Clinical Practice Procedures:
Resuscitation/Cardiopulmonary resuscitation (CPR)

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Clinical.Guidelines@ambulance.qld.gov.au

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<th>Date</th>
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<tr>
<td>Purpose</td>
<td>To ensure a consistent procedural approach to Cardiopulmonary resuscitation (CPR).</td>
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<td>Scope</td>
<td>Applies to all QAS clinical staff.</td>
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<tr>
<td>Author</td>
<td>Clinical Quality &amp; Patient Safety Unit, QAS</td>
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The purpose of **cardiopulmonary resuscitation (CPR)** is to provide sufficient perfusion to preserve life until definitive procedures can be performed.

**The general principles of CPR are as follows:**
- provide good quality compressions
- minimise interruptions to chest compressions
- oxygenate the lungs
- avoid excessive ventilation

Interruption to chest compressions results in a fall in coronary artery perfusion pressure, decreasing the likelihood of defibrillation success.\(^1\)\(^\text{a} \text{-}^4\) Intubation attempts are not to interrupt chest compressions.\(^1\)

Those performing chest compressions should be rotated regularly (e.g. every two minutes).

CPR is to be restarted immediately after a defibrillation attempt, irrespective of any apparent success.

Following two minutes of CPR, or earlier if signs of responsiveness become apparent, the presenting rhythm should be checked. If the rhythm is capable of providing spontaneous output then a pulse check can be performed.

### Indications

- There are no signs of life:
  - unresponsive
  - not breathing normally
  - carotid pulse cannot be confidentially palpated within 10 seconds, **OR**

- There are signs of inadequate perfusion:
  - unresponsive
  - pallor or central cyanosis
  - inadequate pulse
    - < 40 bpm in a child/adult (≥ 1 years)
    - < 60 bpm in an infant (< 1 year)
    - < 100 bpm in a newly born

### Contraindications

- Nil in this setting

### Complications

- Using the presence or absence of a pulse as the primary indicator of cardiac arrest is unreliable.
- Injury to the chest may occur in some patients.
**Procedure – Cardiopulmonary resuscitation**

**Adult** [1-6]

1. Ensure patient is on a firm surface.
2. Place the heel of one hand on the lower half of the sternum and the other hand on top of the first.
3. Compress the sternum to one third the depth of the chest or at least five centimetres.
4. Compress at a rate of 100 – 120 compressions per minute.
5. Chest compressions should be performed with equal time spent in compression as in release.
6. The compression to ventilation ratio is 30 : 2 (regardless of officer numbers) until the placement of an advanced airway (ETT or LMA), at which time ventilation can then occur at a rate of 6 – 10 ventilations per minute with continual chest compressions.\[^{1}\] Ventilations should be timed with the release phase of compressions.

**Child** [2,7,8]

1. Ensure patient is on a firm surface.
   - *Newly born and infant (≤1 year)*: Compress using either two fingers on the sternum, or two thumbs with the fingers surrounding the thorax and supporting the back.

**Method 1:**
- Two fingers on the sternum

**Method 2:**
- Two thumbs on the sternum and fingers surrounding the thorax
**Procedure – Cardiopulmonary resuscitation**

- **Younger child (1–8 years):** The heel of one hand is used.
- **Older child (9–12 years):** Two hand technique can be used, similar to the adult.

2. Compress the sternum to one third the depth of the chest wall.

3. Compression to ventilation ratio is single officer (30:2) / two officer (15:2). This is done until the placement of an advanced airway (ETT or LMA) at which time ventilation can then occur at a rate of 12 – 14 ventilations per minute with continual chest compressions. Ventilations should be timed to coincide with the release phase of compressions (e.g. on release, ventilate).
**Procedure – Cardiopulmonary resuscitation**

**Newly born (immediately postpartum)**[1,8]

1. Ensure patient is on a firm surface.
2. Compress over the lower sternum.
3. The two thumb technique is preferred unless this impedes other procedures at which time the two finger technique is acceptable.
4. Compress the sternum to one third the depth of the chest.
5. The compression to ventilation ratio is 3:1. A half second pause after each third compression will allow an appropriate assisted ventilation. Co-ordination is required to ensure the assisted ventilation does not occur simultaneously with a compression.
6. Although not as tiring as in the older child and adult, it is still recommended that those performing chest compressions are rotated regularly.
7. CPR should be performed for at least 30 seconds, between any pause to assess for improvement in spontaneous heart rate or cardiac output.

**Additional information**

- There is no evidence to suggest a compression rate of 120 per minute or above has any additional benefit.[4]
- Effective, good quality compressions cannot be maintained when moving or extricating a patient. If extrication is necessary paramedics should plan ahead to minimise interruptions to compressions.
- Mechanical compression devices (MCD) are now being used by industrial first aiders and privatised paramedic services. Unless the MCD is causing harm/adverse side effects it is to remain in position and operational for the duration of the cardiac arrest. If transportation is required, the person who applied the MCD should accompany the device to hospital.