



RESUSCITATING COMPETENCE IN ADVANCED LIFE SUPPORT

Unlike wine, cheese, and rare collectibles, which improve substantially with the passage of time, competence in cardiopulmonary resuscitation (CPR) and advanced life support (ALS) begins to erode soon after it is acquired and continues to evaporate thereafter. Evidence now dusty from publication long ago as well as findings posted to the Internet only a few days ago confirm that healthcare professionals who have met the cognitive and skill performance requirements necessary for certification as CPR or ALS providers quickly lose their newly acquired competence in these lifesaving skills.

In an editorial titled “CPR—The Vanishing Competency” (December 2005:8-12)¹ I cited 27 reports published between 1979 and 2005 that identified the rapid loss of CPR skills and, to a lesser extent, CPR knowledge, noting:

These findings hold true for all categories and levels of medical, nursing, and other healthcare personnel, as well as for lay persons, throughout the United States and internationally, and have held true for nearly 30 years, that is, since CPR performance has been examined.^{1(pp8,10)}

The editorial then detailed how 2 newly released research studies^{2,3} had informed us that deficient CPR performance was not only endemic in course training and certification settings, but was “generously distributed both within and outside hospitals here in the United States and abroad.”¹ When we combined findings from this older and newer research, we were left with dual

disappointments: that the same knowledge and skills that healthcare professionals had recently demonstrated to the performance levels required for certification as CPR providers could not be demonstrated to those same performance standards relatively soon thereafter and that the CPR that healthcare professionals actually delivered to victims of cardiac arrest also did not meet those standards. If healthcare professionals are unable to maintain their *competence* in a practice area such as CPR, they surely would not be expected to demonstrate *competency*^{4,5} in real-life provision of CPR—that is, to apply that knowledge and those skills correctly when providing CPR to a real cardiac arrest victim. (Two sources^{4,5} explain the distinction between competence and competency.)

Seven years later it is disheartening to find this same pair of 2005 studies cited in the background material of a new study by Yang et al,⁶ affirming comparably vexing problems with retention of ALS. This analysis of literature related to healthcare providers’ retention of ALS knowledge and skill shows that despite 6 revisions and refinements of the ALS guidelines since their first publication by the American Heart Association (AHA) in 1974⁷ to their current incarnation,⁸ and despite the technologic advancements afforded by computer-based cardiac arrest simulation technology, our fundamental challenges related to retention of knowledge, performance, and actual delivery of ALS to real patients persist. Notable findings from this review included the following⁶:

- Most studies employed multiple-choice items to measure retention of ALS knowledge

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and some form of cardiac arrest simulation to appraise retention of ALS skills.

- Although a majority of studies measured retention at either 6 or 12 months, the interval between ALS training/certification and retesting for retention ranged widely from 6 weeks to 2 years.
- All studies reported diminished ALS knowledge or skills.
- ALS skills decay faster and to a greater degree than ALS knowledge.
- The rate at which ALS knowledge and skills erode varied, yet appeared to be steepest within the initial 6 to 12 months after ALS instruction, followed by lower rates of decline thereafter. Only a single study measured retention at 2 years.
- The degree of erosion in ALS knowledge and skill differed widely, ranging from declines as small as 3% in knowledge scores at 6 months to 86% in performance of ALS skills at 12 months.
- The methodological quality of virtually all studies was judged as “fair”; 1 study received a rating of “poor” and no study methodology was rated as “good.”

These findings raise concerns not only for patient outcomes in the 383 000 cardiac arrests that occur annually in the United States outside of hospitals,⁹ with abysmally low survival to discharge rates of only 7.6%,¹⁰ but also for the approximately 200 000 cardiac arrests that occur each year within US hospitals.¹¹ The fact that these survival rates have remained at this level for most of the past 30 years¹¹ suggests that attempts to improve these outcomes have not succeeded. And, if the current study and accumulated research plus undocumented anecdotal instructor experience clearly and consistently demonstrate that ALS skills begin to evaporate within a few weeks after they are inculcated, the current 2-year recertification cycle for ALS would seem to defy its own evidence base.

If adding detailed algorithms and computer-based approaches to administering courses and providing highly technical simulated teaching and feedback systems to instruction still have not materially improved retention, what other approaches can we devise for reconceptualizing this situation and brainstorming alternative solutions to this problem? Seven years ago, I suggested that learning procedures such as CPR (formulating procedural memory) may be facilitated by development of

so-called “muscle memory” (how it feels when we repeatedly perform an activity [such as skiing or riding a bicycle] in the correct manner), but once that memory pattern was formed and kinesthetically recognized, it became more difficult to then return to refocusing on the myriad of details that comprise that procedure, as CPR and ALS courses and performance testing force learners to do. As a result, my recommendation then was to rethink whether the volume and complexity of these procedures were actually contributing to retention and performance problems and to consider simplifying these procedures to the minimum set of elements that make a positive contribution to survival from cardiac arrest.^(1p11)

I’m sure that my 2005 editorial proposals played no role whatsoever, but I am encouraged to see evidence that the AHA recognizes that simplification of CPR procedures to its bare essentials for laypersons in programs such as Hands-Only CPR¹² may invite potentially lifesaving responses for victims of cardiac arrest. (Hands-Only CPR consists of CPR without mouth-to-mouth ventilation. The AHA recommends its use by laypeople who witness an adult suddenly collapse in an out-of-hospital setting. It includes 2 steps: 1. Call 911 [or send someone to do so] and 2. Provide chest compressions by pushing hard and fast in the center of the chest with minimal interruptions. AHA recommends it for both persons who have never been trained in CPR and for those previously trained but not sure they can remember and perform the steps of conventional CPR correctly.) In addition, the multitude of CPR and ALS classroom and online course offerings¹³ for HeartSaver, family, teens, and even younger children reflect the AHA’s responsiveness to the need for simplifying the design and format of lifesaving information to effectively reach a wide variety of public audiences.

If these approaches are found to be effective in improving patient outcomes by laypersons, perhaps serious consideration can be given to simplifying one or more aspects of ALS procedures to improve the competence and competency of healthcare providers. This proposal does not advocate a dumbing down of ALS content or procedures for healthcare providers, but rather a significant ratcheting up of healthcare practitioners’ capability to retain and then apply ALS content and skills when patient needs demand this level of care. In a healthcare system purportedly driven by patient needs, staff competency needs to match those needs.

Other considerations toward reversing this 3 decade stalemate include the following:

- If ALS testing preparations that healthcare providers make to ready themselves for ALS instruction and evaluation positively influence knowledge and skill, then scheduling more frequent testing of smaller segments of the ALS requirements, such as single patient scenarios tested every other month or quarterly, might enrich retention to a greater degree than confronting practitioners with instruction and testing on the entire set of ALS scenarios once every 2 years.
- If a healthcare provider's customary patient care experiences afford some protection against rapid erosion of newly acquired ALS knowledge and skills, it would be helpful to identify which experiences and how much experience benefits retention most.
- The huge time and resource costs involved with providing the entire ALS course to all healthcare practitioners might be reduced by dividing responsibility for specific competency areas among various categories of healthcare staff who respond to calls for ALS so everyone does not have to be responsible for retaining everything on every aspect of ALS. Assignment areas could be rotated every 3 years so all categories of staff assume responsibility for each patient scenario over time.
- Address the differences in decay intervals between knowledge and skills by recertifying ALS skills more frequently than ALS knowledge.
- Address possible differences in retention among different ALS patient scenarios by identifying which scenarios at your training site(s) participants have the most difficulty completing/have highest failure rates so those can be remediated more frequently.
- Design multisite studies to determine whether there is an identifiable unraveling of CPR and ALS knowledge and skill that occurs at discernable intervals and confirm whether that cascade differs between CPR and ALS and between knowledge and skills.
- Encourage healthcare providers to take advantage of alternative learning strategies such as online instruction for enabling providers to demonstrate attainment of ALS knowledge and for simulation laboratories to practice performance of ALS skills.

- If hands-on clinical practice enhances retention of CPR and ALS competence, identify which attributes of clinical practice best explain those benefits.

I invite you to offer additional recommendations on how we might improve both retention and provision of ALS care. If you care to do so, *CCN* will be pleased to post these on our website so others can gain from your insights. We have a long road to travel here, so please join *CCN* on this journey toward improving patient outcomes for victims of cardiac arrest. **CCN**



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