

IMPROVING IN-HOSPITAL CARDIAC ARREST SURVIVAL RATES THROUGH REFRESHER TRAINING:

How ACLS Virtual Reality
Simulation Impacts
Skills Retention

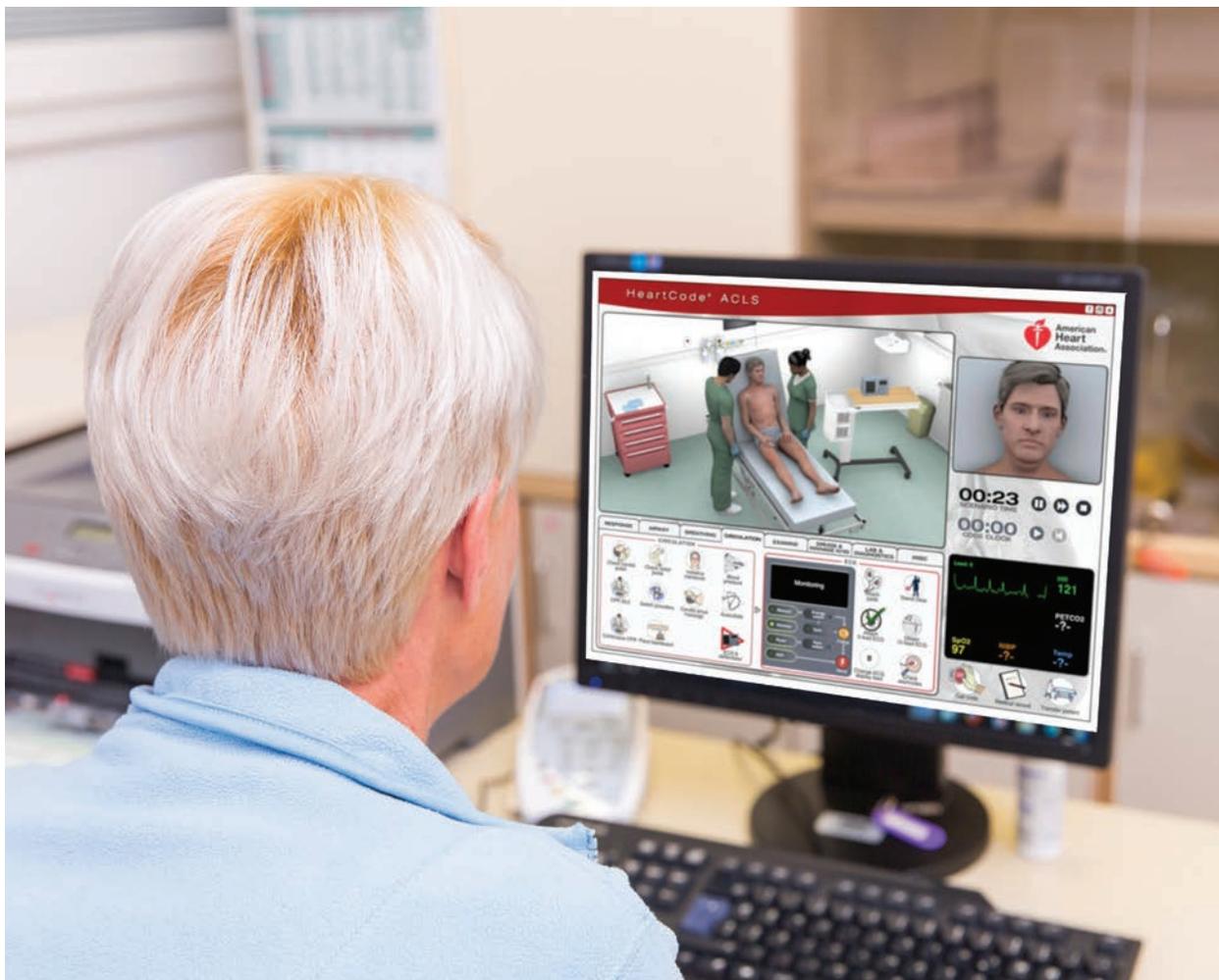


HEALTH X SCHOLARS



SYNOPSIS

In-hospital cardiac arrest occurs in approximately 200,000 adult patients annually in the United States¹ with survival rates varying between hospitals, from 11% to 35%.² Advanced Cardiovascular Life Support (ACLS) certification from the American Heart Association is meant to ensure healthcare professionals know how to identify and treat core heart rhythms they may encounter, and ideally, improve these numbers.



¹ https://cpr.heart.org/AHA/ECC/CPRECC/AboutCPRECC/CPRECCFactsAndStats/UCM_475748_CPR-Facts-and-Stats.jsp, accessed January 9, 2019.

² Risk-standardizing survival for in-hospital cardiac arrest to facilitate hospital comparisons. Chan PS, Berg RA, Spertus JA, Schwamm LH, Bhatt DL, Fonarow GC, Heidenreich PA, Nallamothu BK, Tang F, Merchant RM, AHA GWTC-Resuscitation Investigators. *J Am Coll Cardiol*. 2013 Aug 13; 62(7):601-9.



TRAINING FOR IN-HOSPITAL CARDIAC ARREST

Patients in which clinical staff reported adequate resuscitation training have greater than threefold odds of higher survival rates than patients where adequate training programs are lacking.³ In fact, the rate of survival after cardiac arrest increased by 28.3% with implementation of ACLS training courses.⁴

The ACLS certification is active for two years, yet for those who work in non-critical care areas, the knowledge decays after mere months, much faster than Basic Life Support (BLS) skills decay.⁵ Health systems have struggled to implement cost-effective and adequate refresher training due to the volume of individuals who need training versus the limited numbers of clinical educators.

Currently, AHA offers Heart Code® training, a blended learning method that allows students to self-direct their studies and

then perform hands-on skills assessment. While perfect for BLS and ACLS certification training, it still requires an in-person skills session, which can be difficult to scale across an entire healthcare system for refresher training. To help, AHA has added the Resuscitation Quality Improvement (RQI) program, which leverages Laerdal RQI – mobile simulation stations featuring specialized manikins – for CPR skills retention and 90-day certification extensions.

RQI serves an important purpose in clinical staff certification, especially for resuscitation and CPR skills, but it doesn't offer a scalable, full-spectrum platform for refreshing the ACLS skills necessary to identify the proper protocol for algorithms. Nor does it target the teamwork and communication skills clinicians also need to practice to ensure they're prepared for a cardiac event.

“Communication just needs to get better. There are some residents who are really good at giving direct orders or finding roles, closing the loop, all that stuff. But, there are some who aren't trained on that and they don't know how to do it and so, will talk softly or they won't give a complete order and things kind of get lost.”

– Critical Care Nurse; Hospital I; Bottom-Performing Hospital

“And it's all about team training, less clinical, more team...”

– Cardiology Physician; Hospital D; Top-Performing

³ Resuscitation practices associated with survival after in-hospital cardiac arrest: a nationwide survey. Chan PS, Krein SL, Tang F, Iwashyna TJ, Harrod, M Kennedy M, Lehrich J, Kronick S, Nallamothu BK, AHA GWTC-Resuscitation Investigators. *JAMA Cardiol.* 2016 May 1; 1(2):189-97.

⁴ Impact of advanced cardiac life support training program on the outcome of cardiopulmonary resuscitation in a tertiary care hospital. *Indian Journal of Critical Care Medicine* 15(4):209-12. October 2011

⁵ Resuscitation Education Science: Educational Strategies to Improve Outcomes From Cardiac Arrest. *Circulation.* 2018;138:e82-e122. August 2018

⁶ How Do Resuscitation Teams at Top-Performing Hospitals for In-Hospital Cardiac Arrest Succeed? *Circulation.* 2018;138:154-163. 9 July 2018

⁷ How Do Resuscitation Teams at Top-Performing Hospitals for In-Hospital Cardiac Arrest Succeed? *Circulation.* 2018;138:154-163. 9 July 2018



SCALABLE ACLS REFRESHER TRAINING

Simulation directors, nurse educators and others responsible for patient safety and quality measures need to be able to control the environments and content they deliver to learners, providing consistent experiences for all learners, no matter their locations or when they're available to complete the trainings.

They need to easily set up simulations with less travel time, resourcing restraints and costs. And finally, they need the ability to provide real-time feedback, and track participants' performance and progress, using it to inform future training and improve cardiac patient outcomes at scale. They can when they implement Health Scholars' virtual reality (VR) ACLS training.





HOW VIRTUAL REALITY IMPACTS LEARNING

VR leverages cognitive, behavioral, and emotional learning systems to create impactful, memorable experiences. A recent University of Maryland study compared VR head-mounted displays (HMD) to traditional desktop displays and found that overall average recall performance of participants in the HMD condition was 8.8% higher compared to the desktop condition. Additionally, 70% of users reported that HMD afforded them a superior sense of the spatial awareness, which they claimed was important to their recall success.⁸

In addition to engaging learners for increased recall, VR is:



Scalable: A one-time VR equipment expense unlocks the ability to leverage content and applications across a wide variety of training exercises, procedures and scenarios that would otherwise take educators months to prepare for and execute.



Targeted: VR allows training to specific workflows or skills, customized to the learner's own vulnerabilities.



Consistent at Scale: Training thousands of clinicians across departments, offices and geographies can make for disparate learning experiences, which can lead to costly errors. VR lets educators control the content, instruction, and environment, providing a consistent educational experience for as many learners as they desire at a lower cost than traditional simulation practices.



Cost effective: By virtualizing training, organizations are able to provide refresher training at scale for 50% less than the cost of physical simulation.⁹



⁸ Krokos, Eric, Catherine Plaisant, and Amitabh Varshney. "Virtual Memory Palaces: Immersion Aids Recall." *Virtual Reality*. 2018.

⁹ Health Scholars. Evidence Brief: Health Scholars' Fire in the OR™ Virtual Reality Simulation. July 15, 2018. Accessed November 1, 2018. <https://healthscholars.com/fire-in-the-or-evidence-paper/>.



ACLS VIRTUAL REALITY SIMULATION TRAINING

To effectively address and combat ACLS skills decay, Heath Scholars developed *ACLS Virtual Reality Simulation* training. An immersive VR application, it's designed in accordance with AHA guidelines to complement AHA's HeartCode® training and RQI program. It instructs participants and validates the competencies needed to diagnose and resuscitate adults with cardiopulmonary arrest and other common cardiac emergencies.

HOW IT WORKS

Learners play the role of team lead running a critical encounter and are provided the core ACLS rhythms across stable, unstable and cardiac-arrest scenarios. The experiential learning method requires learners to identify rhythms in the context of the patient's stability and direct virtual team members to shock, give meds, and/or perform CPR as necessary using state of the art voice recognition technology.

ACLS Virtual Reality Simulation can be used as a pre-learning application before physical simulation or to validate and refresh competencies requisite to identifying and properly managing the patients with cardiopulmonary emergencies, including cardiac and respiratory arrest. It uses state-of-the-art voice recognition technology to help learners:

- Address team members by name and make eye contact
- Speak clearly and concisely
- Practice situational awareness of team-member fatigue and task performance
- Engage closed-loop communications
- Reflect on areas of improvement with an in-app debrief





HOW IT WORKS

According to an AHA scientific statement, “Resuscitation Education Science: Educational Strategies to Improve Outcomes from Cardiac Arrest”:

- The current massed approach to resuscitation training should be replaced or supplemented with a spaced practice.
- The duration and design of each training session, the interval between sessions, and the number of repetitions should be tailored to context, learner type, objectives, and prior experiences.
- Techniques such as debriefing after real resuscitation events and in situ simulation can be used to provide spaced training experiences
- Technology-enhanced simulators and learning management systems should be used to collect individual learner data during training to determine the interval of training.¹⁰

ACLS Virtual Reality Simulation can meet all of these needs without bulky equipment or high coordination overhead. It immerses learners in a VR situation that allows them to provide voice-directed commands and show they understand the core rhythms as well as how to address them while using proper communication skills. Its features allow it to:

- Train to all of the AHA core rhythms including return of spontaneous circulation (ROSC)
- Place the learner in the role of the team lead, as required by AHA, and recreate the stress of a mega code situation
- Provide standardized practice, assessment and skills validation
- Debrief on failed waveform identification and on general code management principals needing improvement
- Be completed without having to schedule an entire team – extending the reach of training
- Be used 24/7, at the convenience of the learner, encouraging increased training frequency

“ACLS skills degrade quickly, and we know that repeatable, deliberate practice is the best way for clinicians to master and maintain resuscitative management principals. Health Scholars’ virtual reality training prevents ACLS skills decay by enabling learners to physically engage in code situations at an appropriate frequency. It’s realistic, clinically accurate and can be completed at the convenience of the learner.”

– Daniel Katz, Anesthesiologist, ACLS Instructor



A REPEATABLE, TARGETED ACLS TRAINING SOLUTION

Educators should deliver resuscitation education experiences that allow learners to practice key skills, receive directed feedback and improve until they attain mastery. According to AHA, “Overlearning and automaticity should be considered, with the learner spending extra time practicing a skill even after performing it correctly once, with a goal of performing it correctly a specified number of times or more quickly and within a certain time frame to attenuate the natural decay of skill.”

ACLS Virtual Reality Simulation allows for inexpensive, repeatable skills practice, and automates and tracks this exchange of information. As part of the Health Scholars One™ learning platform, it allows for team debriefs and learning progress tracking. This helps learners and educators efficiently target the specific areas in need of additional focused training at the individual level or in aggregate across the healthcare organization.

With the relatively low in-hospital cardiac arrest survival rate, ACLS refresher training is one of healthcare leaders’ and educators’ top priorities. Implementing *ACLS Virtual Reality Simulation* complements existing training options and offers skills retention at a lower cost repeatedly at scale.

**Train effectively.
Train often.
Save more lives.**

For more information about how *ACLS Virtual Reality Simulation* can impact ACLS skills retention in your healthcare system, [request a demo](#).





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