<tr>
<td></td>
<td>manually counting out the amount remaining in the container from</td>
</tr>
<tr>
<td></td>
<td>the amount initially thought to be there</td>
</tr>
<tr>
<td></td>
<td>It is important to always consider the worst case scenario</td>
</tr>
<tr>
<td>Time of exposure</td>
<td>Exact time if possible</td>
</tr>
<tr>
<td>Intent of exposure</td>
<td>Accidental or deliberate</td>
</tr>
<tr>
<td>Has any treatment been</td>
<td>Has substance been diluted, skin been washed, eyes irrigated etc.</td>
</tr>
<tr>
<td>attempted</td>
<td></td>
</tr>
<tr>
<td>Patient factors</td>
<td>Does the patient have any pre-existing illness, heart disease,</td>
</tr>
<tr>
<td></td>
<td>patient weight, BGL, etc.</td>
</tr>
<tr>
<td>Clinical course</td>
<td>What symptoms has the patient noticed since exposure to poison/</td>
</tr>
<tr>
<td></td>
<td>medication (this can then be correlated with the agent, dose and</td>
</tr>
<tr>
<td></td>
<td>time since ingestion to strengthen the risk assessment)</td>
</tr>
<tr>
<td>Clinical status of patient</td>
<td>Blood pressure, HR, respiratory rate, temperature, O₂ saturation,</td>
</tr>
<tr>
<td></td>
<td>conscious state. [See Glasgow Coma Scale / AVPU]</td>
</tr>
</tbody>
</table>

4. Management

- Consult MO first in cases of suspected poisoning
- MO will contact PIC ③ 13 11 26 (24 hours) to determine if an exposure is likely to be toxic. If the substance is known to be toxic and a toxic quantity is known or suspected to have been taken, the PIC can help determine the contents and other characteristics of the agent involved in the exposure, and then advise on the likely clinical effects and appropriate management in conjunction with the MO
- All patients with intentional poisonings require a 12 lead ECG and a paracetamol level. [See Paracetamol poisoning] for specific advice
Poisoning and drug emergencies

- Supportive care and monitoring: following stabilisation of the patient, good supportive care and monitoring is sufficient for the majority of poisoned patients. Some patients may require further investigations and decontamination as follows:
  - electrolytes, renal and liver function, full blood count, coagulation tests (rarely), chest x-ray, blood gases, spirometry and urine testing
  - decontamination may be considered when:
    o the risk assessment indicates severe or life threatening toxicity
    o supportive care or antidote treatment alone may not ensure a good outcome
    o the poison is still in the gastrointestinal tract (usually within an hour of ingestion)
    o the poison is able to be removed by chosen method
    o the patient’s airway is self protected or has been secured

**Specific ECG changes** [1]

1. QRS widening - this is secondary to sodium channel blockade and is seen in a number of ingestions e.g. tricyclic antidepressants, antihistamines, antiarrhythmics. A QRS >120msecs is considered pathological
2. QT prolongation - this is secondary to potassium channel blockade and can be associated with torsades de pointes
   Drugs associated with QT prolongation include some of the antiarrhythmics, antidepressants, antihistamines, antibiotics and antipsychotics
   All ECG machines correct the QT interval for HR but these are problematic
   The most common correction formula used is Bazett’s formula. This overcorrects when the HR is >70, leading to abnormally prolonged QT interval
   A more accurate method of assessing the QT interval in toxicology is to use the QT nomogram where the uncorrected QT is plotted against the HR. Patients with an abnormal QT HR pair should be monitored until the QT HR pair is below the line
Activated charcoal

- MOs are advised to consult the PIC 131126 for information on the appropriate use of activated charcoal
- The administration of activated charcoal to paediatric patients should be a very rare event, as most children are not exposed to life threatening doses of poisons and can be safely managed with good supportive care. The use of activated charcoal in the paediatric age group should only occur after discussion with the PIC / Clinical Toxicologist
- Activated charcoal binds to poisons in the gut and prevents absorption. It is not effective for cyanide, alcohols, iron, lithium, potassium and other electrolytes, acids, alkalis or petroleum products
- Activated charcoal is usually ineffective if given more than 1 hour post-ingestion; however with some drugs there may be advantage in administer remaining charcoal after this time, or in repeat doses
- Caution is required with the use of activated charcoal in patients who are not intubated because of problems with aspiration. An important example is the drowsy patient with an unstable airway, particularly those who are reluctant to take the activated charcoal, given that it may cause vomiting
- In summary, activated charcoal should only be given if the patient can self administer without any assistance from treating staff. All patients who are or at risk of becoming drowsy, unconscious or fitting will need airway protection and will need intubation prior to administration of activated charcoal
- There is no evidence that the use of sorbitol or other cathartic agent provides any benefit over activated charcoal alone and they are no longer indicated

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Nil</th>
<th>Activated charcoal</th>
<th>NON</th>
<th>DTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>Strength</td>
<td>Route of administration</td>
<td>Recommended dosage</td>
<td>Duration</td>
</tr>
<tr>
<td>Suspension (50 g / 250 mL)</td>
<td>Oral Giving the activated charcoal to a child from a covered container may increase its acceptance (the colour can be off putting). Activated charcoal via the nasogastric or orogastric tube may be considered. The patient must be able to protect their airway or have it secured i.e. intubation</td>
<td>Adult 50 g</td>
<td>Activated charcoal can be repeated on MO orders There are some drugs (carbamazepine, theophylline, quinine, colchicine &amp; phenobarbitone) whose elimination may be enhanced with repeat dosing e.g. 25 - 50 g 4 - 6 hourly</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Child 1g / kg / dose to max. of 50 g</td>
<td>Child 1g / kg / dose to max. of 50 g</td>
<td>Adult 50 g</td>
</tr>
</tbody>
</table>

Contact the PIC on 131126 for advice
Provide Consumer Medicine Information: activated charcoal is unpalatable - but can be mixed with ice cream to improve this
Management of associated emergency: consult MO

The use of Ipecac Syrup or any other methods to induce vomiting are no longer recommended due to the risk of aspiration and lack of efficacy
5. Follow up

- Medical clearance of a patient with deliberate self poisoning or accidental ingestion requires both the physical and mental state to have returned, or be close to their premorbid state. The patient should be able to mobilise independently, perform simple activities of daily living e.g. feed and toilet themselves. In addition the patient should be orientated to time, place and person and perform simple mental tasks e.g. serial 7’s

- The Queensland PIC has a useful website on the first aid treatment and prevention of poisonings, it can be found at: www.health.qld.gov.au/poisonsinformationcentre

6. Referral / consultation

- Consult MO on all occasions if the substance taken is known or suspected to be toxic
- Consult MO in all cases of deliberate poisoning prior to discharge
- The PIC can help to clarify toxicity and give up to date advice on the urgency and the specifics of management
- All patients who are or at risk of becoming drowsy, unconscious or fitting, or who may require specific management or antidotes as detailed below may need to be evacuated/hospitalised
- All patients with deliberate self poisoning will need a mental health review

If information on agents / drugs not specifically mentioned in this section is required please contact the Queensland PIC on 131126

Specific poisons

Anticholinergic agents

[1], [2], [4]

In addition to general approach to Poisoning / overdose

Background

- Anticholinergic toxicity can be due to ingestion of pure anticholinergic agents e.g. benztropine, benzhexol and anticholinergic plants, notably angel’s trumpet or datura (Brugmansia species) and also drugs that have anticholinergic activity as part of their toxicity, such as tricyclic antidepressants and antihistamines

1. May present with

- Central nervous system effects e.g. hallucinations, delirium, sedation and occasionally seizures
- Peripheral nervous system effects e.g. dilated pupils, red, dry skin, mouth and axilla and urinary retention, reduced bowel sounds, tachycardia and hyperthermia (children)
- Effects may be delayed and cyclical

2. Immediate management

See Immediate management under Poisoning / overdose

3. Clinical assessment

See Risk assessment under Poisoning / overdose
4. **Management**

- The patient may be in a hyper stimulated state e.g. delirium. Attending to the patient in a dark and quiet room is useful in the company of a familiar person, friend or relative.
- Consult MO who will advise further management which may include:
  - diazepam for sedation or seizures
  - active cooling for hyperthermia. See Heat exhaustion / heat stroke / hyperthermia
  - IV fluids to maintain hydration
  - IDC for urinary retention
  - deep vein thrombosis prophylaxis if patient is bed bound for an extended period of time

### Anticonvulsants

[1], [2], [4]

#### Background

- This is a diverse group of drugs with differing toxicities. The older agents e.g. sodium valproate and carbamazepine are more toxic in overdose in comparison with the new agents e.g. lamotrigine

### Sodium valproate

In addition to the general approach to Poisoning / overdose

<table>
<thead>
<tr>
<th>Sodium valproate toxicity</th>
<th>related to dose as follows</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 200 mg / kg</td>
<td>minor toxicity e.g. sedation only</td>
</tr>
<tr>
<td>200 - 400 mg / kg</td>
<td>moderate toxicity with CNS depression</td>
</tr>
<tr>
<td>400 mg -1 g / kg</td>
<td>severe toxicity possible</td>
</tr>
<tr>
<td>&gt; 1 g / kg</td>
<td>severe life threatening toxicity</td>
</tr>
</tbody>
</table>

1. **May present with**

- Gastrointestinal toxicity e.g. nausea and vomiting
- Central nervous system depression: ranges from mild sedation to coma
- Cardiovascular effects e.g. hypotension and QT prolongation
- Metabolic abnormalities e.g. metabolic acidosis (lactic acidosis), hypernatraemia (sodium load)
- Bone marrow depression e.g. thrombocytopenia

2. **Immediate management** Not applicable

3. **Clinical assessment**

   See Risk assessment under Poisoning / overdose

4. **Management**

- The risk assessment is based on the dose ingested, serum valproate levels (if available) and the status of the patient, especially the level of CNS depression
- Consult MO who will advise further management. Evacuation / hospitalisation may be required
- Large ingestions will require intubation and ventilation. Activated charcoal 50 g should be given post intubation
- Hypotension (BP <90) should be treated with IV fluid. On rare occasions inotropes will be required to maintain blood pressure
Poisoning and drug emergencies

- Haemodialysis may be required in a patient with life threatening toxicity, based on the dose ingested, the serum level (>850 mg / L) and the presence of lactic acidosis or cardiovascular instability

**Carbamazepine**

In addition to the general approach to Poisoning / overdose
Toxicity is related to dose: > 50 mg / kg or > 3 g can be associated with significant toxicity

1. **May present with**
   - Toxicity can be delayed and prolonged due to erratic absorption and the anticholinergic properties of carbamazepine
   - GIT toxicity e.g. ileus
   - Central nervous system depression: cerebellar effects e.g. nystagmus and dysarthria, sedation progressing to coma, seizures (rare)
   - Cardiovascular effects e.g. tachycardia and hypotension and rarely QRS prolongation with ventricular arrhythmias

2. **Immediate management** Not applicable

3. **Clinical assessment**
   - See Risk assessment under Poisoning / overdose

4. **Management**
   - Intubation and ventilation for patients with a decreased level of consciousness
   - Multi dose activated charcoal (50 g q4h) for intubated patients (if bowel sounds present)
   - IV fluids for hypotension (BP <90), inotropes rarely required
   - Rarely sodium bicarbonate for patients with cardiovascular instability and widen QRS (> 120 msec)
   - Serial carbamazepine levels
   - Role of dialysis is controversial

**Phenytoin**

In addition to the general approach to Poisoning / overdose

<table>
<thead>
<tr>
<th>Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>Of the 3 traditional anticonvulsants, ingestion of phenytoin in overdose is rarely associated with life threatening toxicity. However, toxicity can be prolonged due to saturable liver metabolism with long half life &gt;24 hours. Most patients will do well with supportive care. Chronic toxicity from dose adjustments and / or drug interactions behaves in a similar fashion</td>
</tr>
</tbody>
</table>

1. **May present with**
   - Toxicity correlates reasonably well with drug concentrations
   - 10 - 20 mg / L - therapeutic range
   - 20 - 30 mg / L - nystagmus, ataxia and mild sedation
   - 30 - 50 mg / L - worsening nystagmus, severe ataxia, dysarthria and sedation
   - >50 mg / L - rare to develop but can be associated with coma and seizures
   - GIT toxicity e.g. nausea and vomiting
   - Cardiovascular effects e.g. bradycardia / hypotension, associated with rapid infusion of IV phenytoin (>50 mg / min) is not seen with oral phenytoin
2. **Immediate management**  Not applicable

3. **Clinical assessment**  
   See Risk assessment under Poisoning / overdose

4. **Management**
   - Most patients do well with simple supportive care
   - Intubation and ventilation is rarely required
   - IV fluids for hypotension (BP <90)
   - Multi dose activated charcoal (50 g q4h) to increase clearance in severe toxicity may be indicated
   - Serial phenytoin levels (no more than daily)

   **Other anticonvulsants**
   Lamotrigine, gabapentin, pregabalin, levetiracetam

In addition to the general approach to Poisoning / overdose
Ingestion of these 4 agents most commonly leads to mild GIT and CNS toxicity with sedation and nystagmus. Severe CNS toxicity resulting in coma requiring intubation and ventilation rarely occurs

**Antidepressants**
\[1\] [2] [4] [5]

**SSRIs (selective serotonin reuptake inhibitors)**
   e.g. fluoxetine, paroxetine, fluvoxamine, sertraline, citalopram

In addition to the general approach to Poisoning / overdose

<table>
<thead>
<tr>
<th>Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSRIIs rarely cause significant toxicity. Citalopram can cause QT prolongation and prolonged cardiac monitoring may be required</td>
</tr>
</tbody>
</table>

1. **May present with**
   - Serotonin toxicity (which is rarely life threatening) is best described as:
     - neuromuscular effects e.g. hyperreflexia, clonus, tremor, hypertonicity, seizures (rare)
     - autonomic effects e.g. hyperthermia, diaphoresis, flushing, tachycardia
     - mental status effects e.g. anxiety, agitation and confusion (rare)
     - QT prolongation with citalopram

2. **Immediate management**  Not applicable

3. **Clinical assessment**  
   See Risk assessment under Poisoning / overdose
4. Management

- Most ingestions of SSRIs require only observation; some may need symptomatic treatment for any symptomatic serotonin toxicity e.g. benzodiazepines
- Ingestions of citalopram should be managed as follows:
  - <600 mg ingestion - no activated charcoal and no monitoring
  - 600 - 1000 mg - if activated charcoal is given within 4 hours, no monitoring is required, otherwise cardiac monitoring is required for 13 hours
  - >1000 mg - regardless of the administration of activated charcoal cardiac monitoring is required for 13 hours

**Tricyclic antidepressants (TCAs)**

- e.g. amitriptyline, clomipramine, dothiepin, doxepin, imipramine, nortriptyline, trimipramine

In addition to the general approach to Poisoning / overdose

<table>
<thead>
<tr>
<th>Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingestions of &gt;15 mg / kg can result in severe toxicity with unconsciousness, cardiac arrhythmias and seizures. Onset of toxicity is rapid (within the hour). Patients ingesting TCAs who are asymptomatic at 6 hours post ingestion and have a normal ECG can be discharged</td>
</tr>
</tbody>
</table>

1. **May present with**
   - Neurological effects e.g. rapid deterioration in level of consciousness and seizures
   - Cardiovascular effects e.g. tachycardia, hypotension progressing to broad complex tachycardia and ventricular arrhythmias. Bradycardia is a preterminal sign of cardiovascular collapse
   - Anticholinergic toxicity is often seen with smaller ingestions or after recovery from a large ingestion

2. **Immediate management**
   - Patients who arrive with a decreased level of consciousness will often require intubation and ventilation
   - Commence continuous cardiac monitoring

3. **Clinical assessment** See Risk assessment under Poisoning / overdose

4. **Management**
   - As above if unconscious
   - Consult MO who will advise further management which may include:
     - fluid load with normal saline if hypotensive (BP <90)
     - QRS widening associated with haemodynamic compromise should receive sodium bicarbonate (1 - 2 mmols / kg)
     - seizures should be managed with benzodiazepines e.g. midazolam 5 mg or diazepam 10 mg
     - consideration should be given to administering activated charcoal (50 g) post intubation via a NGT
   - Patients with hypotension, ventricular arrhythmias and / or ongoing seizures and / or not responsive to the above treatment should be discussed with a Clinical Toxicologist
Poisoning and drug emergencies

**Antihistamines**

[1], [2], [4]

In addition to the general approach to Poisoning / overdose

<table>
<thead>
<tr>
<th>Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>➢ Due to ingestion of both sedating antihistamines e.g. promethazine and non-sedating antihistamines e.g. loratadine, desloratadine, cetirizine and fexofenadine</td>
</tr>
</tbody>
</table>

1. **May present with**
   - Central nervous system depression, anticholinergic symptoms including delirium, and rarely seizures. [See Anticholinergic agents](#)
   - Tachycardia, orthostatic hypotension
   - Rarely arrhythmias, myocardial depression and rhabdomyolysis e.g. doxylamine
   - QT prolongation and very rarely torsades de pointes with non-sedating antihistamines

2. **Immediate management** Not applicable

3. **Clinical assessment**
   - See Risk assessment under Poisoning / overdose

4. **Management**
   - Close attention to airways, breathing and circulation is essential, as the majority of patients have an excellent prognosis with good supportive care
   - Consult MO who will advise further management which may include:
     - activated charcoal. This is rarely required due to the rapid onset of sedation, but may be considered in ingestions of particular antihistamines e.g. promethazine
     - sedation may be required 12 - 24 hours after the ingestion when antihistaminic sedative effects have resolved, but the anticholinergic delirium remains

**Antipsychotics**

[1], [2], [4]

Typical e.g. chlorpromazine, haloperidol, pericyazine

In addition to the general approach to Poisoning / overdose

<table>
<thead>
<tr>
<th>Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>➢ Although grouped as a class, these agents have different toxicities in overdose</td>
</tr>
</tbody>
</table>

1. **May present with**
   - Neurological effects e.g. decreased level of consciousness, dystonic reactions
   - Cardiovascular effects e.g. hypotension, tachycardia and QT prolongation

2. **Immediate management**
   - Patients who arrive with a decreased level of consciousness will often require intubation and ventilation

3. **Clinical assessment**
   - See Risk assessment under Poisoning / overdose
4. Management

- If unconscious the patient will often require intubation and ventilation
- Consult MO who will advise further management which may include:
  - fluid load with normal saline if hypotensive (BP <90)
  - extrapyramidal effects e.g. dystonic reactions, should be managed with benztropine 1 - 2 mg IV
  - patients with QT prolongation should have ongoing cardiac monitoring

Atypical

**e.g. quetiapine, olanzapine, risperidone**

In addition to the general approach to Poisoning / overdose

<table>
<thead>
<tr>
<th>Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>Although grouped as a class, these agents have different toxicities in overdose</td>
</tr>
</tbody>
</table>

---

1. **May present with**

- **Quetiapine**
  - tachycardia and hypotension, decreased level of consciousness progressing to coma in large ingestions
- **Olanzapine**
  - mild to moderate decreased level of consciousness rarely leading to coma, sedated delirium and other anticholinergic toxicity e.g. tachycardia
- **Risperidone**
  - tachycardia and dystonic reactions, rarely hypotension. Decreased level of consciousness does not occur

2. **Immediate management**

Patients who arrive with a decreased level of consciousness will often require intubation and ventilation

3. **Clinical assessment**

See Risk assessment under Poisoning / overdose

4. **Management**

- As above if unconscious
- Consult MO who will advise further management which may include:
  - fluid load with normal saline if hypotensive (BP <90)
  - extrapyramidal effects e.g. dystonic reactions, should be managed with benztropine 1 - 2 mg IV
Aspirin / salicylates

In addition to the general approach to Poisoning / overdose

<table>
<thead>
<tr>
<th>Background</th>
<th>Due to ingestion of aspirin containing products and methylsalicylate containing liniments and vaporiser fluids</th>
</tr>
</thead>
</table>

Patients with ingestions of methylsalicylate should be discussed with the PIC (24 hours)

1. **May present with**
   - GIT effects e.g. nausea, vomiting
   - CNS effects e.g. confusion, drowsiness, restlessness, hyperventilation, tinnitus (ringing in ears). Coma and seizures are rare and associated with severe poisoning
   - Metabolic effects e.g. respiratory alkalosis (early) and metabolic acidosis (late)
   - Toxicity is related to ingested dose
     - <150 mg / kg - minor toxicity
     - 150 - 300 mg / kg - mild to moderate effects e.g. tinnitus and hyperventilation
     - 300 - 500 mg / kg - severe toxicity e.g. metabolic acidosis, coma and seizures

2. **Immediate management**
   *See Immediate management under Poisoning / overdose*

3. **Clinical assessment**
   *See Risk assessment under Poisoning / overdose*
   - In addition, patients with salicylate toxicity require an arterial blood gas [ABG], repeated salicylate levels and biochemistry e.g. electrolytes, renal function

4. **Management**
   - Consult MO who will advise further management which may include:
     - activated charcoal for doses >150 mg / kg when the time of ingestion is within 1 hour
   - The PIC can assist with calculations involving methylsalicylate exposures. When the amount is unknown, blood levels may be taken, although this may require evacuation

5. **Follow up**
   *See Follow up under Poisoning / overdose*

6. **Referral / consultation**
   - Patients who have ingested more than 300 mg / kg, or have any evidence of acidosis, may require treatment in a critical care area. This may require retrieval to a larger centre in consultation with a Clinical Toxicologist
Carbon monoxide
[1], [2], [4]

In addition to the general approach to Poisoning / overdose

Background
- Can result from exposure to combustion in a confined space, both accidentally, occupationally (e.g. firemen) and deliberately (car exhaust fumes). Patient with deliberate exposures of carbon monoxide have often taken overdoses.

1. May present with
   - Headache, lethargy, confusion, drowsiness, weakness, altered state of consciousness (may be transient), seizures
   - Nausea, vomiting
   - Tachycardia. In severe poisonings ECG changes and arrhythmias

2. Immediate management
   See Immediate management under Poisoning / overdose
   - Apply high flow $O_2$ via a non rebreathing mask. A Hudson mask is not sufficient. See O2 delivery systems

3. Clinical assessment
   See Risk assessment under Poisoning / overdose
   - Carboxyhaemoglobin levels are a poor marker of exposure and hence prognosis

4. Management
   - Consult MO
   - High flow $O_2$ as above for at least 6 hours. Ongoing $O_2$ therapy may be considered in patients with ongoing clinical effects. These patients should be discussed with a Clinical Toxicologist. Hyperbaric $O_2$ is no longer recommended for most carbon monoxide exposures.
   Note: In carbon monoxide poisoning, a pulse oximeter will record a misleadingly normal $O_2$ saturation

5. Follow up
   See Follow up under Poisoning / overdose

6. Referral / consultation
   Patients with ongoing symptoms or pregnant patients should be discussed with a Clinical Toxicologist
Poisoning and drug emergencies

Caustic substances
[1], [2], [4]

In addition to the general approach to Poisoning / overdose

<table>
<thead>
<tr>
<th>Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>❖ Known or suspected exposures to acids including: rust removers, some toilet bowl cleaners, battery acids, other acids used in cleaning and industry or alkalis including: drain cleaners, oven cleaners, ammonia, detergents including automatic dishwashing detergent</td>
</tr>
</tbody>
</table>

1. May present with
   • Burns to the lining of the mouth, oesophagus, and stomach. The lips and mouth should be inspected for signs of burns, including blisters, redness, and swelling. However, a clear mouth does not necessarily indicate a clear oesophagus
   • Stridor, dyspnoea or dysphonia indicate airway injury which may be life threatening
   • Signs associated with oesophageal inflammation: pain or difficulty with swallowing, excessive drooling, irritability, pulling at lips or tongue, vomiting, abdominal pain

2. Immediate management
   • Initial management is to wipe out the mouth with a cloth, then rinse with water. No further fluids should be given

3. Clinical assessment
   See Risk assessment under Poisoning / overdose

4. Management
   • Close attention to airways and breathing is essential
   • Do not induce vomiting
   • Do not give an acid to neutralise an ingested alkali or vice versa as the heat of neutralisation may cause further damage
   • Do not give activated charcoal [2]. It is ineffective
   • Consideration should be given to administering analgesia in the form of IV opiates as these exposures can be painful. Consult MO who will advise further management and arrange evacuation / hospitalisation if required
   • There is no evidence that the use of corticosteroids prevent the development of oesophageal strictures following alkali ingestions
Cyanide

In addition to the general approach to Poisoning / overdose

**Background**
- Cyanide binds to the ferric ion in the mitochondrial cytochrome oxidases, thereby inhibiting cellular respiration and results in lactic acidosis. Cyanide exposure is usually from inhalation from domestic or industrial fires or from occupational exposure (cyanide is used in gold refining). Onset of toxicity is rapid and death, if it occurs, is often prior to presentation to hospital. Most patients who survive to hospital will do well with supportive care without the need for antidotes.

1. **May present with**
   - CNS effects e.g. headache, weakness, confusion, drowsiness, coma and seizures
   - CVS effects e.g. hypotension, tachycardia, ECG changes, arrhythmias and cardiorespiratory arrest can occur
   - GIT effects e.g. nausea and vomiting
   - Respiratory distress and cyanosis from hypoxia

2. **Immediate management**
   - See Immediate management under Poisoning / overdose
   - Patients with a decreased level of consciousness and / or respiratory failure will require early intubation and ventilation

3. **Clinical assessment**
   - See Risk assessment under Poisoning / overdose

4. **Management**
   - Take precautions (gloves, plastic gown and mask) to prevent contact with cyanide directly or off the patient (particularly from the liquid form of cyanide)
   - Remove the patient from the source of contamination to fresh air
   - Give high flow $O_2$ via a non rebreathing mask. A Hudson mask is not sufficient. See O$_2$ delivery systems
   - Consult MO who in consultation with the PIC may recommend the use of an antidote, of which there are several available
   - MO will arrange evacuation / hospitalisation to an appropriate facility

Eucalyptus Oil

In addition to the general approach to Poisoning / overdose

**Background**
- Ingestion of as little as 5 - 10 mL or more may produce signs of toxicity. Ingestion can also result in aspiration resulting in a pneumonitis, that evolves over hours

1. **May present with**
   - CNS effect e.g. confusion, drowsiness, decreased level of consciousness and coma
   - CVS effects e.g. tachycardia and hypotension
   - Respiratory effects e.g. aspiration, which may result in pneumonitis, with coughing, gagging, wheezing and respiratory distress
   - GIT effects e.g. vomiting, nausea
   - Onset can be rapid with severe toxicity developing within the hour
2. **Immediate management**  
   See Immediate management under Poisoning / overdose

3. **Clinical assessment**  
   See Risk assessment under Poisoning / overdose

4. **Management**  
   • Give O₂ to maintain saturation >93% - adult / 95% - child  
   • Insert IV cannula if any signs of sedation and have midazolam ready in case of seizures. See Fits / convulsions / seizures  
   • Consult MO who will advise further management and arrange evacuation / hospitalisation  
   • The use of activated charcoal is contraindicated given the rapid onset of symptoms and the risk of aspiration  
   • All patients should be observed for 6 hours  
   • Avoid giving any dairy containing food / liquid for at least 2 hours following ingestion in order to limit absorption

---

**Hydrocarbons (including many oils)**

In addition to the general approach to Poisoning / overdose

<table>
<thead>
<tr>
<th>Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxicity depends on the particular hydrocarbon. Clarification of the type of hydrocarbon and the expected toxicity may be obtained from the PIC 13 11 26 (24 hours)</td>
</tr>
<tr>
<td>In general:</td>
</tr>
<tr>
<td>- high viscosity hydrocarbons are thick substances and are generally swallowed resulting in gastrointestinal effects</td>
</tr>
<tr>
<td>- low viscosity hydrocarbons are often easily vaporised or aerosolised and are associated with inhalation and aspiration. They can cause chemical damage to the lungs, hypoxia, aspiration and systemic effects due to easier absorption. Onset of toxicity is often rapid</td>
</tr>
</tbody>
</table>

1. **May present with**  
   • Rapid onset of central nervous system (CNS) depression and seizures  
   • Respiratory symptoms such as coughing and choking, which indicates aspiration has occurred  
   • Cardiac arrhythmias can occur early and be fatal

2. **Immediate management**  
   See Immediate management under Poisoning / overdose

3. **Clinical assessment**  
   See Risk assessment under Poisoning / overdose

4. **Management**  
   • Give O₂ to maintain saturation >93% - adult / 95% - child. If O₂ saturation not maintained consult MO  
   • Do not induce vomiting or administer activated charcoal  
   • See following table
Types of hydrocarbons

<table>
<thead>
<tr>
<th>Type</th>
<th>Examples</th>
<th>Risk of pneumonitis</th>
<th>Risk of systemic toxicity</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-viscosity</td>
<td>Vaseline</td>
<td>Low</td>
<td>Low</td>
<td>Marked diarrhoea may occur, usually managed by increasing oral fluids</td>
</tr>
<tr>
<td></td>
<td>Motor Oil</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Other lubricating oils</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low-viscosity: systemic toxicity possible</td>
<td>Kerosene</td>
<td>High</td>
<td>Low</td>
<td>Observe for acute asthma like features or pneumonitis (may be delayed 1-2 days) Observe for nausea, vomiting, diarrhoea Consult MO</td>
</tr>
<tr>
<td></td>
<td>Lighter fluid</td>
<td></td>
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<tr>
<td></td>
<td>Mineral Turpentine</td>
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<tr>
<td></td>
<td>Pine Oil</td>
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<tr>
<td></td>
<td>- associated with potential for marked CNS effects similar to eucalyptus oil</td>
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<td></td>
</tr>
<tr>
<td>Low-viscosity: known systemic toxicity</td>
<td>Camphor</td>
<td>High</td>
<td>High</td>
<td>Observe for acute asthma like features or pneumonitis (may be delayed 1-2 days) Observe for nausea, vomiting, diarrhoea Consult MO</td>
</tr>
<tr>
<td></td>
<td>Chlorinated insecticides</td>
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<tr>
<td></td>
<td>Benzene</td>
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<tr>
<td></td>
<td>Toluene</td>
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</tbody>
</table>

5. **Follow up**

- Review the next day and the day after given the possibility of delay in respiratory symptoms
- Consult MO if any chest symptoms or signs of increased HR or temperature

**Iron**

[1], [2], [4]

In addition to the general approach to Poisoning / overdose

**Background**

- It is the elemental iron content that is used for the calculation of toxicity. The amount may vary between 80 mg and 105 mg in a 300 mg ferrous or ferric salt tablet depending on the formulation. Ferro-Liquid® mixture contains 6mg / mL of elemental iron. The PIC 13 11 26 (24 hours) can assist with calculations
- Toxicity depends on the weight of the patient and amount of elemental iron ingested:
  - <40 mg / kg - minor toxicity e.g. mild GIT toxicity
  - 40 - 120 mg / kg - risk of systemic toxicity
  - >120 mg / kg - potentially lethal
- It is unusual for children to ingest more than 40 mg / kg elemental iron

1. **May present with**

- Classically iron toxicity is described as presenting in three distinct phases. Clinically however these phases often overlap with each other:
  - **Phase 1**
    - Significant GIT toxicity manifesting as severe nausea, vomiting, abdominal pain, haematemesis and bloody diarrhoea (haemorrhagic gastroenteritis). These effects may be delayed, but are usually seen within 6 hours if a sufficient amount has been ingested. Hypotension from fluid loss can occur
**Phase 2**  
A quiescent or window phase where the GIT toxicity settles prior to systemic toxicity commencing

**Phase 3**  
Systemic toxicity manifesting as multiorgan failure with cardiovascular collapse, renal failure, metabolic acidosis, hepatotoxicity and CNS toxicity. These life threatening effects usually occur between 6 and 48 hours after the exposure.

2. **Immediate management**  
See Immediate management under Poisoning / overdose

3. **Clinical assessment**  
See Risk assessment under Poisoning / overdose  
- A plain abdominal x-ray may show residual whole tablets or a concretion (a hard usually inorganic mass) which may indicate the use of whole bowel irrigation. This decision should be made in consultation with a Clinical Toxicologist

4. **Management**  
- Iron levels at the 4 - 6 hours post ingestion can predict toxicity. In addition patients with iron ingestion require a number of other investigations including electrolytes, renal and liver function, blood gases, full blood count and an abdominal x-ray  
- IV fluids should be administered to ensure adequate circulating volume and replacement of fluid loss  
- Activated charcoal is ineffective  
- Whole bowel irrigation may be useful for large exposures (over 40 mg / kg) Consult MO or a Clinical Toxicologist  
- Consult MO who will organise evacuation / hospitalisation. Desferrioxamine is an antidote that will be needed in serious cases. This can be brought with the retrieval team

**Lithium**  
[1], [2], [4]

In addition to the general approach to Poisoning / overdose

<table>
<thead>
<tr>
<th>Background</th>
</tr>
</thead>
</table>
| - Acute lithium ingestions in patients with normal renal function are relatively benign with minor GIT toxicity only, as the lithium is renally excreted prior to entry into the CNS. This is usually regardless of whether the patient is taking lithium regularly or irregularly  
- Chronic lithium toxicity, which often occurs insidiously in the context of advance age and renal impairment, is a serious illness requiring inpatient care and rarely dialysis |

1. **May present with**  
- GIT effects e.g. nausea, vomiting and diarrhoea  
- Neurological effects e.g. tremor, hyperreflexia, clonus, ataxia and dysarthria  
- Cardiovascular effects e.g. hypotension / QT prolongation in severe toxicity only

2. **Immediate management**  
Not applicable

3. **Clinical assessment**  
See Risk assessment under Poisoning / overdose
4. **Management**
   - Acute lithium ingestions often only require antiemetics and IV fluid
   - Serial lithium levels and discharge when lithium level is below 1 mmol / L
   - Chronic lithium toxicity usually requires inpatient admission and IV fluid with attention to fluid balance including an IDC
   - All cases of chronic lithium toxicity with neurological toxicity should be discussed with a Clinical Toxicologist

**Non steroidal anti-inflammatory drugs (NSAID)**

In addition to the general approach to Poisoning / overdose

<table>
<thead>
<tr>
<th>Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>➢ Most people with ingestions of NSAID do well with supportive care. Most ingestions are with ibuprofen and if &lt;400 mg / kg are unlikely to result in major toxicity</td>
</tr>
</tbody>
</table>

1. **May present with**
   - GIT effects e.g. nausea, vomiting and upper GIT irritation
   - Renal effects e.g. renal impairment in patients who are dehydrated/hypovolaemic
   - CNS effects e.g. altered level of consciousness and seizures with ingestion of mefenamic acid
   - Metabolic effects e.g. metabolic acidosis with large ingestions (>400 mg / kg ibuprofen)

2. **Immediate management** Not applicable

3. **Clinical assessment**
   See Risk assessment under Poisoning / overdose

4. **Management**
   - Most patients will do well with symptomatic and supportive care
   - All patients should receive IV fluid and have their renal function checked
   - Upper GIT irritation symptoms can be managed with IV / oral proton pump inhibitors

### Opiates

<table>
<thead>
<tr>
<th>Opiates</th>
</tr>
</thead>
<tbody>
<tr>
<td>buprenorphine, codeine, dextropropoxyphene, fentanyl, hydromorphone, methadone, morphine, heroin, oxycodone, pethidine, Lomotil®</td>
</tr>
</tbody>
</table>

(Lomotil® contains atropine and diphenoxylate, which are chemically related to pethidine)

Toxicity from opiates cannot be predicted from the dose ingested alone due to tolerance in opiate dependent patients

Activated charcoal is not routinely indicated. A good outcome is expected with supportive care and antidote administration as necessary. The onset of symptoms is also usually rapid, making airway protection essential if considering any form of decontamination
1. **May present with**
   - CNS depression ranging from drowsiness to coma
   - Respiratory depression often mirrors the degree of CNS depression
   - CVS effects e.g. hypotension
   - Miosis (small pupils)
   - QRS widening can occur with ingestions of dextropropoxyphene and propoxyphene
   - QT prolongation and torsades de pointes can occur with ingestions of methadone

2. **Immediate management** Not applicable

3. **Clinical assessment**
   - See Risk assessment under Poisoning / overdose

4. **Management**
   - Give O₂ to maintain saturation >95%. If O₂ saturation is not maintained >95% consult MO. See O₂ delivery systems
   - Hypoxia in patients with opiate ingestion mandates an assessment of CO₂
   - Give naloxone if depressed level of consciousness or respiratory rate. Care needs to be taken not to induce withdrawal in patients who are regular users of opiates - complications include seizures and arrhythmias which may be fatal
   - MO may order further doses or IV infusion of naloxone. Naloxone has a short half life and the patient may relapse as the naloxone wears off
   - The endpoint should be a patient with a respiratory rate >12 bpm and easily responsive to verbal stimuli. Complete reversal of opiates is not required and can lead to undesirable effects e.g. acute opiate withdrawal, agitation, pulmonary oedema

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Naloxone</th>
<th>DTP IHW / SM R&amp;IP</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Authorised Indigenous Health Workers administer one dose then must consult MO / NP

Scheduled Medicines Rural and Isolated Practice Registered Nurses may proceed

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampoule</td>
<td>0.4 mg / mL</td>
<td>IV or IM (IM slow to absorb - may take up to 15 minutes)</td>
<td>Adult Dilute 0.4 mg with normal saline to a total of 8 mL = 0.05 mg / mL Give 0.05 mg (1 mL) to 0.2 mg (4 mL) of this dilution as required to meet endpoint above</td>
<td>Stat Further doses on MO / NP order Can be repeated at intervals of 2 - 3 mins to a max. of 2 mg</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information

Management of associated emergency: opiate analgesics have a longer duration of action than naloxone and respiratory depression may return as the naloxone wears off. Continued observation and monitoring or respiratory function is required. Consult MO
Organophosphates

[1], [2], [4]

In addition to the general approach to Poisoning / overdose

**Background**
- Organophosphate toxicity is a rare and potentially lethal toxicity. This usually occurs in situations of deliberate overdose.
- Occupational dermal or inhalational exposure which is more common can cause toxicity, but this is rarely life threatening.
- Organophosphates are often formulated with hydrocarbons which can contribute to the toxicity, especially if aspirated. See Poisoning / overdose: hydrocarbons.
- All deliberate organophosphate ingestions should be discussed with a Clinical Toxicologist. PIC 13 11 26

1. **May present with**
   - GIT effects e.g. nausea, vomiting, diarrhoea, cardiovascular effects - shock can occur with some organophosphate poisonings. It is unknown whether this is organophosphate toxicity or toxicity from the diluent i.e. hydrocarbon solvent.
   - Cholinergic toxicity
   - Muscarinic effects (effects on parasympathetic nervous system):
     - vomiting, diarrhoea, urination, miosis (small or contracted pupil), bronchorrhea (excessive mucus from the air passages of the lung), bronchospasm, lacrimation (tears) and salivation
     - bradycardia (slow HR) and hypotension
   - Nicotinic effects:
     - muscle weakness, muscle fasciculation (twitching), respiratory muscle paralysis
     - tachycardia (fast HR) and hypertension
   - Central nervous system effects (mixture of both muscarinic and nicotinic effects):
     - agitation, coma, seizures
     - respiratory failure and unconsciousness may follow

2. **Immediate management**
   Although decontamination of the patient and avoidance of secondary contamination is important it must not take precedence over the resuscitation of the patient.

3. **Clinical assessment**
   See Risk assessment under Poisoning / overdose.

4. **Management**
   - Resuscitation should be the primary concern and should not be secondary to external decontamination of the patient.
   - Take precautions (nitrile gloves if available, plastic gown and mask) to prevent contact with organophosphate from the patient. Significant secondary poisoning has never been documented. Some staff are often concerned about this risk, which is due to the strong smell of the hydrocarbon diluent.
   - Manage the patient in a well ventilated room.
   - Give O₂ according to clinical condition - at a minimum, use non rebreathing mask. A Hudson mask is not sufficient. See O₂ delivery systems.
   - Decontamination is very important. For skin exposures, remove contaminated clothing and wash very well with warm soapy water.
   - Gastrointestinal decontamination is unlikely to be effective due to rapid absorption of the liquid formulations.
Poisoning and drug emergencies

- Consult MO who may advise giving atropine IV, and who will organise evacuation / hospitalisation. The antidote pralidoxime (2-PAM) may need to be given in serious cases after consultation with MO.
- The use of oximes e.g. pralidoxime is controversial and should be discussed with a Clinical Toxicologist.
- Atropine requirements may be very high. Start with 1.2 mg and double the dose every 5 minutes until atropinised. Once this has occurred commence an infusion at 10 - 20% of the total atropine dose per hour.
- Target endpoints for atropinisation:
  - clear chest with no wheeze
  - HR >80 and BP (systolic) >80
  - dry axillae
  - normal pupil size
- Advanced care, including intubation and suctioning of airways may be required.

**Carbamates**
Clinical presentation is identical to organophosphate ingestions. The duration of effects are usually briefer and sometimes are less severe. Oximes are not indicated. Some carbamate products are mixed with methanol which can be the major toxicity encountered. As for organophosphate exposures patients with carbamate ingestion should be discussed with a Clinical Toxicologist.

**Patients exposed to unintentional or dermal exposures of organophosphates or carbamates who remain asymptomatic at 6 hours post exposure can be discharged**

**Paracetamol**

[1], [2], [4], [7]

In addition to the general approach to Poisoning / overdose

**Recommend**
- The following information relates to acute exposures to paracetamol.
- Different units are used to report paracetamol levels (micromol / L or mg / L). Incorrect plotting of level may lead to potentially lethal error. Ensure units reported are plotted on nomogram of same measurement.
- Repeated supratherapeutic ingestion (RSI) refers to staggered dosing, often over 1 or more days, i.e. chronic exposure and may require a different approach to management.
- MO advised to contact the PIC 13 11 26 for advice specific to chronic exposures.

**Background**
- In 2008 a consensus statement was published by Clinical Toxicologists consulting to the Australasian PIC on the management of paracetamol poisoning in Australia and NZ [7]. This is available on:
  - Clinicians Knowledge Network website at: sp.cknservices.dotsec.com/ckn/home.php
  - Glaxo Smith Kline produce a wall chart reflecting the same advice which is available to all emergency facilities across Australia (ensure the paracetamol nomogram chart is current).
Poisoning and drug emergencies

1. **May present with**
   - Nausea and vomiting (persistent or late vomiting is common with hepatotoxicity)
   - Right upper quadrant tenderness
   - Severe liver damage about 2 - 4 days after ingestion if untreated (the patient may be mostly asymptomatic until day 2 or 3 following the exposure)
   - Death due to liver failure may result (the patient may be mostly asymptomatic until day 2 or 3 following the exposure)
   - The acute toxic dose in an adult or child over 6 years is 200 mg / kg or 10g, whichever is lowest e.g. 60 kg adult, 10 grams = 20 (500 mg) tablets
   - The acute toxic dose for children less than 6 years is ≥ 200 mg / kg. Doses less than this are not considered toxic and so no active treatment is required
   - Most paediatric exposures are to the liquid forms of paracetamol in children aged between 1 and 3 years (10 - 15 kg). It is uncommon for children to ingest >200 mg / kg, but if this potential exists a 4 hour blood level is required
   - Note: some over the counter preparations contain paracetamol as well as other drugs capable of causing complicating symptoms

2. **Immediate management** Not applicable

3. **Clinical assessment**
   See Risk assessment under Poisoning / overdose

4. **Management**
   - Consult MO
   - If the amount of paracetamol ingested is near to, or greater than the calculated toxic dose, the patient may require evacuation / hospitalisation
   - Activated charcoal can be offered to cooperative adult patients who present within 2 hours of ingestion and have taken a toxic dose
   - No gastric decontamination is required for paediatric ingestions of paracetamol, as it is very uncommon for children to take a toxic dose
   - Perform a paracetamol level
   - Consider if time is available to obtain a paracetamol level before initiating acetylcysteine treatment
   - Acetylcysteine (Parvolex) given intravenously, is an effective antidote where best effects are noted if administered within 8 hours of paracetamol ingestion
   - Indications for acetylcysteine are based on the serum paracetamol level plotted on a paracetamol nomogram (which is sent with the results from pathology)
   - If acetylcysteine has been commenced within 8 hours of ingestion then a standard 21 hour infusion can be given with no requirement for follow up investigations
   - If acetylcysteine has been commenced more than 8 hours after ingestion then the requirement for ongoing acetylcysteine after the standard 21 hour infusion is based on LFT and a PT taken >24 hours after ingestion
   - Acetylcysteine is to continue until the LFT and PT have peaked
### Acetylcysteine (Parvolex)

Give on advice of PIC / MO / NP

<table>
<thead>
<tr>
<th>Schedule</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>Strength</td>
</tr>
<tr>
<td>Ampoule</td>
<td>200 mg / 1 mL</td>
</tr>
</tbody>
</table>

- Initially 150 mg / kg IV in 200 mL glucose 5% / normal saline over 60 mins
- Followed by continuous IV infusion of 50 mg / kg in 500 mL glucose 5% / normal saline over 4 hours
- Then 100 mg / kg in 1 L glucose 5% / normal saline over 16 hours (total dose 300 mg / kg in 21 hours)

Administered within 8 hours of ingestion

Provide Consumer Medicine Information: contact the PIC ☎ 131126 for advice

Management of associated emergency: consult MO

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5. **Follow up**
   - Discharge patient in consultation with MO

6. **Referral / consultation**
   - MO consult PIC ☎ 13 11 26 for chronic exposure

---

**Paraquat**

[1], [2], [4]

In addition to the general approach to Poisoning / overdose

<table>
<thead>
<tr>
<th>Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>❖ As little as 10 - 15 mL of concentrated liquid paraquat (herbicide - weed killer) is fatal, which corresponds to less than a mouthful in an adult</td>
</tr>
</tbody>
</table>

1. **May present with**
   - Oral and pharyngeal ulceration, nausea, vomiting and diarrhoea
   - Inflammation of the heart muscle (myocarditis), liver and kidney damage and life threatening pulmonary oedema
   - Death occurs often secondary to multi-organ dysfunction early or pulmonary fibrosis late

2. **Immediate management**
   - Give activated charcoal immediately. If there is a delay with getting a patient to receive activated charcoal, e.g. isolated patients calling in, instruct them to eat soil or food - this will absorb the paraquat

3. **Clinical assessment**
   - See Risk assessment under Poisoning / overdose
4. **Management**

- Treatment must be rapid. Delays will greatly increase risk of toxicity and death.
- Take precautions (gloves, plastic gown and mask) to prevent contact with paraquat.
- Do not give O₂ initially unless ordered by MO (O₂ enhances pulmonary toxicity of paraquat).
- Consult MO who may advise O₂ if O₂ saturation falls below 90%. Most exposures will require evacuation / hospitalisation to an appropriate facility. Base line spirometry is of use for monitoring disease progression.
- All paraquat ingestions - accidental or deliberate - should be discussed with a Clinical Toxicologist.

**Recreational drugs including petrol sniffing**

[1], [2], [4]

**Amphetamines and cocaine**

In addition to the general approach to Poisoning / overdose

<table>
<thead>
<tr>
<th>Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are numerous derivatives of amphetamines available. Some are used therapeutically e.g. dexamphetamine. With others only available via illicit means e.g. ecstasy or MDMA. Concentrations vary and patient tolerance means that toxicity of these agents can be variable.</td>
</tr>
</tbody>
</table>

1. **May present with**

- Sympathomimetic toxidrome characterised by:
  - CNS excitation e.g. agitation, delirium, seizures
  - neuromuscular excitation e.g. hyperreflexia
  - autonomic effects e.g. hyperthermia, diaphoresis, mydriasis
  - cardiovascular effects e.g. tachycardia, hypertension, arrhythmias and rarely hypotension
  - metabolic effects e.g. hyperglycaemia, hypokalaemia and metabolic acidosis

- Can be complicated by hyponatraemia, rhabdomyolysis, cerebral haemorrhage, aortic dissection and myocardial infarction.

2. **Immediate management** Not applicable

3. **Clinical assessment**

See Risk assessment under Poisoning / overdose

4. **Management**

- Consult MO who will advise further management which may include:
  - most patients sympathomimetic toxidrome will settle with sedation e.g. diazepam 5 - 10 mg IV. There is no upper range of benzodiazepine dose as long as the patient is responding. Minimal response and / or brief duration of action strongly suggests benzodiazepine tolerance and another agent should be used for sedation e.g. droperidol 10 mg IM / IV
  - In addition to above, specific therapy may include:
    - hypertension - IV nitrates e.g. GTN or hydralazine 5 - 10 mg IV
    - myocardial ischaemia - aspirin 150 mg, IV nitrates e.g. GTN
    - hyperthermia (>39°C) - cold IV fluids, tepid sponging and ice packs to the groin and axillae
    - rhabdomyolysis - IV fluids, IDC, fluid balance
  - Complicated amphetamine toxicity should be discussed with a Clinical Toxicologist.
Poisoning and drug emergencies

Cannabis (marijuana)

In addition to the general approach to Poisoning / overdose

**Background**
- Widely used illicit drug with psychoactive properties which in general cause benign symptoms only
- Chronic heavy use leads to cannaboid hyperemesis syndrome, characterised by nausea, vomiting and colicky abdominal pain. The patient may report improvement with hot showers either at home or in hospital. Patients will often admit to infrequent use only. All patient's symptoms will resolve with decreased use or abstinence

1. **May present with**
   - CNS symptoms e.g. ataxia, uncoordination, sedation and rarely CNS depression
   - CVS symptoms e.g. tachycardia, hypotension (postural)
   - Psychiatric e.g. euphoria, agitation, anxiety, delusions and hallucinations

2. **Immediate management** Not applicable

3. **Clinical assessment**
   See Risk assessment under Poisoning / overdose

4. **Management**
   - Most patients toxicity will resolve with time and simple supportive care
   - Occasionally sedation e.g. diazepam 5 - 10 mg IV may be required

Gamma-hydroxybutrate (GHB)

In addition to the general approach to Poisoning / overdose

**Background**
- GHB and its precursors are used by bodybuilders and possibly as a date rape drug. Its use leads to a rapid onset of CNS and respiratory depression usually with complete recovery within 4 - 6 hours

1. **May present with**
   - CNS effects e.g. rapid onset of CNS depression with coma and agitation/delirium upon waking
   - CVS effects e.g. bradycardia and hypotension
   - GIT effects e.g. vomiting
   - Metabolic effects e.g. hypothermia

2. **Immediate management**
   - Patients who arrive with a decreased level of consciousness may require intubation and ventilation

3. **Clinical assessment**
   See Risk assessment under Poisoning / overdose

4. **Management**
   - Most patients can be managed in the left lateral position to maintain an adequate airway as the duration of toxicity is brief. Rarely intubation / ventilation is required
   - IV fluids for hypotension and re-warming for hypothermia
1. **May present with**
   - Chest symptoms and signs
   - Headache, nausea, vomiting
   - Euphoria, confusion, agitation
   - Fitting
   - Withdrawn, strange, aggressive or displaying acutely disturbed behaviour
   - Lethargy
   - Tremor (shakes), nystagmus (eye tremor), ataxia (unsteadiness), blurred vision and slurred speech

2. **Immediate management**
   - If fitting see Fits / convulsions / seizures
   - If patient is confused or withdrawn, strange, aggressive or displaying acutely disturbed behaviour ensure your own safety
     - you may need to enlist the help of the police or others
     - have them visibly close by and ready to help, but not to further frighten or intimidate the patient
     - do not approach the patient if they have a weapon and don’t put yourself in a position where you could be trapped by the patient
     - explain what is happening at all times. Reassure the patient and avoid confrontation
     - for additional information on ensuring safety and managing anger See Mental health presentations

3. **Clinical assessment**
   - Obtain complete patient history (if possible) include in history taking:
     - past medical, surgical and social history
     - past episodes of sniffing
     - alcohol and / or substance intake
     - obtain information on the type of hydrocarbon used, as this will directly influence the clinical presentation
   - Perform standard clinical observations +
     - O₂ saturation
     - capillary BGL
     - conscious state. See Glasgow Coma Scale / AVPU
   - Perform physical examination:
     - auscultate chest for air entry and added sounds (crackles or wheezes)
     - inspect for tremor, nystagmus or unsteadiness (finger-nose-finger test)
4. Management

- Consult MO. MO may advise treatment as per Acute asthma, Pneumonia - adult / child, if evidence of chest signs and symptoms
- May require O₂ to maintain O₂ saturation >93% - adults / 95% - child. See O₂ delivery systems
- If patient is sufficiently agitated to interfere with care and oral sedation is appropriate MO may advise to give oral diazepam - oral administration will usually be adequate
- Acutely disturbed or heavily sedated patients should not be left alone
- Regularly assess vital signs and GCS until either the patient recovers or is evacuated / hospitalised
- When caring for patients with signs of petrol sniffing, be mindful of the effects on balance and coordination, particularly following administration of diazepam

<table>
<thead>
<tr>
<th>Schedule</th>
<th>4</th>
<th>Diazepam</th>
<th>DTP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>IHW / SM R&amp;IP / IPAP</td>
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<tr>
<td>Authorised Indigenous Health Workers and Isolated Practice Area Paramedic must consult MO / NP</td>
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<tr>
<td>Scheduled Medicines Rural and Isolated Practice Registered Nurses may proceed</td>
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</tr>
<tr>
<td>Form</td>
<td>Strength</td>
<td>Route of administration</td>
<td>Recommended dosage</td>
</tr>
<tr>
<td>Tablet</td>
<td>5 mg</td>
<td>Oral</td>
<td>Adults 5 mg with second 5 mg dose if required to a max. of 10 mg</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: causes sedation and respiratory depression
Management of associated emergency: consult MO

5. Follow up

- Before allowing any patient home it is especially important to assess suicidal intent. Enquire specifically about:
  - suicidal thoughts
  - previous deliberate self-harm
  - evidence of a premeditated act without the intention of being found
- Consider other high risk factors:
  - mental illness including depression and schizophrenia
  - violent self-harm attempt such as jumping, hanging or shooting
  - chronic alcohol misuse or drug dependency
  - single, male
  - after having a baby
- If allowed home, patient should be discharged into the care of a responsible person
- Review daily for 2 to 3 days (respiratory symptoms in particular may be delayed)
- See next MO clinic
- Further management of petrol sniffing is a difficult problem. The best approach is community based, involving community council, health staff and family. Alcohol, Tobacco and Other Drug Service (ATODS) and Mental Health Services may be able to advise or assist
- Teachers, Sport and Recreation Officers and apprenticeship schemes all play a role in instilling self-esteem in the youth of communities
6. **Referral / consultation**

Consult MO as above and if:
- GCS < 14, abnormal clinical observations, chest symptoms or signs, any significant other findings
- diazepam is required
- patient is assessed as being a risk to themselves or others

**Sedative / hypnotics**

[1], [2], [4]

e.g. benzodiazepines, zopiclone, zolpidem

In addition to the general approach to Poisoning / overdose

### Background

- Most ingestions of these agents are in patients who are therapeutically taking this medication. Regular use leads to tolerance and in overdose mild to moderate sedation only. Unconsciousness requiring intubation and ventilation is uncommon

1. **May present with**
   - Benzodiazepine sedatives such as diazepam, oxazepam, nitrazepam and flunitrazepam are commonly taken in deliberate overdose, often in combination with alcohol
   - Unconsciousness is unusual unless the benzodiazepine is combined with other sedatives or alcohol; most patients are sleepy, easily roused, and maintain adequate respiratory function
   - Be wary of hypotension (BP <90) and unsteadiness on waking

2. **Immediate management**  Not applicable

3. **Clinical assessment**

See Risk assessment under Poisoning / overdose

4. **Management**

- Close attention to airway, breathing and circulation is essential, as the majority of patients have an excellent prognosis with good supportive care
- Consult MO who will advise further management. Evacuation / hospitalisation may be required
- Flumazenil, a specific benzodiazepine antagonist is rarely indicated. It may be useful where facilities are not available to safely intubate and ventilate a patient. Flumazenil may be hazardous if given when there is a co-ingestion of a pro-convulsant drug
- Contact the PIC 131126 (24 hour) for advice on the use of flumazenil

**References**

Recommend

- Every snakebite should be treated as potentially venomous. See Immediate management
- All patients with envenomation should be managed in consultation with a Clinical Toxicologist. MO is advised to contact the PIC ☎️ 131124

Related topics

- Tetanus immunisation
- DRS ABCD resuscitation / the collapsed patient
- Pressure immobilisation bandaging

1. **May present with**
   - No symptoms, but a history suggestive of a bite
   - No obvious bite site
   - Obvious bite site - painful, red, local tissue swelling
   - Signs and symptoms of envenomation:
     - sudden collapse
     - coagulopathy: bleeding of gums, coughing, spitting or vomiting blood, prolonged bleeding from the bite or IV puncture site, blood in urine
     - neurotoxicity: progressive paralysis - drooping of eyelids, uncoordinated eye movements, double vision, difficulty in swallowing, breathing or speaking, fatigue and irregular shallow breathing, gait disturbances, including weakness or poor co-ordination
     - myotoxicity: muscle and back pain, tenderness, weakness
     - non-specific: tender and/or enlarged regional lymph nodes, headache, nausea, vomiting, abdominal pain

2. **Immediate management**

   **DRS ABCD resuscitation / the collapsed patient**

   Aim to delay lymphatic spread of venom and possible systematic effects while the patient is transported to a facility where they can be managed and antivenom can be administered if necessary
   - Keep the person as calm and still as possible
   - Avoid unproven and harmful techniques such as tourniquets, ice, cutting, sucking
   - Do not wash the wound as a swab may be required later for the Snake Venom Detection Kit (SVDK)
   - **Apply pressure immobilisation bandaging**
     - pressure bandage over the entire limb
     - immobilisation of limb
     - immobilisation of the whole person
   - **Do not remove a pressure immobilisation bandage until**
     - the patient has a normal neurological examination and the first set of bloods and examination are normal or
     - antivenom administration has commenced if found to be envenomed [1]
Procedure for pressure immobilisation bandage

- Use an elastic bandage relevant to size of patient
- Start at bite site using firm pressure
- Cover the bitten area first and then bandage upwards from the lower portion of the limb to cover as much of the affected limb as possible (see diagram); this includes application of the bandage, over the top of the clothes if necessary. The patient should be kept calm and still. Firm pressure bandages can be applied to bites on the trunk provided respiratory movement is not impeded. Only indirect firm pressure can be applied to bites to the neck
- Apply a splint to immobilise the limb (see diagram)
- MO may request, if the bite is on the trunk, to apply local pressure over the site and immobilise the patient
- Never let the patient walk
- Indicate on bandage the location of the snakebite
- If a snakebite occurs and only one other person is present and no vehicular transport is available, it is probably safest to apply a pressure bandage and splint, then leave the bitten patient to get help
- In isolated areas, if bitten when alone, apply a pressure bandage and splint, then set off for help

3. Clinical assessment

- Include in history taking:
  - geographic area bite occurred
  - time of bite
  - appearance of snake if seen
  - number of strikes
  - first aid measures used
  - time of bandage application
- Perform standard clinical observations +
  - $O_2$ saturations
  - level of consciousness See Glasgow Coma Scale / AVPU
  - urinalysis for blood. If positive could be red blood cells (bleeding); haemoglobin (red blood cell breakdown) or myoglobin (muscle breakdown). Keep some urine (second catch) in case it is needed for use with the SVDK following a negative test on the bite site
- **Do not remove bandage** - cut a small window to obtain a swab for SVDK
• Check for evidence of bite:
  - lack of any bite / fang marks does not exclude envenomation
  - fang marks may look like minor scratches
  - multiple random fang marks may indicate that massive envenomation has occurred
  - opposite may occur with significant bite marks and no envenomation
• Palpate the lymph nodes draining the bite site for signs of tenderness
• Check for evidence of paralysis:
  - muscles of eyes and face affected first - drooping of eyelids, uncoordinated eye movements, double vision, loss of full range of eye movements
  - impaired respiratory effort or peripheral weakness
• Check for evidence of abnormal bleeding - gums, urine (as above), bite site and IV site
• Check for evidence of rhabdomyolysis - muscle tenderness and weakness

4. Management
• Consult MO immediately
• Ensure limb is appropriately bandaged and apply further bandages as necessary without removing the first bandage
• Insert IV cannula
• Monitor vital signs and urine output
• Collect blood for FBC, U/E, CK and coagulation studies (including a D Dimer)
• If hypotension / shock is present, commence normal saline or Hartmann’s solution. MO will advise volumes and rate
• Nil by mouth
• MO will arrange evacuation / hospitalisation if required to a facility that has:
  - sufficient antivenom stocks
  - critical care facilities
  - on site pathology

Snake Venom Detection Kits (SVDK)
SVDK are expensive and should only be used in conjunction with clinical and biochemical examinations. They should be kept only at locations that stock a range of antivenoms e.g. Rural Hospitals with a MO.
• There is no place for SVDK in locations that carry no antivenom or only polyvalent antivenom
• The SVDK is a guide only in the choice of antivenom. More often than not the local geography in association with the clinical examination and blood test results determine the choice of antivenom
• A positive skin SVDK does not indicate envenomation nor does it indicate antivenom use. In the context of an abnormal clinical examination and/or blood tests it may assist in antivenom use
• A negative skin SVDK test does not indicate a non-venomous snake and does not alter management at all
• A positive urine SVDK may indicate envenomation, however false positives can occur especially for brown snake

When definite envenomation has occurred, delay in treatment could be life threatening. Consult MO and give snake antivenom. The choice of antivenom will be based on clinical examination and blood test results. Rarely a patient will be so unwell that they will require antivenom before appropriate assessment. In this case 1 ampoule or vial of polyvalent can be given.
Toxinology (bites and stings)

Indications for antivenom [1]

- Definite onset of paralysis e.g. drooping of the eyelids, uncoordinated eye movements, double vision, difficulty in swallowing, breathing or speaking, and / or
- Definite haemorrhage e.g. coughing, spitting or vomiting blood, prolonged bleeding from the bite or IV injection site, visible blood in the urine, and / or whole blood which does not clot in a glass test tube in less than 20 minutes, and / or
- Evidence of myolysis e.g. muscle tenderness, pain or weakness, rising CK

Do not remove the pressure immobilisation bandage
No patient is too ill to receive antivenom
The treatment of envenomation is usually antivenom

- Draw up adrenaline and keep close at hand in the event of an allergic reaction / anaphylaxis to the antivenom (0.5 mL of 1:1000 for adults)
- If the patient has past history of reaction to antivenom or horse protein, MO may advise to give IV hydrocortisone (4 mg / kg, max. 200 mg)
- The PIC [13 11 26 (24 hours) can assist with correct management of snakebites including referring MO to specialists in clinical toxicology
- Check BP and HR every 5 minutes

### Schedule 4

<table>
<thead>
<tr>
<th>Form</th>
<th>Polyvalent snake antivenom</th>
<th>DTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vial</td>
<td>1 vial contains 40,000 units in 50 mL (Brown 1000 units, Tiger 3000 units, Death adder 6000 units, Taipan 12000 units, King brown 18000 units)</td>
<td>Polyvalent snake antivenom DTP</td>
</tr>
</tbody>
</table>

**Authorised Indigenous Health Workers and Isolated Practice Area Paramedic must consult MO / NP**

Scheduled Medicines Rural & Isolated Practice Registered Nurses may proceed

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vial</td>
<td>1 vial contains 40,000 units in 50 mL (Brown 1000 units, Tiger 3000 units, Death adder 6000 units, Taipan 12000 units, King brown 18000 units)</td>
<td>Slow IV infusion via a second infusion line into the side arm of the main IV line</td>
<td>1 vial diluted 500 mL of normal saline</td>
<td>Slow IV infusion over 15 - 30 mins Further doses on MO / NP order</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: allergic reaction / anaphylaxis can occur; also serum sickness as a delayed adverse reaction (serum sickness takes many days or weeks to occur whereas anaphylaxis is immediate)

Management of associated emergency: check O₂ supply, self inflating resuscitator, oropharyngeal airways and suction apparatus. If patient develops a significant allergic reaction to the antivenom (itching of the skin, hives, angioneurotic oedema, hypotension/shock, loss of consciousness)

- stop the infusion of antivenom
- give adrenaline IM 0.01 mg / kg (adult or child) up to a max. of 0.5 mg (0. 5 mL of 1:1,000 solution) lateral thigh [2]. See Anaphylaxis

[1] [3]
Toxinology (bites and stings)

• Check when last had tetanus vaccination. See Tetanus immunisation
• If asymptomatic the splinting and pressure bandages should not be removed until the patient’s pathology investigations (including coagulation profile, fibrin degradation products, FBC, CK, electrolytes and urinalysis) have confirmed no evidence of envenomation and the neurological examination is normal
• If asymptomatic and pathology tests are negative, bandages can be removed. However the patient must be closely observed for at least 12 hours and if this period extends into the night, the patient should remain overnight. This should occur in an appropriate facility. The duration of observation may be longer in regions where delayed effects occur, for example the delayed neurotoxicity following death adder bites in northern Australia

5. Follow up
   ➤ If antivenom is used, complete and send off the questionnaire that comes with each ampoule. This is very important for increasing our epidemiological and clinical knowledge on snakebites
   ➤ Be aware serum sickness can occur one to two weeks after exposure to responsible agent. The features are rash, fever and polyarthritis or polyarthritis [4]

6. Referral / consultation
   ➤ Consult MO on all occasions of snakebite

Spider bites (general)

Related topics

- Redback spider bite
- Funnel web (big black) spider bite
- Tetanus immunisation
- DRS ABCD resuscitation / collapsed patient
- Pressure immobilisation bandaging
- Chronic wounds

1. May present with
   • A history of being bitten by a spider
   • Fang marks or no marks
   • Localised reactions - red, swelling, hot
   • Pain associated with bite will depend on the age of the spider and the size of its “pincers” / fangs; generalised spreading pain not associated with bite suggests redback spider
   • Signs and symptoms of systemic envenomation which include:
     - nausea, vomiting, headache
     - general feeling of being unwell

2. Immediate management Not applicable

3. Clinical assessment
   • Include in history:
     - description of spider
     - time of bite
     - geographical location where bite occurred
     - first aid measures used
     - site and feature of bite
   • Perform standard clinical observations
   • Perform physical examination of all systems
4. Management

- Reassure the patient
- Apply ice pack to bite site
- Give analgesia, in most cases paracetamol 1 g or 15 mg / kg / dose in children plus ibuprofen 800 mg in adults or 10 mg / kg / dose in children

   See Simple analgesia back cover

- Check when had last tetanus vaccination. See Tetanus immunisation

The white-tailed spider has a reputation of being everywhere throughout Australia and was previously believed to cause necrotic arachnidism, a syndrome of progressive ulceration / cutaneous injury from spider venom. There is now evidence to show that bites from the white tailed spider are very unlikely to cause symptoms of ulceration [5]

5. Follow up

- Advise daily wound care and review as required

6. Referral / consultation

- Consult MO if severe or persistent local or systemic symptoms

Funnel-web (big black) spider bite

Related topics

- Snakebite
- Tetanus immunisation

DRS ABCD resuscitation / collapsed patient
Pressure immobilisation bandaging

1. May present with

- Severe systematic envenoming which occurs rapidly usually within 30 minutes and almost always within 2 hours [1]
- History of witnessed painful bite by big black spider with large fangs
- Severe pain at bite site, but little local reaction (no swelling / redness)
- Tongue and other muscle twitching, tingling of the lips
- Lacrimation, piloerection (erection of the hair), sweating, hypersalivation
- Abdominal pain, nausea, vomiting, headache
- Hypertension, bradycardia or tachycardia
- Breathlessness
- Anxiety

   In young children, the first indication of envenoming may be sudden severe illness with inconsolable crying, salivation, vomiting or collapse [1]

2. Immediate management

   DRS ABCD resuscitation / the collapsed patient - managed in an area with cardiopulmonary and resuscitation equipment if possible

- Apply pressure immobilisation bandage See Snakebite
- Apply a splint to immobilise the limb
3. Clinical assessment

Include in history taking:
- description of spider (if seen)
- time of bite
- geographical location where bite occurred
- first aid measures

Perform standard clinical observations +
- O$_2$ saturations
- level of consciousness. See Glasgow Coma Scale / AVPU

Perform physical examination:
- look for any signs of envenomation, including:
  - site and feature of bite
  - general - agitation, vomiting, headache and abdominal pain
  - autonomic - sweating, salivation, piloerection (erection of hair) and lacrimation (tearing)
  - cardiovascular - high blood pressure, fast or low HR and pulmonary oedema
  - neurological - muscular twitching, tingling mouth and lips, muscle spasm, coma

4. Management

- Insert IV cannula
- Nil by mouth
- Consult MO who may arrange evacuation / hospitalisation for administration of antivenom. If antivenom is required an initial 2 ampoules are recommended. Further doses may be required in severe envenomation
- Do not remove the pressure immobilisation bandage unless antivenom is available in the asymptomatic patient and / or after 2 - 4 ampoules in the symptomatic patient
- Do 12 lead ECG
- Check when last had tetanus vaccination. See Tetanus immunisation
In cardiac arrest, undiluted antivenom, administered as a rapid IV push, may be lifesaving. All immediately available funnel-web antivenom (at least 4 ampoules should be given)

5. Follow up
- If evacuated / hospitalised, patient will be observed for 6 hours after removal of pressure bandage / administration of antivenom or until symptoms of envenomation have resolved
- If not evacuated / hospitalised, review next day
- Be aware serum sickness can occur one to two weeks after exposure to responsible agent. The features are rash, fever and polyarthralgies or polyarthritis [4]

6. Referral / consultation
- Consult MO on all occasions of suspected funnel-web spider bite

Redback spider bite

Recommend
- Do not apply pressure immobilisation bandage [1]

Related topics
- Tetanus immunisation

1. May present with
- A history of being bitten by a spider
- Puncture marks are not always seen
- Intense local pain. The bite is not painful at first, but between 10 - 40 minutes later the bite site becomes very painful, with pain radiating from the bite site to become regional and then general [1]
- Sweating and piloerection (erection of hair) can occur within an hour of bite [1]. This is best felt for using the back of your hand as is often localised to a small area around the bite. The sweating and piloerection can spread to involve the limb (usually and characteristically following the line of the lymphatics) or can become generalised
- Less commonly a red, hot or swollen bite site
- Headache, nausea, vomiting, abdominal pain
- Mild to severe hypertension and tachycardia
- If untreated the symptoms may increase in severity over several hours and often resolve over several days, however they may persist for weeks or months [1]
- Very rarely, severe cases can lead to progressive muscular paralysis

2. Immediate management  See Management

3. Clinical assessment
- Include in history taking:
  - description of spider if seen
  - time and location of bite
  - first aid measures
- Standard clinical observations
- Perform physical examination:
  - site and feature of bite
4. **Management**

Do not apply a pressure immobilisation bandage for redback spider bites

- Envenoming is not life threatening and resuscitation is rarely required
  - Reassure the patient
  - Apply an ice pack to bite site
  - Clean the wound with antiseptic or wash with soap and water to help prevent secondary infection
  - Give analgesia - adults paracetamol 1 g, ibuprofen 800 mg and oxycodone 5 -10 mg [6] if available. In children give paracetamol 15 mg / kg / dose and ibuprofen 10 mg / kg / dose [7]

See Simple analgesia back cover

- Consult MO if patient not responding to simple analgesia, and / or clinical features of systemic envenoming or the diagnosis is in doubt [1]
- Any patient symptoms consistent with significant envenoming by a redback spider should be considered for a trial of the antivenom. Give 2 vials IV of CSL Redback Spider antivenom (2 vials should be diluted in 100 mL of normal saline and given over 30 minutes) [8]
- If after two hours the initial resolution of symptoms is incomplete or a relapse occurs consult MO who may contact a Clinical Toxicologist via the PIC 13 11 26 for advice on benefit of any further antivenom
- The benefit of giving delayed antivenom (later than 48 hours) is controversial and advice from a Clinical Toxicologist should be sought
- Check when the patient had last tetanus vaccination. See Tetanus immunisation

5. **Follow up**

- Review symptoms and wound daily

6. **Referral / consultation**

- Consult MO if severe or persistent local or systemic symptoms
Scorpion stings and centipede bites

Recommend
- Do not apply pressure immobilisation bandage [1]

Related topics
- Tetanus immunisation

1. May present with
   - History of sting / bite
   - May or may not have seen scorpion / centipede
   - Local symptoms at site of sting / bite - red, tender, mild swelling, numbness and tingling [1]
   - Severe local pain is common [1] lasting 15 to 45 minutes, occasionally longer
   - Occasional systemic symptoms mild, non-specific and self limiting include nausea, headache, and malaise [1]

2. Immediate management
   Not applicable

3. Clinical assessment
   - Include in history taking:
     - description of sting / bite if seen
     - time and location of sting / bite
     - first aid measures
   - Perform standard clinical observations
   - Perform physical examination:
     - site and feature of sting / bite

4. Management
   - Reassure patient
   - Apply an ice pack to sting / bite site
   - Clean the wound with antiseptic or wash with soap and water to help prevent secondary infection
   - Give oral analgesia if pain is severe or prolonged. See Redback spider bites
   - Pain is usually relieved by simple analgesia
   - Check when last had tetanus vaccination. See Tetanus immunisation

5. Follow up
   - Advise daily wound care and review as required

6. Referral / consultation
   - Consult MO as above or if systemic symptoms
Tick bites

Tick paralysis / tick typhus

1. **May present with**
   - Initially, local itching and irritation 6 - 12 hours after bite
   - If tick is located in the person’s head - swelling of face, eyes
   - Evidence of tick (attachment sites are often close to the trunk after initially dropping on to the body at a peripheral site)
   - Tick paralysis usually takes several days to occur and can result in muscle weakness, causing difficulty walking, poor balance or poor coordination. This can lead to visual symptoms, such as difficulty reading and double vision. Adults can present with a regional or cranial nerve palsy. Symptoms can worsen for up to 48 hours post tick removal
   - Allergic reaction - ranging from localised swelling to severe life threatening anaphylaxis

Ticks and scrub mites may carry rickettsia that cause tick typhus and scrub typhus. Febrile illnesses associated with a rash can be fatal. Consult MO

2. **Immediate management** Not applicable

3. **Clinical assessment**
   - Include in history taking:
     - estimate of how long patient has had the tick
     - geographical area where exposure may have occurred
     - first aid measures
   - Perform standard clinical observations
   - Perform physical examination:
     - inspect for ticks. The size of the tick will depend on the type and developmental stage
     - inspect for tissue reaction. A small lump due to bite can persist for weeks due to reaction to foreign material
     - inspect in hair, natal crease, groin, labia, ear canals etc. if tick envenomation is suspected. They can be very difficult to find. Don’t stop if one is found, as there may be more
   - Observe for progressive muscle weakness and paralysis which can be localised to a limb. Facial paralysis similar to Bell’s palsy may occur

4. **Management**
   - **Procedure for removal of tick**
     - It is important to remove all ticks as soon as possible after discovery
     - When located, the tick is carefully removed with every attempt made to remove all of the tick mouth parts attached to the skin
     - The tick should be grasped as close to the skin as possible using fine forceps or veterinary tick removers (see picture next page)
     - Once grasped the tick is then removed by applying gentle outward traction [1]
     - Take care not to squeeze the body of the tick or use any methods which may agitate the tick, such as applying heat or using kerosene or methylated spirits, as
these methods may cause the tick to inject further saliva/toxin into the body

- An alternative method is the knot method. Make a loose half-hitch in a thread such as a piece of dental floss or suture material. The open knot is slipped over the tick as close as possible to the skin and then pulled taut. The embedded tick then usually flips out
- Clean the wound with antiseptic or wash with soap and water to help prevent secondary infection
- It is normal for a tick bite to remain slightly itchy for several weeks, however if other symptoms develop, then a MO should be consulted immediately
- Check when the patient last had tetanus vaccination. See Tetanus immunisation
- Consult MO if any signs of tick bite paralysis, who will arrange evacuation / hospitalisation

5. **Follow up**
   - Advise daily wound care after removal and review as required
   - Once the tick has been removed, it might be expected that the effects of the toxin would quickly dissipate, but this is not the case. The extent of the paralysis may worsen for up to 48 hours after the removal of the tick [1]

6. **Referral / consultation**
   - Consult MO if tick bite paralysis or suspect tick typhus
## Jellyfish stings

<table>
<thead>
<tr>
<th>Jellyfish sting and treatment summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Box jellyfish (Chironex fleckeri)</td>
</tr>
<tr>
<td>Whip-like sting marks with characteristic frosted ladder pattern</td>
</tr>
<tr>
<td>Douse with vinegar for at least 30 seconds, to inactivate all undischarged sting cells. If life threatening sting, give box jellyfish antivenom. See Box jellyfish (Chironex fleckeri) envenomation</td>
</tr>
</tbody>
</table>

### Related topics
**DRS ABCD resuscitation / the collapsed patient**

#### Box jellyfish (Chironex fleckeri) envenomation

**Recommend**
- Douse all visible sting sites with vinegar to inactivate any undischarged sting cells
- Give antivenom as soon as possible if there is evidence of life threatening envenoming
- Do not apply a pressure immobilisation bandage

1. **May present with**
   - Severe immediate pain typically lasting up to 8 hours
   - Wide (up to 1 cm) whip-like sting marks, with a characteristic frosted ladder pattern
   - Attached jellyfish tentacles
   - Loss of consciousness
   - Cardiorespiratory arrest

2. **Immediate management**
   - Liberally douse the stung area and all adherent tentacles with vinegar, for at least 30 seconds
Toxinology (bites and stings)

- Restrain the patient if necessary. Severe pain may cause irrational behaviour and vigorous activity making first aid and other management difficult. Furthermore, muscular exertion is dangerous as it will increase the absorption of the toxin.
- Insert IV cannula
- Nil by mouth

3. Clinical assessment

- Include in history taking time of sting and first aid measures taken

<table>
<thead>
<tr>
<th>Schedule</th>
<th>4</th>
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</thead>
<tbody>
<tr>
<td>Box jellyfish antivenom</td>
<td>DTP</td>
</tr>
<tr>
<td>Authorised Indigenous Health Workers and Isolated Practice Area Paramedic may administer one dose then consult MO / NP</td>
<td></td>
</tr>
<tr>
<td>Scheduled Medicines Rural &amp; Isolated Practice Registered Nurses may proceed</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampoule</td>
<td>20,000 units</td>
<td>IV</td>
<td>Adults and children 20,000 units diluted to 10 mL with water or normal saline</td>
<td>Stat Give slowly over 5 - 10 mins Additional doses may be given on MO / NP order (repeat doses up to max. of 6 vials if patient remains in cardiac arrest)</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: Intramuscular antivenom is not recommended and should not be used in the prehospital setting. Recent evidence has demonstrated that intramuscular antivenom does not reach the systemic circulation within hours in patients with haemodynamic compromise.

Management of associated emergency: make sure everything is ready to treat anaphylaxis if this occurs. See Anaphylaxis [9]

- Perform standard clinical observations +
  - note in particular cardiovascular system - blood pressure and HR
  - ECG - attach to monitor and observe for arrhythmias
  - conscious state. See Glasgow Coma Scale / AVPU
- Perform physical examination - site, size and features of sting

4. Management

- Manage patient in area equipped for cardiorespiratory monitoring and resuscitation if possible [1]
- Consult MO
- Continue CPR if in cardiac arrest. This should continue for at least 1 hour
- Pain relief - an intravenous opioid will be necessary. Consult MO
- Give box jellyfish antivenom. If not possible to achieve IV access intraosseous route should be considered [9]

See Simple analgesia back cover

5. Follow up

- All patients with envenomation from box jellyfish will need evacuation / hospitalisation

6. Referral / consultation

- Consult MO on all occasions of suspected box jellyfish stings or as soon as circumstance allow
Irukandji syndrome

Recommend
❖ Apply generous volumes of vinegar to all visible sting sites [10]

Background
❖ This syndrome is associated with stings from the carukia barnesi jellyfish and can result in life threatening symptoms, with a small number of patients developing cardiac failure

1. May present with
  • Minor short-lived pain with initial sting or may go unfelt initially
  • Onset of systemic symptoms 15 - 40 minutes after sting [10]:
    - pain
    - severe agitation, restlessness
    - sense of impending doom
    - feeling unwell
    - generalised sweating
    - vomiting
    - severe pain in the back, limbs and abdomen
    - can mimic symptoms of decompression sickness
    - severe hypertension, tachycardia

2. Immediate management [10]
   
   DRS ABCD resuscitation / the collapsed patient
   Application of vinegar
   Consult MO re required resuscitation drugs
   Even if respiratory or cardiac arrest, and no antivenom available, continue CPR (EAR ± ECC) until MO advises to stop

3. Clinical assessment
   • Include in history taking:
     - time of sting
     - first aid measures used
   • Perform a standard clinical observations +
     - note particular respiratory rate and any signs of respiratory distress
     - blood pressure (severe hypertension may occur)
     - O₂ saturation levels
     - ECG
   • Perform physical examination:
     - auscultate the chest for added sounds (crackles or wheezes), as an indication of pulmonary oedema
     - examine and document site, size and features of sting

4. Management
   • Liberally douse the sting area with vinegar
   • Insert IV cannula
   • Consult MO who will arrange evacuation
   • Apply high flow O₂ [10]
   • Monitor BP, pulse, O₂ saturations, respirations
   • Attach to heart monitor
   • Give analgesia - give morphine or if allergic to morphine give fentanyl
   • IV infusion should be considered [10]
Toxinology (bites and stings)

<table>
<thead>
<tr>
<th>Schedule</th>
<th>8</th>
<th>Morphine sulphate</th>
<th>DTP SM R&amp;IP</th>
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Scheduled Medicines Rural & Isolated Practice Registered Nurses may proceed

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampoule</td>
<td>10 mg / mL</td>
<td>IV</td>
<td>Adults 0.05 mg / kg repeated every 5 minutes until adequate analgesia or 4 doses, Children 0.05 mg / kg repeated every 5 minutes until adequate analgesia or 4 doses Max. 2 mg</td>
<td>Stat Further doses on MO / NP order</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: advise can cause nausea and vomiting, drowsiness

Management of associated emergency: caution - in the elderly and those with significant renal / liver disease. Respiratory depression is rare - if it should occur give naloxone. See Poisoning / overdose - opiates NB: as naloxone counteracts the narcotic, it may cause the return of severe pain

- If allergic to morphine or significant renal disease give fentanyl: N.B. fentanyl has a rapid onset of action

<table>
<thead>
<tr>
<th>Schedule</th>
<th>8</th>
<th>Fentanyl</th>
<th>DTP SM R&amp;IP</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Ampoule</td>
<td>100 microgram / 2 mL</td>
<td>IV</td>
<td>Adults 0.5 microgram / kg repeated every 5 minutes until adequate analgesia to a max. of 100 microgram, Children 0.5 microgram / kg repeated every 10 minutes until adequate analgesia to max. of 1.5 microgram / kg</td>
<td>Stat Further doses on MO / NP order</td>
</tr>
</tbody>
</table>

Provide Consumer Medicine Information: advise can cause nausea and vomiting, drowsiness

Management of associated emergency: respiratory depression is rare. If it should occur give naloxone. See Poisoning / overdose - opiates NB: as naloxone counteracts the narcotic, it may cause the return of severe pain

- Magnesium Sulphate (MgSO4) - bolus dose 0.15 mmol / kg over 15 min, then commence infusion at 0.1 - 0.15 mmol / kg / hr [10]. Should only be given in a facility where careful monitoring of HR and respiration can occur
• Control of hypertension - may be life saving. (Deaths in Queensland caused by intercerebral haemorrhage [10]). If SBP >200 mmHg, DBP > 120 mmHg - give 2 puffs of glyceryl trinitrate (GTN) whilst awaiting evacuation (contraindicated in patients on selective phosphodiesterase inhibitor - sildenafil, vardenafil). May repeat as required on MO orders [10]. MO may commence IV glyceryl trinitrate infusion
• Contact PIC 131126 if assistance is required and referral to a Clinical Toxicologist can also be made

5. Follow up
   ➤ Evacuate / hospitalise

6. Referral / consultation
   ➤ Consult MO in all cases of suspected irukandji syndrome

### Bluebottle (Physalia) sting

<table>
<thead>
<tr>
<th>Recommend</th>
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</thead>
<tbody>
<tr>
<td>✐ Relieve pain by immersion in water as hot as can be tolerated</td>
</tr>
<tr>
<td>✐ Do not use vinegar</td>
</tr>
</tbody>
</table>

1. May present with
   • History of being stung by bluebottle
   • Immediate burning pain (lasts up to 2 hours)
   • Linear or spindle (elliptical) red welts
   • Systemic effects are infrequent

2. Immediate management Not applicable

3. Clinical assessment
   • Include in history:
     - time of sting
     - first aid measures used
   • Perform standard clinical observations
   • Perform physical examination:
     - site, size and features of sting

4. Management
   • Immerse (or shower) in water as hot as person can tolerate (45°C) for 20 minutes for pain relief [1]. Use with caution in young children and those with poor peripheral circulation e.g. elderly and diabetic
   • Oral paracetamol is usually sufficient analgesia

     See Simple analgesia back cover

   • Monitor for allergic reactions

5. Follow up
   ➤ Review if any indication of systemic symptoms i.e. nausea, headache or malaise

6. Referral / consultation
   ➤ Transport to hospital or medical intervention is rarely required
Other jellyfish stings

Mauve stinger (*Pelagia species*), hair jellyfish (*Cyanea species*), jimble and other box jellyfish (*Chiropsalmus bronzeii*)

**Recommend**
- Do not use vinegar. It is only used for box jellyfish and irukandji syndrome

1. **May present with**
   - Wheals of varying size on a red base
   - Immediate, intense pain
   - Systemic effects are uncommon

2. **Immediate management** Not applicable

3. **Clinical assessment**
   - Include in history:
     - time of sting
     - description of jellyfish if seen
     - first aid measures
   - Conduct standard clinical observations
   - Perform physical examination:
     - site, size and features of sting

4. **Management**
   - Wash the area with sea water
   - Remove any tentacles
   - Do not use vinegar [9]
   - Consider immersing affected area (or shower) in water as hot as person can tolerate (45°C) for pain relief. Use with caution in young children and those with poor peripheral circulation e.g. elderly and diabetic
   - Oral paracetamol is usually sufficient analgesia

See Simple analgesia back cover

5. **Follow up**
- Review if any indication of systemic symptoms such as nausea, headache or malaise

6. **Referral / consultation**
- Consult MO if:
  - pain not controlled by oral analgesia
  - systemic effects, or doubt over cause of sting (suspected box jellyfish or irukandji syndrome)
Blue-ringed octopus and cone shell envenomation

Recommend
- Apply pressure immobilisation bandage [1]
- See Immediate management - resuscitation / the collapsed patient

Related topics
DRS ABCD resuscitation / the collapsed patient
Pressure immobilisation bandaging

1. May present with
Blue-ringed octopus [1]
- Often painless bite
- Tingling sensation around the mouth
- Local symptoms are minimal or absent
- Collapse on or near the beach shortly after a minor bite
- Early signs of systemic envenomation:
  - ptosis
  - blurred vision
  - double vision
  - difficulty swallowing
- Flaccid paralysis - occurs within minutes of bite
- Respiratory / cardiac arrest

Cone shell
- Local pain, swelling and numbness
- Can progress to muscle uncoordination and weakness, disturbance of speech, vision and even hearing
- Swallowing / breathing difficulties and respiratory paralysis if severe envenomation

2. Immediate management
DRS ABCD resuscitation / the collapsed patient
Continue CPR (EAR ± ECC) until advised to stop by the MO
- Apply a pressure bandage over the wound site and involved limb
- Apply a splint to immobilise the limb

3. Clinical assessment
- Include in history:
  - time of sting (if possible)
  - first aid measures
  - indication of time of commencement of paralysis
- Perform standard clinical observations +
  - note particular attention to cardio / respiratory system and neurological assessment
- Perform physical examination:
  - site, size and features of sting

4. Management
- Consult MO, who will organise evacuation
- Apply pressure immobilisation bandage [1] See Snakebite
- If indicated provide airway support
- Cardiorespiratory resuscitation, continue until help arrives / evacuation / transfer
5. Follow up
   Do not remove pressure bandage; if envenomation by blue-ringed octopus or cone shell is suspected, the bandage should be left in situ until evacuated/hospitalised in an appropriate facility

6. Referral / consultation
   Consult MO in all cases of suspected blue-ringed octopus or cone shell envenomation

Fish stings
Stonefish / bullrout / stingray / cat fish

Recommend
- Do not apply pressure immobilisation bandage [1]

Related topics
- Acute wounds
- Tetanus immunisation
- Marine lacerations

1. May present with
   - Immediate and intense pain
   - Local swelling, bruising, puncture marks
   - Mechanical trauma from barb
   - Barb or spine in situ
   - Tissue necrosis and infection and potentially, gangrene
   - Stonefish sting
     - systemic effects are rare [1]
     - nausea, vomiting, dizziness, shortness of breath
     - cardiovascular signs
   - Bullrout sting
     - in severe cases headache and vomiting
   - Stingray envenomation
     - increasing local pain which spreads to the entire limb, swelling and a characteristic bluish white appearance of the wound
     - systemic effects are rare, they include nausea, vomiting, muscle cramps, diarrhoea, sweating, syncope, cardiac arrhythmias

2. Immediate management
   Pain relief - immerse affected limb (or shower) in water as hot as person can tolerate (45°C). Put both limbs in hot water to gauge heat. Use with caution in young children and those with poor peripheral circulation e.g. elderly and diabetic. Continue until resolution of pain, or for at least 30 minutes

3. Clinical assessment
   - Include in history:
     - circumstances of injury
     - time of injury
   - Standard clinical observations
   - Perform physical examination:
     - inspect site of injury. See Acute wounds
4. **Management**

- Reassure the patient
- Provide pain relief. Some options may include:
  - immerse limb in hot water
  - injection of a local anaesthetic, lignocaine plain 1% with infiltration around the wound is very effective in relieving the pain
  - consult MO regarding opiate analgesia - depending on severity of injury will order IV morphine
  - oral paracetamol

  [See Simple analgesia back cover]

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Lignocaine</th>
<th>DTP</th>
</tr>
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<tbody>
<tr>
<td>4</td>
<td>IHW / SM R&amp;IP / IPAP</td>
<td></td>
</tr>
</tbody>
</table>

**Schedule 4 Lignocaine DTP**

Authorised Indigenous Health Workers and Isolated Practice Area Paramedic must consult MO / NP

Scheduled Medicines Rural & Isolated Practice Registered Nurses may proceed

<table>
<thead>
<tr>
<th>Form</th>
<th>Strength</th>
<th>Route of administration</th>
<th>Recommended dosage</th>
<th>Duration</th>
</tr>
</thead>
</table>
| Ampoule   | 1% 50 mg / 5 mL | Subcutaneous | Adult 3 mg / kg to total max. infiltration of 200 mg  
Child 3 mg / kg / dose to max. 5 mg / kg / dose | Stat  
Do not repeat the total max. dose at intervals of < 1.5 hours |

Provide Consumer Medicine Information

Management of associated emergency: resuscitation equipment available. Consult MO

- See Acute wounds / marine lacerations:
  - incising open the entry wound may be necessary
  - foreign bodies, such as a broken off barb, must be removed and dead tissue excised
  - irrigate the wound with normal saline
  - do not close, this allows for drainage and healing
  - x-ray (if available and MO orders) if a foreign body is suspected
  - check when had last tetanus vaccination. See Tetanus immunisation
  - elevate wound
  - antibiotics may be necessary

- Evacuation/ hospitalisation and administration of stonefish antivenom may need to be considered for systemic symptoms or severe pain. CSL Stonefish antivenom should only be given if there is clear evidence of envenoming. It should be given IV (dilute in 100 mL of normal saline and give over 30 minutes). Make sure everything is ready to treat anaphylaxis should this occur

5. **Follow up**

- Stonefish sting - people without clinical features of systemic envenoming at 2 hours do not require further observation [1]
- Those treated with opioid analgesia or antivenom may be discharged when they have been asymptomatic for a period of 4 hours [1]
- Review wound daily initially
Toxinology (bites and stings)

6. Referral / consultation

Consult MO with:
- all stonefish or stingray stings that warrant narcotic analgesia
- stonefish sting with systemic symptoms
- stingray wound over chest or abdomen; these patients need to be evacuated / hospitalised in a facility with appropriate surgical (thoracic, abdominal) capability as soon as possible
- delayed presentation (a day or more after injury) of any stings / wounds
- any stings / wounds that cannot be adequately excised and cleaned
- large or deep wounds
- antibiotic prophylaxis may be required

Stingray injuries

1. May present with
   - History of injury from stingray
   - Lacerations
   - Local trauma and severe pain

2. Immediate management  Not applicable

3. Clinical assessment
   - Include in history:
     - time of injury
     - first aid measures used
   - Perform standard clinical observations
   - Perform physical examination:
     - site, size and features of injury

4. Management
   - Wash the wound site
   - Immerse (or shower) in water as hot as person can tolerate (45°C) for 20 minutes for pain relief. Use with caution in young children and those with poor peripheral circulation e.g. elderly and diabetic
   - Apply local pressure for bleeding
   - Oral paracetamol may be sufficient analgesia
     
     See Simple analgesia back cover

   - Pain relief - an intravenous opioid may be necessary

5. Follow up

   Advise daily wound care and review as required

6. Referral / consultation

   Transport to hospital or medical intervention for possible wound debridement or surgery
Sea urchin injuries

1. May present with
   - Local pain
   - Embedded or broken off spines

2. Immediate management  Not applicable

3. Clinical assessment
   - Include in history:
     - time of injury
     - first aid measures used
   - Perform standard clinical observations
   - Perform physical examination
     - site, size and features of injury

4. Management
   - Wash the wound site
   - Immerse in water as hot as person can tolerate (45°C) for 20 minutes for pain relief. Use with caution in young children and those with poor peripheral circulation e.g. elderly and diabetic
   - Removal of spines close to surface
   - X-ray may be required to identify any embedded spines
   - Oral paracetamol is usually sufficient analgesia

   See Simple analgesia back cover

5. Follow up
   - Review if any ongoing pain or indication of retained spines. Further x-rays or ultrasound may be required

6. Referral / consultation
   - Transport to hospital or medical intervention
1. **May present with**
   - Mild local itching and stinging
   - Occasionally prolonged symptoms of erythema, but also vesicles, local swelling and joint stiffness can develop [14]
   - Fire sponges are reported to cause delayed reactions and desquamation can occur after 2 - 3 weeks [14]

2. **Immediate management**  Not applicable

3. **Clinical assessment**
   - Include in history:
     - time of sting
     - first aid measures used
   - Perform standard clinical observations
   - Perform physical examination:
     - site, size and features of sting

4. **Management**
   - Wash the site
   - Oral paracetamol is usually sufficient analgesia
     
     See *Simple analgesia* back cover

5. **Follow up**
   - Review if any ongoing symptoms

6. **Referral / consultation**
   - Usually not required
Ciguatera poisoning

Background
- Ciguatera is caused by the ingestion of tropical fish which contain ciguatoxins. The classic feature is temperature reversal, paradoxical or reverse temperature perception.

1. May present with
- Symptoms are grouped into neurological, gastrointestinal or non-specific:
  - neurological:
    - numbness and tingling of the hands and around the mouth
    - hot and cold sensation reversed such that cold items give a hot sensation and vice versa
    - headache, weakness, faintness
    - joint and muscle pain
    - pain on passing urine
    - itchy skin, sweating, chills
    - breathlessness
  - gastrointestinal:
    - nausea, vomiting, diarrhoea, abdominal pain
  - non-specific:
    - slow HR, hypotension
    - symptoms usually develop within 12 hours and always within 36 hours of ingestion
- Symptoms may be variable and vague and the diagnosis initially overlooked - may present with mood disorders (depression, irritability, anxiety)

2. Immediate management  Not applicable

3. Clinical assessment
- Obtain a full history including type and amount of fish ingested. Diagnosis is made on the history
- Perform standard clinical observations

4. Management
- Consult MO
- If bradycardia (slow HR), hypotension or moderate to severe symptoms - insert IV cannula
- Ciguatoxin may be passed through breast milk. Assessment of breastfed infants and advice with regard to the safety of breastfeeding may be necessary

5. Follow up
  - If not evacuated / hospitalised review the next day
  - Gastrointestinal symptoms usually settle in a few days
  - The joint and muscle pains, weakness and temperature reversal may take weeks to months to resolve completely
  - Ingestion of very small amounts of toxin may lead to a recurrence of symptoms in those who have been recently affected by ciguatera. The patient should avoid eating pelagic or reef fish for at least 6 months to 1 year. Symptoms can be exacerbated by ingestion of nontoxic seafood, nuts, grains, alcohol and by exercise. Opiates can also exacerbate symptoms

6. Referral / consultation
  - Consult MO in all cases of suspected ciguatera poisoning
References

7. Therapeutic Guidelines. Dosing or oral medication commonly used in children (Table 1.19). 2007 [cited 2011 May].