Resuscitation Council UK

Quality Standards: CPR and AED training in the community

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Introduction and scope

Cardiac arrest can occur at any time and in any place. These standards refer specifically to cardiac arrest in adults, where the most important interventions to save a life are early recognition of cardiac arrest, calling the emergency services (dialling 999^{*}), starting cardiopulmonary resuscitation (CPR) and using an automated external defibrillator (AED). In adults, defibrillation within 3-5 minutes of collapse may produce survival rates as high as 50-70%. Recent Out of Hospital Cardiac Arrest Audit data show that, in England, around 30% of cardiac arrest victims did not receive CPR prior to the arrival of the emergency medical services when bystander CPR could have been initiated (OHCAO Registry Report, 2017). Resuscitation Council UK has, therefore, identified the development of quality standards for CPR practice and training in the community as one of its key objectives.

In certain settings it may be appropriate to teach specific approaches to paediatric resuscitation, but the standards in this document refer to the management of cardiac arrest in adults according to Resuscitation Council UK's current guidelines for Basic Life Support and Automated External Defibrillation.

With these community quality standards, Resuscitation Council UK aims to:

- improve outcomes from out-of-hospital cardiac arrest by increasing response rates from concerned bystanders
- improve quality of training and service provision

- provide individuals, as members of their community, with guidance on how to act when a person has a cardiac arrest
- provide guidance to organisations on their responsibilities in providing emergency care for victims of cardiac arrest
- provide guidance to organisations on their responsibilities in providing resuscitation training and equipment
- highlight the training, support, guidance and legislation available for individuals and organisations to achieve these standards within the countries of the UK
- offer resources to assist trainers to deliver agreed teaching specifications
- promote AED availability and use in the wider community
- ensure all out-of-hospital cardiac arrests are reported accordingly.

Resuscitation Council UK already defines quality standards for various healthcare settings. There are numerous other settings where cardiac arrest can occur, and where CPR standards are not as clearly defined, including: workplaces, swimming pools, health clubs, shopping centres, transport hubs, the home and many more. These Resuscitation Council UK standards are aimed at giving guidance to support training and practice in non-clinical settings.

^{*}NOTE: In the UK, 999 and 112 both connect you to emergency services with no enhanced location service for either. In Europe, 112 may be dialled to access the national emergency services of the country you are calling from. For simplicity, this document refers to 'dialling 999' as the generic way of accessing the emergency services in the UK.

1. Core standards for cardiopulmonary resuscitation

When cardiac arrest occurs, systems and education should be in place to ensure that:

- cardiac arrest is recognised early,
- help is sought shout for nearby help and dial 999,
- CPR is promptly started according to current guidelines,
- an AED is located, retrieved and used as early as possible.

These interventions can be performed with guidance from the 999 call handler including: instructions for confirming cardiac arrest, starting compression-only

2. Methods

A working group reviewed the evidence for specific aspects of resuscitation practice based on the current Resuscitation Council UK Guidelines. The process used to produce these guidelines is accredited by the National Institute for Health and Care Excellence (www.nice.org.uk).

3. The national standard

As far as possible, all residents of the UK should be aware of how to:

- recognise a cardiac arrest,
- call the emergency services (dial 999),
- start CPR,
- locate and operate an AED.

Organisations where there is an expectation or requirement to perform CPR and use an AED should have appropriately trained personnel and equipment fit for that purpose.

To achieve this, Resuscitation Council UK is committed to:

- developing strategies to raise national awareness of CPR. Examples of this include <u>Lifesaver</u>, <u>World Restart a Heart Day</u>, and media engagement,
- lobbying UK Governments to mandate that all school children are trained in CPR and use of an AED. English schools have already agreed to this and will be implementing from 2020,
- advising 999 call handlers to provide appropriate telephone instructions to help callers: recognise cardiac arrest, start CPR, locate and use the nearest AED,
- setting standards for CPR and use of an AED,
- setting standards for the teaching of CPR and use of an AED,
- setting standards for provision of CPR-related equipment and their use and maintenance.

4. Organisational standards

Organisations where resuscitation is not their prime activity should:

- meet the legal requirement for first aiders in the workplace in accordance with The Health and Safety (First-Aid) Regulations 1981 (www.hse.gov.uk/pubns/books/I74.htm),
- nominate a member of staff to manage first aid and resuscitation related activities including training and equipment monitoring,
- train all staff to at least the CPR/AED Awareness standard so that CPR is started without delay whilst waiting for further help,
- ensure systems are in place to ensure that: 999 calls are placed rapidly; quality CPR is started early, and an AED is located and used promptly and appropriately,
- consider training key staff to an enhanced CPR standard (see Appendix).

To achieve this, organisations should:

- have permissive guidance to enable all staff to act promptly to help save a life,
- make training available to all staff,
- appoint an accountable person to manage first aid and resuscitation provision,
- conduct a risk assessment with regard to providing an AED,
- ensure that the location of first aid equipment (including AED) is clearly and appropriately signposted,
- make all staff aware of where the nearest AED is located,
- ensure the AED (where provided) is readily accessible and that its presence is indicated throughout the premises with appropriate AED signage,
- where an AED is provided by the organisation, ensure that it is subject to appropriate checks and registered with the ambulance service and/or national defibrillator network.

Organisations with a responsibility to provide resuscitation in the community should:

 nominate a member of staff to oversee first aid and resuscitation activities, including training,

- ensure that all staff with a duty to respond have a current first aid qualification that includes CPR and AED operation,
- encourage all other staff to be trained to at least the CPR/AED Awareness Standard,
- ensure that all staff have appropriate equipment to carry out their role,
- train key staff to an enhanced CPR standard (See Appendix),
- consider training some staff to become CPR trainers.

To achieve this, organisations should:

- appoint an accountable person to manage first aid and resuscitation provision, including training,
- have a system in place to facilitate the early call for an ambulance and for rescuers to be able to talk directly with call handler if necessary,
- ensure local procedures allow emergency services easy access to premises,
- have permissive guidance to enable all staff to act promptly to help save a life,
- make CPR/AED training available to all staff,
- provide access to appropriate training for all those with a duty to respond,
- conduct a first aid needs assessment,
- conduct a risk assessment with regard to purchasing an AED,
- provide an AED or access to an AED in the workplace. Staff should know the location of the AED, and ensure it is signposted and registered with the local ambulance service and/or the National Defibrillator Network.

5. Training standards

Training standards are defined for four distinct groups:

- 1. The general public CPR/AED Awareness.
- 2. Children in secondary education (taught via curriculum) Basic CPR/AED Training.
- 3. Those without a formal duty of care Basic CPR/AED Training.
- 4. Those with a duty of care Enhanced CPR/AED Training.

Training specifications for these groups are provided in the appendix. It is up to individual organisations to decide and define their respective training liability, which may involve formal risk assessment.

The principles underlying these training standards are that:

- Individuals should receive training based on their role and responsibilities.
- CPR training may comprise a variety of methods (e.g. formal courses, simulation training, video-based training/self-instruction, videos). For example, <u>Lifesaver</u> and <u>Lifesaver VR</u> developed by Resuscitation Council UK, teach CPR and AED awareness through interactive gaming on a smartphone, tablet or computer.
- All training should include: recognition of cardiac arrest, the need for an early 999 call, performance of chest compressions and retrieving and using an AED.
- Enhanced training should include the above, plus: methods of artificial ventilation, compression/ventilation ratios, simulated use of an AED in a realworld (e.g. workplace) environment. Where possible, CPR performance should be objectively assessed using a simulated incident and a resuscitation training manikin that gives feedback on compression rate, depth, position and recoil. Where possible, records of an individual's CPR training performance should be retained by the organisation.
- At least annual refresher training should be provided and, for basic and enhanced level, this must include practical performance of CPR.

6. Equipment standards

Organisations should have equipment available based on the level of resuscitation training and response they provide:

- There should be a process in place to ensure all equipment and supplies are in working order.
- All organisations should conduct a risk assessment regarding the provision of an AED.

To achieve this, organisations should have systems in place to:

- ensure that emergency equipment is located and signposted appropriately and checked according to manufacturers' guidelines
- ensure that training covers the use, location and checking of equipment
- monitor the checking of equipment, including record of expiry dates and functionality of equipment, using signed and dated checklists
- where owned or leased by the organisation, ensure the AED is registered with the local ambulance service and/or national defibrillator network.

7. Supporting documents

- 1. Resuscitation Council UK: Guidelines 2015
- 2. Resuscitation Council UK: <u>A guide to AEDs</u>
- 3. Resuscitation Council UK: Guide to AED signage
- 4. HSE First aid at work legislation
- 5. Links to National Strategy Documents:
 - England: Resuscitation to Recovery
 - Northern Ireland: <u>www.health-ni.gov.uk/articles/community-</u> resuscitation
 - Scotland: <u>www.gov.scot/Publications/2016/11/7733/2</u>
 - Wales: https://gov.wales/health-social-care
- 6. UK Out-of-Hospital cardiac arrest outcomes project: <u>https://warwick.ac.uk/fac/med/research/ctu/trials/ohcao/</u>
- 7. Resuscitation Council UK: CPR, AEDs and the law

8. APPENDIX: Teaching Specification -Community-based Adult CPR/AED Awareness

CPR awareness training can be delivered using self-directed learning using a variety of learning resources. For example, <u>Lifesaver</u> and <u>Lifesaver VR</u> are available as a free resource for the general public and also available as a <u>licensed</u> <u>e-learning product</u>.

Standard	Content to be taught
Recognise emergency situation	Recognition of life-threatening emergencies and sudden collapse is sometimes preceded by the victim feeling 'unwell'. It is important to learn the difference between a 'heart attack' and 'cardiac arrest'. You may shout for help at any time in order to alert people nearby.
Danger	Make sure you, the victim and others are safe before proceeding. If in doubt, dial 999. Don't delay assessment of victim if environment appears safe.
Response	Check the victim for a response. Gently shake their shoulders and ask loudly "are you alright?".
Airway	Open the airway. Turn victim onto their back and open airway using head tilt and chin lift.
Breathing	Look, listen and feel for normal breathing for no more than 10 seconds. Be aware that slow, noisy, gasping breaths are sometimes present during cardiac arrest and that these shouldn't be confused with 'normal' breathing. (In an unresponsive victim who is breathing normally, dial 999).

Standard	Content to be taught
Dial 999 [*] and send for an AED	If the victim is unresponsive and not breathing normally, shout for nearby help and ask someone to dial 999 or do it yourself, switching your mobile phone to speakerphone, and stay with the victim in order to start CPR promptly. Be aware that the 999 call handler will ask questions and attempt to help by giving instructions. If possible, send someone to find an AED and bring it to the victim without delay. Some rural areas may have procedures for alerting local volunteers and this should be discussed in the context of summoning additional help whilst ensuring that the 999 call is made without delay.
Start chest compressions	 Kneel next to victim, place heel of one hand in centre of victim's chest, place heel of other hand on top and interlock fingers. Keep elbows straight and shoulders vertically above your hands. Compress the chest at a rate of 100-120 per minute to a depth of 5-6 cm ensuring all pressure is released from the chest between each compression without losing contact between the heel of the hand and the sternum. DO NOT interrupt CPR (chest compressions) unless: a healthcare professional tells you to stop, the casualty is definitely waking, or you become exhausted.

Standard	Content to be taught
Locate and use AED	Needs additional people to find and bring an AED whilst others ensure uninterrupted CPR is performed. Turn on the AED and follow prompts. Need to achieve removal of clothes and application of pads whilst minimising interruption to chest compressions.

^{*}There is no need to teach alternate phone numbers as 999, 112, 911 all connect to the 999 service in UK.

9. APPENDIX: Teaching Specification -Community-based Adult CPR/AED Basic

Standard	Content to be taught
Recognise emergency situation	Recognition of life-threatening emergencies and sudden collapse is sometimes preceded by the victim feeling 'unwell'. It is important to learn the difference between a 'heart attack' and 'cardiac arrest'. You may shout for help at any time in order to alert people nearby.
Danger	Is it safe to approach? Remove or manage any immediate danger. Do not ask for a definitive list of 'dangerous circumstances', stick to the simple to understand principles. If it is safe to approach, proceed quickly, if there is manageable danger, manage the danger, and if it is too dangerous or complex to proceed, dial 999 in the first instance.
Response	Is victim responsive or unresponsive? Gently try to rouse the victim using 'shake and shout'. Try to stimulate a response by gently shaking the victim by the shoulders and asking loudly "are you alright?". An unresponsive victim is 'unconscious' and needs immediate further assessment and professional help. If the victim responds, leave them in the position you found them and try to ascertain whether they want/need help and summon accordingly. Reassess frequently.

Standard	Content to be taught
Alert others	Alert others to your situation to expedite a response (this does not have to be done at a specific point). Shout for help and alert others to the emergency. If on your own, do not phone 999 until you know whether the victim is breathing or not. If there are multiple bystanders, they can call 999 (see below) and get a defibrillator to your aid - the sooner the better. Be aware that some rural areas may have procedures for alerting local volunteers and this should be discussed in the context of summoning additional help whilst ensuring that the 999 call is made without delay.
Airway	Use head tilt and chin lift to manually open airway. Place a hand on the victim's forehead and then lift the bony part of the point of the chin. When you know or suspect there is neck trauma, you may assess for breathing first, but if breathing is absent, an airway opening manoeuvre is required.

Standard	Content to be taught
Breathing	 Look, listen and feel for normal breathing for no more than 10 seconds. Maintain head tilt and chin lift and: Look at the victim's chest to ascertain whether they are breathing normally. Look for regular rise and fall of the chest associated with normal breathing. Listen for noises of breathing near to the victim's mouth and nose. Feel for expired air with your cheek next to the victim's mouth. The 'feel' does not refer to placing a hand on the chest as this necessitates the removal of a hand that is keeping the airway open. Assessment of breathing should take long enough to make an accurate assessment but should not delay commencement of CPR. Assessment should take no more than 10 seconds. Discuss gasping or agonal breathing and apparent seizures and that these should not be confused with 'normal breathing'. Where possible, show a video of agonal gasps to aid recognition (widely available on the internet). If you are certain that the victim is breathing normally but still unresponsive: Place them in the recovery position, summon additional help, dial 999 if concerned. If victim is unresponsive and NOT breathing normally: Dial 999*,start CPR as below.

Standard	Content to be taught
Circulation/CPR	 Start chest compressions. Ensure correct hand position (middle of lower half of sternum). Do not teach 'measuring techniques,' just identify the centre of the chest. Compression depth 5-6 cm. Emphasise that quality of chest compressions, including depth, is directly related to survival. Compression rate 100-120 per minute. Ensure full recoil of chest between compressions. Spend as much time on compression as recoil, keep it smooth. Rescuer's arms should be straight at the elbow with shoulders vertically above the heels of the hands. The rescuer's weight should be through the heel of the hand directly onto the bony sternum. The best position for performing chest compressions is kneeling beside the victim. It does not matter which side you do it from. As a minimum, perform continuous chest compressions until additional help is available. If giving ventilations, CPR ratio is 30 compressions to 2 ventilation attempts. DO NOT interrupt CPR [chest compressions] unless: a healthcare professional tells you to stop the casualty is definitely waking, or you become exhausted.

Standard	Content to be taught
	(NOTE: this is not a mandatory component of Basic CPR/AED training, but may be taught to basic CPR providers who are willing to perform mouth-to-mouth and who have been previously trained. In areas where there are known delays in ambulance response times, we recommend the inclusion of rescue breaths).
Rescue Breaths (Optional)	Give 2 rescue breaths Provided that it is safe to do so, and the rescuer is trained, willing and able to perform mouth-to-mouth ventilations, having established good quality chest compressions in the first instance, 2 breaths should be given, immediately followed by 30 compressions continuing in this ratio of 30 compressions to 2 breaths. Delays to chest compressions should always be minimised and no more than 10 seconds should be taken to give 2 ventilations. Discuss use of barrier devices and pocket masks. Assembling these devices takes too long for a single rescuer to achieve, so if unwilling/unable to give direct mouth-to-mouth, consider delaying use of barrier devices and perform continuous uninterrupted chest compressions until more rescuers arrive.
	Minimise interruptions to CPR Further emphasise need to minimise interruptions to chest compressions until help arrives or AED tells you to pause. Do not stop chest compressions whilst waiting for equipment (AED) to be brought and applied.

appropriate to body size (third of the depth of the chest), importance of ventilating, if possible, and that applying the adult guidelines to a child is acceptable.

Standard	Content to be taught
Turn on AED and follow prompts	Discuss what an AED does and where they can be found. Demonstrate: how the AED works, where and how to apply the pads, what the voice prompts mean, the need to stand clear when advised and how to deliver the shock if advised. Emphasise need to continue CPR uninterrupted whilst preparing and applying AED. The most expedient way to do this is to ask a helper (trained or untrained) to give continuous chest compressions whilst the person who is most familiar with the AED applies the AED pads. Discuss actions if 'no shock advised'. If victim not breathing, carry on CPR. AED works on 2-minute cycles of CPR and re-assessment. No specific training is required to use an AED and it can do no harm as it will not shock a person who doesn't need it.

10. APPENDIX: Teaching Specification – Community-based Adult CPR/AED Enhanced

Standard	Content to be taught
Danger	Is it safe to approach? Remove or manage any immediate danger. Do not ask for a definitive list of 'dangerous circumstances', stick to the simple to understand principles. If it is safe to approach, proceed quickly, if there is manageable danger, manage the danger, and if it is too dangerous or complex to proceed, dial 999 in the first instance.
Response	Is victim responsive or unresponsive? Gently try to rouse the victim using 'shake and shout'. Try to stimulate a response by gently shaking the victim by the shoulders and asking loudly "are you alright?". You do not need to teach to shout into each of the victim's ears in turn 'in case they are deaf in one ear'. Someone who is unresponsive is considered 'unconscious' and needs immediate further assessment and professional help. If the victim responds, leave them in the position you found them and try to ascertain whether they want/need help and summon accordingly. Re-assess the victim frequently.
Alert others	Alert others to your situation to expedite a response (this does not have to be done at a specific point). Shout for help and alert others to the emergency. If on your own, do not phone 999 until you know whether the victim is breathing or not. If there are multiple bystanders, they can call 999 (see below) and get a defibrillator to your aid - the sooner the better. Be aware that some rural areas may have procedures for alerting local volunteers and this should be discussed in the context of summoning additional help whilst ensuring that the 999 call is made without delay.
Airway	Use head tilt and chin lift to manually open airway. Place a hand on the victim's forehead and then lift the bony part of the point of the chin. When you know there is neck trauma, you may assess for breathing first, but if breathing is absent, an airway opening manoeuvre is required and takes priority over cervical spine control.

Standard	Content to be taught
Breathing	 Look, listen and feel for normal breathing for no more than 10 seconds. Maintain head tilt and chin lift and: Look at the victim's chest to ascertain whether they are breathing normally. Look for regular rise and fall of the chest associated with 'normal breathing'. Listen for noises of breathing near to the victim's airway. Feel for expired air with your cheek next to the victim's mouth. The 'feel' does not refer to placing a hand on the chest as this necessitates removal of a hand that is keeping the airway open. Discuss gasping or agonal breathing and apparent seizures and that these should not be confused with 'normal breathing'. Wherever possible, learners should be shown a video of agonal gasps to aid recognition (widely available on the internet). Assessment of breathing should take long enough to make an accurate assessment but should not delay commencement of CPR. Assessment should take no more than 10 seconds.
	If breathing normally: Place them in the recovery position. Summon additional help. Dial 999 if necessary. If NOT breathing normally: Dial 999, start CPR.

Standard	Content to be taught
Dial 999	 Dial 999, send someone to find and bring an AED. Cover activation of local emergency team, first responders, the National Defibrillator Network (NDN), GoodSAM, AEDs or national emergency services. Information required: Location and victim not breathing, starting CPR. Where possible this should be done without delay in starting chest compressions. If alone, where possible, use mobile phone on speakerphone. When there are others present, ensure they dial 999 and confirm to you that they have done so whilst you perform chest compressions. Getting an AED is the next practical priority once CPR has been started.

Standard	Content to be taught
	 Start chest compressions. Ensure correct hand position (middle of lower half of sternum). Do not teach 'measuring techniques,' just identify the centre of the chest. Do this with good practical demonstration. Compression depth 5-6cm. This is difficult to teach and assess without a manikin that gives feedback. Emphasise that quality of chest compressions is directly related to survival. Compression rate 100-120 per minute. Ensure full recoil of chest between compressions. Spend as much time on compression as recoil, keep it smooth. Rescuer's arms should be straight at the elbow with shoulders vertically above the heels of the hands. The rescuer's weight should be through the heel of the hand directly onto the bony sternum. The best position for performing chest compressions is kneeling beside the victim. It does not matter which side you do it from.
	DO NOT interrupt CPR (chest compressions) unless:
Circulation/ CPR	 a healthcare professional tells you to stop, the casualty is definitely waking, or you become exhausted
	Discuss rescuer fatigue and importance of maintaining quality of chest compressions and chest compression fraction. This is the percentage of time in which chest compressions are done by rescuers during a cardiac arrest. In a real-world cardiac arrest, CPR is often interrupted or delayed by things such as rescue breaths, pulse checks and heart rhythm analysis. Unnecessary interruptions to CPR (e.g. randomly checking for breathing when there are no obvious signs of life) reduces survival rates.
	If there is more than one rescuer, change the chest compression provider every two minutes ensuring that delays in chest compressions are minimal.
	If combining with ventilation, perform 30 compressions to every 2 ventilations. If unable, unwilling or unsure how to give artificial ventilations, just perform continuous chest compressions until additional help is available and ventilation established.

Standard	Content to be taught
Rescue breaths/ ventilations	Give 2 rescue breaths/ventilations. Having performed at least 30 chest compressions and provided that it is safe to do so, and the rescuer is trained, willing and able to perform mouth-to-mouth, 2 breaths should be given, immediately followed by 30 compressions. Continue delivering this ratio of 30 compressions to 2 ventilations. Delays to chest compressions should always be minimised and no more than 10 seconds should be taken to give 2 ventilations. Demonstrate and recommend correct use of barrier devices and pocket masks. Where appropriate and with more highly trained and skilled learners this may include correct use of bag-mask ventilation (2-person technique) with supplemental oxygen. Assembling these devices takes too long for a single rescuer to achieve, so if unwilling to give direct mouth-to-mouth, consider delaying use of additional ventilation devices until more rescuers arrive. Continue CPR until help and/or AED arrives.

For paediatric resuscitation, modifiers to adult guidelines may be taught. These modifiers include: depth of chest compression appropriate to body size (third of the depth of the chest), importance of ventilating, if possible, and that applying the adult guidelines to a child is acceptable.

Standard	Content to be taught
Turn on AED and follow prompts	Further emphasise need to minimise interruptions to chest compressions until help arrives or AED tells you to pause. Do not stop chest compressions whilst waiting for equipment (AED) to be brought and applied. If alone and unless an AED is within easy reach, do not leave the victim in order to retrieve an AED as stopping chest compressions will reduce the chance of survival. Asking other people to find and bring the nearest AED is the best course of action and this process can be informed by the 999 call handler who will have access to the National Defibrillator Network database. Cover types of AED and ways of accessing them. Public-access defibrillators, locally available resources (e.g. appointed first aiders, common AED locations - supermarkets, gyms, transport hubs etc.), role of ambulance control/despatcher and 'AED Location Apps' as well as initiatives such as 'GoodSAM'. Locate 'ON' button and push firmly. Follow voice prompts. Listen carefully and minimise interruptions to CPR whilst attaching AED pads. The most expedient way to do this is to ask a helper (trained or untrained) to give continuous chest compressions while the person who is most familiar with the AED applies the AED pads. Chest needs to be bare, dry and relatively hair free. Shave the chest only if the hair is excessive, and even then, spend as little time as possible on this. Do not delay defibrillation if a razor is not immediately available. Pads should be applied one at a time immediately after removing backing from self-adhesive covering. Position pads below right clavicle and in the left axilla. Stop CPR when AED tells you to, to allow it to analyse heart rhythm. If shock advised, deliver shock without delay ensuring other rescuers are not touching the victim, then restart CPR. If no shock advised, resume CPR immediately unless the victim is definitely waking up, moving, opening eyes AND breathing normally. Continue to follow prompts, advise that the AED works on 2- minute cycles of CPR and analysis. Discuss paediatric mode and modif

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