

PX Advisor

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WHERE STRONG LEADERS FIND INSPIRED THINKING

HEALTHCARE COMPLIANCE DOING

The Right Thing

- Avoid conflicts of interest
- Improve resuscitation rates
- Improve cyber security
- Always explain things to patients in a way they can understand

Frequent Practice and Real-Time Feedback Are Keys to Improved Resuscitation

“Conflicts of Interest” Are Becoming Hot Topics in Healthcare



FREQUENT PRACTICE & REAL-TIME FEEDBACK ARE KEYS TO IMPROVED **RESUSCITATION**



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In our feature article this quarter, HealthStream takes a look at the practice of resuscitation. Many of us have perceptions from popular television shows that resuscitation is almost always effective; however, the truth is that we are really not as good at resuscitating as you might think. Currently, we are only able to revive about 19% of those with in-hospital cardiac arrest.

New research from the American Heart Association and others is showing that more frequent CPR training is needed in our healthcare organizations and that real-time feedback using voice-assisted manikins can greatly improve students' skills at resuscitation. Even long-time CPR instructors have been shocked to discover that they do not pass tests incorporating the more sophisticated tools that can be leveraged to measure performance.

Most hospitals in the U.S. use traditional classroom instruction to train employees in CPR, with only about 30% making the switch to the American Heart Association's HeartCode® program that includes online instruction coupled with practice using Voice-Assisted Manikins. Those who have made the upgrade have seen improvements in CPR quality, code response rates, and employee confidence and competence. The American Heart Association's Resuscitation Quality Improvement (RQI) program is the next generation of this training. By breaking the learning that is typically required every two years into short quarterly modules, learners are proving to have higher retention and patient survival rates.

Here we look at the latest available research on resuscitation and talk with Resuscitation Scientist, Associate Professor, and Emergency Medicine Specialist Dr. Michael Kurz about his experiences at the University of Alabama-Birmingham.

Cardiac Arrest is a Leading Cause of Death

Internationally, more than 135 million cardiovascular deaths occur each year, and this number is increasing. Across the globe, for every 100,000 people, cardiac arrests range from 20-140 people. Unfortunately, survival rates are low and range from 2 – 11 % (Meaney, et al., 2013).

In the U.S., survival rates are slightly higher but still less than 15%. Cardiac arrest is a leading killer in the U.S. "claiming more lives than colorectal cancer, breast cancer, prostate cancer, influenza, pneumonia, auto accidents, HIV, firearms, and house fires combined" (Meaney et. al., p. 418).

Even in hospital settings, survival rates are surprisingly low and typically range from 15 – 20%. Interestingly, there is a difference in survival rate based on the time of day that the arrest occurs. For example, there is a 20% survival rate if the arrest occurs between 7 AM and 11 PM. However, the survival rate drops to 15% if the arrest occurs between 11 PM and 7 AM. Meaney et al. also reported that there is a survival difference based on the interaction between location in the

hospital and time of the arrest. There is only a 9% survival rate if the arrest occurs in an unmonitored setting at night. The rate increases to about 37% if the arrest occurs during the day in the operating room or a post-anesthesia unit. Clearly, there is an opportunity in the U.S. healthcare system to reduce variation and improve overall survival rates from cardiac arrest.

High-Quality CPR is a Helpful Defense

Prompt and effective CPR intervention has shown to be helpful in improving survival from cardiac arrest. The amount of time between the cardiac event and the performance of high-quality CPR is related to survival (Kardong-Edgren, Oermann, Odom-Maryon, and Ha, 2010). The depth and rate of compressions used during CPR has also been shown to impact the outcome of cardiac arrest. "When rescuers compress at a depth of <38 mm, survival-to-discharge rates after out-of-hospital arrest are reduced by 30%. Similarly, when rescuers compress too slowly, return of spontaneous circulation (ROSC) after in-hospital cardiac arrest falls from 72% to 42%." In the 2010 Consensus Statement of the American Hospital Association, Dr. Peter A. Meaney, MD, MPH, of Children's Hospital of Philadelphia, and colleagues conclude, "Poor-quality CPR should be considered a preventable harm" (Meaney et al., p. 418).

High-Quality CPR is Challenging

High-quality CPR is difficult. CPR quality is poor even among trained medical professionals. Smith, Gilcrest, and Pierce (2008) as reported by Kardong-Edgren, Oermann, and Odom-Maryon (2012) found that "only 63% of nurses (44% were working in critical care or emergency departments/operating rooms) could pass BLS at 3 months after course completion and only 58% at 12 months" (p. 9).

Kardong-Edgren et al. (2012) conducted a year-long study using 10 nursing schools and 606 nursing students. The goal of the study was to determine the number of nursing students that were unable to perform CPR compressions and ventilations correctly. "After CPR course completion, 57 (10%) of the 606 participants were unable to perform correctly either

of these two skills (compressions and ventilation). For participants who completed monthly practice, the number of participants unable to perform either of these two skills decreased from 25 (8%) to 3 (1%) compared with the no practice group, which decreased from 32 (11%) to 17 (6%)” (p. 13).

Why Is High-Quality CPR So Difficult to Master and Retain?

- Most CPR training programs are infrequent, which results in quick deterioration of skills that are taught (Meaney et al., 2013).
- Instructor-led CPR training may not be effective for learning basic CPR skills or retention of these skills (Kardong-Edgren et al., 2010).
- Students often fail to develop adequate skills during CPR training—especially in the areas of compression rate, compression depth, and ventilation rate. (Kardong-Edgren et al., 2012)
- Providers are unable to retain CPR skills without practice (Oermann, Kardong-Edgren, and Odom-Maryon, 2011)

Some Solutions to the Problem

An AHA expert panel found that CQI (continuous quality improvement) programs have proven to be more effective in enhancing the quality of CPR when compared to training programs that are only taken once every two years. However, the CQI approach has not been used widely in healthcare organizations. Thus, the overall quality of CPR remains low although there are opportunities to improve through the use of CQI programs (Meaney et al., 2013). The panel recommended continuous training programs that are characterized by frequent and short training sessions. This continuous model enhances retention of skills learned. One of their final recommendations was to “implement strategies for continuous improvement in CPR quality and incorporate education, maintenance of competency, and review of arrest characteristics that include available CPR quality metrics” (Meaney et al., 426). A study by Kardong-Edgren et al. (2010), conducted prior to the AHA panel’s summary, addressed several of their recommendations. The purpose of their study was to compare a computer-based CPR course that included

The panel recommended continuous training programs that are characterized by frequent and short training sessions.

VAM (voice assisted manikin) feedback (HeartCode® BLS) with an instructor-led course (IL) in terms of compression rate and depth, correct hand placement, ventilation frequency and volume on 604 nursing students across 10 nursing schools. While they found no difference between the two methodologies on compression rate, “students who had the HeartCode course and practiced CPR on VAMs had significantly more compressions with adequate depth ($p < 0.0001$) and ventilations with adequate volume ($p < 0.0001$) than did students trained by instructors (p. 1023).”

A few other studies found similar results.

- Niles, Sutton, Donoghue, and Kalsi (2009) found that refresher training with a portable manikin/defibrillator system resulted in significantly shorter times for proficiency in CPR.
- Mpotosa, De Weverb, and Cleymanse (2013) found that short self-learning CPR sessions with a training video and computerized voice feedback manikin training was very successful in learning effective CPR.
- Diez, Rodriguez-Diez, and Nagore (2013) in a study of 2nd year medical students found that VAM participants (as opposed to IL) performed more accurately in terms of hand position and produced better compression rates. Cost reduction and time saving for instructors was also mentioned.

In conclusion, the research is clearly indicating that more frequent and more automated training can improve resuscitation skills. These findings are corroborated by the following article from Resuscitation Scientist Dr. Michael Kurz.



5 Things You Should Know about Resuscitation

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Michael Kurz considers himself to be a “Resuscitation Scientist.” He began his training at the University of Virginia in Charlottesville, where he obtained his M.D. degree and an M.S. in Health Evaluation Sciences. Dr. Kurz did his Emergency Medicine Residency at the University of Chicago and his Emergency Cardiac Care Fellowship at the Virginia Commonwealth University Medical Center. Along the way, he has served as a paramedic and flight physician. Dr. Kurz is now Associate Professor of Emergency Medicine at the University of Alabama-Birmingham (UAB), where he is also one of five attendings for post-resuscitation service and focuses on improving resuscitation outcomes both inside and outside the hospital.

Although he is not yet 40 years of age, Dr. Kurz has received numerous research awards. He has 25 articles published in peer-reviewed journals, with 6 more pending, and is a reviewer for a variety of academic publications including Circulation, Annals of Emergency Medicine, and Resuscitation. He is a volunteer for the American Heart Association (AHA) and an author of the 2015 AHA Guidelines for CPR and ECC which will be released in October. [He neither holds an official role with nor receives any financial support from the AHA.]

1) Our failure rate is high

For many of us, our perceptions of resuscitation have been heavily influenced by what we have seen on TV. We have the notion that the patient almost always survives; however, the reality is very different. Survival rates from in-hospital cardiac arrests (IHCA) are actually quite low—averaging 19% for adults and 35% for children (Griffin, 2013).

We know that these survival rates could be much higher if healthcare professionals consistently provided life support according to the specifications of the American Heart Association (AHA). A survey was recently conducted by Ipsos, a global survey-based research company, to assess adherence to the AHA guidelines. More than 1,000 self-reported “CPR experts” were surveyed, with the typical respondent having performed CPR for more than 13 years, been in their current position for about seven years, and performed CPR approximately 300 times in their career and 23 times in the past 12 months (O’Connor, 2010). The results showed that 75% of these individuals perceived their CPR skills to be quite high, and most said they were familiar with the AHA guidelines. Yet, only 26% reported that their performed rate, depth,

and ratios were fully compliant with the AHA’s ECC and CPR guidelines. Although TV makes it look easy, it is really quite hard to do CPR well for two minutes.

Target CPR Performance Metrics

1. Chest Compression FRACTION (CCF) >80%
2. Compression RATE of 100 to 120/minute
3. Compression DEPTH (Adult) >50mm
4. Full Chest Recoil (with ZERO leaning)
5. Avoid EXCESSIVE VENTILATION
 - a. Minimal chest rise
 - b. RATE, 12 breaths/minute

Source: American Heart Association, 2013

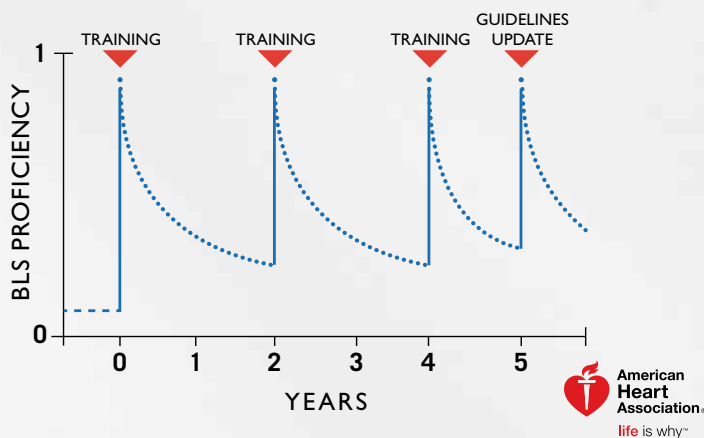
2) Current training methods are less than optimal

Today, healthcare professionals are trained in CPR every two years. Most employees take AHA’s Basic Life Support (BLS) course for Healthcare Providers, while those working in more intense environments, such as the Emergency Department and ICU, take the more in-depth Advanced Cardiovascular Life Support (ACLS) course. While some healthcare organizations have

upgraded to the use of online courses with computer-enabled manikins that provide immediate feedback, a majority of employees are still training using classroom instruction and manikins that are not computer-enabled to provide feedback. Recent research has illuminated two basic problems with this historical approach.

First, live instructors in a classroom setting are not able to provide the full range of feedback necessary to ensure high-quality CPR. For example, a live teacher can coach on the RATE of compressions, necessary, but they can neither assess the true DEPTH of the compression nor the RECOIL time between compressions. Second, research is showing that CPR competence rapidly erodes and is not sustained throughout the two years in between certifications. The following graph shows a peak in competency at the time of the 2-year training, but steady erosion from that date until the next training course. Clearly, the current two-year course model does not lend itself to the necessary maintenance of competency.

Biennial Training Does Not Sustain HQ CPR



3) There is a better way

Research is showing that targeted, frequent training sessions of only 6-8 minutes can dramatically improve CPR skills competency. A recent study examined the effects of quarterly, 6-minute training sessions on the CPR performance of nursing students. One group of nursing students practiced their CPR skills after 3, 6, 9, and 12 months, compared to a control group that had no practice sessions. The study found that the group who practiced either maintained or improved their skills over time while the control group showed

significant deterioration of skills (Oermann et al., 2011). In response to a preponderance of data corroborating these findings, the AHA 2010 Guidelines on CPR and ECC recommend the use of more frequent training for improved CPR proficiency.



Healthcare providers in the Resuscitation Quality Improvement (RQI) Program are required to participate in quarterly 6-8 minute CPR skill simulations using a new mobile RQI station. In addition, students are assigned brief online modules focusing on cognitive content that must be completed each year. The computerized manikin stations provide real-time audio-visual feedback during the skills assessment to ensure proficiency on all CPR metrics (including compression depth and recoil), allowing students to make real-time adjustments in their delivery of CPR. This approach also aligns with the optimal way adults learn with frequent, short, intense bursts of training.

4) Pilots show clinical and financial success

Pilots of the new RQI Program have been underway since 2012, with participation from sites like The Ohio State University and Kaiser Permanente San Diego. Pilots have shown an improved maintenance of competence among staff, and survey participants have indicated a high level of satisfaction with the new program.

The business case for RQI has also been confirmed. We are finding that the RQI Program can provide as much as a 6x ROI compared to traditional classroom instruction. It is cheaper, more effective, and safer than older methods. Proficiency and competency are improved even though RQI requires significantly less time per person for training.

5) Staff are stunned to learn that they may have not been delivering high quality CPR

The AHA, Laerdal Medical, and HealthStream have collaborated to bring a turnkey solution to RQI for healthcare organizations. The University of Alabama-Birmingham began using this program in early 2015. Initially, people were attracted to the new toy, and we found that early adoption was high. My staff liked the real time feedback. Many were stunned because they had passed their 2-year training but were unable to deliver high quality CPR for more than 30 seconds using the new mobile station. Staff also liked that they

could receive training in only 6-8 minutes during their regular shift rather than having to attend time-consuming classes. Staff have been holding competitions to see who has the best metrics on the shift, and this has led to more confident, competent providers.

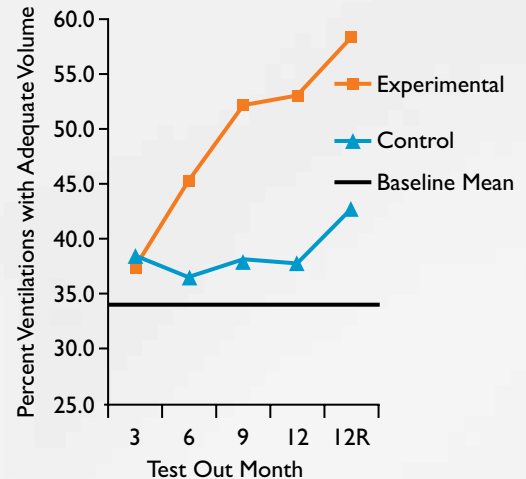
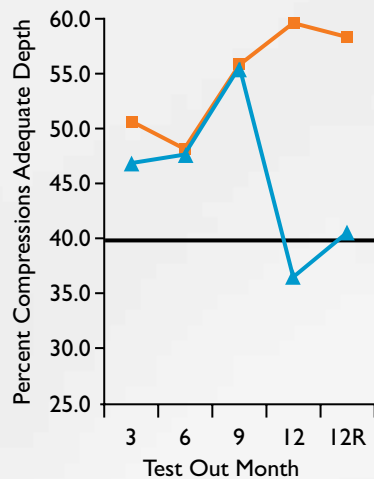
The biggest challenge is gathering the courage to accept disruptive innovation. It was a difficult decision to move away from our personnel-intensive classroom process until we saw our own pilot results. To me, the RQI Program just makes a lot of sense. I think it is going to be widely adopted in the healthcare industry over the next 2–3 years.

Effects of monthly practice on nursing students' CPR psychomotor skill performance

by Marilyn H. Oermann, Suzan E. Kardong-Edgren, Tamara Odom-Maryon in *Resuscitation* (2011).

In a study of 606 nursing students from the University of North Carolina at Chapel Hill and Washington State University, participants were given an initial HeartCode® BLS training course and then randomly assigned to one of two groups. The experimental group received 6-minute CPR training at 3, 6, 9, and 12 month intervals. The control group received no additional training.

Overall, the CPR skills of the experimental group were significantly better than those of the control group.



Please send any comments to PXAdvisor@healthstream.com or tweet us @HealthStream.

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