

## Cardiopulmonary resuscitation (CPR)

If the heart stops pumping, it is known as a cardiac arrest. Cardiopulmonary resuscitation (CPR) is a combination of techniques, including chest compressions, designed to pump the heart to get blood circulating and deliver oxygen to the brain until definitive treatment can stimulate the heart to start working again.

A heart attack occurs when part of the heart is starved of oxygen. A heart attack can 'stun' the heart and interrupt its rhythm and ability to pump. This is because the heart does not receive enough oxygen and cannot pump blood around the body. There is no heartbeat (pulse) because the heart is not working. The medical term for a heart attack is an acute myocardial infarction (AMI).

When the blood stops circulating, the brain is starved of oxygen and the person quickly becomes unconscious and stops breathing. Without treatment, the person will die.

### Causes of cardiac arrest

A cardiac arrest can be caused by many things and causes tend to differ from adults to children.

For adults, they may include:

- heart disease – the most common cause of reversible adult cardiac arrest (70%)
- trauma
- respiratory illness
- hanging.

For children, they may include:

- SIDS – this is the leading cause of reversible cardiac arrest in children
- cardiac disease (usually congenital)
- trauma
- respiratory illness.

### CPR can be life-saving first aid

CPR can be life-saving first aid and increases the person's chances of survival if started soon after the heart has stopped beating. If no CPR is performed, it only takes three to four minutes for the person to become brain dead due to a lack of oxygen.

By performing CPR, you circulate the blood so it can provide oxygen to the body, and the brain and other organs stay alive while you wait for the ambulance. There is usually enough oxygen still in the blood to keep the brain and other organs alive for a number of minutes, but it is not circulating unless someone does CPR. CPR does not guarantee that the person will survive, but it does give that person a chance when otherwise there would have been none.

If you are not sure whether a person is in cardiac arrest or not, you should start CPR. If a person does not require CPR, they will probably respond to your attempts. By performing CPR, you are unlikely to cause any harm to the person if they are not actually in cardiac arrest.

### The basic steps of CPR

CPR is most successful when administered as quickly as possible. It should only be performed when a person shows no signs of life or when they are:

- unconscious
- unresponsive
- not breathing or not breathing normally (in cardiac arrest, some people will take occasional gasping breaths – they still need CPR at this point. Don't wait until they are not breathing at all).

It is not essential to search for a pulse when a person is found with no signs of life. It can be difficult to find a person's pulse sometimes and time can be wasted searching. If CPR is necessary, it must be started without delay.

The basic steps for performing CPR can be used for adults, children and infants. They are based on guidelines updated in 2010 that are easy to follow and remember. This information is only a guide and not a substitute for attending a CPR course.

The basic steps are:

- D – **Dangers?**
- R – **Response?**
- S – **Send** for help
- A – Open **airway**
- B – Normal **breathing**
- C – Start **CPR**
- D – Attach **defibrillator** (AED).

**1. Dangers?** Check for dangers. Consider why the person appears to be in trouble – is there gas present or have they been electrocuted? Might they be drunk or drug-affected and consequently a hazard to you? Approach with care and do not put yourself in danger. If the person is in a hazardous area (such as on a road), it is okay to move them as gently as possible to protect both your and their safety.

**2. Response?** Look for a response. Is the victim conscious? Gently shake them and shout at them, as if you are trying to wake them up. If there is no response, get help.

**3. Send for help.** Dial triple zero (000) – ask for an ambulance.

**4. Open airway.** Check the airway. It is reasonable to gently roll the person on their back if you need to. Gently tilt their head back, open their mouth and look inside. If fluid and foreign matter is present, gently roll them onto their side. Tilt their head back, open their mouth and very quickly remove any foreign matter (for example, chewing gum, false teeth, vomit). It is important not to spend much time doing this, as performing CPR is the priority. Chest compressions can help to push foreign material back out of the upper airway.

**5. Normal breathing?** Check for breathing – look, listen and feel for signs of breathing. If the person is breathing normally, roll them onto their side. If they are not breathing, or not breathing normally, go to step 6. The person in cardiac arrest may make occasional grunting or snoring attempts to breathe and this is not normal breathing. If unsure of whether a person is breathing normally, start CPR as per step six.

#### **6. Start CPR**

##### **Cardiac compressions:**

- Place the heel of one hand on the lower half of the person's breastbone.
- Place the other hand on top of your first hand and either grasp your own wrist or interlock your fingers, depending on what is comfortable for you.
- The depth of compression should be one third of the chest depth of the person.
- The rate is either:
- 30 compressions to two breaths (mouth-to-mouth as per step 7) aiming for 100 compressions and no more than eight breaths per minute, **OR**
- If unwilling to do mouth-to-mouth, perform continuous compressions at a rate of approximately 100 per minute.
- Thinking of the music 'Staying alive' by the Bee Gees and performing compressions on the beat can assist to keep the correct rhythm.
- Sometimes, people will have their ribs broken by chest compressions. This is still better than the alternative of not receiving CPR. If it occurs, pause and reposition your hands before continuing. Chest compressions are tiring and fatigue will affect the quality. If any other rescuers are available and willing to assist, rotate the person performing compressions every two minutes, even if you don't feel tired yet.

**Establishing compressions is the clear priority. If a rescuer cannot coordinate the breathing or finds it too time-consuming or too unpleasant, effective chest compressions alone will still be of benefit. It is important not to avoid all resuscitation efforts because of the mouth-to-mouth component.**

**7. Mouth-to-mouth.** If the person is not breathing normally, make sure they are lying on their back on a firm surface and:

- Open the airway by tilting the head back and lifting their chin.
- Close their nostrils with your finger and thumb.
- Put your mouth over the person's mouth and blow into their mouth.
- Give 2 full breaths to the person (this is called 'rescue breathing'). Make sure there is no air leak and the chest is rising and falling. If their chest does not rise and fall, check that you're tilting their head back, pinching their nostrils tightly and sealing your mouth to theirs. If still no luck, check their airway again for any obstruction.
- If you cannot get air into their lungs, go back to chest compressions. If there is an airway obstruction, compressions may help shift the object.

**Continue CPR**, repeating the cycle of 30 compressions then 2 breaths until professional help arrives. Chest compressions are tiring and fatigue will affect the quality. If any other rescuers are available and willing to assist, rotate the person performing compressions every 2 minutes, even if you don't feel tired yet.

**8. Attach automated external defibrillator (AED)** as soon as one becomes available.

- Only use an adult AED on any person over the age of eight years, who is unresponsive and not breathing normally. For children under the age of eight, ideally, a paediatric AED and pads should be used. Devices differ and instructions should be followed in each instance.
- CPR must be continued until the AED is turned on and the pads are attached.
- Place pads following the diagram instructions on the pads. Pad-to-skin contact is important for successful defibrillation. Remove any medication pads, excess moisture or excessive chest hair (if this can be done with minimum delay).
- It is important to follow the prompts on the AED. Do not touch the victim during analysis or shock delivery.

## **CPR techniques for young children and infants**

CPR steps for children aged eight years or younger are the same as for adults and older children, but the technique is slightly different.

### **CPR for children aged 1–8 years**

To perform CPR on children aged 1–8 years:

- Use the heel of **one** hand only for compressions, compressing to one third of chest depth.
- Follow the basic steps for performing CPR described above.

### **CPR for infants (up to 12 months of age)**

To perform CPR on infants (up to 12 months of age):

- Place the infant on their back. Do not tilt their head back or lift their chin (this is not necessary as their heads are still large in comparison to their bodies).
- Perform mouth-to-mouth by covering the infant's nose and mouth with your mouth – remember to use only a small breath.
- Do chest compressions, using two fingers of one hand, to about one third of chest depth.
- Follow the basic steps for performing CPR described above.

## **What to do if the person recovers during CPR**

CPR may revive the person before the ambulance arrives. If they do revive:

- Review the person's condition if signs of life return (coughing, movement or normal breathing). If the person is breathing on their own, stop CPR and place them on their side with their head tilted back.
- If the person is not breathing, continue full CPR until the ambulance arrives.
- Be ready to recommence CPR if the person stops breathing or becomes unresponsive or unconscious again. Stay by their side until medical help arrives. Talk reassuringly to them.

It is important not to interrupt chest compressions or stop CPR prematurely to check for signs of life – if in doubt, continue full CPR until help arrives. It is unlikely you will do harm if you give chest compressions to someone with a beating heart. Regular recovery (pulse) checks are not recommended as they may interrupt chest compressions and delay resuscitation.

## Stopping CPR

Generally, CPR is stopped when:

- the person is revived and starts breathing on their own
- medical help such as ambulance paramedics arrive to take over
- the person performing the CPR is forced to stop from physical exhaustion.

## Where to get help

- In an emergency, call triple zero (000)
- For training in CPR, contact St John Ambulance Australia, Victoria Tel. 1300 360 455
- For training in CPR, contact Australian Red Cross Tel. 1300 367 428

## Things to remember

- Always call triple zero (000) in an emergency.
- Cardiopulmonary resuscitation (CPR) combines mouth-to-mouth resuscitation and cardiac compressions to deliver oxygen and artificial circulation to an unresponsive person until medical help arrives.
- Cardiac or chest compressions are the priority in CPR. If you don't want to do mouth-to-mouth, chest compressions alone may still be life-saving.
- CPR is a life-saving skill that everyone should learn.
- This fact sheet is not a substitute for proper CPR training by an accredited organisation.

**This page has been produced in consultation with, and approved by:**

Ambulance Victoria

Content on this website is provided for education and information purposes only. Information about a therapy, service, product or treatment does not imply endorsement and is not intended to replace advice from your doctor or other registered health professional. Content has been prepared for Victorian residents and wider Australian audiences, and was accurate at the time of publication. Readers should note that, over time, currency and completeness of the information may change. All users are urged to always seek advice from a registered health care professional for diagnosis and answers to their medical questions.

For the latest updates and more information, visit [www.betterhealth.vic.gov.au](http://www.betterhealth.vic.gov.au)

**Copyright** © 1999/2015 State of Victoria. Reproduced from the Better Health Channel ([www.betterhealth.vic.gov.au](http://www.betterhealth.vic.gov.au)) at no cost with permission of the Victorian Minister for Health. Unauthorised reproduction and other uses comprised in the copyright are prohibited without permission.