

Lay Rescuer AED Programs & the 2005 Guidelines for ECC & CPR

By Mary Newman

Guideline (n): An official recommendation indicating how something should be done or what sort of action should be taken in a particular circumstance. —**Encarta World English Dictionary**

The new AHA guidelines for CPR and emergency cardiovascular care are based on an evaluation of 22,000 peer review journal articles conducted by 281 scientists from the international resuscitation community in preparation for the 2005 International Consensus Conference on CPR and ECC Science with Treatment Recommendations. According to the AHA, the 2005 guidelines are “based on the most extensive evidence review of CPR ever published.”

This article examines how the new guidelines impact lay rescuer automated external defibrillation (AED) programs in community settings outside the hospital, highlighting information that program directors of public access defibrillation (PAD) and other on-site AED programs need to know.

LESSONS LEARNED FROM RECENT RESEARCH

Lessons learned about effective treatment of SCA since publication of the last guidelines in 2000 include the following key developments:

- Lay rescuer AED programs in airports and casinos and first responder AED programs with police officers have resulted in survival rates of 41–74% from out-of-hospital witnessed SCA

when the patient is in a shockable rhythm (ventricular fibrillation or VF), immediate bystander CPR is provided, and AEDs are used within three to five minutes of collapse. In addition, the Public Access Defibrillation (PAD) trial, a large prospective randomized clinical trial funded by the National Heart, Lung and Blood Institute (NHLBI), the AHA and several AED manufacturers, found that lay rescuer CPR-AED programs double the number of survivors from out-of-hospital VF SCA when compared with programs that provided lay-rescuer CPR only.

- If SCA is witnessed, the best course of action is to treat the adult patient immediately with a defibrillator.
- There is a high rate of first-shock success with modern defibrillators. Most patients whose arrests are witnessed and who are treated immediately with AEDs are converted out of VF following the first shock (80–90%).
- Even when the patient is successfully defibrillated, a perfusing rhythm is not normally present for several seconds or minutes. Therefore, rescuers should resume CPR, starting with chest compressions *immediately after*

a shock is delivered.

- If the first shock fails and the patient remains in VF, it is most helpful to provide CPR because chest compressions can improve the likelihood that subsequent shocks will be successful.
- The quality of CPR has a strong influence on survival. It is important to provide compressions at an effective rate and depth, to completely release pressure on the chest after each compression and to minimize interruptions in compressions. It is also important to provide effective ventilations and avoid over-ventilation.

SUPPORT FOR LAY RESCUER AED PROGRAMS

The 2005 guidelines changes represent good news for lay rescuer AED programs. For the first time ever, science solidly supports the value of lay rescuer AED programs in certain locations. Further, the AHA has recognized that physician oversight of lay rescuer AED programs is not essential—as long as a qualified health-care provider, such as a nurse or paramedic, provides program oversight.

In addition, treatment protocols have become simpler and should be easier to remember. Following is a summary of key treatment and programmatic guideline changes. (See Figure A for a list of national CPR/AED training organizations.)

TREATMENT CHANGES

Lay rescuers who encounter unresponsive victims who are not breathing should provide two breaths and then begin chest compressions. There is no need to assess other signs of circulation. Rescue breaths should take one second and should achieve visible chest rise. One-rescuer CPR for all victims

Figure A: National CPR/AED Training Organizations

American Heart Association	www.americanheart.org	877/AHA-4CPR
American Red Cross	www.redcross.org/services/hss/	800/RED-CROSS
American Safety & Health Institute	www.ashinstitute.com	800/682-5067
Medic First Aid International	www.medicfirstaid.us	800/800-7099
National Safety Council	www.nsc.org	800/621-7619

Figure B: Making AEDs 'Guidelines 2005 Ready' (G5R)

Manufacturer	Brands	G5R Plans	Contact Information
Cardiac Science	First Save, Power Heart G3, Power Heart G3 Pro	Software upgrades available in 2006.	www.cardiacscience.com; 800/426-0337
DefibTech	Lifeline, Reviver	Software upgrades for AEDs in field available this spring. May be upgraded directly by end-user free of charge.	www.defibtech.com 866/333-4248
HeartSine Technologies	Samaritan PAD, Samaritan AED	Actively working to comply with new AHA Guidelines. Release date has not been finalized.	www.heartsine.com 866/HRT-SINE
Medtronic	LIFEPAK CR Plus, LIFEPAK EXPRESS, LIFEPAK 500, LIFEPAK 500 DPS	Free upgrades for all devices shipped after Nov. 28, 2005. Upgrades available for biphasic defibrillators shipped before Nov. 28, 2005. Pricing and availability to be announced.	www.medtronic.com 800/442-1142
Philips Medical Systems	Home/On-site, FRx, FR2+, Forerunner	Forerunner: All units can be configured to be G5R now. FR2+: Units presently shipping can be configured to be G5R now. Home/OnSite and FRx: All units can be configured for Guidelines-compliant one-shock series and two minutes of CPR now. Units will start shipping in 2006 with CPR Coaching optimized for new Guidelines and minimal CPR interruption. Units already shipped may be updated in 2006 for Guidelines-optimized CPR coaching via a program designed to minimize customer effort and time device is out of service.	www.philips.com/heartstart 800/722-7900
Welch Allyn	AED 10	All existing AED devices are upgradeable to new guidelines. Program outlining upgrade procedure and pricing to be announced in Q1, 2006. New G5R AEDs will ship in Q1 2006.	www.welchallyn.com 800/462-0777
ZOLL Medical Corp.	AED Plus, AED Pro	AED Plus will be G5R before October 2006 using upgrade kit with additional operating configurations to current product and adjustments to graphical user interface. AED Plus covered by ZOLL's Guidelines 2005 Guarantee. Upgrade kits free of charge to customers who purchased AED Plus after Oct. 1, 2005. For other customers, nominal fee will be charged. AED Pro is G5R. ZOLL Guidelines 2005 Guarantee applies to all versions of AED Pro. Configuration file for upgrading previous versions to G5R available from ZOLL at no cost. Modifications require software changes only—no hardware or labeling changes necessary.	www.zoll.com 800/348-9011

A compression:ventilation ratio of 30:2 has been recommended for all rescuers (lay or health-care provider) who are acting alone in a resuscitation attempt of victims of all ages (except for newly born).

(except newborn infants) should now be provided at a ratio of 30 compressions to two breaths. When any rescuer witnesses SCA and an AED is immediately available on site, the rescuer should treat the victim with the AED immediately. For treatment of VF SCA, rescuers should provide one shock with the defibrillator and immediately resume CPR, starting with chest compressions. (Previously three stacked shocks were recommended.) Strong chest compressions are critical to resuscitation success. Rescuers should push hard and fast (at a rate of 100 compressions per minute), allow the chest to fully recoil between compressions and strive to minimize interruptions in compressions.

“For the lay rescuer who witnesses an SCA, the treatment is the same—retrieve the AED and administer a shock immediately if indicated,” says Roger D. White, MD, of the Mayo Clinic, Special Contributor to the 2005 Guidelines and member of the AHA ACLS Committee. “What is different is resumption of chest compressions immediately after the first shock is delivered. If the first shock doesn’t work, then the patient likely will benefit from CPR.”

“While it is true that there are circumstances in which an expanding body of evidence indicates that CPR preceding the first defibrillation shock might be advantageous in terms of shock success and patient outcome, this circumstance almost never prevails in settings in which lay rescuers are likely to use an AED,” said White. “Rather, it is applicable to EMS responders, for whom the time to reach the victim is typically considerably longer. Thus, for lay rescuers a shock-first policy, followed by CPR, is the optimal sequence.”

Another change is recognition that some patients will benefit most from a shock first, while others will benefit most from CPR first. For EMS providers, one of the most

challenging aspects about the decision to shock first or provide CPR first is when to do which intervention first. This is why we recommend that unless the event is witnessed or the rescuer is using a smart defibrillator that indicates otherwise, the rescuer should provide CPR first. When the response time exceeds five minutes, there is evidence that CPR first may be beneficial. Evolving and already available ECG analysis technology will enable devices to determine whether the patient needs CPR or shocks first.

PROGRAM CHANGES

Lay rescuer AED programs in places where SCA is likely to occur are now considered a Class I recommendation. These locations include sites similar to those in the PAD trial (i.e., sites with a history of at least one SCA every two years or sites that have more than 250 adults over 50 years of age present for more than 16 hours a day). For instance, the AHA supports placement of AEDs in targeted public areas, such as airports, jails, casinos, sports arenas, gated communities, office complexes, doctor’s offices and shopping malls. Qualified health-care providers may provide oversight of lay rescuer AED programs. Previously, physician oversight was recommended.

“This is the first time that AHA guidelines have designated PAD programs in places SCA is likely to occur a Class I recommendation,” says Mary Fran Hazinski, RN, clinical nurse specialist from Vanderbilt University and Senior Science Editor of the 2005 Guidelines. This does not mean merely AED placement, Hazinski noted, citing some cases in which AEDs were available but left unused, and others in which AEDs were used but rescuers did not know how to perform CPR when prompted by the devices. “There is a difference between AEDs and AED programs,” Hazinski emphasizes.

ACTION CHECKLIST FOR EFFECTIVE LAY RESCUER AED PROGRAMS

What do you need to do to make your lay rescuer AED program as effective as possible? According to the new guidelines, attention to the following elements will help:

- Identify a qualified health-care provider to provide program oversight.
- Develop, practice, and follow a written response plan.
- Identify and train likely rescuers, taking into account the need for refresher training and rescuer turnover. Remember that SCA victims may need CPR, treatment with an AED or both, so rescuers should be prepared to not only to use the AED but also to provide quality CPR.
- Be sure the program is integrated with the local EMS system.
- Develop and implement a process of ongoing quality improvement that feature routine inspections of AED devices and electrodes, and evaluation of post-event data including response plan effectiveness, rescuer performance, and AED function.

THE BOTTOM LINE

Who shall live? Who shall die? The answer lies in the speed with which the SCA victim receives effective treatment. The most effective treatment is that which arrives within minutes of collapse. It does not matter who provides CPR, as long as it is provided quickly and effectively. It does not matter who carries the AED as long as it is used quickly and effectively. The type of AED used is less important than the speed with which it is used. And yes, the quality of CPR matters.

In the end, the most important determinant of survival from SCA is the presence of trained rescuers who are ready, willing and able to intervene effectively. Communities that want to make a difference should work to increase awareness about SCA as a leading cause of death, train their citizens in CPR and AED use, and make AEDs readily available in high-risk settings. When the vital role of bystander acumen, action, and access to lifesaving equipment is fully recognized, survival from SCA will become the rule, rather than the exception.

Frequently Asked Questions

What do these changes mean for directors of lay rescuer AED programs? Following are answers to some frequently asked questions. Feel free to copy this page and distribute to program directors in your area.

Q: What is the rationale for the change from a 15:2 compression:ventilation ratio to a 30:2 ratio, and has anyone studied the effects of this change on rescuer fatigue?

A: Although no studies have specifically compared the effectiveness of the 30:2 compression:ventilation ratio with the 15:2 ratio on survival or differences in rescuer fatigue, a growing body of research indicates that interruptions in compressions can have a detrimental effect on outcome. In fact, research shows that in real-world scenarios using the 15:2 ratio, compressions are provided only half the time. A new study, for example, indicates that when lay rescuers interrupt compressions to provide breaths, they typically stop compressions for 15 seconds. This means circulation ceases and the rescue effort retreats to baseline.

“We believe that providing more compressions and fewer breaths will provide a better match for patient needs than previous protocols,” says Michael Sayre, MD, emergency physician from The Ohio State University and chair of the AHA BLS Committee and president of the SCA Network.

Although rescuer fatigue also affects outcome, it is better for the patient if the rescuer continues fast, forceful chest compressions (“push hard, push fast”) than to pause too often for ventilations, pulse checks or rhythm assessment. This is because providing ventilations at a “normal” rate is less important than previously realized, and pulse checks are unreliable at best, even when performed by highly skilled health-care providers. To compensate for rescuer fatigue, experts recommend switching rescuers every two minutes, if possible.

“There are no data to indicate that the 30:2 ratio is more or less tiring than the 15:2 ratio. It is probable that rescuers will tire more quickly with the new ratio, but if

this is better for the patient, then it is a desirable goal,” according to Sayre. “If a second rescuer is available, then switching every two minutes will likely be helpful. If the rescuer is alone, there is no good way to get around the challenge of rescuer fatigue.”

An additional benefit of selecting the 30:2 ratio as a universal protocol for all patients (except newborns) is that it is expected to improve learning and retention and make application in real life more realistic.

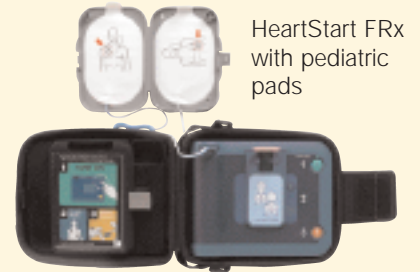
Q. Do the new guidelines mean there is renewed emphasis on CPR and defibrillation is less important?

A. Yes—and no. Although there is a renewed emphasis on CPR, defibrillation is still essential. Decades of research have supported the importance of CPR and recent studies continue to validate its importance. The quality of CPR matters and patients will benefit from fast, forceful chest compressions delivered with minimal interruptions. At the same time, defibrillation is still critically important, especially in the first few minutes after collapse.

“I share the concern,” says White, “that whenever we try to prioritize a particular maneuver, other maneuvers will be misunderstood as less important. Fortunately, because of the effectiveness of modern AEDs, in cases of witnessed VF in which the AED is used immediately, resumption of chest compressions after the initial shock should expedite rapid restoration of sustained spontaneous circulation.”

Q. What about the use of AEDs to treat children?

A. Although VF is relatively uncommon in children, it does occur in 5–15% of pediatric SCA cases. In these cases, rapid defibrillation can improve outcomes. For children ages one to eight, a pediatric dose of



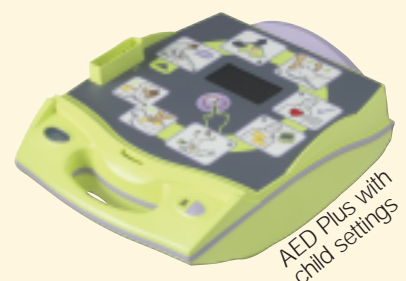
electrical therapy should be used if possible. Some AEDs adjust the dosage through pediatric dose-attenuator systems; others use different methods to adjust to a pediatric dose. If a child is in VF and a device with pediatric capabilities is not available, a standard AED should be used.

The guidelines do not recommend for or against AED programs in locations with children routinely present, such as schools, but they do recommend that AED programs established in such locations should install AEDs capable of administering pediatric doses.

Scientific evidence is insufficient to recommend for or against use of AEDs in children under age one.

Q: We plan to start a new on-site AED program at our health club. Should we wait until training courses have implemented the new guidelines?

A. No. In the meantime, you could lose an opportunity to save a life. Previous AHA guidelines and courses based on those guidelines have helped save many lives. If you do not already have an on-site AED program and your location is considered a relatively high-risk site for an SCA event, do not hesitate to get started.





LIFEPAK 1000 AED with child electrodes

You can update potential rescuers once new courses become available. All nationally recognized CPR-AED training programs expect program materials to be updated by the spring or early summer of 2006.

“These new guidelines do not imply that care based on earlier guidelines is either unsafe or ineffective, including the use of AEDs that conform to those earlier guidelines,” according to Jerry Potts, PhD, director of science, AHA ECC Programs. “For this reason and because of the critical importance of providing immediate care to a victim of sudden cardiac arrest, the AHA encourages implementation of (and training for) lifesaving medical emergency response plans (including AED programs) to continue without interruption or consideration of the pending publication of revised training materials.”

“The old guidelines are still good,” says Sayre. “They definitely resulted in saving lives. The main difference is that the new guidelines will make resuscitation easier to learn and easier to accomplish.”

“Nothing needs to be on hold,” adds Hazinski.

Q: We just implemented a corporate-wide AED program that involved training of an extensive network of potential rescuers. Do we need to update training for everyone immediately or can this be done gradually?

A. The new guidelines reflect the latest in resuscitation science and offer what is considered by experts to provide the best-known care for SCA victims. It is reasonable and defensible for entities with AED programs to gradually phase in the new guidelines. If your corporation develops and implements a policy to gradually train

For children ages one to eight, a pediatric dose of electrical therapy should be used if possible. Some AEDs adjust the dosage through pediatric dose-attenuator systems; others use different methods to adjust to a pediatric dose. If a child is in VF & a device with pediatric capabilities is not available, a standard AED should be used.

potential rescuers according to the new guidelines over a period of two years, for example, this is a reasonable and prudent course to follow.

“We hope that EMS systems and PAD programs will implement the new guidelines as quickly as they can because we believe this will improve survival. The old way works, but the new way can work even better,” says Sayre. “However, we know people need new training materials and we know that programmatic changes take time.”

Q: Do we need to be concerned about liability risks if it takes our organization some time to fully implement the new guidelines?

A. According to the AHA guidelines published in *Circulation*, “These new recommendations do not imply that care involving the use of earlier guidelines is unsafe. In addition, it is important to note that these guidelines will not apply to all rescuers and all victims in all situations. The leader of a resuscitation attempt may need to adapt application of the guidelines to unique circumstances.”

Richard A. Lazar, Esq., CEO of AED Risk Insights, publisher of the AED Law Center and member of the SCA Network Board of Directors, says that regardless of the way the new guidelines are ultimately viewed by the legal and public policy communities, immediate implementation is not possible. “You can’t expect these changes to occur overnight,” says Lazar. “According to market estimates (Frost & Sullivan, 2005), there are approximately 300,000 AEDs in public settings in the U.S. In addition, there are probably millions of trained rescuers nationwide who may need to be retrained. It’s fair to say it

will take time to update so many devices and rescuers. In my view, at least two years is a reasonable transition period. It certainly is unreasonable to expect the market to move more quickly.”

Q: When can we expect AED companies to update their software to reflect the new guidelines?

A. All AED companies are working to update their software to reflect the new guidelines and make them “Guidelines 2005 Ready” or G5R. Some models can be reconfigured without software modifications. Others require installing software updates. Changes will include adapting to the one-shock protocol and adding verbal prompts to resume chest compressions. For device specific information, see Figure B (p. 31).

Q. Do the new guidelines indicate which defibrillator waveform is superior for patient outcome?

A. Defibrillators on the market include monophasic waveform defibrillators and both fixed and escalating biphasic waveform defibrillators. According to the guidelines, no specific waveform (monophasic or biphasic) is consistently associated with a rate of return of spontaneous circulation (ROSC) or rates of survival to hospital discharge after cardiac arrest.

Most lay rescuer AED programs use biphasic devices. According to the guidelines, none of the available evidence has shown superiority of either nonescalating- or escalating-energy biphasic waveforms for termination of VF. Rather, it is likely that other factors such as the interval from collapse to CPR or defibrillation have a greater impact on survival than specific waveforms or energy levels.