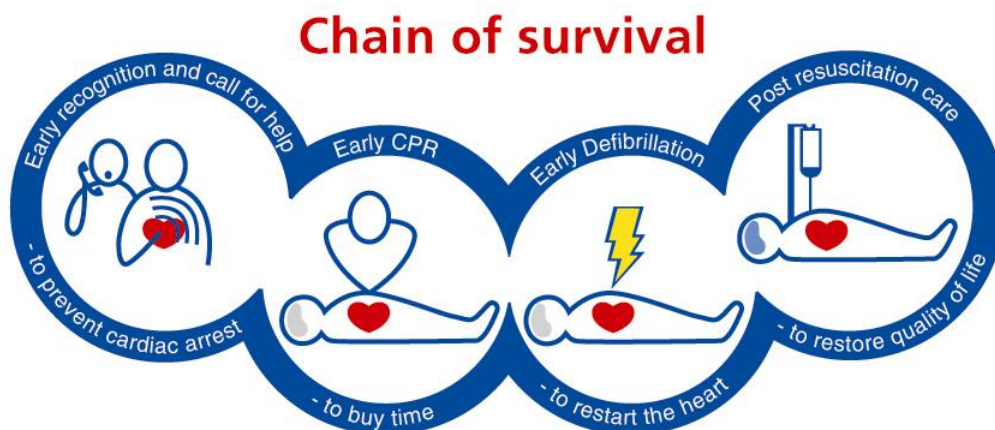


Scope and purpose

The purpose of the Resuscitation Council (UK) guidance is to provide evidence-based interventions that are most likely to prevent cardiac arrest or increase the chances of the successful resuscitation (with full neurological recovery) of an adult, child or newborn baby in cardiac or respiratory arrest.

A cardiac arrest is the ultimate medical emergency – the correct treatment must be given immediately if the patient is to have any chance of surviving. The interventions that contribute to a successful outcome after a cardiac arrest can be conceptualised as a chain – the Chain of Survival.⁸



The key topics addressed by the guidance include:

- what a layperson should do if they witness a sudden collapse and a subsequently unresponsive victim;
- what healthcare professionals should do to prevent cardiac arrest;
- how healthcare professionals should treat cardiac arrest when it occurs;
- how healthcare professionals should provide life support until the patient's heart has been restarted;
- how healthcare professionals should treat the patient whose heart has been restarted (post resuscitation care);
- the process for facilitating decisions about resuscitation with patients, family members and/or carers .

Target audience

Basic life support (BLS) guidance is aimed at potentially all adults, especially those with a duty to respond to a medical emergency, and many children in the UK (i.e., anyone who might undertake training in, or have to perform actual cardiopulmonary resuscitation (CPR)). These people may be called upon at any time to attempt resuscitation on a relative, neighbour, colleague, or fellow traveller. Most of the remaining guidance relating to resuscitation is aimed at all healthcare professionals. The RC(UK) '[Standards for clinical practice and training](#)' document provides clear recommendations on the level of training required by individual groups of healthcare professionals.

Summary of main changes

Adult basic life support

The following changes in the basic life support (BLS) guidelines have been made to reflect the importance placed on chest compression, particularly good quality compressions, and to attempt to reduce the number and duration of pauses during chest compression:

- When obtaining help, ask for an automated external defibrillator (AED), if one is available.
- Compress the chest to a depth of 5-6 cm and at a rate of 100-120 min⁻¹.
- Do not stop to check the victim or discontinue CPR unless the victim starts to show signs of regaining consciousness, such as coughing, opening his eyes, speaking, or moving purposefully AND starts to breathe normally.
- Teach CPR to laypeople with an emphasis on chest compression, but include ventilation as the standard, particularly for those with a duty of care.

The use of Automated External Defibrillators

There are no major changes to the sequence of actions for AED users in Guidelines 2010. The following changes are aimed mainly at increasing the use of AEDs along with clarification on when to stop CPR:

- An AED can be used safely and effectively without previous training; its use should not be restricted to trained rescuers. Training should however be encouraged to help improve the time to shock delivery and correct pad placement
- Short video/computer self-instruction courses, with minimal or no instructor coaching, combined with **hands-on practice** can be considered as an effective alternative to instructor-led BLS and AED courses. Such courses should be validated to ensure that they achieve equivalent outcomes to instructor-led courses
- When using an AED minimise interruptions in chest compression. Do not stop to check the victim or discontinue CPR unless the victim starts to show

signs of regaining consciousness, such as coughing, opening his eyes, speaking, or moving purposefully AND starts to breathe normally.

Pre-hospital cardiac arrest

A pre-hospital chapter has been included for the first time in the RC(UK) Guidelines. The chapter covers the following resuscitation topics of specific relevance to the pre-hospital emergency medical services (EMS):

- Telephone-advised cardiopulmonary resuscitation (CPR)
- CPR versus defibrillation first
- Pre-hospital airway management
- Rules for stopping resuscitation.

Prevention of cardiac arrest and decisions about cardiopulmonary resuscitation

Increasing importance is being given to prevention of cardiac arrest. Revisions to this chapter include:

- Recognition of those at risk of sudden cardiac death out of hospital.
- Much more detail on prevention strategies including the use of track-and-trigger systems.
- Emphasis on the use of structured communication e.g., Situation, Background, Assessment, Recommendation (SBAR).
- Reference to the current [Do-Not-Attempt-Resuscitation \(DNAR\) guidelines](#).

In-hospital resuscitation

Many of the changes to the 2010 guidelines on in-hospital resuscitation reflect changes that are described in more detail in the advanced life support (ALS) section. Highlights for in-hospital resuscitation include:

- Much greater emphasis on high-quality CPR with minimal interruptions in chest compressions.
- Defibrillation strategy is described in detail. The aim is to reduce the preshock pause to less than 5 s by planning ahead, compressing during charging, and using a very brief safety check.
- The importance of contributing data to the [National Cardiac Arrest Audit \(NCAA\)](#).

Adult advanced life support

There are several changes to the ALS guidelines and, for simplicity, these are grouped by topic.

Defibrillation

- There is increased emphasis on the importance of minimal interruption in high-quality chest compressions throughout any ALS intervention: chest compressions are paused briefly only to enable specific planned interventions.
- The recommendation for a specified period of CPR before out-of-hospital defibrillation following cardiac arrest unwitnessed by the EMS has been removed.
- Chest compressions are now continued while a defibrillator is charged – this will minimise the preshock pause.
- The role of the precordial thump is de-emphasised.
- There is inclusion of the use of up to three quick successive (stacked) shocks for ventricular fibrillation/pulseless ventricular tachycardia (VF/VT) occurring in the cardiac catheterisation laboratory or in the immediate post-operative period following cardiac surgery.

Drugs

- Delivery of drugs via a tracheal tube is no longer recommended – if intravenous (IV) access cannot be achieved give drugs by the intraosseous (IO) route.
- When treating VF/VT cardiac arrest, adrenaline 1 mg is given once chest compressions have restarted after the third shock and then every 3-5 min (during alternate cycles of CPR). Amiodarone 300 mg is also given after the third shock.
- Atropine is no longer recommended for routine use in asystole or pulseless electrical activity.

Airway

- There is reduced emphasis on early tracheal intubation unless achieved by highly skilled individuals with minimal interruption to chest compressions.
- There is increased emphasis on the use of capnography to confirm and continually monitor tracheal tube placement, quality of CPR and to provide an early indication of return of spontaneous circulation (ROSC).

Ultrasound

- The potential role of ultrasound imaging during ALS is recognised.

Post-resuscitation care

- There is recognition of the potential harm caused by hyperoxaemia after ROSC is achieved: once ROSC has been established and the oxygen saturation of arterial blood (SaO₂) can be monitored reliably (by pulse oximetry and/or arterial blood gas analysis), inspired oxygen is titrated to achieve a SaO₂ of 94 - 98%.
- There is much greater detail and emphasis on the treatment of the post-cardiac-arrest syndrome.
- There is recognition that implementation of a comprehensive, structured post-resuscitation treatment protocol may improve survival in cardiac arrest victims after ROSC.
- There is increased emphasis on the use of primary percutaneous coronary intervention in appropriate, but comatose, patients with sustained ROSC after cardiac arrest.
- There is revision of the recommendation for glucose control: in adults with sustained ROSC after cardiac arrest, blood glucose values >10 mmol l⁻¹ should be treated but hypoglycaemia must be avoided.
- Use of therapeutic hypothermia to include comatose survivors of cardiac arrest associated initially with non-shockable rhythms as well shockable rhythms. The lower level of evidence for use after cardiac arrest from non-shockable rhythms is acknowledged.
- There is recognition that many of the accepted predictors of poor outcome in comatose survivors of cardiac arrest are unreliable, especially if the patient has been treated with therapeutic hypothermia.

Peri-arrest arrhythmias

There are relatively few changes from Guidelines 2005 in the treatment of peri-arrest arrhythmias:

- The assessment of patients in the context of peri-arrest arrhythmias uses the ABCDE approach.
- A single set of adverse features for tachy- and brady-arrhythmias has been introduced for consistency.

Paediatric basic life support

Changes in paediatric life support guidelines have been made partly in response to new scientific evidence, and partly to simplify them in order to assist teaching and retention. As in the past, there remains a paucity of good-quality evidence specifically on paediatric resuscitation, and some conclusions have had to be drawn from experimental work or extrapolated from adult data.

- Pulse palpation for 10 s is unreliable for determining the presence or absence of an effective circulation. This means that palpation of the pulse cannot be the sole determinant of the need for chest compressions. Healthcare providers therefore need to determine the presence or absence of 'signs of life', such as response to stimuli, normal breathing (rather than abnormal gasps) or spontaneous movement. They may also feel for a pulse but, if there are no other 'signs of life', they should only withhold CPR if they are certain there is a definite pulse. If the lay person considers that there are no 'signs of life', CPR should be started immediately.
- Although ventilation remains a very important component of CPR in asphyxial arrest, rescuers who are unable or unwilling to provide this should be encouraged to perform at least compression-only CPR. A child is far more likely to be harmed if bystanders do nothing at all.
- Chest compressions are frequently too shallow, so there has been a subtle, but important, change in the instruction on chest compressions from 'approximately one third' to 'at least one third' of the AP diameter of the chest. The mean one-third compression depths for infants and children are 4 and 5 cm respectively. In order to be consistent with the adult BLS guidelines the recommended compression rate is now 100 - 120 min⁻¹.

Paediatric advanced life support

There is concern that resuscitation from cardiac arrest is not performed as well as it might because the variations in guidelines for different age groups cause confusion to providers, and therefore poor performance. As in 2005, most of the changes in paediatric guidelines for 2010 have been made for simplification and to minimise differences between adult and paediatric guidance.

- Adrenaline is given after the third shock for shockable rhythms and then during every alternate cycle (i.e. every 3-5 min during CPR). In the non-shockable side of the algorithm adrenaline is still given initially as soon as vascular access is available.
- Amiodarone is given after the third shock for shockable rhythms. The dose is repeated after the fifth shock, if VF or pulseless VT is still present.
- Bag-mask ventilation remains the preferred method for achieving airway control and ventilation. If this fails, the laryngeal mask airway (or possibly other supraglottic airway device) is an acceptable alternative for suitably trained providers.
- Once spontaneous circulation has been restored, delivered oxygen should be titrated according to SaO₂ to limit the risk of hyperoxaemia.
- CO₂ detection (preferably with capnography) is encouraged even more strongly, not only to confirm placement of tracheal tubes but also to aid decision making during CPR and management of ventilation after ROSC.
- Recommendations for post-resuscitation care include consideration of induced hypothermia.

Newborn life support

The following are the main changes that have been made to the Newborn Life Support (NLS) guidelines in 2010:

- For uncompromised babies, a delay in cord clamping of at least one minute from the complete delivery of the infant, is now recommended. As yet there is insufficient evidence to recommend delayed clamping of the cord in babies who are severely compromised at birth and until further research has provided this information, resuscitative intervention remains the priority.
- For term infants, air should be used for resuscitation at birth. If, despite effective ventilation, oxygenation (ideally guided by pulse oximetry) remains unacceptable, use of a higher concentration of oxygen should be considered.
- Pre-term babies less than 32 weeks gestation may not reach the same arterial blood oxygen saturations in air as those achieved by term babies. Therefore blended oxygen and air should be given judiciously and its use guided by pulse oximetry. If a blend of oxygen and air is not available use what is available.
- Pre-term babies of less than 28 weeks gestation should be covered completely up to their necks in a food-grade plastic wrap or bag, without drying, immediately after birth. They should then be nursed under a radiant heater and stabilised. They should remain wrapped until their temperature has been checked after admission. For these infants delivery room temperatures should be at least 26°C.
- The recommended CV ratio for CPR remains 3:1 for newborn resuscitation.
- Attempts to aspirate meconium from the nose and mouth of the unborn baby, while the head is still on the perineum, are not recommended. If presented with a floppy, apnoeic baby born through meconium it is reasonable to inspect the oropharynx rapidly to remove potential obstructions. If appropriate expertise is available, tracheal intubation and suction may be useful. However, if attempted intubation is prolonged or unsuccessful, start mask ventilation, particularly if there is persistent bradycardia.
- If adrenaline is given the intravenous route is recommended using a dose of 10-30 mcg kg⁻¹. If the tracheal route is used, it is likely that a dose of at least 50-100 mcg kg⁻¹ will be needed to achieve a similar effect to 10 mcg kg⁻¹ intravenously.
- Detection of exhaled carbon dioxide (capnography) in addition to clinical assessment is recommended as the most reliable method to confirm placement of a tracheal tube in neonates with a spontaneous circulation.
- Newly born infants born at term or near-term with evolving moderate-to-severe hypoxic-ischemic encephalopathy should, where possible, be treated with therapeutic hypothermia.