

PAD Trial Frequently Asked Questions



- **What is a cardiac arrest?**

Cardiac arrest is a term used to mean that the heart has stopped. It is usually caused by a heart rhythm problem called ventricular fibrillation, where:

1. the heart stops beating effectively;
2. circulation of blood stops, and no pulse can be felt;
3. the victim collapses suddenly, and
4. the victim is unresponsive or unconscious and will die unless he/she receives immediate treatment, usually CPR and early defibrillation.

Cardiac arrest is fatal over 95% of the time. That is, fewer than 5 people out of 100 with an out-of-hospital cardiac arrest will survive.

- **Is a heart attack the same thing as a cardiac arrest?**

No. A heart attack (myocardial infarction) is caused by an occlusion (blockage) of a coronary (heart) artery. During a heart attack, only a portion of the heart is damaged. There are obviously varying degrees of severity. Generally, during a heart attack the person has a pulse, is breathing, and is conscious. Typical symptoms are:

1. chest pain, arm pain, jaw pain, and/or neck pain;
2. sweating;
3. shortness of breath;
4. nausea, vomiting,
5. weakness, and/or
6. dizziness.

However, a heart attack can also cause an out-of-hospital cardiac arrest. So a heart attack is not the same as a cardiac arrest, though it might cause a cardiac arrest.

- **Who are the victims of cardiac arrest?**

Cardiac arrest can happen to people of all ages, and it often occurs without warning. It most often occurs in those over the age of 50, usually in people who have previously recognized heart disease. Often, however, the recognized heart problem is mild.

- **How many cardiac arrests occur each year in the United States?**

It's difficult to give an exact number. Somewhere between 220,000 and 460,000 cardiac arrests occur each year in the United States. Approximately 60% are witnessed by a bystander.

- **What is CPR?**

CPR stands for cardiopulmonary resuscitation. A person trained in CPR will

1. recognize when someone may be having a cardiac arrest;
2. check for responsiveness in the victim;
3. call 911;
4. check the victim's airway;
5. give 2 breaths (if the patient is not breathing);
6. check for signs of life (movement, coughing), and then
7. start chest compressions to help circulate oxygenated blood through the victim's body, if needed.

The person performing CPR will continue the steps of giving breaths and chest compressions until Emergency Medical Services (EMS) personnel arrive.

- **What is Public Access Defibrillation (or PAD)?**

PAD is an approach to responding to out-of-hospital cardiac arrests whereby lay volunteers (non-medical personnel) are trained in CPR and the use of automated external defibrillators (AEDs). PAD includes a plan for the training of volunteers in defibrillation and a plan to bring the defibrillator and the volunteer promptly to the victim.

- **What was the PAD Trial?**

The Public Access Defibrillation Trial was a study looking at survival in patients who experienced an out-of-hospital cardiac arrest. Volunteers without medical training and without a traditional duty to respond to medical emergencies were trained to perform CPR. At one-half of the PAD Trial locations (e.g., apartment complexes, golf courses, airports, shopping malls, etc.), the volunteers were also trained to use an AED, and the facility was equipped with a sufficient number of AEDs to permit rapid response to a medical emergency.

- **What treatments were being compared?**

The PAD Trial studied two types of response systems to out-of-hospital cardiac arrest:

1. a lay emergency response team trained in CPR only (recognition of out-of-hospital cardiac arrest, calling 911, and CPR), and
2. a lay emergency response team trained in CPR and the use of an AED.

- **What is an AED, and how does it work?**

The AED is a specialized device that has one primary function: to identify the heart rhythm of a sudden cardiac arrest victim and, if necessary, to deliver a large electric shock which may correct the abnormal rhythm. The device is lightweight and portable, and is about the size of a laptop computer. It has large, self-adhesive electrodes ("pads") that must be placed on the victim's bare chest. The electrodes are attached to the AED by connecting wires. When the AED is turned on, its internal computer looks at the heart rhythm and classifies it. The AED then determines if the heart rhythm needs to be shocked, and the rescuer is required to push a button to deliver the shock. After the shock, the device will then automatically re-analyze the victim's heart rhythm and repeat the same process, if necessary. If a shock is not indicated for the victim's heart, the device will tell the rescuer that no shock is needed, and the AED will not advise an electrical shock. These devices have been tested extensively to ensure that they will deliver an electrical shock to those people with a potentially fatal heart rhythm. A shock cannot be administered unless the AED automatically diagnoses the appropriate rhythm. For example, if an AED is connected to a person with a normal rhythm, a shock cannot be delivered by mistake.

- **When might AEDs be beneficial?**

The AED will help only patients with very fast heartbeats or disorganized heart activity called ventricular fibrillation. The AED will not shock and will not help a heart that is totally stopped and has no electrical activity. Likewise, the AED will not shock and will not help someone who has another serious problem leading to unconsciousness, such as drug or alcohol overdose, stroke, severe trauma, or blood loss.

- **When do we need PAD? Isn't calling 911 good enough?**

By the time an ambulance or fire rescue unit (EMS) reaches a victim of cardiac arrest, it is usually too late. When persons suffer a sudden cardiac arrest, for each minute that passes without defibrillation, their chance of survival decreases by 7-10%. An average response time for EMS and the defibrillator to be "on scene" in most major cities is 7 to 12 minutes. After 10 minutes, there are very few survivors. We hoped that in the community setting, defibrillation would occur sooner with AEDs in the hands of trained volunteers.

- **Who participated in the trial?**

Twenty-four sites throughout the U.S. and Canada participated. Each site enrolled between 20 and 70 community units. A community unit was a public or residential location with a potential for experiencing out-of-hospital cardiac arrests. Examples of study units included apartment buildings, shopping malls, hotels, golf courses, etc.

- **Who/what was being randomized?**

Each study unit was randomly assigned (like a coin toss) to receive CPR training or CPR plus AED training.

- **Who was trained to perform CPR?**

CPR training was offered to employees, residents, or other available volunteers associated with each study unit. These persons are referred to as PAD volunteers. They were individuals who were non-medical personnel who agreed to participate in the trial. The PAD volunteer was trained to recognize a cardiac arrest, call 911, and perform CPR. If the unit was randomized to CPR plus AED, the PAD volunteer was also trained in the use of the AED.

- **How much training did the volunteer receive?**

All volunteers received 2-4 hours of initial training, and many were retrained one or more times during the study.

- **How did volunteers know when a cardiac arrest had occurred in their facility?**

One of the most important tasks of the study was to tailor effective response plans for each facility using the resources available to them. In some cases facilities invested in additional equipment such as two-way radios or other communications infrastructure. For a response system to be effective when an arrest occurs, trained volunteers must 1) be available, 2) be promptly notified about the event, and 3) respond quickly (e.g. within ~3 minutes) to the victim's side. Study Coordinators spent considerable time with unit personnel to develop their response plans. Instructions were provided to employees and, where possible, customers, clients, visitors, etc., about how activate the response system. In addition to trained volunteers, designees were appointed to notify Emergency Medical Services personnel, meet them at a pre-arranged location and guide them to the victim. Mock cardiac arrests were staged to evaluate how well the system worked and whether any elements needed to be changed or improved. In addition, Coordinators routinely checked with the facilities to insure that response systems were still functioning, AEDs were properly maintained and a sufficient number of trained volunteers was available.

- **What other questions/issues did the trial study?**

There are several items which were evaluated besides survival of the cardiac arrest victims:

We evaluated quality of life, mental function, and cost of medical care in survivors. We will soon analyze the cost of implementing each type of system (CPR vs CPR+AED). The trial also attempted to determine how frequently volunteers must be trained and where AEDs should be placed to be most effective.

- **If we didn't know whether it was a good idea to equip facilities with an AED, why have so many airports, casinos, etc., purchased and deployed AEDs?**

Many facilities decided on their own initiative to buy AEDs and to train employees in their use, even before we had scientific information about their utility. Some venues, such as commercial aircraft, began deploying AEDs years ago because it was obvious that a rapid response from emergency medical services was impossible in their circumstances. Furthermore, some facilities have identified persons who have a duty to respond to medical emergencies. These persons are likely to be better trained and to respond more quickly to a cardiac arrest.

- **Who sponsored the PAD Trial?**

The PAD Trial was primarily funded by the National Heart, Lung, and Blood Institute of the National Institutes of Health, with additional funding and materials provided by the American Heart Association. Additional support was provided by Cardiac Science/Survivalink, Incorporated, Guidant Foundation, Medtronic Physio-Control Corporation, Philips Medical Systems - Heartstream Operation, and the Laerdal Medical Corporation.

- **Why did we do this study?**

We knew that CPR and AEDs, when used by specific people who have a duty to respond to medical emergencies, have been effectively used to improve survival in specific locations (for example, airplanes and casinos).

We did not know if lay rescuers, who have no duty to respond to medical emergencies, could effectively use AEDs in other environments. In addition, we did not know if use of AEDs by lay non-medical responders would increase survival (by providing early defibrillation), or if it might decrease survival (by delaying calls to 911).

- **What was the outcome of the PAD Trial?**

Between July 2000 and January 2002, 993 facilities were enrolled to participate in the study at 21 centers in the United States and 3 centers in Canada. Approximately 20,000 volunteers were initially trained. Follow-up in the study ended September 30, 2003. There were 44 total survivors from among the cardiac arrest patients, 15 in the CPR arm and 29 in the CPR+AED arm, nearly a two-fold improvement in survival with the use of the AED. Most successful resuscitations (42/44) occurred in the public units. Survival in large residential units was rare, and the AED offered no benefit. Serious adverse effects were rarely reported. No volunteers received inadvertent shocks, and no patients were shocked unnecessarily. AED maintenance problems were infrequent. A few participating volunteers reported severe stress related to responding to emergency situations.

- **Why did so few people survive?**

Even with rapid application of CPR or CPR+AED, an out-of-hospital cardiac arrest remains a life-threatening emergency. Some cardiac events need additional therapy that can only be applied by the EMS or in the hospital. Furthermore, the time from collapse to treatment was often long, even in this study, making survival unlikely. Many events were unwitnessed, so volunteer responders had no chance to provide quick medical care.

- **Why were there so few cardiac arrests?**

It remains difficult to identify locations where an arrest is likely to happen. Some facilities, such as major transportation hubs or large golf courses have a generally high incidence of cardiac arrests over one or two years, but predicting the future of arrest events in a particular locale remains problematic. We know that the majority of arrests occur at home or in a residential facility, and the outcome of cardiac arrests in these locations was quite poor. Further research is needed to improve outcome in residential locations.

- **What will happen to the results of the study?**

The results of this study will be published in medical journals, and they have been sent to the sites where the study was performed. These sites will inform the participating facilities, volunteers, and their communities about the results of the trial so that local authorities and public health officials will be able to act upon them quickly. In addition, press releases have been circulated, and the PAD Trial website contains information on the results of the trial: (<http://depts.washington.edu/padctc>).

- **Who should buy and use an AED?**

AEDs should be purchased and placed in locations where the likelihood of witnessed cardiac arrest is high, and where potential responders can be appropriately trained and skills can be maintained. You should contact your local EMS for guidance about deployment of AEDs in your area.

- **What is the cost of the having an AED program?**

This topic is the subject of further investigation, and will be analyzed in the near future. We don't yet know the cost of a program, or the cost of saving an individual life. It's clear, though, that the cost extends far beyond the price of the AED itself. The costs of initial training, as well as follow-up refresher courses, must be considered.

- **What are the legal aspects of having an AED?**

Most all states have "Good Samaritan" laws protecting volunteers who are providing emergency medical care with AEDs under the guidelines of the state.

- **If a person survives a cardiac arrest, what long-term treatment should he/she receive?**

Treatment must always be individualized. Some patients will have an automatic defibrillator (a device like a pacemaker that can shock the heart when necessary) implanted to be ready to treat any future episodes. We are now analyzing the PAD Trial data to determine the long-term treatment provided, the functional and neurologic status of the survivors, how long patients lived after the cardiac arrest, and the cost of the treatment.

- **What other studies of AEDs are being conducted?**

A trial funded by the NHLBI is currently underway to see if providing AEDs to families of heart attack patients will improve survival if a cardiac arrest occurs in that household. The PAD Trial demonstrated that having AEDs distributed to large living facilities, such as apartment complexes, was not effective. The new NHLBI trial is studying whether putting AEDs in the individual homes or apartments of cardiac patients and training family members in their use will be successful in saving lives. It remains to be seen if this targeted deployment of AEDs to specific cardiac patients will improve survival.