

Education, Implementation and Teams (EIT) 2021 Update

Ming-Ju Hsieh, MD, PhD

Member, EIT Task Force of ILCOR

Associate Professor, College of Medicine, National Taiwan University

National Taiwan University Hospital, Taiwan





Origins of EIT PICOs

- Old PICOs in previous published guidelines
 - Need to update or not
- New PICOs from TF members
- New PICOs from Resuscitation Councils
- Systematic review or Scoping review
- Every 2-4 weeks online meeting on ZOOM

Topics in EIT 2021

- One systematic review
 - self-directed, digitally based basic life support (BLS) education and training in adults and children
- 18 evidence updates (EvUps)

Table 16 – EIT Topics Reviewed by EvUps

Topic/PICO	Year(s) last updated	Existing treatment recommendation
EMS practitioner's experience or exposure (EIT 437)	2020 CoSTR	We suggest that EMS systems (1) monitor their clinical personnel's exposure to resuscitation and (2) implement strategies when possible to address low exposure or ensure that treating teams have members with recent exposure (weak recommendation, very low–certainty evidence).
High-fidelity training (EIT 623)	2015 CoSTR; 2020 EvUp	We suggest the use of high-fidelity manikins when training centers/organizations have the infrastructure, trained personnel, and resources to maintain the program (weak recommendations, very low-quality evidence). If high-fidelity manikins are not available, we suggest that the use of low-fidelity manikins is acceptable for standard ALS training in an educational setting (weak recommendations, low-quality evidence).

Topic/PICO	Year(s) last updated	Existing treatment recommendation
CACs (EIT 624)	2019 CoSTR	<p>We suggest that adult patients with nontraumatic OHCA be cared for in CACs rather than in non-CACs (weak recommendation, very low–certainty evidence). We cannot make a recommendation for or against regional triage by primary EMS transport of patients with OHCA to a CAC by primary EMS transport (bypass protocols) or secondary interfacility transfer to a CAC. The current evidence is inconclusive, and confidence in the effect estimates is currently too low to support an EIT and ALS Task Force recommendation.</p> <p>For patients with in-hospital cardiac arrest, we found no evidence to support an EIT and ALS Task Force recommendation.</p> <p>For the subgroup of patients with either shockable or nonshockable initial cardiac rhythm, the current evidence is inconclusive, and the confidence in the effect estimates is currently too low to support an EIT and ALS Task Force recommendation.</p>
Timing for retraining (EIT 628)	2015 CoSTR; 2020 EvUp	<p>There is insufficient evidence to recommend the optimum interval or method for BLS retraining for laypeople. Because there is evidence of skills decay within 3 to 12 mo after BLS training and evidence that frequent training improves CPR skills, responder confidence, and willingness to perform CPR, we suggest that individuals likely to encounter cardiac arrest consider more frequent retraining (weak recommendation, very low-quality evidence).</p>

2020 American Heart Association Guidelines

Cardiac Arrest Centers

Recommendation for Cardiac Arrest Centers		
COR	LOE	Recommendation
2a	C-LD	1. A regionalized approach to post-cardiac arrest care that includes transport of acutely resuscitated patients directly to specialized cardiac arrest centers is reasonable when comprehensive postarrest care is not available at local facilities. ^{1–10}

Circulation. 2020;142(suppl 2):S580–S604.

Topic/PICO	Year(s) last updated	Existing treatment recommendation
Cognitive aids during resuscitation (EIT 629)	2020 CoSTR	<p>We recommend against the use of cognitive aids for the purposes of lay providers initiating CPR (weak recommendation, low-certainty evidence).</p> <p>We suggest the use of cognitive aids for health care providers during trauma resuscitation (weak recommendation, very low-certainty evidence). In the absence of studies on CPR, no evidence-based recommendation can be made.</p> <p>There are insufficient data to suggest for or against the use of cognitive aids in lay provider training.</p> <p>We suggest the use of cognitive aids for training of health care providers in resuscitation (weak recommendation, very low-certainty evidence).</p>
TOR for in-hospital cardiac arrest (EIT 4002)	2020 CoSTR	<p>We did not identify any clinical decision rule that was able to reliably predict death after in-hospital cardiac arrest. We recommend against using the UN10 rule as a sole strategy to terminate in-hospital resuscitation (strong recommendation, very low-certainty evidence).</p>

Topic/PICO	Year(s) last updated	Existing treatment recommendation
Precourse preparation for advanced courses (EIT 637)	2020 CoSTR	We recommend distributing precourse learning formats preceding face-to-face training for participants of ALS courses (weak recommendation, very low- to low-certainty evidence). In addition, we strongly recommend providing the option of eLearning as part of a blended-learning approach to reduce face-to-face training time in ALS courses (strong recommendation, very low- to low-certainty evidence).
System performance improvements (EIT 640)	2020 CoSTR	We recommend that organizations or communities that treat cardiac arrest evaluate their performance and target key areas, with the goal of improving performance (strong recommendation, very low-certainty evidence).

Topic/PICO	Year(s) last updated	Existing treatment recommendation
Community initiatives to promote BLS implementation (EIT 641)	2015 CoSTR; 2020 ScopRev	The treatment recommendation (below) remains unchanged from 2015. We recommend implementation of resuscitation guidelines within organizations that provide care for patients in cardiac arrest in any setting (strong recommendation, very low quality of evidence).
Prehospital TOR rules (EIT 642)	2020 CoSTR	We conditionally recommend the use of TOR rules to assist clinicians in deciding whether to discontinue resuscitation efforts out of hospital or transport to hospital with ongoing CPR (conditional recommendation, very low–certainty evidence).

Prehospital TOR Rules-Conditionally Recommend

- The majority of studies describe either the derivation and internal validation of individual TOR rules, or the external validation of previously published TOR rules.
- Only one study addressed clinical validation (the use of a termination of resuscitation rule in clinical practice) of a TOR rule by emergency medical technicians (EMT's) with defibrillators.
 - Evidence is weak.
- However, termination of resuscitation is common practice in many EMS systems.
 - It preserves the dignity of the recently deceased, reduces risk for EMS providers and protects scarce healthcare resources.
- In those EMS systems implementing prehospital TOR rule, the system must ensure there is no conflict with legislation prohibiting non-physicians from discontinuing resuscitation and have appropriate governance arrangements to monitor practice.

Topic/PICO

Year(s) last updated

Existing treatment recommendation

CPR feedback devices during training (EIT 648)

2020 CoSTR

We suggest the use of feedback devices that provide directive feedback on compression rate, depth, release, and hand position during CPR training (weak recommendation, low-certainty evidence). If feedback devices are not available, we suggest the use of tonal guidance (eg, music or metronome) during training to improve compression rate only (weak recommendation, low-certainty evidence).

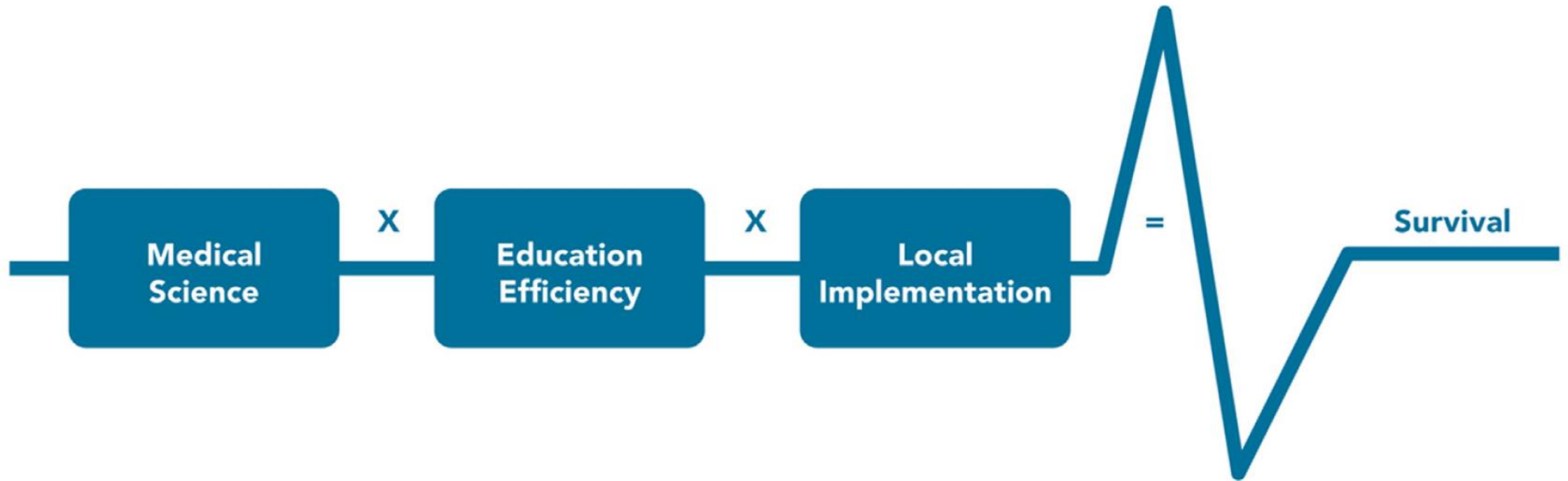
BLS training in high-risk populations (EIT 649)

2015 CoSTR

We recommend the use of BLS training interventions that focus on high-risk populations on the basis of the willingness to be trained and the fact that there is low harm and high potential benefit (strong recommendation, low-quality evidence).

Topic/PICO	Year(s) last updated	Existing treatment recommendation
Technology to engage first responders (EIT 878)	2020 CoSTR	We recommend that citizens/individuals who are in close proximity to a suspected OHCA event and are willing to be engaged/notified by a smartphone app with a mobile positioning system or text message–alert system should be notified (strong recommendation, very low–certainty evidence).
Resuscitation team with ALS course training (EIT 4000)	2020 CoSTR	We recommend the provision of accredited adult ALS training for health care providers (weak recommendation, very low–certainty evidence).
Opioid overdose first aid education (EIT 4001)	2015 CoSTR; 2020 ScopRev	We suggest offering opioid overdose response education, with or without naloxone distribution, to persons at risk for opioid overdose in any setting (weak recommendation, very low quality of evidence). In making these recommendations, we place greater value on the potential for lives saved by recommending overdose response education, with or without naloxone, and lesser value on the costs associated with naloxone administration, distribution, or education.

The Utstein formula of survival



5 TOP MESSAGES

1. THE ERC PROVIDES CPR TEACHING TO ENABLE EVERY CITIZEN TO PROVIDE THE BASIC SKILLS TO SAVE A LIFE

- For bystanders, rescuers with a duty to respond, first responders, EMS dispatchers, healthcare professionals, children from preschool age to young adults at higher education

2. THE REQUIRED RESUSCITATION SKILLS ARE EASY TO LEARN AND EASY TO TEACH

- Recognize cardiac arrest, alert professional rescuers, provide high quality CPR, use an AED
- Advanced resuscitation skills for healthcare providers
- Educational competencies to teach resuscitation

3. IMPROVING BASIC LIFE SUPPORT TUITION

- Learner adapted programs, technology enhanced learning and feedback devices, annual short competency refreshers

4. HEALTHCARE PROVIDERS SHOULD ATTEND ADVANCED LIFE SUPPORT COURSES AND MAINTAIN THEIR CERTIFICATION

- Simulation and teaching non-technical skills
- Use of cognitive aids
- Application of data-driven, performance-focused debriefing

5. FACULTY DEVELOPMENT

- Teaching programs for BLS-instructors for all levels of providers, for advanced life support courses, instructor courses and educators

To Enable **EVERY CITIZEN** to provide basic skills

Easy to learn, easy to teach

Improving BLS courses

Advanced life support courses for HCPs

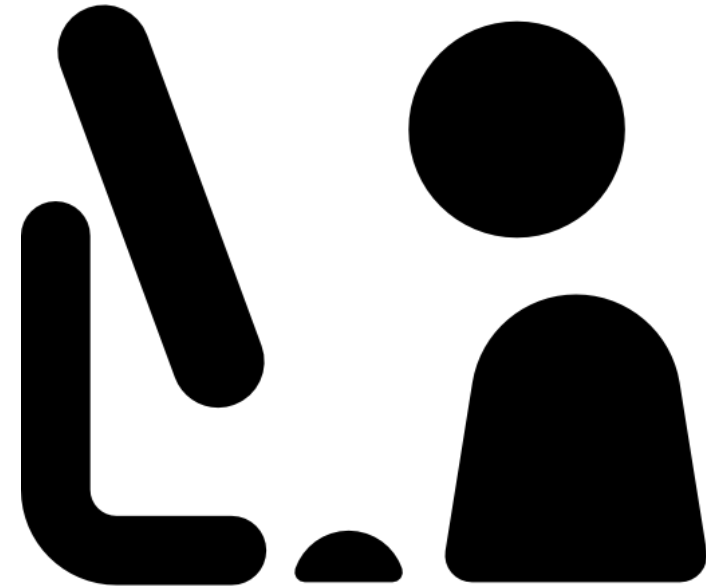
Faculty Development

How do we teach?

Instructor-led training



Digitally-based training



Self-Directed, Digitally Based BLS Education and Training in Adults and Children (EIT:647)

- **Population:** Adults and children undertaking BLS training
- **Intervention:** Self-directed, digitally based BLS training
 - any form of digital (eg, video, phone application [app] based, internet based, game based, virtual reality, augmented reality) education or training for BLS that can be completed without an instructor, except for mass media campaigns (eg, television, social media education).
- **Comparator:** Instructor-led BLS training
 - education or training (eg, lecture, skills demonstration, skills feedback) that occurred in the presence of a BLS instructor.

Self-Directed, Digitally Based BLS Education and Training in Adults and Children (EIT:647)

- **Outcome:**

- Patient outcomes: Good neurological outcome at hospital discharge/30 days; survival at hospital discharge/30 days; ROSC; rates of bystander CPR; bystander CPR quality during an OHCA arrest (any available CPR metrics); and rates of AED use.
- Educational outcomes at the end of training and within 12 months: CPR quality (chest compression depth and rate; chest compression fraction; complete chest recoil, ventilation rate, overall CPR competency) and AED competency; CPR and AED knowledge; and confidence and willingness to perform CPR

Consensus on Science

- Overall, 41 studies were identified.
 - 33 RCTs and 8 non-RCTs
- Certainty of evidence: very low to moderate for all outcomes, primarily because of risk of bias.
- Critical Outcome: Subsequent Use of Skills and Patient Outcomes.
 - Only 1 article reported any OHCA events (n=13), but the data were insufficient to enable meaningful comparisons between groups.
- Educational Outcomes (CPR and AED Skills)
 - Instructor-led training vs digital training with manikin practice for CPR: n=28
 - Instructor-led training vs digital training for AED: n=11
 - Instructor-led training vs digital training using video only for CPR: n=9
 - Instructor-led training vs gaming training: n=3

Treatment Recommendations

- We recommend instructor-led training (with manikin practice with feedback device) or the use of **self-directed training with video kits (instructional video and manikin practice with feedback device)** for the acquisition of **CPR** theory and skills in lay-adults and high school aged (>10 years) children (strong recommendation, moderate quality of evidence).
- We recommend instructor-led training (with AED scenario and practice) or the use of **self-directed video kits (instructional video with AED scenario)** for the acquisition of **AED** theory and skills in lay-adults and high school aged (>10 years) children (strong recommendation, low quality of evidence).

Treatment Recommendations

- We suggest BLS video education (without manikin practice) be used when instructor-led training or self-directed training with video kits (instructional video plus manikin with feedback device) are not accessible, or when quantity over quality of BLS training is needed in adults and children (weak recommendation, weak quality of evidence).
- There was insufficient evidence to make a recommendation on gaming as a CPR or AED training method.
- Insufficient evidence to suggest a treatment effect on bystander CPR rates or patient outcomes.

Knowledge Gaps

- Optimal methods to improve the achievement of guideline-recommended CPR metrics (compression rate and depth, chest recoil) and AED use
- Reporting and standardization of technical specifications of the manikin represent opportunities for future research.
- Evidence comparing outcomes from serious gaming with instructor-led training

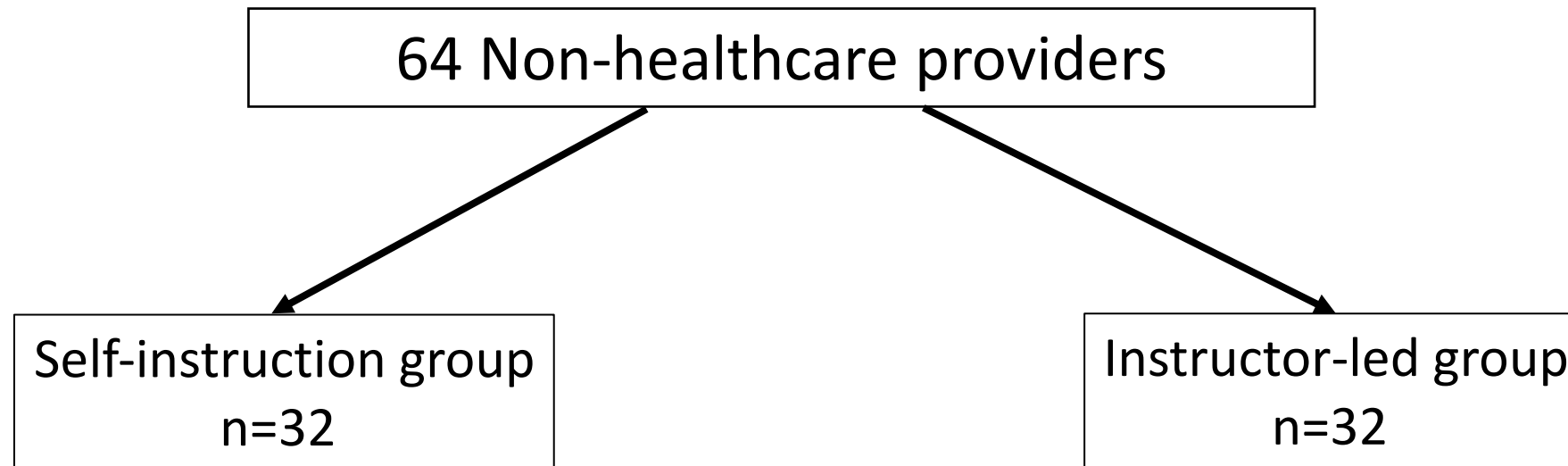
scientific reports



OPEN

A non-inferiority randomised controlled trial comparing self-instruction with instructor-led method in training of layperson cardiopulmonary resuscitation

Ying-Chih Ko^{1,5}, Chih-Wei Yang^{1,2,3,5}, Hao-Yang Lin¹, Wen-Chu Chiang⁴, Ming-Ju Hsieh¹✉ & Matthew Huei-Ming Ma^{1,4}✉



- Interventions of study groups
 - Self-instruction: instructional video plus manikin with automated feedback device
 - Instruction-led: instructor-led training with manikin practice by instructor feedback
- Non-inferiority margin: 10%

- Primary outcome: skill pass rate
- Secondary outcomes: individual skill performance

- The characteristics of participants in two groups were similar.

Outcome

Individual skill item (mean ± SD)	Self-instruction (n = 32)	Traditional instruction (n = 32)	p-value
1. Makes sure safety of the environment	0.47 ± 0.51	0.78 ± 0.42	0.009
2. Checks consciousness	1.00 ± 0	1.00 ± 0	-
3. Checks breathing < 10 s	0.26 ± 0.45	0.97 ± 0.18	<0.001
4. Calls for help	0.90 ± 0.30	0.91 ± 0.30	0.97
5. Corrects compression position	1.00 ± 0	0.97 ± 0.18	0.33
6. Corrects compression rate (100–120 bpm)	1.44 ± 0.84	1.84 ± 0.52	0.024
7. Corrects compression depth (5–6 cm)	1.66 ± 0.65	1.44 ± 0.76	0.22
8. Completes chest recoil	2.00 ± 0	2.00 ± 0	-
9. Opens airway	1.75 ± 0.57	1.97 ± 0.18	0.044
10. Chest elevation when giving breaths	1.59 ± 0.71	1.63 ± 0.75	0.87
11. Correct compression/breath ratio (30:2)	1.00 ± 0	1.00 ± 0	-
12. No unnecessary compression interruptions	2.00 ± 0	1.88 ± 0.34	0.044
13. Activates AED as soon as possible	0.56 ± 0.50	0.78 ± 0.42	0.06
14. Corrects AED pad position	0.81 ± 0.40	0.78 ± 0.42	0.76
15. Connects pad to AED machine	1.00 ± 0	1.00 ± 0	-
16. Clears site when analysing rhythm by AED	1.00 ± 0	1.00 ± 0	-
17. Clears site when defibrillation by AED	1.00 ± 0	1.00 ± 0	-
18. Resumes chest compression immediately after defibrillation	1.00 ± 0	1.00 ± 0	-
Pass rate, n (%)	30 (93.8%)	30 (93.8%)	

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Individual skill item (mean ± SD)	Self-instruction (n = 32)	Traditional instruction (n = 32)	p-value
Mean compression depth (mm)	48.39 ± 6.87	41.97 ± 8.76	0.002
Mean percentage of correct compression rate (100–120 bpm) (%)	47.78 ± 35.34	50.96 ± 37.05	0.73
Mean compression rate (bpm)	120.71 ± 10.61	115.42 ± 11.86	0.07
Mean percentage of full chest recoil (%)	77.74 ± 28.59	56.35 ± 37.03	0.014
Mean percentage of correct hand position (%)	96.74 ± 17.77	85.90 ± 31.04	0.10
Mean percentage of compression time within all CPR time period (%)	59.06 ± 5.63	57.06 ± 7.98	0.26
Mean ventilation volume (mL)	404.61 ± 154.89	615.10 ± 449.57	0.018
Mean percentage of correct ventilation volume (%)	96.45 ± 17.99	75.10 ± 42.33	0.013

Discussion

- Self-instruction group performed better in some chest compression and ventilation skills, but performed worse in confirming environmental safety and checking normal breathing.
- A blended training course for BLS course may be better
 - Self-directed digital learning before reduced face-to face training and manikin practice with automated feedback in front of an instructor
 - EIT 637: recommend e-learning as part of a blended-learning approach in ALS courses

Take Home Message

- One systematic review and 18 evidence updates were included in EIT 2021.
- Instructor-led training (with manikin practice with feedback device) or the use of self-directed training with video kits were both recommended for the acquisition of CPR and AED skills in lay-adults and high school aged (>10 years) children.
- BLS video education (without manikin practice) can be used when instructor-led training or self-directed training with video kits are not accessible.
- Self-directed digital learning before reduced face-to face training and manikin practice with automated feedback in front of an instructor may be cost-effective.
 - need more study