

## BASIC LIFE SUPPORT: CARDIOPULMONARY RESUSCITATION



# Basic Life Support: Cardiopulmonary Resuscitation. ARC and NZRC Guideline 2010

Australian Resuscitation Council, New Zealand Resuscitation Council

**This guideline is applicable to adults, children and infants.**

### Cardiopulmonary resuscitation – (CPR)

Cardiopulmonary resuscitation is the technique of chest compressions combined with rescue breathing. The purpose of cardiopulmonary resuscitation is to temporarily maintain a circulation sufficient to preserve brain function until specialised treatment is available. Rescuers must start CPR if the victim is unresponsive and not breathing normally. Even if the victim takes occasional gasps, rescuers should start CPR.<sup>1</sup> [Class A; LOE IV] CPR should commence with chest compressions. [Class B; LOE extrapolated evidence] Interruptions to chest compressions must be minimised.<sup>2</sup> [Class A; LOE IV, extrapolated evidence]

In victims who need resuscitation, bystander CPR dramatically increases the chance of survival.<sup>3</sup>

Bystander CPR rarely leads to harm in victims who are eventually found not to have suffered cardiac arrest: bystander CPR should be actively encouraged.<sup>4</sup> [Class B; LOE Expert Consensus Opinion]

### Compression ventilation ratio

Current consensus is that a universal compression-ventilation ratio of 30:2 (30 compressions followed by two ventilations) is recommended for all ages regardless of the numbers of rescuers present.<sup>6,7</sup> Compressions must be paused to allow for ventilations.

No human evidence has identified an optimal compression-ventilation ratio for CPR in victims of any age.<sup>6,7,8</sup> [LOE III-2, III-3, IV, extrapolated evidence]

### Steps of resuscitation

Initial steps of resuscitation are:

#### DRS ABCD

- Check for danger (hazards/risks/safety)
- Check for response (if unresponsive)
- Send for help

- Open the airway
- Check breathing (if not breathing / abnormal breathing)
- Give 30 chest compressions (almost two compressions/second) followed by two breaths
- Attach an AED (Automated External Defibrillator) if available and follow the prompts.

When providing 30 compressions (at approximately 100/min) and giving two breaths (each given over one second per inspiration), this should result in the delivery of five cycles in approximately two minutes. [Class A; LOE Expert Consensus Opinion]

### Chest compressions only

If rescuers are unwilling or unable to do rescue breathing they should do chest compressions only. If chest compressions only are given, they should be continuous at a rate of approximately 100/min.<sup>1,5</sup> [Class A; LOE III-2]

### Multiple rescuers

When more than one rescuer is available ensure:

- that an ambulance has been called;
- all available equipment has been obtained (e.g. AED).

### Duration of CPR

Rescuers should minimise interruptions of chest compressions and CPR should not be interrupted to check for response or breathing.<sup>1</sup> Interruption of chest compressions is associated with lower survival rates.

The rescuer should continue cardiopulmonary resuscitation until:<sup>1</sup>

- the victim responds or begins breathing normally
- it is impossible to continue (e.g. exhaustion)
- a health care professional arrives and takes over CPR

- a health care professional directs that CPR be ceased [Class A; Expert Consensus Opinion]

## Risks

The risk of disease transmission during training and actual CPR performance is very low.<sup>4</sup> [Class A; LOE IV, extrapolated evidence] A systematic review found no reports of transmission of hepatitis B, hepatitis C, human deficiency virus (HIV) or cytomegalovirus during either training or actual CPR when high-risk activities, such as intravenous cannulation were not performed.<sup>4</sup> [Class A; LOE extrapolated evidence]. If available, the use of a barrier device during rescue breathing is reasonable.<sup>4</sup> [Class A; LOE IV, extrapolated evidence] After resuscitation all victims should be reassessed and re-evaluated for resuscitation-related injuries.<sup>4</sup> [Class A; LOE IV, extrapolated evidence]

## References

1. Koster RW, Sayre MR, Botha M, Cave DM, Cudnik MT, Handley AJ, Hatanaka T, Hazinski MF, Jacobs I, Monsieurs K, Morley PT, Nola JP, Travers AH. Part 5: Adult basic life support: 2010 International consensus on cardiopulmonary resuscitation and emergency cardiovascular care science with treatment recommendations. *Resuscitation* 2010; **81**: e48–e70.
2. Deakin CD, Morrison LJ, Morley PT, Callaway CW, Kerber RE, Kronick SL, Lavonas EJ, Link MS, Neumar RW, Otto CW, Parr M, Shuster M, Sunde K, Peberdy MA, Tang W, Hoek TLV, Böttiger BW, Drajer S, Lim SH, Nolan JP, on behalf of the Advanced Life Support Chapter Collaborators. Part 8: Advanced life support: 2010 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations. *Resuscitation* 2010; **81**: e93–e174.
3. Nolan JP, Hazinski MF, Billi JE, Boettiger BW, Bossaert L, de Caen AR, Deakin CD, Drajer S, Eigel B, Hickey RW, Jacobs I, Kleinman ME, Kloeck W, Koster RW, Lim SH, Mancini ME, Montgomery WH, Morley PT, Morrison LJ, Nadkarni VM, O'Connor RE, Okada K, Perlman JM, Sayre MR, Shuster M, Soar J, Sunde K, Travers AH, Wyllie J, Zideman D. Part 1: executive summary: 2010 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations. *Resuscitation* 2010; **81**: e1–e25.
4. Soar J, Mancini ME, Bhanji F, Billi JE, Dennett J, Finn J, Ma MHM, Perkins GD, Rodgers DL, Hazinski MF, Jacobs I, Morley PT, on behalf of the Education, Implementation, and Teams Chapter Collaborators. Part 12: Education, implementation, and teams: 2010 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations. *Resuscitation* 2010; **81**: e288–e330.
5. de Caen AR, Kleinman ME, Chameides L, Atkins DL, Berg RA, Berg MD, Bhanji F, Biarent D, Bingham R, Coovadia AH, Hazinski MF, Hickey RW, Nadkarni VM, Reis AG, Rodriguez-Nunez A, Tibballs J, Zaritsky AL, Zideman D, On behalf of the Paediatric Basic and Advanced Life Support Chapter Collaborators. Part 10: Paediatric basic and advanced life support: 2010 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations. *Resuscitation* 2010; **81**: e213–e259.
6. Consensus on Resuscitation Science & Treatment Recommendations. Part 2: Adult Basic Life Support. *Resuscitation* 2005; **67**: 187–201.
7. Consensus on Resuscitation Science & Treatment Recommendations. Part 6: Paediatric Basic and Advanced Life Support. *Resuscitation* 2005; **67**: 271–291.
8. Consensus on Resuscitation Science & Treatment Recommendations. Part 4: Advanced Life Support. *Resuscitation* 2005; **67**: 213–247. <http://www.resuscitationjournal.com>

