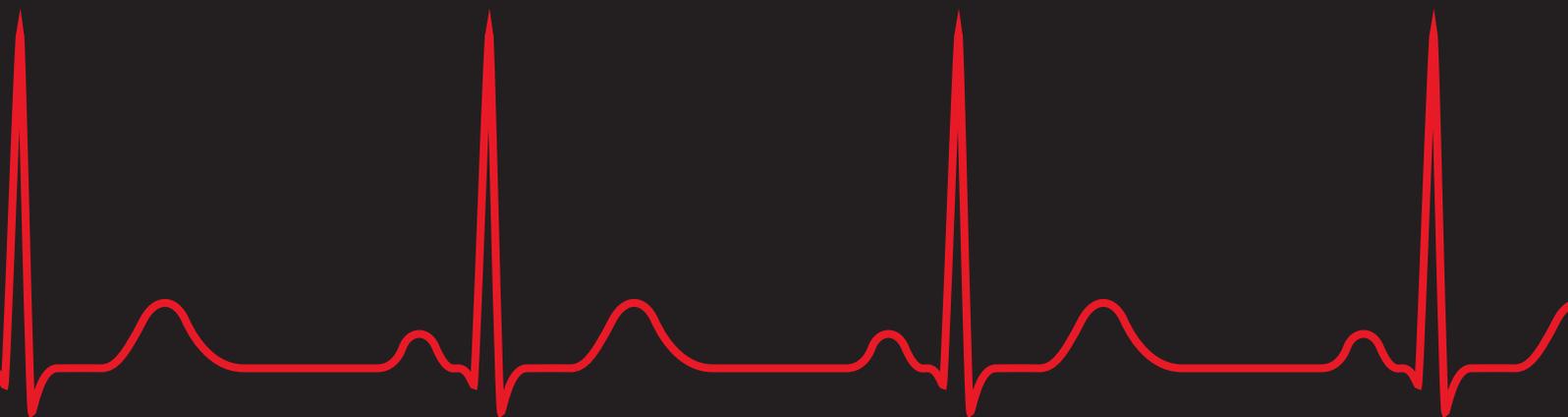


# Advanced Life Support (ALS) Course – the past to the present

---

By  
Dr Andy Lockey



Resuscitation  
Council UK

**ALS**

The Advanced Life Support (ALS) course delivers training in cardiac resuscitation to healthcare providers throughout the world. Although its core programme and methods of educational delivery have altered over the years, it remains at heart a multidisciplinary course delivering teaching on contemporary evidence-based international resuscitation guidelines.

Modern day resuscitation training in the UK can trace its roots back to the early eighties, when a series of people visited the United States to experience the Advanced Cardiac Life Support (ACLS) course run by the American Heart Association (AHA). The versions that were imported and anglicised and subsequently unified became the course we know today as ALS.

### → 1981 – 1992: The Early Days

The independent charity, known as “The Community Resuscitation Advisory Committee” (CRAC) was formed in August 1981. Its primary aim was to review resuscitation standards and its founder members were Peter Baskett, Douglas Chamberlain, Judith Fisher (Chair), Rodney Herbert (Treasurer), Mark Harries, Andrew Marsden, John McNae, Roger Sleet and David Zideman (Hon. Secretary). In July 1982, the constitution was amended and CRAC became the Resuscitation Council (UK). One of the main aims of this new organisation was the “education of doctors, nurses, ambulance personnel and other health workers”.

The AHA had been running ACLS courses since 1975, when it had been set up by a Thoracic Surgeon from Nebraska called Steve Carveth. As an organisation, they were very supportive of the development of the Resuscitation Council (UK). On behalf of the AHA, Bill Montgomery ran an “Emergency Cardiac Care” Course in Runnymede in September 1982. Invited participants from the Resuscitation Council (UK) were exposed to “an American style package with all its good and bad points” (Peter Baskett).

In October 1982, a CPR Flipchart was introduced at the “International Conference on Cardiac Arrest

and Resuscitation” in Brighton. A modest initial print run of 8,000 copies swiftly sold out.

In May 1983, Andrew Marsden set up an ‘ALS Working Party’ to look at guideline development. The first meeting was held in Wakefield on 13 May 1983. Douglas Chamberlain would subsequently take over as Chair of the ALS Working Party in 1985. Andrew Marsden and Judith Fisher were sponsored by Laerdal to attend an AHA meeting (“Mass Education in CPR”) in Omaha in May 1984 and, following that, attended an ACLS course run by Jim Hirschman in Coral Gables (Florida, USA). In January 1985, Andrew Marsden, along with Tony Redmond, took the ACLS course to Wakefield (where he was an A&E Consultant at Pinderfields General Hospital). He ran the course through the Wakefield Life Support Training Scheme programme. He would go on to run four further courses before the proliferation of the ALSG course (see later) replaced it as the mainstream course for the north of England.

The Resuscitation Council UK was invited to attend the AHA Standards meeting in Dallas in July 1985 and was represented by Judith Fisher, Andrew Marsden, Colin Robertson, David Zideman, Peter Baskett and Douglas Chamberlain. An impromptu meeting of these luminaries held in MacDonaldis in Dallas Fort Worth airport on the journey home generated the first UK ALS algorithms. Ironically, these first algorithms were written on McDonalds napkins.

At the same time, David Skinner (A&E Consultant - Barts Hospital, London) travelled to Seattle to visit Eisenberg and Copass to see their pre-hospital work. He had been concerned for quite a while about the lack of guidelines and structure to the care of cardiac arrest victims. He had been informed during his registrar days by a well-meaning A&E Consultant that “the cardiology team deal with these patients”. In fact, the cardiology senior house officer and a few other juniors ‘dealt’ with these cases

with little in the way of a structured approach. David was aware of the work of Pantridge and Geddes in Belfast, and Douglas Chamberlain in Brighton but wanted to expand his knowledge by visiting Seattle. Whilst there, he extended his visit to attend an ACLS Course. He was impressed by the fact that it included role play and the possibility of failure for its candidates. He passed the course and, on the plane home, took out the course programme and substituted the names of UK colleagues with the aim of running a UK equivalent course.

David's first course was run at Barts in 1986. As with Andrew Marsden's course in Wakefield, the structure of the course was very similar to the American ACLS with lectures, workshops and a simulated cardiac arrest scenario. The programme was so similar to the American version that it even included timetabled doughnuts for the morning. David was assisted by Peter Driscoll, who was one of his Senior Registrars.

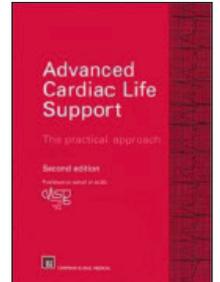
Further courses followed at Barts and one of the candidates in 1989 was an A&E Consultant from the West Midlands called Andy Swain. Andy took the basics of the course and developed it further with a GP colleague (Mick Colquhoun). Together with David Pitcher (Consultant Cardiologist – Hereford) and aided by Peter Baskett, the course was initially held in a hotel in the Malvern Hills in September 1990 before moving to Weston-super-Mare.

In 1987, the Royal College of Physicians produced an important report relating to Cardiopulmonary Resuscitation. The committee was set up by Tom Evans and also involved Douglas Chamberlain and Peter Baskett. It stressed the importance of proper training of staff in resuscitation and formally recommended the idea that every hospital should have a Resuscitation Training Officer or equivalent.

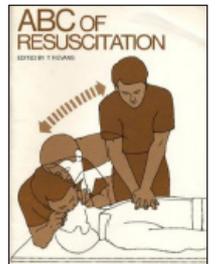
In December 1989, it was recognised at the Resuscitation Council (UK) that there was a need for national certification of ACLS courses in the UK. Options proposed for those who would accredit the courses included a) Resuscitation Council (UK), b) Immediate Care Committee of the Royal College of Surgeons of Edinburgh, and c) the British Heart Foundation and/or the British Cardiac Society.

In 1990, Peter Driscoll moved to Salford to take up a Consultant post in A&E at Hope Hospital. One of his colleagues, David Yates (Professor in A&E), was organising the annual Casualty Surgeons conference in Manchester and planned to run an ACLS course before the conference and an ATLS course afterwards. He had employed Sue Wieteska to administer the courses. This conference was memorable for the fact that attendees looked out of the window at the coffee break to witness the Strangeways prison riot. The course was directed by David Skinner with the faculty including Peter Driscoll and Andy Swain. It was a huge success and the candidates, who were mostly A&E senior registrars from the northwest, approached Peter Driscoll to encourage him to set this up on a regular basis. In particular they had been impressed with the structure of the ATLS course and suggested that the ACLS course could be developed along similar lines.

Peter Driscoll, along with several colleagues (Kevin Mackway-Jones, Barbara Phillips, Sue Wieteska, Peter Oakley, John Shaffer, Elizabeth Molyneux, Gary Brier, Peter Nightingale, Peter Barnes, and Carl Gwinnutt) decided to get together to look at regional life support training in the North-West. They decided to further anglicise the course and update the educational theory. The resulting course (still called ACLS) became the standard for the majority of the North and North-West. The course manual ("ACLS – the Practical Approach") was known as 'The Red Book' and was published by Chapman & Hall. The course was run over 2.5 days based upon Resuscitation Council (UK) guidelines and contained teaching on paediatric resuscitation and also arterial blood gases. Several iterations of the course were developed over the next two years. Paediatric resuscitation remained on the syllabus, although there were concerns that ACLS was not the best way to deliver this training. This led to the creation of the Advanced Paediatric Life Support course in 1993.



1. Advanced Cardiac LifeSupport.



2. ABC of Resuscitation

In June 1992, the group officially became a charitable organisation known as the Advanced Life Support Group (ALSG). They would go on to develop a portfolio of successful courses including APLS, Major Incident Medical Management and Support (MIMMS), and also the Generic Instructor Course (GIC).

At the same time, the Resuscitation Council (UK) also decided to develop the course. There was a feeling that the American course was too detailed, theoretical, and lacked a practical/skill-based approach. They decided to call it ALS as the AHA was keen to move into the UK with ACLS at that time (they had run some courses through military routes). The ALS course initially used the 'ABC of Resuscitation' (first published in 1986) as a manual. The course lasted 2 days and was first run in 1991 by Tony Handley and Colin Robertson. It was predominantly delivered in the South and South West of the United Kingdom.

### → 1992 – 1994: Andy Swain

3. Andy Swain



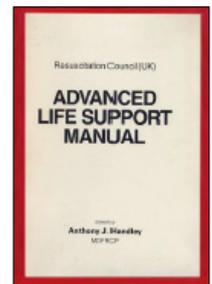
In 1992, the ALS course Working Party was formed with Andy Swain as the inaugural Chair, albeit known as 'Convenor'. The initial membership of this committee comprised Colin Robertson (Chairman), Tony Handley (Honorary Secretary), Mike Ward (Honorary Treasurer),

Dr Alastair McGowan (A&E Consultant, Wakefield), Prof Richard Vincent (Consultant Cardiologist, Brighton), and two Resuscitation Training Officers (Mark Whitbread and Mary Matthews). In addition, there was representation from a professor of education (Prof Duncan Harris, from Brunel University). Later in 1992, Mary Matthews stepped down and was replaced by Maureen Ryan (RTO, North Manchester General Hospital) who was one of the first five RTOs to be appointed following the RCP report in 1987.

A one-day meeting was held at Barts Hospital in London on 16 June 1992 to view the available course materials and iron out any problems. It was also used to "qualify" an initial group of instructors. The first two pilot courses for this

new version of the course were held in Autumn 1992 in Edinburgh and Weston-super-Mare. An Instructor Course (based upon the ALSG format) was run in Leeds in January 1993. This was followed in March 1993 by the first formal Resuscitation Council (UK) ALS course run in Eastbourne and directed by Mick Colquhoun.

The first edition of the Resuscitation Council (UK) ALS manual was published in November 1992 to coincide with the new ERC Guidelines. Andy Swain was responsible, along with Colin Robertson, for the development of the course over those next formative years. In the first year, 50 courses were run over 20 centres with 1000 providers trained. At this time, discussions were held at both Resuscitation Council (UK) and ALSG about the desire for a unified course. Peter Driscoll was invited onto the ALS Working Party to help to deliver this goal and represent the ALSG viewpoint. He would subsequently be succeeded by Terry Wardle and then Carl Gwinnutt as the formal ALSG representative on the ALS Subcommittee.



4. ALS manual 1st edition

In January 1994, the first ALS Instructors Day was held at Barts. Andy Swain set out his aspirations for ALS as follows:

- Increased availability to qualified staff**
- Extend availability to undergraduates**
- National course**
- Foster links with other countries**

To address the latter objective, Andy ran a prototype course in Italy in 1994 along with Tony Handley and two further courses in Greece in 1996 and 1997. Carl Gwinnutt ran the first ALS course in Porto (Portugal) in October 1996. Mike Ward, as Resuscitation Council (UK) Chair, would also go on to run a provider and abbreviated instructor course in Perugia (Italy) in 1997, and Lisbon (Portugal) in 1998.

In those early days, relations between the Resuscitation Council (UK) and ALSG were challenging for both parties. Two slightly different courses were emerging with regional loyalties to one or the other.

The Resuscitation Council (UK) was responsible for setting guidelines and standards, but felt as a result that this gave them the mandate to deliver the training. ALSG was an organisation with a fast pace of learning about the delivery of high quality courses and they felt that they had equal rights to deliver the course. Communication was difficult and little progress was being made despite several meetings.

By 1994, it became clear that there was a need for one unified course for the UK. There was continued concern at both the Resuscitation Council (UK) and ALSG over the lack of progress in agreeing a single ALS course and it was agreed that further attempts should be made at achieving this goal.

An agreement was made in summer 1994 for the administration of the new ALS course to pass to the Resuscitation Council (UK) but it was recommended that the Chair of this committee should be an ALSG member to help maintain relations between the two organisations. Carl Gwinnutt (Consultant Anaesthetist – Salford) was proposed as Chair.

By this stage, the annual number of people trained was 1,923 from 103 courses in 56 course centres.

## → 1994 – 1998: Carl Gwinnutt

5. Carl Gwinnutt



The main objective of appointing a member of the ALSG to chair the ALS Subcommittee at the Resuscitation Council (UK) was to try and unify the course and create an environment where both organisations were working together. This initially proved to be a challenge and meetings were often difficult. Under Carl's expert guidance however, and with the addition of "new blood" to the Subcommittee, significant progress was soon made.

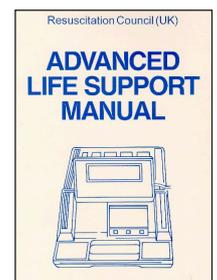
The second edition of the ALS manual was published in a ring binder in 1995 followed by agreement between the ALSG and Resuscitation Council (UK) over administration of the courses within the UK.

In 1995, the ALS course was still predominantly lecture based. Day 1 included lectures on ALS in perspective, causes and prevention of cardiac arrest, risks to rescuers, basic life support, management of the airway, cardiac monitoring and rhythm recognition, defibrillation, drugs and their delivery, treatment algorithms and cardiac arrest in special circumstances 1. Practical stations covering BLS, drugs and their delivery, IV access, basic airway, and advanced airway were also delivered. Day 2 included lectures on special circumstances 2, the cardiac arrest team, peri-arrest algorithms and pacing, post resuscitation care, ethical and legal considerations, and bereavement. In addition, there was 'cardiac arrest demonstration' prior to three CASTeach stations. These stations involved role play training in a variety of scenarios. There were no standardised scenarios and instructors were free to generate their own stories. There was a considerable degree of variability and unfortunately some instructors chose to overcomplicate and dramatise these scenarios. Despite this, it is important to note that the ALS course was way ahead of its time. It was virtually unique in targeting multi-professional learning using simulation and role play.

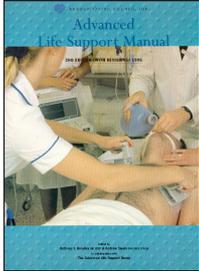
Candidates were assessed summatively on airway management, defibrillation and a scenario. Once again, there were no mandatory standardised testing scenarios and candidates could expect anything from a simple VF arrest to a complex scenario involving every single reversible cause and peri-arrest rhythm dependent upon the whim of the instructors. Finally, candidates sat a multiple choice paper and also a separate rhythm recognition paper containing ten life threatening rhythms and five other rhythms (with a pass mark for the rhythm paper of 66%).

A revised edition of the ALS Manual (2nd Edition) was published in 1996.

In 1997, the International Liaison Committee on Resuscitation (ILCOR) produced a set of Advisory Statements. The ERC Guidelines were produced



6. ALS Manual 2nd Edition



in 1998 and adopted in the UK following a successful joint meeting with the ERC in Brighton. In light of the new guidelines (which included amalgamation of the three previous treatment algorithms into one universal algorithm), a new course was planned. Carl took the lead in revising the ALS manual and

associated course materials for what would be the first major overhaul of the course.

The first ALS Instructors Day for the new version of the ALS course was held at the Royal London Hospital on 10 December 1997 with a programme including three international speakers.

By 1998, there were 455 provider courses providing training for 8,000 healthcare workers.

### → 1998 – 2001: Jerry Nolan



Jerry Nolan (Consultant Anaesthetist – Bath) took over as Chair of the ALS Subcommittee in February 1998. He asked Carl Gwinnutt to continue to lead on the final stages of changes to the ALS manual and course.

The second ALS Instructors Day was held at the Hammersmith Hospital on 9 November 1998 – the day before the Resuscitation Council (UK) Symposium. The registration fee was set at £10. The day included a glimpse into the future of ALS training as well as a stormy debate about airway teaching. It had been proposed that doctors should be taught tracheal intubation and that nurses should be taught LMA insertion but the conclusion was that this was divisive and unnecessary.

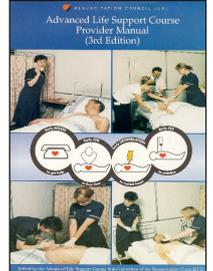
The 3rd Edition of the ALS Manual (now in colour and complete with up to date ERC Guidelines) was published in time for the new version of the course in August 1998. The drugs delivery and IV access skill stations were dropped from the course, as was the mandatory teaching of tracheal intubation (although it would still be demonstrated along with LMA insertion despite

the lack of suitable training manikins for the latter). External pacing was now included with the intention that one of the two new CASTeach sessions would include this skill. The course was still predominantly lecture driven, but the means of assessment was starting to change. The rhythm paper was merged with the MCQ and the defibrillation testing was incorporated into the CASTest. BLS and basic airway testing were moved to the end of day 1.

A version of this new course was run on 29-31 July 1998 in Antwerp under the banner of the ERC. This and all subsequent iterations of the programme to date have been adopted by the ERC for their ALS courses. The number of courses and participating countries was particularly boosted when Peter Baskett took over as the inaugural chair of the ERC ALS International Course Committee in 2000 and was further promoted under the stewardship of John Ballance, who took over when Peter retired from this role in late 2006.

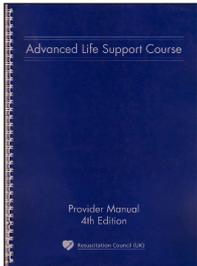
On a more worrying note, a few reports were emerging in the UK of unprofessional behaviour by ALS Instructors. With this in mind, a code of conduct and formal disciplinary pathway were drawn up. Subsequently, in 2000, a policy was also drawn up for the management of the incompetent candidate who would be returning to work in a cardiac arrest team leadership role.

In March 1999, a discussion document was circulated amongst the ALS Subcommittee looking at various options for the future of ALS. Concepts including modular courses (championed by the new Lead Educator Ian Bullock), multi-level courses and single combined courses (including core and advanced concepts) were discussed. It was also recognised that many Trusts were running in-house abbreviated ALS training for nursing staff rather than sending them on ALS courses. An example of such a course was presented by Alex Scott (non-ARTO Resuscitation Officer Representative, Glasgow) and it was agreed to look at developing a one day accredited course based upon this programme. Initially known as



“Intermediate”, this evolved into the Immediate Life Support (ILS) Course, which was piloted in January 2000. The ILS course curriculum covered the knowledge and skills necessary to manage the patient in cardiac arrest for the time preceding the arrival of the cardiac arrest team.

10. ALS Manual 4th Edition



In October 1999, the ALS Instructors Day was held outside London for the first time at the Leeds Playhouse, hosted by the new trainee doctor representative on the subcommittee (Andy Lockey). It was particularly memorable for the fact that the theatre was set up for a production of Macbeth with a moat surrounding the stage. There was a clear focus on educational issues and the day evaluated really well.

On 16 August 2000, a new set of international guidelines were published by ILCOR. A fourth edition of the ALS Manual (now in spiral bound format) was published to coincide with this and now included chapters on ‘Acute Coronary Syndromes’ and ‘Audit and Outcome’.

The course materials were also updated with minimal changes in time for an implementation date of February 2001. The ‘Risks to the rescuer’ lecture was dropped and any vital information was added to the BLS lecture. The ‘Causes and Prevention’ lecture now contained reference to acute coronary syndromes. One particular milestone was that the visuals were now distributed in PowerPoint format rather than 35mm slides. Finally, a set of optional teaching scenarios and mandatory testing scenarios were developed. It had long been realised that candidates were receiving differing levels of assessment dependent upon factors such as their occupation, level of seniority, and the whims of the instructor. Andy Lockey was tasked with developing a set of four CASTest scenarios that covered the same elements (‘shockable’ and ‘non-shockable’ rhythms along with reversible causes) through different clinical scenarios with a set of ‘bold’ (mandatory) and ‘non-bold’ (optional) assessment criteria.

The new course material was introduced at a combined Resuscitation Council (UK) Instructors’

Day at Heriot-Watt University in Edinburgh in March 2001. ALS Instructors were joined by PALS and NLS instructors for a mixture of plenary and breakout sessions. The day was almost marred by appalling weather conditions with knee-deep levels of snow, but made all the better for the samples of whisky handed out by the Scottish Resuscitation Group.

By 2001, there were 527 ALS courses run that had trained an annual figure of just over 12,500 candidates with a 95% pass rate.

### → 2002 – 2003: David Gabbott

David Gabbott (Consultant Anaesthetist – Gloucester) commenced his tenure as Chair in January 2002. During his two years at the helm, he would go on to oversee a significant and comprehensive review of the course to a larger scale than had ever happened before.



11. David Gabbotts

At the Instructors’ Day in Birmingham in April 2002, opinions were sought from a breakout ALS Instructor session with regards to the future direction of ALS. A draft programme was devised and presented to the Regional Representatives for feedback before being piloted in January 2003. There was a significant reduction in the number of lectures and a greater number of workshops and increased use of case-directed learning. Arterial blood gas analysis was added to the programme for the first time since the early days of the ACLS course.

Standardised CASTeach scenarios were now mandatory and the number of CASTeach sessions was increased. Layperson BLS training and assessment was now dropped and continuous assessment was used for basic airway skills. There were now two CASTest sessions to cover firstly the collapsed patient and defibrillation and secondly the peri-arrest patient. A testing sheet was devised for hands-free defibrillation as this was an emerging development in defibrillator technology. Finally, plans were made to formally analyse and validate the MCQ papers.

The results of the three-month pilot were presented at the ALS Instructors Day at Earls Court in June 2003. Once again, the day had memorable moments in that it co-habited the same hotel as a ‘Buffy the Vampire Slayer’ convention (with attendant colourful characters). The day also included sessions on defibrillation, thrombolysis in CPR, telemedicine teaching, and an inaugural ‘Jane Bridger’ lecture (named after an inspirational doctor who had continued to teach ALS in the latter stages of a respiratory illness) by Peter Baskett.

The new course was formally introduced in January 2004. It now represented a truly ‘advanced’ course, which dovetailed with the curriculum of the ILS course. Candidates could now attend a course that was more applicable to their needs rather than an all-inclusive single course containing elements too advanced or basic for their requirements.

By this stage, the annual figures for ALS training were now 609 courses and 14,130 candidates trained.

## → 2004 – 2011: Andy Lockey

12. Andy Lockey



Andy Lockey (Consultant in Emergency Medicine - Halifax) took over as Chair of the ALS Subcommittee in January 2004.

The Instructors’ Day in June 2004 returned to an integrated format for ALS, NLS and EPLS instructors. It was held in

Manchester and the Jane Bridger lecture was delivered by Prof Douglas Chamberlain. Topics included a debate on intubation, new technology in resuscitation and a session covering resuscitation standards.

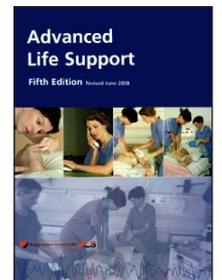
Research projects were now underway looking at the validity and reliability of the assessment tools used during the course. Carl Gwinnutt analysed the MCQ papers and found them to have a Cronbach’s Alpha score in excess of 0.8 indicating high validity. The CASTest scenarios were validated over 65 course centres with 2,449 assessments demonstrating no difference in pass rate (74.4%) between the four scenarios. For the

first time, the ALS course could truly claim to be educationally evidence based in its delivery.

An early analysis of the new course showed that the number of nurses attending the course had increased from 2,630 in 2003 to 3,669 in 2004. There was an associated reduction in the failure rate for this group from 12.4% to 7.2%. Despite concerns that the introduction of the ILS course might lead to a reduction in the numbers of those attending ALS, this was unfounded.

Change was once again on the horizon however with the release of a new set of international guidelines at the end of 2005. For the first time, it was decided that there would be no moratorium of courses between the announcement of the new guidelines and the introduction of the new course and that the current course should continue to be taught.

The new version of the course was introduced, along with the 5th Edition of the manual, in April 2006. The programme was now fixed at two days in length, to reflect the concerns from faculty that they were struggling to gain teaching leave for three days. Following the successful introduction of continual assessment for airway skills, a new station called “Initial Assessment and Resuscitation (IAR)” was introduced. This covered teaching and continual assessment of the recognition of the unwell patient (ABCDE approach), in-hospital BLS, and defibrillation. The CASTest1 was now incorporated into the IAR session leaving the candidates with only one testing scenario at the end of the course.



13. ALS Manual 5th Edition

The ALS Instructors day in September 2006 was held in Bristol, with Sarah Gill delivering the Jane Bridger lecture. Once again, there was a diverse programme including a mixture of factual and educational presentations. These included sessions on pre-hospital resuscitation, defibrillation, visual cognition and a debate on the necessity of formal assessment. National concerns were being raised at this stage about the time and resources available for study leave for candidates and professional/teaching leave for instructors. The introduction

of Foundation Training for doctors in 2005 had seen the welcomed statement that all Foundation Year 2 doctors should have training to “advanced life support level”, but Trusts were starting to look critically at time spent teaching by their employees.

With this in mind, Gavin Perkins was appointed Vice Chair of the ALS Subcommittee with a specific remit to look at e-learning options for the course. The AHA had an e-learning component to their ACLS course, but otherwise there was no precedent in ALS. Gavin led a team, including Robin Davies and Tom Clutton-Brock, to look at the option of an e-learning format for delivery of knowledge components of the course. This project was time consuming, in that it necessitated the introduction of a ‘Learning Management System’ to be able to track the progress of candidates.

In December 2008, the ALS Instructors’ Day returned to London, to the Royal College of Physicians. Paula McLean delivered the Jane Bridger lecture. Other sessions included an update on DNA(CP)R, on-the-job training, and outcome-based assessment. A review was conducted in 2008 of the number of ALS course centres. It was established that several course centres, although registered, were no longer active. The number of centres was therefore amended from 274 to 197. This is reflected in Figure 18.

In 2009, a long-standing arrangement with ALSG came to an end. Since the unification of the ALS course, centres in the north of England had been encouraged to continue to submit their course approval and post-course documentation to Manchester. The details would then be processed then passed on to Resuscitation Council (UK) in London. The process was unnecessarily complex, and meant that an up-to-date database for enquiries was difficult to maintain.

The e-ALS course commenced its pilot phase in January 2009. It delivered the knowledge base in e-learning format and then the candidates attended a one-day practically based face-to-face course. There was a paucity of evidence in the international literature about the benefits of e-learning specific to advanced life

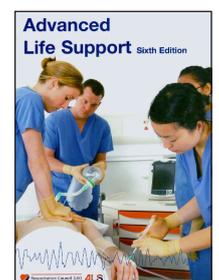
support training so a multi-centre prospective international randomised controlled trial was set up supported by the Department of Health National Institute for Health Research and funded by the Resuscitation Council (UK). The study aimed to recruit 2,762 participants in total and was designed to test non-inferiority (in other words, the null hypothesis was that the e-ALS course was no worse than the traditional course). The primary outcome would be the proportion of candidates passing the CASTest at the first attempt. Secondary outcomes included the overall pass rate, MCQ score, airway and IAR pass rates, CASTest score, and candidate evaluations.

The results for the e-ALS project were presented at the Resuscitation Council (UK) Symposium in Birmingham in November 2010. It was stated that this had been the largest CPR education trial that had been conducted and that the e-learning component had been successful in delivering the theoretical components of ALS. The pass rates for the initial cardiac arrest simulation test were 6% lower in the e-ALS arm. The end of course pass rate was 4% lower in the e-ALS group and the overall final pass rates (following re-tests) were 2% lower in the e-ALS group. Although the primary outcome (initial pass rate) showed a statistically significant difference, the ultimate overall pass rate suggested that the differences were not educationally significant. As a result, further work was commissioned to explore future options for e-learning.

At the same symposium, the new ILCOR guidelines were presented. Work had already been ongoing to update the ALS course and the 6th Edition of the manual was published in January 2011. The updated course deliberately contained few changes, with the exception of the updated clinical material in line with the guideline changes. The Resuscitation Council (UK) had received feedback from the National Patient Safety Agency that a significant number of reported critical incidents during resuscitation related to issues involving teamwork and communication. As a result, these ‘Human factors’ issues were now



**e-ALS**



integrated into the teaching materials and a new chapter in the manual covered the topic.

In 2010, there were 829 courses run and 16,517 candidates trained.

The ALS Instructors Day returned to the Heriot-Watt University in Edinburgh in May 2011. Invited speakers included Ben Abella and Dana Edelson from the USA.

### → 2011 – 2016: Gavin Perkins

15. Gavin Perkins



Gavin Perkins (Honorary Consultant Physician and Professor of Critical Care Medicine – Warwick) took over as Chair of the ALS Subcommittee in May 2011 at the end of the ALS Instructor Day in Edinburgh. One of his first tasks was to schedule the pilot testing of the new

version of e-ALS for Autumn 2011. It was decided that e-ALS would not substitute the traditional two-day ALS course but would be offered alongside it.

The new version of e-ALS was formally launched in January 2012. A formal evaluation of the course was published in 2015 with a retrospective study of 27,170 candidates. It was concluded that the e-ALS course demonstrates equivalence to traditional face-to-face learning in equipping candidates with ALS skills and that “further dissemination of the e-ALS course should be encouraged”. Its uptake in the UK has increased year on year and the number of candidates on e-ALS in 2015 accounted for a third of all ALS candidates (Figure 19). Additional research also provided a cautionary note that e-learning is well received by most, but not all participants.



Towards the end of 2011, Susannah Price (Consultant Cardiologist/Intensivist - Royal Brompton, London) commenced

discussions with the Resuscitation Council (UK) to import the FEEL course (Focused Echocardiography in Emergency Life Support) into its portfolio of courses. This one-day course is intended to train novice practitioners in the use

of trans-thoracic echocardiography during the peri-resuscitation period. Further collaborative meetings were held during 2012 with formal terms of reference for a FEEL Subgroup being developed during that time. This involved FEEL reporting to the ALS Subcommittee. FEEL was fully adopted as Resuscitation Council (UK) course in September 2013.

In early 2012, a national survey was conducted of ALS Providers and Instructors in preparation for a review of the course programme. 1,500 responses were received and there was strong consensus to prioritise simulation, non-technical skills (NTS), end-tidal CO<sub>2</sub> monitoring, supraglottic airway devices, intraosseous access and DNACPR issues.

A full review of the ALS course programme was commenced in Summer 2012 to address these issues. A DVD version of the CASDemo had already been filmed and had been made available to course centres in March 2012.

It was initially planned to include a lecture on non-technical skills (NTS) in the face-to-face course, but this plan was modified at a late stage after members of the subcommittee listened to a talk by Anne Lippert at the ERC Conference in Vienna in October 2012. It was decided instead to embed NTS into the second set of simulation teaching sessions with the aid of a checklist. The lecture that had already been prepared was moved to the e-learning platform instead, along with the lecture on ‘Decisions relating to resuscitation’. After a review of available checklists, a modified version of the TEAM tool was devised for use on the ALS course, with the kind permission of the original TEAM tool author Simon Cooper.

The skill stations on the course were altered to include the “Deteriorating Patient Workshop” and the “Associated Resuscitation Skills workshop” (to include basic airway, supraglottic airway devices, intraosseous access, and end-tidal CO<sub>2</sub> monitoring).

Pilot courses for the new programme were run over the latter half of 2013.

After a gap of two years, the ALS Instructor Day was held on 27 November 2013 in Leeds. Topics were presented following the themes



## Acknowledgments

Douglas Chamberlain, Mick Colquhoun, Dami Daramola, Sarah Dickie, Peter Driscoll, Judith Fisher, David Gabbott, Crystal Govender, Carl Gwinnutt, Sue Hampshire, Tony Handley, Helen Keen, Andrew Marsden, Sarah Mitchell, Bill Montgomery, Jerry Nolan, Gavin Perkins, Colin Robertson, Maureen Ryan, David Skinner, Jas Soar, Andy Swain, Mike Ward, Paul White, Sue Wieteska, Joyce Yeung.

---

## Bibliography

Baskett P. Progress of the advanced life support courses in Europe and beyond. *Resuscitation*. 2004 Sep;62(3):311-3

Baskett PJ, Nolan JP, Handley A, Soar J, Biarent D, Richmond S; European Resuscitation Council. European Resuscitation Council guidelines for resuscitation 2005. Section 9. Principles of training in resuscitation. *Resuscitation*. 2005 Dec;67 Suppl 1:S181-9

Finn JC, Bhanji F, Lockey A, Monsieurs K et al. Part 8: Education, implementation and teams 2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations. *Resuscitation* 2015;95:e203-224

Greif R, Lockey AS, Conaghan P et al. Resuscitation Council Guidelines for Resuscitation 2015. Section 10 Education and implementation of resuscitation. *Resuscitation* 2015;95:288-301

Lockey AS, Dyal L, Kimani PK, Lam J, Bullock I, Buck D, Davies RP and Perkins GD. Electronic learning in advanced resuscitation training: the perspective of the candidate. *Resuscitation* 2015;97:48-54

Napier F, Davies RP, Baldock C, Stevens H, Lockey AS, Bullock I, Perkins GD. Validation for a scoring system of the ALS cardiac arrest simulation test (CASTest). *Resuscitation*. 2009 Sep;80(9):1034-8

Perkins GD, Lockey AS. The Advanced Life Support Provider Course. *BMJ* 2002;325:S81-83

Perkins GD, Davies RP, Stallard N, Bullock I, Stevens H, Lockey A. Advanced life support cardiac arrest scenario test evaluation. *Resuscitation* 2007;75(3):484-90.  
• Perkins GD, Boyle W, Bridgestock H, Davies S, Oliver Z, Bradburn S, Green C, Davies RP, Cooke MW. Quality of CPR during advanced resuscitation training. *Resuscitation* 2008;77(1):69-74

Perkins GD, Fullerton JN, Davis-Gomez N, Davies RP, Baldock C, Stevens H, Bullock I,

Lockey AS. The effect of pre-course e-learning prior to advanced life support training: a randomised controlled trial. *Resuscitation*. 2010 Jul;81(7):877-81.

Soar J, Perkins GD, Harris S, Nolan JP. The Immediate Life Support Course. *Resuscitation* 2003; 57:21-26

Soar J, Monsieurs KG, Ballance J, Barelli A, Biarent D, Grief R, Handley AJ, Lockey AS, Richmond S, Ringsted C, Wyllie, Nolan JP, Perkins GD. European Resuscitation Council Guidelines for Resuscitation 2010. Section 9: Principles of education in resuscitation *Resuscitation*. 2010 Oct;81(10):1434-44

Thorne CJ, Lockey AS, Bullock I et al. e-learning in advanced life support – an evaluation by the Resuscitation Council (UK). *Resuscitation* 2015(90):79-84

Thorne CJ, Lockey AS, Kimani PK et al. e-Learning in Advanced Life Support – what factors influence assessment outcome? *Resuscitation* 2017;114:83-91

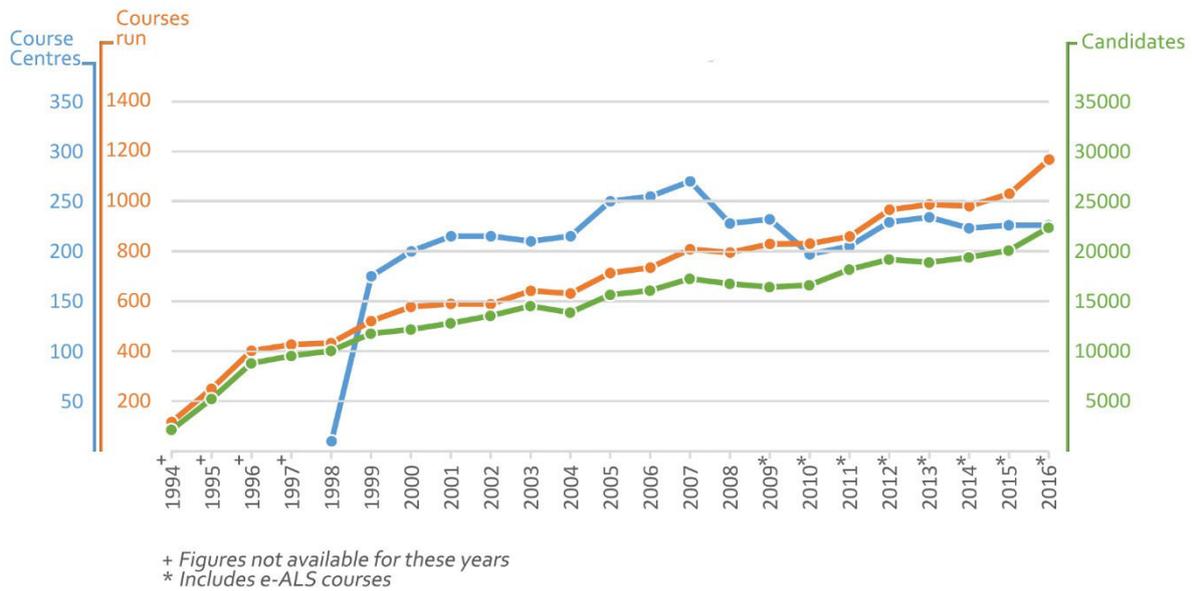


Figure 18

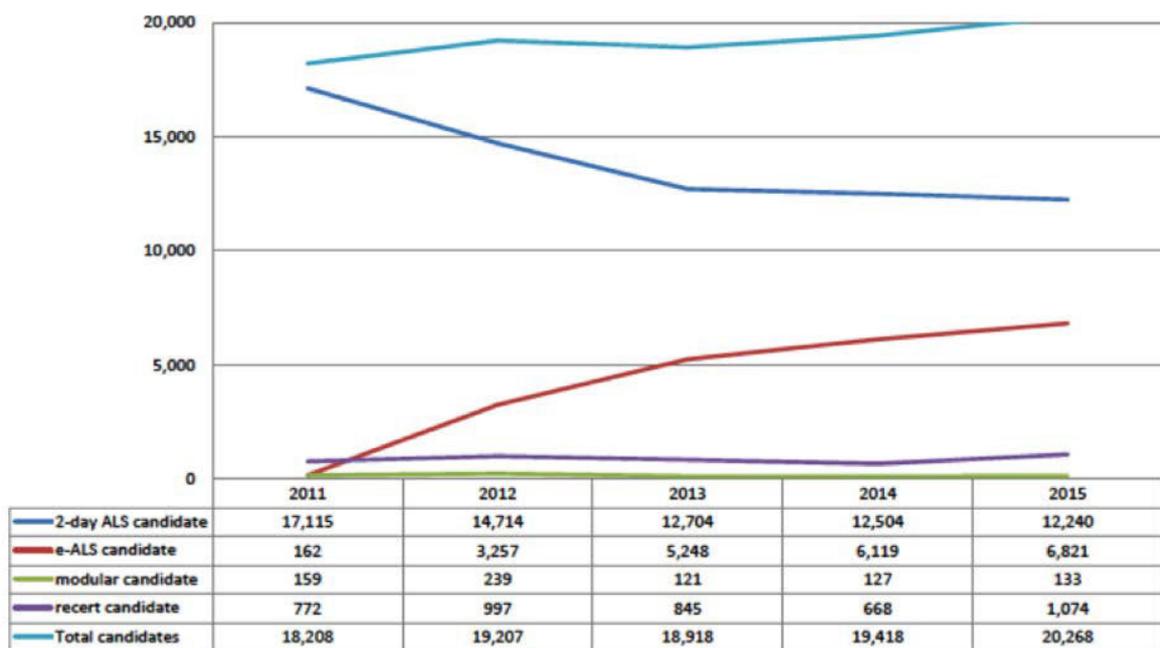


Figure 19. Number of ALS candidates