



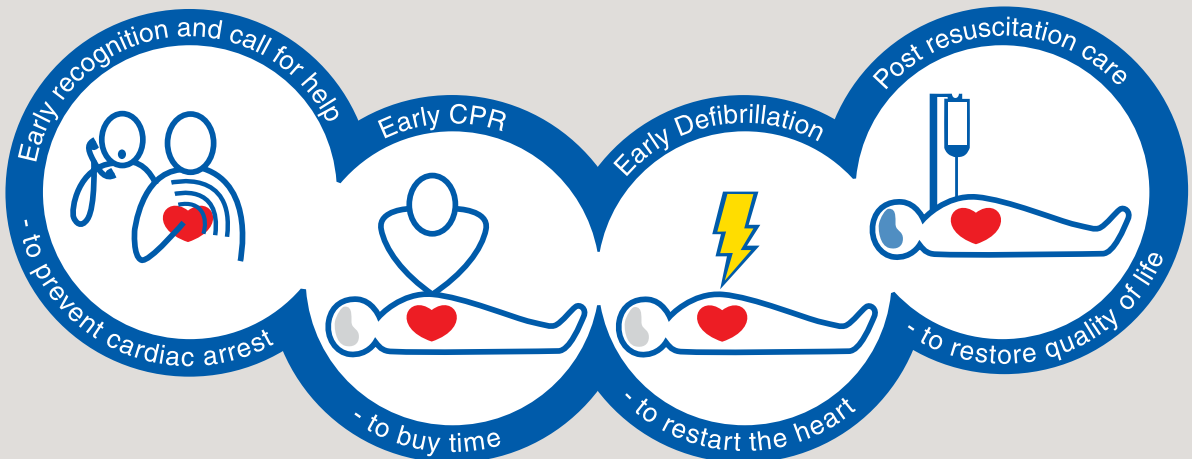
**Laerdal**

helping save lives



# Insight

## Resuscitation Guidelines 2015 - Summary of Key Changes



# Introduction

Our 2020 Vision is to help save 500,000 more lives every year and therefore it seems fitting that we should help disseminate the important changes to the new Resuscitation Guidelines issued by the Resuscitation Council (UK). The 2015 guidelines are not all that different to the 2010 guidelines, but some of the treatment recommendations will change the way resuscitation is delivered. This leaflet is intended as a summary of some of the key changes and key points and we encourage you to refer back to the complete guidelines for detailed information.



More people are surviving cardiac arrest than ever before, but survival rates are still not nearly good enough. The ambulance service initiates resuscitation on about 28,000 people (52 cases per 100,000 inhabitants) outside the hospital with approximately 8% of these people surviving to leave hospital. Whereas in-hospital cardiac arrest occurs in 1.6 per 1000 hospital admissions with rate of survival to hospital discharge of 18.4%.<sup>1</sup> Recent international data suggests that survival rates after both in-hospital and out-of-hospital cardiac arrest are slowly improving

The Resuscitation Council (UK) aims to improve survival rates by drawing on the best international research available. It does this by updating its guidelines every five years. For its 2015 guidelines, it has worked with international partners and stakeholders, including survivors of cardiac arrest, to produce detailed information about basic and advanced life support for adults, children and babies at birth.

The process has been accredited by NICE (the National Institute for Health and Care Excellence), is valid until March 2020 and the guidelines are tailored to clinical practice in the UK.

Healthcare organisations should implement those components of the 2015 Guidelines relevant to them by the end of 2016.

<sup>1</sup> Nolan JP, Soar J, Smith GB, et al. Incidence and outcome of in-hospital cardiac arrest in the United Kingdom National Cardiac Arrest Audit. *Resuscitation* 2014;85:987-92.

Steve Overton

Managing Director, Laerdal Medical Ltd

*“Recent international data suggests that survival rates after both in-hospital and out-of-hospital cardiac arrest are slowly improving”*

## CPR in the community

**The community response to cardiac arrest is key in saving lives.** Every year, UK ambulance services respond to about 60,000 cases of cardiac arrest, but attempt resuscitation in less than half. This is often because the victim has not received CPR from a bystander (or lay rescuer) and has already died.

Training and empowering more people to perform CPR could save thousands of lives. In Denmark, for example, the number of survivors of cardiac arrest almost tripled after a push to make Danish citizens more comfortable in giving CPR. From 2001 to 2010, there was a rise from 7.9% to 21.8% in the number of patients with cardiac arrest who arrived at the hospital alive.

Increasing the use of external defibrillators (AEDs), and training people in how to use them, could also save many lives. Defibrillation within 3-5 minutes of collapse can produce survival rates as high as 70%. But in the UK, less than 2% of victims have an AED used before the ambulance arrives.

*“Everyone who’s able to learn CPR should do so”*

### Key recommendations

- All school children should be taught CPR and how to use an AED.
- Everyone who’s able to learn CPR should do so.
- Defibrillators should be made available in public places and places where the emergency response might be delayed.
- Owners of defibrillators should register their devices with their local ambulance services.
- There should be systems in place to help ambulance services identify the nearest AED to the scene of a cardiac arrest.
- All out-of-hospital cardiac arrest resuscitation attempts should be reported to the National Out-of-Hospital Cardiac Arrest Audit [www.warwick.ac.uk/ohcao](http://www.warwick.ac.uk/ohcao)



# Adult basic Life support and automated external defibrillation

The new guidelines highlight the critical role of the ambulance call operator in diagnosing cardiac arrest, the importance of the bystander who gives CPR and the timely use of an AED.

The emergency medical dispatcher plays an important role in the early diagnosis of cardiac arrest, in giving dispatcher-assisted CPR, also known as telephone CPR, and in the location and dispatch of an AED.

The sooner the emergency services are called, the greater the chance of saving a life.

If possible, stay with the victim when the emergency call is made. The victim who is unresponsive, and not breathing normally, is in cardiac arrest.

Straight after cardiac arrest, blood flow to the brain is reduced to virtually zero. This may cause seizure-like episodes that can be confused with epilepsy. If the victim seems to be having seizures, bystanders and emergency medical dispatchers should assess whether he or she is breathing normally and suspect cardiac arrest.

A victim in cardiac arrest needs CPR. Start CPR by giving 30 chest compressions.

If trained and able, combine every 30 chest compressions with two ventilations. Otherwise, continue chest-compression-only CPR.

Chest compression targets remain, in the new guidelines, at a depth of 5-6cm, and at a rate of 100–120 per minute.

If an AED arrives, switch it on and follow the instructions.

Unless you're absolutely certain that the person has recovered, continue CPR until the emergency services have arrived.



## Adult advanced life support

In the new guidelines, there is more emphasis on minimally interrupted, high quality chest compressions. Interruptions for specific interventions, such as defibrillation or tracheal intubation, should be less than 5 seconds.

There is a new section on monitoring.

Waveform capnography should be used to confirm and monitor tracheal tube placement, and to monitor the quality of CPR and give an early indication of the return of spontaneous circulation (ROSC).

There are several approaches to airway management during CPR. Rescuers should use the technique that they are trained to do. Only experts in tracheal intubation should intubate.

The recommendations for drug therapy during CPR have not changed. Drugs such as adrenaline and amiodarone may improve short-term survival from cardiac arrest, but their overall benefits or harms are still unknown.

Mechanical chest compression devices should not be used routinely, but they may be useful in situations where sustained, high quality manual chest compressions are impractical or put the rescuer's safety at risk.

Focused ultrasound done by trained rescuers may help to identify reversible causes of cardiac arrest.

In patients who have a reversible, treatable cause of cardiac arrest, extracorporeal life support techniques can provide an artificial circulation while the reversible cause is treated and while spontaneous circulation is restored. At the moment, this is only available in specialist settings.

*“In the new guidelines, there is more emphasis on minimally interrupted, high quality chest compressions”*





# Paediatric basic life support

There are two main changes:

1. The length of breath delivered in paediatric CPR is now about one second, as in adult practice.
2. In chest compressions, the lower sternum should be depressed by at least a third of the anterior-posterior diameter of the chest, or by 4cm for the infant and 5cm for the child.

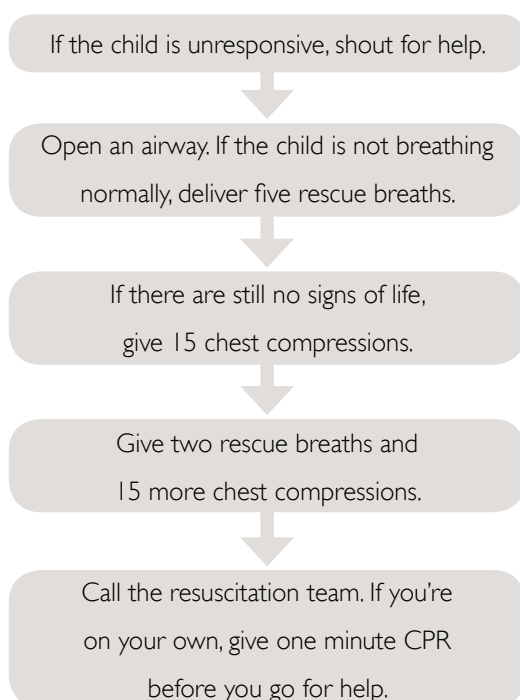
Many children do not receive CPR because rescuers are not sure if there are specific methods for children and are afraid of causing harm. This fear is unfounded. It is far better to pursue the adult CPR sequence than to do nothing.

As with adults, CPR should start as soon as possible to get the best outcome.

**Lay rescuers** can be taught adult CPR and the following simple modifiers:

- Give 5 rescue breaths before starting chest compressions.
- If you are on your own, perform CPR for one minute before going for help.
- Compress the chest by at least a third of its depth. Use two fingers for an infant (under one year). Use one or two hands for a child over one year, to get the right depth of compression.

For **healthcare professionals**, the sequence for delivering basic life support to children is different to that for adults.



*“It is far better to pursue the adult CPR sequence than to do nothing”*



## Paediatric advanced life support

Paediatric advanced life support is highly specialised, and the details are beyond the scope of this leaflet. Many of the features of the cardiac arrest sequence are the same as in adult practice.

The sequence in the new guidelines is largely the same as before, but there are changes to management after the return of spontaneous circulation. Full details are in the Resuscitation Council guidelines.

## Resuscitation and support of transition of babies at birth

**It's rare for a baby at birth to need resuscitation. More often, it needs medical help during the process of post-natal transition.**

These are the main changes to the NLS (newborn life support) guidelines from 2010:

- For full term and preterm babies who are uncompromised at birth, cord clamping should be delayed for at least one minute from full delivery.
- The temperature of newly born babies should be kept between 36.5°C and 37.5°C after birth. Even the mild hypothermia that used to be seen as clinically acceptable carries a risk. The admission temperature should be recorded.
- For babies delivered at less than 32 weeks, a number of approaches, such as using a thermal mattress or plastic wrapping, or a combination of both, might be needed to maintain the right temperature. For every degree below 36.5°C, the risk of death increases by at least 28%.
- An ECG can give a quick and accurate estimation of heart rate in babies needing resuscitation at birth.
- Resuscitation of full term babies should start with air. For preterm babies, either air or a low concentration of oxygen, up to 30%, should be used. The use of oxygen should be guided by oximetry.







- Tracheal intubation should only be performed for suspected tracheal obstruction. It should not be routine when there is meconium.
- For preterm babies with respiratory distress, nasal continuous positive airways pressure (CPAP) is a better option than intubation.
- If compressions are needed, the ratio remains 3:1 for newborn babies and they should be synchronized. They should be started if the heart rate remains less than 60 per minute after 5 effective inflation breaths and 30 seconds of effective ventilation. This gives more opportunity for the heart rate to respond.

## Prehospital resuscitation

**The emphasis in the new guidelines is on the team. Ideally, there should be four members, with one as a team leader. Between them, they manage the airway, give chest compressions and help with vascular access and drug delivery.**

The priority is to oxygenate and ventilate the patient. Simpler airway devices such as supraglottic airways, including the laryngeal mask airway and i-gel, should be used as part of a stepwise approach. Tracheal intubation should only be performed by those with proper training, and when simpler airways have been found to be inadequate.

*“The emphasis in the new guidelines is on the team”*

There is no evidence that a period of CPR before defibrillation improves success rates. Solo responders arriving at a cardiac arrest should start with AED placement and defibrillation.

Mechanical chest compression devices are a reasonable alternative to high quality manual chest compressions in situations where these are impractical or put the rescuer's safety at risk.

Waveform capnography can play an important role. It helps ensure the correct placement of a tracheal tube and is a useful indicator of cardiac output and the effectiveness of chest compressions. It may also indicate the return of spontaneous circulation (ROSC), when there's a sudden rise in exhaled CO<sub>2</sub>.

Once spontaneous circulation has returned, passive cooling is recommended. The patient should not be covered with blankets and the ambulance temperature should be no higher than ambient.

The patient should be transferred to the most appropriate hospital for their needs. This may not be the nearest.

# In-hospital resuscitation guidelines

There are no major changes to the last guidelines. There is, instead, a change of emphasis. The new guidelines focus on high quality chest compressions, the need to minimize the pre-shock pause and the use of waveform capnography.

Team members should ensure that chest compressions are performed to a rate of 100 -120 compressions a minute and that the chest recoils completely after each compression.

The team should work together to minimize any interruptions to chest compression, taking turns every 2 minutes or less to prevent fatigue.

The delay between chest compressions and delivery of the shock must be kept to the absolute minimum. Even a delay of 5-10 seconds will reduce the chances of the shock being successful.

All team members, apart from the person giving chest compressions, should stand clear of the patient while the defibrillator is charged. Once the shock has been delivered, chest compressions must start again straight away.

Waveform capnography has a number of useful roles. It ensures the tracheal tube is in the airway rather than the oesophagus, gives an indication of the rate of ventilation and can be used to indicate the quality of chest compressions.

A sudden, sustained increase in end-tidal CO<sub>2</sub> during CPR may indicate the return of spontaneous circulation. This may help prevent an unnecessary and potentially harmful dose of adrenaline.

At the moment, the guidelines don't recommend an end-tidal CO<sub>2</sub> value that should be used to stop resuscitation.



## Post resuscitation care

The post-resuscitation phase starts wherever spontaneous circulation has returned. Once the patient has been stabilized, he or she is transferred to the most appropriate high-dependency care area for continued diagnosis, monitoring and treatment.

In the new guidelines, there is more emphasis on the need for urgent coronary catheterisation and percutaneous coronary intervention (PCI) following an out-of-hospital cardiac arrest.

Targeted temperature management is still important, but the target temperature can be in the range of 32°C to 36°C. (The previous recommended target range was 32°C to 34°C.)

There is now a multimodal strategy for prognostication, allowing enough time for neurological recovery and for sedatives to be cleared. The new guidelines recommend a delay of 72 hours after a return of spontaneous circulation, and the use of multiple modes, including clinical examination, electrophysiology, biomarkers and imaging.

These steps should only be taken by highly experienced clinicians.

*“The new guidelines focus on high quality chest compressions”*

## ABCDE approach

All healthcare professionals should use the ABCDE approach to assess and treat the patient:

### **Airway (A)**

Airway obstruction is an emergency. Get expert help immediately. In most cases, only simple methods of airway clearance are needed. Tracheal intubation may be needed if these fail.

### **Breathing (B)**

Look, listen and feel for the general signs of respiratory distress: sweating, central cyanosis, use of the accessory muscles of respiration, and abdominal breathing. All critically ill patients should be given oxygen.

## ***Circulation (C)***

In almost all medical and surgical emergencies, consider hypovolaemia to be the primary cause of shock, until proven otherwise. Unless there are obvious signs of a cardiac cause, give intravenous fluid to any patient with cool peripheries and a fast heart rate. For full advice, see guidelines.

## ***Disability (D)***

Common causes of unconsciousness include profound hypoxia, hypercapnia, cerebral hypoperfusion, sedatives or analgesic drugs. Make a quick initial assessment of the patient's conscious level. Measure the blood glucose to exclude hypoglycaemia. Nurse unconscious patients in the lateral position if their airway is not protected.

## ***Exposure (E)***

To examine the patient properly, full exposure of the body may be necessary. Respect the patient's dignity and minimise heat loss.

# Prevention of cardiac arrest and decisions about CPR

In previous guidelines, the focus was on preventing cardiac arrest in hospitals. There are no major changes in the recommended approach to this.

Early recognition of deterioration is crucial. The best way to do this is to use an early warning score. In the UK, the national early warning score (or NEWS) is the one that's recommended.

A prompt and efficient response is also crucial and depends on effective team work by outreach, medical and emergency teams.

There are far more cardiac arrests out of hospital than in hospital, so the 2015 guidelines also mention measures that can be taken to prevent out-of-hospital cardiac arrest. Many of these are due to acute coronary syndromes and need early recognition and a prompt call for help.

It's important to make anticipatory decisions about CPR. When a person is at risk of dying, these decisions are an integral part of good-quality clinical care.





The patient should be involved in the decision-making process unless it's impossible, or would cause them harm. If you fail to consider the patient and their wishes, you may be acting in breach of their human rights.

## Peri-arrest arrhythmia

The basic principles in assessing and treating a suspected cardiac arrhythmia are unchanged.

Oxygen therapy is not recommended unless the patient is hypoxic. If the patient is hypoxic, the concentration of oxygen delivered should be guided by monitoring arterial oxygen saturation whenever possible.

There is more emphasis on the use of antithrombotic therapy in atrial fibrillation (AF) and the importance of assessing thromboembolic risk in people with AF.

*“Regular, ‘low-dose’  
training may be a better  
way to keep CPR/AED  
skills up to date”*

## Education and implementation

### Training

All school children should be taught how to perform CPR and use an automated external fibrillator (AED).

Ambulances should have access to a national database of AEDs and their dispatchers should have training in how to give clear and effective instructions to rescuers over the phone. Work has already started to create a national database, but needs the co-operation of everyone who owns an AED.

Regular, “low-dose” training may be a better way to keep CPR/AED skills up to date than more intensive training at less frequent intervals.

E-ALS courses are as effective as conventional, face-to-face courses and likely to become more popular:



High fidelity manikins aren't essential for life support courses.

Life support courses should include training in non-technical skills such as leadership, team behaviour and communication.

## Implementation

Healthcare systems should evaluate their processes to make sure people with a cardiac arrest have the best outcomes. Only by measuring performance can we understand what needs to be improved.

There may be a role for regional cardiac arrest centres, but more work is needed to identify which specific aspects of care are beneficial.

Teams who manage patients in cardiac arrest should use data-driven, performance-focused debriefing.

Social media and innovative technology will play an important part in improving outcomes from cardiac arrest. These range from simple delivery of information, like the iResus app, through to more interactive apps, like life-saver.org.uk.

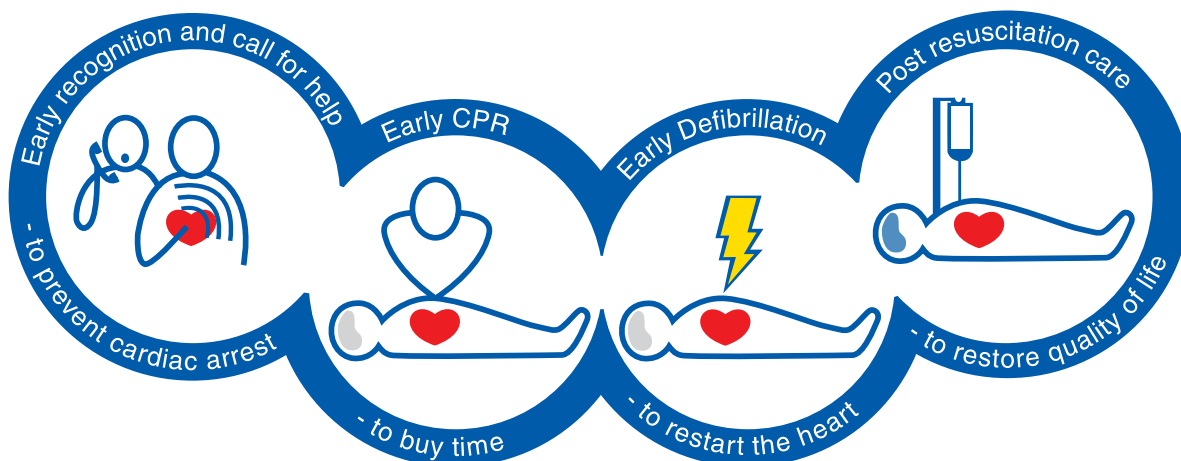
*“Teams who manage patients in cardiac arrest should use data-driven, performance-focused debriefing”*

## Conclusion

Far too many people still die from cardiac arrest. So many of these deaths could be avoided. If we all work together to spread the message about some of the simpler things that can be done, we will save many lives.

The full resuscitation guidelines can be found at:

[www.resus.org.uk/resuscitation-guidelines](http://www.resus.org.uk/resuscitation-guidelines)







Laerdal Medical is a supplier of healthcare simulation and therapeutic products. Most famous of all is its CPR training manikin, Resusci Anne, which was introduced in 1960 and has trained over 300 million people around the world in CPR since that time.

Through working with resuscitation professionals globally and supporting many community CPR programmes, Laerdal is committed to meeting the needs of today's good Samaritans, thereby living the company's mission

*– Helping Save Lives.*

**For further information**

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