

## ED Update

The difference between a workplace fatality and a success story is about 10 minutes. That's how long a victim of sudden cardiac arrest has to receive defibrillation before almost all hope of resuscitation is lost. The victim's likelihood of surviving drops 10 percent for every minute he or she is in arrest, according to Doug Hakala, senior manager of commercial markets for Medtronic Physio-Control, a Seattle-based manufacturer of automated external defibrillators.

During those 10 minutes, true "first responders"—usually a family member, co-worker or passerby who literally is the first to find the victim—must take immediate action to maintain what first-aiders call "The Chain of Life" The "chain" has four links:

**Early 911:** Notify emergency medical services immediately.

**Early CPR:** Begin CPR as quickly as possible.

**Early defibrillation:** If an automated external defibrillator is available, get it to the victim fast. Remember: This victim has 10 minutes.

**Early advanced life support:** A lay rescuer can handle the first three links. The fourth one is for trained emergency medical service providers. The sooner you call 911, the sooner the patient will receive advanced life support care.

All four links are essential, but in many cases the third link makes the difference. An AED is a device designed to shock the heart of a cardiac arrest victim, and hopefully return the heart to a normal rhythm, said the National Safety Council's Barb Caracci, director of program development for the council's Home and Community Safety Group.

The AED is not a cure-all: if used in time, it can revive victims who experience one of two particular types of abnormal heart rhythms: ventricular fibrillation, in which the heart muscles no longer beat synchronously, and ventricular tachycardia, in which the heart beats too rapidly to effectively move blood to the vital organs, said Mary McBurnie, a biostatistician with the University of Washington in Seattle. The AED delivers an electric shock that momentarily stuns the heart, allowing it to restart in a normal rhythm, McBurnie said.

A cardiac arrest is not the same thing as a heart attack, which is caused by a blockage in the coronary artery, according to the National Center for Early Defibrillation in Pittsburgh. More than 460,000 sudden cardiac arrest deaths occur in the United States each year, according to the National Heart, Lung and Blood Institute.

While films and television have familiarized many of us with images of emergency physicians applying cumbersome paddles attached to large machinery to a patient's chest and yelling "clear," today's AED is about the size of a laptop computer and guides the trained user through the process step-by-step. Once the user applies the pads, the AED will analyze the heart's rhythm to determine if a shock is necessary. If so, a prompt will instruct the user to administer the shock with the simple push of a button.

### ***AEDs Go Public***

Pushing those buttons has saved numerous lives in recent years. Public access defibrillation is a trend that emerged in the mid- and late-1990s, and in this new millennium continues to grow. The theory of PAD, as the movement is known, is that by placing AEDs in public places where people are likely to suffer a cardiac arrest, one can reduce the amount of time before a victim

receives defibrillation, increasing that person's chances for survival. Americans are growing used to seeing AEDs in airports, shopping malls, government buildings, health clubs and golf courses, as well as many office buildings and industrial plants.

OSHA in 2001 issued a technical bulletin that discussed the successful use of AEDs in public places such as Chicago's two major airports. In 14 cases of cardiac arrest at O'Hare and Midway airports in the first 10 months of the program, lay bystanders using AEDs saved the lives of nine victims—a 64 percent survival rate, according to the bulletin.

Until November 2003, anecdotal evidence such as the success at Chicago's airports was the only indication that installing an AED and training employees to use them was a good idea. In November, a team of researchers spearheaded by the University of Washington released the results of the Public Access Defibrillation Trial Study. This was the first clinical trial of public access defibrillation that compared survival rates between victims who received only CPR to victims who received shocks with a defibrillator.

According to McBurnie, the study's project director, 24 research centers in the United States and Canada participated. Each center recruited between 20 and 70 community units. McBurnie explained the research method, "Among these units, these units were what we considered public units, which were shopping centers, malls, recreational facilities, and we had several multi-unit residential complexes, apartment buildings and gated communities. Within these units we identified a certain number of lay volunteers. Then we assigned them to two different cardiac arrest response systems. Half of the units were assigned to a CPR group, meaning that volunteers were trained to identify cardiac arrest, call 911 and then perform CPR until emergency medical services arrived. The other group got the same training, plus training and access to AEDs.

For a period of 21-and-a-half months for each unit, we monitored for cardiac arrest and counted the number of cardiac arrest survivors between the two groups."

According to the National Heart, Lung and Blood Institute, which participated in the study, the research centers recruited a total of almost 20,000 volunteers. The results, according to McBurnie, made a strong case for public access defibrillation in areas that are likely to see a cardiac arrest. "We found that in the AED group we had twice as many survivors as in the CPR group. We had 15 survivors in the CPR group and we had 30 in the AED group," she said.

According to Medtronic's Hakala, the advantages of having an AED on hand are clear. "If an AED is available and the person is trained to use it, they can apply the AED and perhaps save the person within two to three minutes then a person has a 70 percent chance of survival. It's important to note that AEDs can't save everybody, because there are other medical situations out there, but the advantages of having them out there, and having people know that they're out there are very significant," he said.

### ***Are AEDs Right For My Company?***

Before deciding whether your company should implement its own AED program, you'll need to perform a risk analysis, the National Safety Council's Caracci said. McBurnie agreed, "There are some situations in which it would not be appropriate to have an AED." Employers must gauge as best they can the likelihood of a cardiac arrest in their facility. Some questions they should ask include:

- Have employees experienced cardiac arrest on the job in the past? If your company has experienced a cardiac arrest on the job or in your facility, AEDs may be a sound investment.
- What is the age of your typical employee? Although anyone—even children in some circumstances—can experience sudden cardiac arrest, the average person’s risk increases with age, according to the February 13, 2003, testimony before the New York City Council by Mary T. Bassett, the city’s deputy commissioner for health promotion and prevention.
- How prevalent are other risk factors? Most factors that can contribute to cardiac arrest are beyond the employer’s control. Still, observation can give some idea of the prevalence of factors such as smoking, obesity, and high stress.

Caracci recommends assembling a team that will be responsible for implementing and managing the AED program. “It would be helpful if you included your local EMS provider as part of the team. You are going to have to dovetail with the efforts of the local fire/EMS department, so it’s very important that you include them,” she said.

Now you can’t pick up your AED at the local Sears. The U.S. Food and Drug Administration requires that AED owners have a prescription from a medical doctor. Caracci said. Nor does the physician’s role end there, because many states and municipalities have laws and regulations that require medical direction. Some medical directors are more involved than others. The director may simply review and approve your implementation plan, or he or she may want to be more involved.

The team also will have to conduct a needs assessment to see what link in the Chain of Survival they must strengthen, and review state and local laws that regulate public access defibrillation. “All states have laws that address AEDs, and some of them have requirements for training, some have requirements for integrating the EMS system, medical direction, record keeping and others do not. Also at the local level, municipalities often have ordinances that encourage bystander intervention. So you need to read the laws, regulations and advisories that apply to your area,” Caracci said.

“The bottom line,” she said, “is do your AED implementation well, or don’t do it at all.” Some AED manufacturers provide program management services in addition to the AEDs themselves, according to Medtronic’s Hakala and Mark Smith, director of market development, public access defibrillation for Welch-Allyn Medical Products, an AED manufacturer headquartered in Skaneateles, NY.

Such program manage the details of obtaining the prescription and medical direction, maintaining the AED units, ensuring regulatory compliance, interfacing with local emergency medical services and managing training of employees to use the AEDs, Smith said. Other AED manufacturers include Cardiac Science Inc., based in Irvine, CA and Royal Philips Electronic, based in the Netherlands.

McBurnie and Caracci each pointed out that employers will need to keep track of which employees are trained to use the AEDs, make sure that training remains current and train new employees after trained responders are lost due to attrition. Also, Caracci, Hakala and Smith each recommended periodic drills to test and identify areas that need improvement.

One important note: AEDs are safe to use. The chance that a lay rescuer will be harmed while using an AED is very slim, experts say. McBurnie said during the PAD Trial none of the test communities experienced an unnecessary shock, nor were any of the volunteers harmed while using an AED. Rescuers may experience extreme stress, however, as a result of being involved in a life-threatening situation, McBurnie said. “There were a few cases, maybe four or five, in which it didn’t resolve and the volunteer sought counseling,” she said.