SAUDI HEART ASSOCIATION
NATIONAL CPR COMMITTEE

THE EVIDENCED BASED 2015 CPR GUIDELINES
Chapter 9 EDUCATIONAL STRATEGY

EDUCATION MODULE
In educational research, which often include manikin studies, participant learning outcomes are very common whereas patient-related outcomes and actual performance in the clinical setting were deemed the critical outcomes. For simulation research patient-related (and system-related) outcomes are more relevant than transfer of learning from the education programs to the clinical environment, which in turn is more important than isolated demonstration of learning in a training setting.

The EIT Task Force reviewed 17 PICO questions, which was a reduction of 15 questions from 2010. The questions selected included the following:
- Basic Life Support Training
- Cardiopulmonary resuscitation (CPR) instruction methods (self-instruction versus traditional)
- external defibrillator (AED) training methods
- Timing for basic life support (BLS) retraining
- Resource-limited settings
- BLS training for high-risk population
- Compression-only CPR training
- Automated Advanced Life Support Training
- Pre-course preparation for advanced life support (ALS) courses
- High-fidelity manikins in training
- Team and leadership training
- Timing for advanced resuscitation training

Implementation:
Implementation of guidelines in communities
Cardiac arrest centres
Social media technologies
Measuring performance of resuscitation systems
CPR feedback devices in training
Debriefing of resuscitation performance
Medical emergency teams (METs) for adults

Summary of New Treatment Recommendations
The following is a summary of the most important new reviews or changes in recommendations for education, implementation, and teams since the last ILCOR review, in 2010:

**Training**
- High-fidelity manikins may be preferred to standard manikins at training centers/organizations that have the infrastructure, trained personnel, and resources to maintain the program.
- CPR feedback devices (providing directive feedback) are useful for learning psychomotor CPR skills.
- One to two year retraining cycles are not adequate to maintain competence in resuscitation skills. The optimal retraining intervals are yet to be defined, but more frequent training may be helpful for providers likely to encounter a cardiac arrest.

**Systems Level**
- "You can’t improve what you can’t measure", so systems that facilitate performance measurement and quality improvement initiatives are to be used where possible.
- Data-driven performance-focused debriefing can help improve future performance of resuscitation teams. Out-of-hospital cardiac arrest (OHCA) victims should be considered for transport to a specialist cardiac arrest center as part of a wider regional system of care.
- There have been advances in the use of technology and social media for notification of the occurrence of suspected OHCA and sourcing of bystanders willing to provide CPR.
BLS TRAINING

For the OHCA victim, the goal is to increase rates of bystander CPR and deliver prompt defibrillation, because these are the major determinants of the community Chain of Survival. Unfortunately, only a minority of cardiac arrest victims actually receive bystander CPR, and it is difficult for potential rescuers to overcome barriers such as panic, fear of harming the victim, concern about the rescuers’ inability to perform CPR correctly, physical limitations, fear of liability or infection, or in some instances the victim’s characteristics. So, Recent training in CPR, along with dispatcher-assisted CPR may help overcome these barriers and save more lives. For health-care professionals, it is the quality of CPR delivered that is critical, because poor compliance with recommended guidelines has been associated with lower survival.

CPR Instruction Methods (Self-Instruction Versus Traditional)

ILCOR Treatment Recommendations: We suggest that video and/or computer-based self-instruction with synchronous or asynchronous hands-on practice may be an effective alternative to instructor-led courses (weak recommendation, very-low-quality evidence). The teaching material of the video or the computer and different type of self-instruction teaching courses might affect the learning effect.

SHA recommendation: as we have different training modules conducted including video with instructor-led, video with hands on practice all synchronized in the same courses, we found from the clinical practice of health care provider no difference. The National CPR committee will start E learning training for the cognitive part and hands on training in the accredited training center.

AED Training Methods

ILCOR Treatment Recommendation:
For lay providers learning AED skills, we suggest that self-instruction combined with short instructor-led training may replace longer traditional courses (weak recommendation, low-quality evidence).
For healthcare providers learning AED skills, we suggest that self-directed training (as short as 40 minutes) may be used in place of traditional training (weak recommendation, low-quality evidence).
SHA recommendation: we will keep same practice of teaching lay persons the AED for high risk population through the heart saver program while health care providers through BLS.

Timing for BLS Retraining
ILCOR Treatment Recommendations 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 months 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).

SHA recommendation: we will keep the 2 years recertification period for all courses conducted by Our accredited centers.

Compression-Only CPR Training

ILCOR Treatment Recommendation We suggest that communities may train bystanders in compression-only CPR for adult OHCA as an alternative to training in conventional CPR (weak recommendation, very-low-quality evidence). Recognizing that a proportion of cardiac arrests are caused by asphyxia (e.g., drowning or with cardiac arrests involving children) and in these cases compression-only CPR may not be as effective as conventional CPR, the EIT Task Force suggests that communities consider epidemiology of cardiac arrest in their locale, their bystander CPR response rates, and cultural preferences along with this systematic review to decide on their optimal community CPR training strategy.

The impact of training communities to use compression-only CPR

Resource-Limited Settings

ILCOR Recommendations:
We suggest that alternative instructional strategies would be reasonable for BLS or ALS teaching in low-income countries (weak recommendation, very-low-quality evidence). The optimal strategy has yet to be determined.

SHA recommendation: we recommend to keep the same practice of teaching the skills of both chest compression and ventilation with emphasis on the proper compression components.

Basic Life Support Training for High-Risk Populations

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

SHA recommendation: we will keep the same practice as we are conducting courses to industrial workers and high volume places and Malls beside workers of resorts. In addition SHA conducting these courses for ministry of education and wide rage of high risk population.
ADVANCED LIFE SUPPORT TRAINING

ALS training was established in the mid-1970s. Since this time, the courses have evolved in design and have been implemented in many different countries, training health-care workers throughout the world. Unfortunately, the literature suggests that without ongoing education the skills learned in these courses are lost over a period of months. There are also increasing pressures from administrators to justify the time and costs of training away from the clinical workplace. This section addresses issues associated with ALS training and key PICO questions which include the following:

- The use of precourse preparation to determine if it improves learning and clinical performance.
- The use of high-fidelity manikins.
- The effect of leadership and team training.
- Determine if there is any evidence for an alternate retraining interval to affect learning and performance of healthcare workers.

Precourse Preparation for Advanced Life Support Courses

**ILCOR Treatment Recommendation:** The confidence in effect estimates is so low that the task force decided a specific recommendation for or against precourse preparation in ALS courses was too speculative.

SHA recommendation: we recommend the use of pre test evaluation which is built in the CPR portal since 2012 as it observed to effective for the course preparation. Also we will develop an E learning module to include interactive wide range coverage of all cognitive skills.

High-Fidelity Manikins in Training

**ILCOR Treatment Recommendations** 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 based on 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 based on low-quality evidence). In reviewing the science, it was clear that there was a benefit to high-fidelity manikins but less clear whether the incremental costs justified the added expenses.

SHA recommendation: we encourage the use of high-fidelity manikins under proper circumstances and preset program. The use of interactive program briefing and debriefing is more effective.
Team and Leadership Training

**ILCOR Treatment Recommendations:** We suggest that team and leadership training be included as part of ALS training for healthcare providers (weak recommendation, low-quality evidence).

SHA recommendation: we are emphasizing during the ALS courses on the rule of team leader and that clear from the program and skill stations where there is a separate training skill. We encourage all accredited training centers and hospitals applying Mock code to emphasize on the leader roles.

Timing for Advanced Resuscitation Training

**ILCOR Treatment Recommendation** Compared with standard retraining intervals of 12 to 24 months, we suggest that more frequent manikin-based refresher training for students of ALS courses may be better to maintain competence (weak recommendation, very-low-quality evidence). The optimal frequency and duration of this retraining is yet to be determined.

SHA recommendation: we will keep the 2 years recertification period for all courses conducted by Our accredited centers. During this period we encourage centers and hospital to conduct mock code refreshing courses.
IMPLEMENTATION

The resuscitation literature is heterogeneous in its methods, quality, and results. Studies conducted decades apart or in different settings often demonstrate conflicting findings, making comparisons difficult; yet resuscitation councils are required to develop evidence-based guidelines for organizations to implement. Past guideline rollouts have demonstrated that implementation is neither easy nor straightforward and can take years to accomplish. The barriers to implementing a guideline within an organization may delay its entry into practice by years, and modifying caregiver behaviors can take years longer. Recognizing this, publishing clinical practice guidelines is not sufficient without including a discussion of how to implement them. Several barriers delayed implementation of the 2005 resuscitation guidelines among member organizations of the Resuscitation Outcomes Consortium, including delays in training providers, obtaining training materials and instructors, reprogramming defibrillators, changing regulatory frameworks, obtaining agreement from physician leadership, and conflicting research interests. Similar delays were also demonstrated in Europe. The questions reviewed include:

- Implementation of guidelines in communities.
- Cardiac arrest centres.
- Social media technologies.
- Measuring performance of resuscitation systems.
- CPR feedback devices in training.
- Debriefing of resuscitation performance.
- MET for adults.

**Implementation of Guidelines in Communities**

**ILCOR Treatment Recommendations** We recommend implementation of resuscitation guidelines within organizations that provide care for patients in cardiac arrest in any setting (strong recommendation, very-low-quality evidence).

We recognize that most of the authors of the 2015 CoSTR are involved in writing resuscitation guidelines and that this should be considered a potential intellectual conflict of interest.

Knowledge Gaps: The optimal treatment components of resuscitation guidelines are unknown. The optimal methods for knowledge translation are unknown. The optimal methods for implementation are unknown.

SHA recommendation we recommend all health sectors and training centers to adapt our guidelines inside the Kingdom of Saudi Arabia and collaborate with the SHA in developing the science of resuscitation in our region. The unique variation between the health sectors inside Saudi Arabia from the prospect of infrastructure, personnel level of education and facilities give an opportunity to have our own database.
Cardiac Arrest Centers:

ILCOR Treatment Recommendation: We suggest that OHCA patients should be considered for transport to a specialist cardiac arrest center as part of wider regional system of care for management of patients with OHCA (weak recommendation, low-quality evidence).
SHA recommendation: we recommend to have specialized cardiac arrest centers for the management of OHCA like other specialized cardiac, trauma, renal, ... etc.). This recommendation needs a higher level integration between all health care and EMS sectors.

Values, Preferences, and Task Force Insights In making this recommendation, we recognize the development of cardiac arrest centers may be considered as a health improvement initiative, as has been performed for other critical conditions, including myocardial infarction, stroke, and major trauma, without the evidence of randomized trials.

Knowledge Gaps; What are the precise differences in post resuscitation care received at cardiac arrest centers compared with non–Cardiac arrest centers?
The safe journey time or distance for patient transport under various conditions is unknown.
The essential treatments that a cardiac resuscitation center should offer need to be defined.
What is the role of secondary transport from receiving hospital to a regional center?
Is there sufficient clinical equipoise to conduct an RCT of standard care versus transport to a cardiac resuscitation center?

Social Media Technologies

ILCOR Treatment Recommendation We suggest that individuals in close proximity to suspected OHCA episodes who are willing and able to perform CPR be notified of the event via technology or social media (weak recommendation, moderate-quality evidence).
SHA recommendation: we recommend early CPR to all OHCA and support all efforts that encourage this concept. There are ongoing projects supported by SHA like global positioning system (GPS) tracing for pre hospital AED and rescuer in each family, rescuer in each house.. etc. the efforts still needs more collaboration between different stakeholders.

Values, Preferences, and Task Force Insights In making this recommendation, we place value on the time-sensitive benefit of CPR and AED use in OHCA and the limitations of optimized emergency medical services systems to improve response times. We also recognize that there are individuals willing and able to provide BLS in most communities and these novel technologies can engage these individuals in the response to cardiac arrest outside the hospital.
Knowledge Gaps:
What is the impact of notified versus un notified bystander responses on clinically meaningful patient outcomes such as survival to hospital discharge with good neurologic outcome, survival to hospital discharge, survival to hospital admission, and ROSC?
What is the impact of notified versus un notified bystander responses on bystander CPR rates and time to first compressions?

Measuring Performance of Resuscitation Systems

ILCOR Treatment Recommendation We suggest the use of performance measurement and quality improvement initiatives in organizations that treat cardiac arrest (weak recommendation, very-low-quality evidence).
SHA recommendation: we recommend the role of CPR committees inside the health organizations to review cardiac arrest events on monthly bases and use the quality tools like FOCUS PDCA to improve the outcome performance of resuscitation and the patients outcomes.

Once new guidelines have been approved and frontline providers trained, their real-life integration is often over-looked. Assessing clinical performance and using a system to continuously assess and improve quality can improve compliance with guidelines.
Knowledge Gaps: There is a need to identify the most appropriate approach to measure performance. Better understand the influence of local community and organizational characteristics.

CPR Feedback Devices in Training

For the critical outcomes of improvement of patient outcomes and skill performance at actual resuscitation, we found no evidence that examined the use of feedback devices.

ILCOR Treatment Recommendation We suggest the use of feedback devices that provide directive feedback on compression rate, depth, release, and hand position during training (weak recommendation, low-quality evidence). If feedback devices are not available, we suggest the use of tonal guidance (examples include music or metronome) during training to improve compression rate only (weak recommendation, low-quality evidence).
SHA recommendation: we recommend the use of feedback devices or tonal guidance during the real-time chest compression.

In making these recommendations, a higher value was placed on the potential of improving CPR performance over the potential costs. Used by BLS instructors, these real-time feedback adjuncts can provide accurate participant performance information to give effective feedback during training.

Debriefing of Resuscitation Performance

There were no RCTs and no studies comparing briefing as the sole intervention.
**ILCOR Treatment Recommendations** We recommend data-driven, performance-focused debriefing of rescuers after IHCA in both adults and children (strong recommendation, low-quality evidence). We suggest data-driven, performance-focused debriefing of rescuers after OHCA in both adults and children (weak recommendation, very-low-quality evidence).

SHA recommendation: we recommend that all organization treating cardiac arrest to conduct refreshing courses to the code teams in the form of mock codes with briefing and debriefing sessions immediately after the code. In case of inability to conduct such mock code due to the unavailability of low or high fidelity manikins, debriefing session on real patients can be done.
ILCOR Treatment Recommendations We suggest that hospitals consider the introduction of an Early Warnings System (EWS)/response team/Medical Emergency Team (MET) system to reduce the incidence of IHCA and in-hospital mortality (weak recommendation, low-quality evidence).
SHA recommendation: we recommend all health organizations introduce the concept of rapid response team (RRT) to prevent and/or reduce the in-hospital Cardiac Arest and mortality.
This recommendation places a high value on the outcomes—the prevention of IHCA and death—relative to the likely substantial cost of the system. Such a system should provide a system of care that includes (a) staff education about the signs of patient deterioration; (b) appropriate and regular vital signs monitoring of patients; (c) clear guidance (eg, via calling criteria or early warning scores) to assist staff in the early detection of patient deterioration; (d) a clear, uniform system of calling for assistance; and (e) a clinical response to calls for assistance.

Related Appendix
Please refer to the following appendices:
The CPR check list
The CPR policy
The mock code policy