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European Resuscitation Council Guidelines for Resuscitation 2010 Section 9. Principles of education in resuscitation

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Introduction

Survival from cardiac arrest is determined by the quality of the scientific evidence behind the guidelines, the effectiveness of education and the resources for implementation of the guidelines.[1] An additional factor is how readily guidelines can be applied in clinical practice and the effect of human factors on putting the theory into practice.[2] Implementation of Guidelines 2010 is likely to be more successful with a carefully planned, comprehensive implementation strategy that includes education. Delays in providing training materials and freeing staff for training were cited as reasons for delays in the implementation of the 2005 guidelines.[3,4]

This chapter includes the key educational issues identified by the International Liaison Committee on Resuscitation (ILCOR) evidence evaluation,[5] discusses the scientific basis of basic and advanced level resuscitation training and provides an update on the European Resuscitation Council (ERC) life support courses.[6]

Key educational recommendations

The key issues identified by the Education, Implementation and Teams (EIT) task force of ILCOR during the Guidelines 2010 evidence evaluation process[5] that are relevant to this chapter are:

- Educational interventions should be evaluated to ensure that they reliably achieve the learning objectives. The aim is to ensure that learners acquire and retain the skills and knowledge that will enable them to act correctly in actual cardiac arrests and improve patient outcomes.
- 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 basic life support (cardiopulmonary resuscitation [CPR] and automated external defibrillator [AED]) courses.
- Ideally all citizens should be trained in standard CPR that includes compressions and ventilations. There are circumstances however where training in compression-only CPR is appropriate (e.g., opportunistic training with very limited time). Those trained in compression-only CPR should be encouraged to learn standard CPR.
- Basic and advanced life support knowledge and skills deteriorate in as little as three to six months. The use of frequent assessments will identify those individuals who require refresher training to help maintain their knowledge and skills.
- CPR prompt or feedback devices improve CPR skill acquisition and retention and should be considered during CPR training for laypeople and healthcare professionals.
- An increased emphasis on non-technical skills (NTS) such as leadership, teamwork, task management and structured communication will help improve the performance of CPR and patient care.
- Team briefings to plan for resuscitation attempts, and debriefings based on performance during simulated or actual resuscitation

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attempts should be used to help improve resuscitation team and individual performance.
- Research about the impact of resuscitation training on actual patient outcomes is limited. Although manikin studies are useful, researchers should be encouraged to study and report the impact of educational interventions on actual patient outcomes.

Who and how to train

Ideally all citizens should have some knowledge of CPR. There is insufficient evidence for or against the use of training interventions that focus on high risk populations. However, training can reduce family member and, or patient anxiety, improve emotional adjustment and empowers individuals to feel that they would be able to start CPR.[5]

People that require resuscitation training range from laypeople, those without formal healthcare training but with a role that places a duty of care upon them (e.g., lifeguards, first aiders), and healthcare professionals working in a variety of settings including the community, emergency medical systems (EMS), general hospital wards and critical care areas.

Training should be tailored to the needs of different types of learners and learning styles to ensure acquisition and retention of resuscitation knowledge and skills. Those who are expected to perform CPR regularly need to have knowledge of current guidelines and be able to use them effectively as part of a multi-professional team. These individuals require more complex training including both technical and non-technical skills (e.g., teamwork, leadership, structured communication skills).[7,8] In the next section we have arbitrarily divided these into basic level and advanced level training interventions whereas in truth this is a continuum. Most research in this area is based on training rescuers in adult resuscitation skills. Much of this research also applies to training in resuscitation of children and of the newborn.

Basic level and AED training

Bystander CPR and early defibrillation saves lives. Many factors decrease the willingness of bystanders to start CPR, including panic, fear of disease, harming the victim or performing CPR incorrectly.[9–24] Providing CPR training to laypeople increases willingness to perform CPR.[12,18–20,25–30]

CPR training and doing CPR during an actual cardiac arrest is safe in most circumstances. Individuals undertaking CPR training should be advised of the nature and extent of the physical activity required during the training program. Learners who develop significant symptoms (e.g., chest pain, severe shortness of breath) during CPR training should be advised to stop. Rescuers who develop significant symptoms during actual CPR should consider stopping CPR (see basic life support guidelines for further information about risks to the rescuer).[31]

Basic life support and AED curriculum

The curriculum for basic life support and AED training should be tailored to the target audience and kept as simple as possible. The following should be considered as core elements of the basic life support and AED curriculum[5,32]:

- Personal and environmental risks before starting CPR.
- Recognition of cardiac arrest by assessment of responsiveness, opening of the airway and assessment of breathing.[31,32]
- Recognition of gasping or abnormal breathing as a sign of cardiac arrest in unconscious unresponsive individuals.[33,34]
- Good quality chest compressions (including adherence to rate, depth, full recoil and minimizing hands-off time) and rescue breathing.
- Feedback/prompts (including from devices) during CPR training should be considered to improve skill acquisition and retention during basic life support training.[35]
- All basic life support and AED training should aim to teach standard CPR including rescue breathing/ventilations. Chest compression-only CPR training has potential advantages over chest compression and ventilation in certain specific situations.[10,15,18,23,24,27,36,37] An approach to teaching CPR is suggested below.

Standard CPR versus chest compression-only CPR teaching

There is controversy about which CPR skills different types of rescuers should be taught. Compression-only CPR is easier and quicker to teach especially when trying to teach a large number of individuals who would not otherwise access CPR training. In many situations however, standard CPR (which includes ventilation/rescuer breathing) is better, for example in children,[38] asphyxial arrests, and when bystander CPR is required for more than a few minutes.[32] A simplified, education-based approach is therefore suggested:

- Ideally, full CPR skills (compressions and ventilation using a 30:2 ratio) should be taught to all citizens.
- When training is time-limited or opportunistic (e.g., EMS telephone instructions to a bystander, mass events, publicity campaigns, YouTube 'viral' videos, or the individual does not wish to train), training should focus on chest compression-only CPR.
- For those trained in compression-only CPR, subsequent training should include training in ventilation as well as chest compressions. Ideally these individuals should be trained in compression-only CPR and then offered training in chest compressions with ventilation at the same training session.
- Those laypersons with a duty of care, such as first aid workers, lifeguards, and child minders, should be taught how to do chest compressions and ventilations.
- For children, rescuers should be encouraged to use whichever adult sequence they have been taught, as outcome is worse if they do nothing. Non-specialists who wish to learn paediatric resuscitation because they have responsibility for children (e.g., parents, teachers, school nurses, lifeguards etc), should be taught that it is preferable to modify adult basic life support and give five initial breaths followed by approximately 1 min of CPR before they go for help, if there is no-one to go for them. Chest compression depth for children is at least one-third of the A-P diameter of the chest.[39]
- Citizen-CPR training should be promoted for all. However being untrained should not be a barrier to performing chest compression-only CPR, preferably with dispatcher telephone advice.

Basic life support and AED training methods

There are numerous methods to deliver basic life support and AED training. Traditional, instructor-led training courses remain the most frequently used method for basic life support and AED training.[40] When compared with traditional instructor-led training, well designed self-instruction programmes (e.g., video, DVD, computer driven) with minimal or no instructor coaching can be effective alternatives to instructor-led courses for laypeople and healthcare providers learning basic life support and AED skills.[41–55] It is essential that courses include hands-on practice as part of the programme.

The use of AEDs by individuals without prior formal training can be beneficial and may be life saving.[45,56–60] Performance in the use of an AED (e.g., speed of use, correct pad placement) can be further improved with brief training of laypeople and healthcare professionals.[45,50,61,62]

Duration and frequency of instructor-led basic life support and AED training courses

The optimal duration of instructor-led basic life support and AED training courses has not been determined and is likely to vary according to the characteristics of the participants (e.g., lay or healthcare; previous training; age), the curriculum, the ratio of instructors to participants, the amount of hands-on training and the use of end of course assessments.

Most studies show that CPR skills such as calling for help, chest compressions and ventilations decay within three to six months after initial training.[43,46,63–68] AED skills are retained for longer than basic life support skills alone.[59,64,69]

CPR performance can be retained or improved with re-evaluation and, if required, a brief refresher, or retraining after as little as three to six months.[64,70–73]

Use of CPR prompt/feedback devices

The use of CPR prompt/feedback devices may be considered during CPR training for laypeople and healthcare professionals.[35] Devices can be prompting (i.e., signal to perform an action e.g., metronome for compression rate or voice feedback), give feedback (i.e., after event information based on effect of an action such as visual display of compression depth), or a combination of prompts and feedback. Training using a prompt/feedback device can improve CPR skill performance, acquisition and retention. In these studies acquisition and retention was measured by testing on a manikin without using the device.[63,74–78] Instructors and rescuers should be made aware that a compressible support surface (e.g., mattress) can cause a prompt/feedback device to overestimate depth of compression.[79,80]

Advanced level training

Advanced level training curriculum

Advanced level training is usually for healthcare providers. Curricula should be tailored to match individual learning needs, patient case mix and the individual's role within the healthcare systems response to cardiac arrest. There is limited evidence about specific interventions that enhance learning and retention from advanced level life support courses. The ERC Advanced Life Support (ALS) course following Guidelines 2005 has been shown to reduce "no-flow" fraction but not other elements of quality of CPR performance in cardiac arrest simulations.[81] Increased clinical experience of learners seems to improve long-term retention of knowledge and skills.[82,83]

Studies of advanced life support in actual or simulated in-hospital arrests,[84–94] show improved resuscitation team performance when specific team and, or leadership training is added to advanced level courses. Team training and rhythm recognition skills will be essential to minimize hands-off time when using the 2010 manual defibrillation strategy that includes charging during chest compressions.[95,96]

Core elements for advanced life support curricula should include:

- Cardiac arrest prevention.[97,98]
- Good quality chest compressions including adherence to rate, depth, full recoil and minimizing hands-off time, and ventilation using basic skills (e.g., pocket mask, bag mask).
- Defibrillation including charging during compressions for manual defibrillation.
- Advanced life support algorithms.
- Non-technical skills (e.g., leadership and team training, communication).

Extended training may cover advanced airway management, management of peri-arrest arrhythmias; resuscitation in special circumstances, vascular access, cardiac arrest drugs, post-resuscitation care and ethics.

Advanced level training methods

Pre-course training

A variety of methods (such as reading manuals, pretests and e-learning can be used to prepare candidates before attending a life support course.[99–107] A recent large randomized controlled study of use of a commercially available e-learning simulation programme before attending an advanced life support course compared with standard preparation with a course manual showed no improvement in cognitive or psychomotor skills during cardiac arrest simulation testing.[107,108]

There are numerous studies of alternative teaching methods that claim equivalence or benefit for computer or video-based training and decrease the time instructors spend with learners.[100,101,106,109–123] Any method of pre-course preparation that is aimed at improving knowledge and skills or reducing instructor to learner face-to-face time should be formally assessed to ensure equivalent or improved learning outcomes compared with standard instructor-led courses. A large multicentre randomised controlled trial to test if a 1-day face-to-face ALS course supplemented by e-learning material is equivalent to the 2-day face-to-face standard ALS course with respect to the course learning outcomes is ongoing [ISRCTN86380392].

Simulation and realistic training techniques

Simulation training is an essential part of resuscitation training. There is large variation in how simulation can be and is used for resuscitation training.[124] The lack of consistent definitions (e.g., high vs. low fidelity simulation) makes comparisons of studies of different types of simulation training difficult.

Simulation training has fairly consistently,[33,125–136] although not universally[137–143] been shown to improve knowledge and skill performance on manikins. Evidence of change in real life performance is more limited. A small number of before and after studies examining the effects of resuscitation training (including simulation) on real life performance have documented improvement in actual patient outcomes.[144–148] These studies are limited by their inability to separate the effect of simulation training from other educational and temporal factors. One randomised controlled trial and a prospective case control study which allocated participants to simulator or standard resuscitation training showed improved real life performance of those skills.[127,149]

There are conflicting data on the effect of increasing realism (e.g., use of actual resuscitation settings, high fidelity manikins) on learning, and few data on patient outcomes.[125,128,133,135,137,138,140,141,150–154] One study reported a significant increase in knowledge when using manikins or live patient models for trauma teaching compared with no manikins or live models.[153] In this study there was no difference in knowl-

edge acquisition between using manikins or live patient models, although learners preferred using the manikins.

There is insufficient evidence for or against the use of more realistic techniques (e.g., high-fidelity manikins, in situ training) to improve outcomes (e.g., skills performance on manikins, skills performance in real arrests, willingness to perform) when compared with standard training (e.g., low fidelity manikins, education centre) in basic and advanced life support. The incremental cost effectiveness of higher fidelity simulators should be determined.[141]

Future studies should focus on measuring the effect of training interventions (including simulation) on patient and real life process focused outcomes. Chart note review,[155] quality assurance studies[149] and quality of CPR monitoring technology[89,156] have confirmed the feasibility of this approach.

Advanced life support training intervals

Knowledge and skill retention declines rapidly after initial resuscitation training. Refresher training is invariably required to maintain knowledge and skills; however, the optimal frequency for refresher training is unclear. Most studies show that ALS skills and knowledge decayed when tested at three to six months after training,[65,157–164] two studies suggested seven to twelve months,[165,166] and one study eighteen months.[167]

Assessment on advanced level courses

The best method of assessment during courses is unknown. Written tests in ALS courses do not reliably predictor practical skill performance and should not be used as a substitute for demonstration of clinical skill performance.[168–171] Assessment at the end of training does seem to have a beneficial effect on performance and retention and should be considered.[172,173]

Alternative strategies that may improve advanced life support performance

Use of checklists and cognitive aids

Cognitive aids such as checklists may be used to improve adherence to guidelines as long as they do not cause delays in starting CPR and the correct checklist is used.[174–186] Checklists should be tested in simulated resuscitations before implementation.[84–94]

Mock codes

Mock cardiac arrest codes and drills provide the opportunity to test the individual and system responses to cardiac arrest. Mock codes can improve advanced life support provider knowledge,[187] skill performance,[188] confidence,[189] familiarity with the environment[190] and identify common system and user errors.[191,192]

Team briefings and debriefings

Briefings and debriefings should be used during both learning and actual clinical activities.

Successful teams such as sports teams meet before and after events. Surveys in the UK[193,194] and Canada[90] show that resuscitation teams rarely have formal briefings and debriefings. Debriefings and feedback are two separate but related entities in that various forms of feedback are components of debriefing. Debriefing tends to be face-to-face and involves both parties engaging in discussion. Feedback tends to provide information about prior events and can use several methods (video recordings, defibrillator downloads or trained observer feedback). Debriefing appears to be an effective method for improving resuscitation performance and, potentially, patient outcomes as long as objective data forms the basis for the discussion.[87,89,127,129,149,187,195–205] The ideal format for debriefing remains to be determined.

European Resuscitation Council resuscitation courses

The ERC has a portfolio of training courses that aim to equip learners with the ability to undertake resuscitation in a real clinical situation at the level that they would be expected to perform – be they laypeople, first responders in the community or the hospital, or a healthcare professional working for an EMS, on a general ward, in an acute area, or as a member of a resuscitation team.

ERC courses focus on teaching in small groups using interactive discussion and hands-on practice for skills and clinical simulations using resuscitation manikins.[6,206] Courses have a high ratio of instructors to candidates (e.g. 1:3–1:6 depending on the type of course). Full up to date information about ERC courses and terminology is available on the ERC website www.erc.edu.

Ethos

ERC courses are taught by instructors who have been trained in teaching and assessment. The ethos of ERC courses is to create a positive environment that promotes learning. First names are encouraged among both faculty and candidates to reduce apprehension. Interactions between faculty and candidates are designed to be positive and teaching is conducted by encouragement with constructive feedback and debriefing on performance. A mentor/mentee system is used to enhance feedback and support for the candidate. Some stress is inevitable,[207] particularly during assessment, but the aim of the instructors is to enable the candidates to do their best.

Course management

Courses are overseen by specialist committees within each National Resuscitation Council and by the ERC international course committee. The ERC has developed a web-based course management system (http://courses.erc.edu). The system can be used to register all ERC courses and enables course organizers to register a course from any country, assign instructors, record candidate attendance and outcomes, and file the course director's report directly with the ERC. Candidates may sign up online to a course, or may contact the organizer to register their interest in the course. At the end of the course the system will generate course certificates for the candidates and faculty. These certificates are assigned a unique number and can be accessed at any time by course organizers and directors. Participants that successfully complete courses are referred to as providers. For example someone that successfully completes an ALS course is known as an ALS provider. National Resuscitation Councils have access to information about courses organised in their country.

Language

Initially, the ERC courses were taught in English by an international faculty.[206] As local instructors have been trained, and manuals and course materials have been translated into different languages, courses are now mainly taught in the native language. Early translation of guidelines and course materials is essential as delays in translation into the local language can cause significant delays to implementation of guidelines.[3]

Instructors

A tried and tested method has evolved for identifying and training instructors.

Identification of instructor potentials (IP)

These will be individuals who, in the opinion of the faculty, have passed and demonstrated a high level of performance during a provider course and, importantly, have shown qualities of leadership, team working and clinical credibility, with skills that include being articulate, supportive, and motivated. These individuals will be invited to take part in an instructor course and are called instructor potentials. Instructor potentials wishing to teach on Advanced Life Support (ALS), European Paediatric Life Support (EPLS), Newborn Life Support (NLS), Immediate Life Support (ILS), and European Paediatric Immediate Life Support (EPILS) courses should attend the Generic Instructor Course (GIC); for those wishing to teach only on the ERC Basic Life Support (BLS)/Automated External Defibrillation (AED) Course there is a specific BLS/AED Instructor Course.

Instructor courses

These are conducted by experienced instructors and, in the case of the Generic Instructor Course (see below), include an educator who has undertaken specific training in medical educational practice and the principles of adult learning. Assessment is formative by the faculty and feedback is given as appropriate.

Instructor candidate (IC) stage

Following successful completion of an instructor course (see below) the individual is designated instructor candidate (IC) status and normally will teach on two separate courses, under supervision, receiving constructive feedback on his or her performance. Following successful completion of these two courses the IC normally progresses to full instructor status. Occasionally the faculty will decide that a further course is required or, rarely, that the candidate is not suitable to progress to be an instructor. An appeal can be lodged with the relevant ERC International Course Committee who will make the final decision.

Course Director (CD) status

Each ERC course is led by an approved Course Director. Individuals are selected for approval as Course Directors through nomination by their peers and approved by their National Resuscitation Council (NRC) or the ERC International Course Committee. Course Directors are relatively senior individuals who are clinically credible, have demonstrated their qualities as a teacher and assessor and posses the leadership skills to lead a faculty of instructors. They will have embraced the educational principles inherent in the instructor course. A key component of ERC courses are the faculty meetings. These usually take place at the start and end of each day of the course. They are led by the course director. The aim of these meetings is to brief the teaching faculty and to facilitate evaluation of each candidate's performance. At the end of each course a final faculty meeting is held. During this meeting the faculty will review the performance of each candidate and decide whether they have successfully completed the course. As described above, candidates that have shown exceptional ability are selected for invitation to train as instructors. Where there are instructor candidates on the courses, their performance is also evaluated and feedback provided by their mentor or the course director. This faculty meeting also gives the instructors an opportunity to debrief at the end of the course.

The Basic Life Support (BLS) and Automated External Defibrillator (AED) Courses

BLS/AED courses are appropriate for a wide range of providers. These may include clinical and non-clinical healthcare professionals (particularly those who are less likely to be faced with having to manage a cardiac arrest), general practitioners, dentists, medical students, first-aid workers, lifeguards, those with a duty of care for others (such as school teachers and care workers), and members of first responder schemes, as well as members of the general public. Separate BLS and AED provider courses are available, but the ERC encourages candidates to combine BLS skills with the use of an AED.

Provider course format

The aim of this provider course is to enable each candidate to gain competency in BLS and the use of an AED. Each BLS/AED provider course lasts approximately half a day and consists of skill demonstrations and hands-on practice, with a minimum number of lectures. The recommended ratio of instructor to candidates is 1:6, with at least one manikin and one AED for each group of 6 candidates. Formal assessment is not usually undertaken, but each candidate receives individual feedback on their performance. Those who need a certificate of competency for professional or personal use may be assessed continuously during the course or definitively at the end.

BLS/AED Instructor Course

Many of the candidates attending a BLS/AED provider course are laypeople, and some want subsequently to become instructors themselves. For this reason, the ERC has developed a one-day BLS/AED instructor course. Candidates for this course must be healthcare professionals, or laypeople who hold the ERC BLS/AED provider certificate and are designated as instructor potentials. The aim is be as inclusive as possible regarding course attendance, the overriding criterion being that all candidates should have the potential and knowledge to teach the subject. The BLS/AED instructor course follows the principles of the Generic Instructor Course (GIC), with an emphasis on teaching people. Following successful completion of the course, each candidate becomes an instructor candidate (IC) and teaches on two BLS/AED courses before becoming a full instructor.

The Immediate Life Support (ILS) Course

The Immediate Life Support (ILS) course is for the majority of healthcare professionals who attend cardiac arrests rarely but have the potential to be first responders or resuscitation team members.[208] The course teaches healthcare professionals the skills that are most likely to result in successful resuscitation whilst awaiting the arrival of the resuscitation team.[209] Importantly, ILS also includes a section on the initial care of the sick adult and preventing cardiac arrest and complements other short courses that focus on the initial treatment of sick patients.[210] A recent cohort study found that the number of cardiac arrest calls decreased while pre-arrest calls increased after implementing a programme that included ILS teaching in two hospitals; the intervention was associated with a decrease in true arrests, and increase in initial survival after cardiac arrest and survival to discharge.[211]

Potential ILS candidates include nurses, nursing students, doctors, medical students, dentists, physiotherapists, radiographers, and cardiac technicians.

Course format

The ILS course is delivered over one day and comprises lectures, hands-on skills teaching and cardiac arrest simulation teaching (CASTeach) using manikins. The programme includes several options that enable instructors to tailor the course to their candidate group. The ILS course is designed to be straightforward to run. Most courses are conducted in hospitals with small groups of candidates (average 12 candidates). Course centres should try as far as possible to train candidates to use the equipment (e.g., defibrillator type) that is available locally.

Course content

The course covers those skills that are most likely to result in successful resuscitation: causes and prevention of cardiac arrest including use of the ABCDE approach, starting CPR, basic airway skills and defibrillation (AED or manual). The course includes an optional session on issues relevant to the candidate group (e.g., anaphylaxis, equipment checks). Once all the skills have been covered there is a cardiac arrest demonstration by the instructors that outlines the first responder role to the candidates. This is followed by the CASTeach station where candidates practice. ILS candidates are not usually expected to undertake the role of team leader. Candidates should be able to start a resuscitation attempt and continue until more experienced help arrives. When appropriate, the instructor takes over as resuscitation team leader. This is not always necessary because in some simulations resuscitation may be successful before more experienced help arrives. Standardised simulations are used that can be adapted to the workplace and clinical role of the candidate.

Assessment

Candidates are assessed continuously and must show their competence throughout the ILS course. There are no formal testing stations at the end of the course. Candidates are sent assessment forms with the pre-course materials. The forms indicate clearly how their performance will be measured against pre-determined criteria. Assessment on the ILS course enables the candidate to see what is expected, and frame their learning around achievement of these outcomes. The following practical skills are assessed on the ILS course: airway management, CPR and defibrillation. With a supportive approach, most candidates achieve the course learning outcomes.

The Advanced Life Support (ALS) Course

The target candidates for this course are doctors and senior nurses working in acute areas of the hospital and those who may be resuscitation team leaders and members.[212,213] The course is also suitable for senior paramedics and some hospital technicians. The ILS course is more suitable for first responder nurses, doctors who rarely encounter cardiac arrest in their practice, and emergency medical technicians.

Each instructor acts as a mentor for a small group of candidates. The course normally lasts for 2 or 2.5 days.

Course format

The course format has very few formal lectures and teaching concentrates on hands-on skills, clinically-based simulations in small groups with emphasis on the team leader approach, and interactive group discussions. A formal mentor/mentee session is included to enable candidates to give and receive feedback.

Course content

The course content is based on the current ERC Guidelines for Resuscitation. Candidates are expected to have studied the ALS course materials carefully before the course.

The course aims to train candidates to highlight the causes of cardiac arrest and identify sick patients in danger of deterioration and to manage cardiac arrest and the immediate peri-arrest problems encountered in and around the first hour or so of the event. It is not a course in advanced intensive care or cardiology. Competence in basic life support is expected before the candidate enrols for the course.

Emphasis is placed on the techniques of safe defibrillation and ECG interpretation, the management of the airway and ventilation, the management of peri-arrest rhythms, simple acid-base balance, and of special circumstances relating to cardiac arrest. Post-resuscitation care, ethical aspects related to resuscitation and care of the bereaved are included in the course.

Assessment and testing

Each candidate is assessed continuously during the course and reviewed at the end of each day at a faculty meeting. Feedback is given as required. Candidates are expected to be able to use the ABCDE approach to assess and treat the sick patient, recognise cardiac arrest, provide good quality CPR and safe defibrillation throughout the course. There is a cardiac arrest simulation testing (CASTest) towards the end of the course. This tests the participant's applied knowledge and skills during a simulated cardiac arrest. The reliability and measurement properties of the CASTest have been reported.[169,214,215] A multiple choice question (MCQ) paper taken at the end of the course tests core knowledge. Candidates are required to achieve 75% to pass this test. The measurement properties of the multiple choice papers have been assessed from over 8000 candidates and found to have high internal consistency and discrimination properties (Data from Resuscitation Council (UK) and Dr Carl Gwinnutt).

The European Paediatric Life Support (EPLS) Course

The EPLS course is designed for healthcare workers who are involved in the resuscitation of a newborn, an infant or a child whether in or out-of-hospital. The course aims at providing caregivers with knowledge and skills for the management of the critically ill child during the first hour of illness and to prevent progression of diseases to cardiac arrest.

EPLS is not a course in neonatal or paediatric intensive care aimed for advanced providers.

Competence in paediatric basic life support is a prerequisite although refresher teaching in basic life support and relief of foreign body airway obstruction is included. The EPLS course is suitable for doctors, nurses, emergency medical technicians, paramedics etc who have a duty to respond to sick newborns, infants and children in their practice.[216,217]

Experience in paediatrics is necessary to keep simulations realistic and answer to candidates' questions so a minimum of 50% of the faculty must have regular experience in neonatal or paediatric practice. The course lasts for 2–2.5 days.

Course format

The course format has few formal lectures. Teaching of knowledge and skills is delivered in small groups using clinically based simulations (e.g., cardiac arrest, cardiac and respiratory failure, delivery room simulations). The emphasis is on assessment

and treatment of the sick child, team working and leadership.

Course content

The course content follows the current ERC guidelines for neonatal and paediatric resuscitation. The course candidates are expected to have studied the manual before attending the course. A pre-course MCQ is sent with the manual to candidates 4–6 weeks before the course to encourage candidates to read the course materials.

The EPLS course is aimed at training candidates to understand the causes and mechanisms of cardiorespiratory arrest in neonates and children, to recognise and treat the critically ill neonate, infant or child and to manage cardiac arrest. Skills taught include airway management, bag-mask ventilation, log roll and cervical collar placement, oxygen delivery, an introduction to intubation and vascular access, safe defibrillation, cardioversion and AED use.

Each candidate is assessed individually and reviewed by the faculty. Feedback is given as required. A BLS assessment follows the BLS refresher course and a simulation-based test at the end of the course emphasises the assessment of the sick child and other core skills. An end of course MCQ with a pass mark of 74% tests core knowledge.

The European Paediatric Immediate Life Support (EPILS) Course

Course format

EPILS is a one-day course comprising one lecture, hands-on skills and simulation teaching. The programme includes options to enable teaching to be tailored for candidate groups.

Course content

The course is aimed at training nurses, EMS personnel, and doctors to recognize and treat critically ill infants and children, prevent cardiorespiratory arrest and to treat children in cardiorespiratory arrest during the first few minutes whilst awaiting the arrival of a resuscitation team. This interactive course is based on short practical simulations adapted to the workplace and to the actual clinical role of candidates.

Basic life support, bag-mask ventilation, chest compressions, choking, and intraosseous access are included; drugs during cardiac arrest and laryngeal mask insertion are optional. The EPILS course is designed to be simple to run. Most courses are conducted in hospitals with small groups of candidates (average 5–6 candidates with one instructor). There needs to be at least one baby and one child manikin for every 6 candidates. Course centres should try as far as possible to train candidates to use the equipment (e.g., defibrillator type) that is available in their clinical setting.

Assessment

Candidates are sent a pre-course MCQ paper with pre-course materials to help them prepare for the course. The MCQ paper helps to ensure that candidates read the course materials before attending the course and does not count towards the final assessment. There are no formal testing stations during the course. Candidate's performances are assessed continuously. Assessment forms are given to the candidates at the beginning of the course and instructors provide feedback throughout the course. The following practical skills are assessed on the EPILS course: basic life support, bag-mask ventilation and AED use. With a supportive approach, most candidates achieve the course learning outcomes.

The Newborn Life Support (NLS) Course

This one-day course is designed for healthcare workers likely to be present at the birth of a baby in the course of their job. It aims to give those who may be called upon to start resuscitation at birth the background knowledge and skills to approach the management of the newborn infant during the first 10–20 min. The course is suitable for midwives, nurses, EMS personnel, and doctors and, like most such courses, works best with candidates from a mixture of specialties.

Course format

The NLS manual is sent to each of the candidates four weeks before the course. Each candidate receives a MCQ together with the manual and is asked to complete this and bring it with them to the course. There is an introduction followed by two short lectures. The candidates are then divided into four groups and undertake three workstations before lunch. The afternoon is then taken up by a demonstration simulation followed by two hours of simulation teaching in small groups and, finally, a theoretical and practical assessment by an MCQ and an individual practical airway test. The course places appropriate emphasis on airway management but also covers chest compression, umbilical venous access and drugs.

Both basic infant and four infant advanced manikins should be available as well as other airway adjuncts. Resuscitaires, ideally complete with sufficient gas cylinders for the whole day, should also be available.

The Generic Instructor Course (GIC)

This course is for candidates who have been recommended as instructor potential (IP) emanating from ERC provider courses (ALS, EPLS, NLS, ILS, EPILS). Candidates with IP status from certain other provider courses can also attend (e.g., European Trauma Course, Pre Hospital Trauma Care, Italy). There should be a maximum of 24 candidates with a ratio of at least one instructor to three candidates. Instructors must be full and experienced ERC instructors who have been through a formal process of training to become a GIC instructor. Groups should not exceed six candidates. The emphasis of the course is on developing teaching and assessment skills, as well as promoting team leadership and providing constructive feedback. Core knowledge of the original provider course is assumed. The course lasts for 2 days or 2.5 days.

Course format

The course format is largely interactive. An ERC medical educator plays a key role leading the educational process, the discussions and feedback. This lecture is interspersed with group activities. The remainder of the course is conducted in small group discussions and skill and simulation based hands on sessions. Mentor/mentee sessions are included and there is a faculty meeting at the beginning of the course and at the end of each day.

Course content

Candidates are given precourse reading material and are expected to have read this before attending. The theoretical background of adult learning and effective teaching and assessment is covered by the educator at the beginning of the course. Each teaching and assessment skill is demonstrated by the faculty. The

candidates then get the opportunity to practice: equipment familiarisation, lecturing, teaching skills by means of the four stage approach, intermediate fidelity simulation sessions using simulations, small group teaching sessions (open and closed discussions), and assessment.

For each teaching tool, a "mini-topic" is extracted from the original provider course material. Throughout the course, emphasis is placed on the role of the instructor and each candidate has the opportunity to adopt the instructor role. The concept of constructive feedback is a key element and is also emphasised. Finally, the roles and qualities of an ERC Instructor are discussed.

Assessment

Each candidate is assessed formatively by the faculty throughout the course. Candidates' performances and attitudes are discussed at the daily faculty meetings and feedback given as required. Successful candidates may proceed to the status of instructor candidate (IC). Candidates who successfully complete the course but who are considered by the faculty to need specific support in their development may be recommended to undertake their IC placements at nominated centres.

The Educator Master Class

Medical Educators are an essential component of the GIC Faculty. This two-day course is designed for those aspiring to become medical educators for the ERC and is run when there is a need for expansion of Educator numbers. Suitable candidates are selected by the ERC Educational Advisory Group (EAG) following a written application and generally must have a background and qualification in medical education or have demonstrated a special commitment to educational practice over a number of years. They should have experience of a provider course and a GIC and should have studied the background reading for the course.

The instructors for the course are experienced educators.

Course format

The course consists mainly of closed discussion groups for the whole course, led by one or two of the instructors, together with breakout small group discussions and problem solving.

Course content

The course covers the theoretical framework for medical educators, assessment and quality control, teaching methodologies, critical appraisal, the role of the mentor, multi-professional education strategies and continued development of the medical educator.

Assessment

Each candidate is assessed formatively by the faculty throughout the course. Successful candidates may proceed to the status of educator candidate where they will be supervised and assessed by an experienced educator and course director until it is decided whether or not they will be suitable educators to work on their own.

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