



Clinical Practice Procedures: Resuscitation/Cardiopulmonary resuscitation (CPR)

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Purpose	To ensure a consistent procedural approach for cardiopulmonary resuscitation (CPR).
Scope	Applies to Queensland Ambulance Service (QAS) clinical staff.
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Population	Applies to all ages unless stated otherwise.
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Cardiopulmonary resuscitation (CPR)

December, 2024

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.^[1-4] Intubation attempts must not interrupt chest compressions.^[1]

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

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

After 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

- No signs of life:
 - Unresponsive
 - Inadequate respiration
 - Pulse cannot be confidently palpated or auscultated within 10 seconds, **OR**
- Signs of inadequate perfusion:
 - Unresponsive
 - Pallor or central cyanosis
 - Pulse less than:
 - 60 BPM in a newborn (following an appropriate ventilation strategy)
 - 60 BPM in an infant (less than 1 year)
 - 40 BPM in a paediatric (1–12 years)
 - 40 BPM in a adult

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 (e.g. broken ribs) can occur in some patients.

Procedure – Cardiopulmonary resuscitation

Adult – ventilation ratio 30:2 (regardless of officer numbers) [1-6]

1. Ensure the 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.



Compression rate:
100 – 120/minute

at least 5 cm



3. Compress the sternum by 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 on compression and release phases.
6. The compression to ventilation ratio is 30:2 (regardless of officer numbers) until the placement of an advanced airway (ETT or SAD). Ventilations can then occur at a rate of 6–10 per minute with continuous chest compressions.^[1] Ventilations should be timed with the release phase of compressions.

Paediatric – ventilation ratio 30:2 single officer/15:2 two officer [2,7,8]

1. Ensure the patient is on a firm surface.
 - **Infant (less than 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 paediatric (1–8 years):** The heel of one hand is used.
 - **Older paediatric (9–12 years):** Two hand technique can be used, similar to the adult.
2. Compress the sternum by one third the depth of the chest wall.

3. Compression to ventilation ratio is 30:2 for 1 officer/15:2 for 2 officer CPR. This is done until the placement of an advanced airway (ETT or SAD). Ventilations then occur at a rate of 12–14 per minute with continuous chest compressions. Ventilations should be timed to coincide with the release phase of compressions.



Compression to ventilation ratio:

single officer (30:2)/
two officer (15:2)

1/3 depth chest wall ⇕



Younger paediatric (1–8 year old)



Compression to ventilation ratio:

single officer (30:2)/
two officer (15:2)

1/3 depth chest wall ⇕



Older paediatric (9–12 year)

Procedure – Cardiopulmonary resuscitation

Newborn (immediately postpartum) – ventilation ratio 3:1^[1,8]

1. Ensure the patient is on a firm surface.
2. Compress over the lower sternum.
3. The two thumb technique is preferred unless this impedes other procedures, in which case, the two finger technique is acceptable.
4. Compress the sternum by 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 time for 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 for older paediatric and adult CPR, 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 over 120 per minute has any additional benefit.^[4]
- The corpatch, ZOLL X Series® and X Series Advanced® CPR feedback sensor device should be used for patients aged 8 years or older.
- There is no role for the use of Positive End Expiratory Pressure (PEEP) during cardiopulmonary resuscitation in adult or paediatric patients that are currently in cardiac arrest. The use of PEEP however should be considered for cardiopulmonary resuscitation in the newborn cohort.
- Effective, good quality compressions cannot be maintained when moving or extricating a patient. If extrication is necessary clinicians should plan ahead to minimise interruptions to compressions.
- Mechanical Chest Compression Devices (MCCD) are regularly used by industrial first aiders and privatised paramedic services. Unless the MCCD is causing harm or adverse events, it must remain in position and operational for the duration of the cardiac arrest. If transport is required, the person who applied the MCCD should accompany the device to hospital.