

Jumpstart My Heart

DAN creates Automated External Defibrillators (AEDs) for Scuba Diving course

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- More than 1,000 people a day die from sudden cardiac arrest.
- Heart problems constitute the second most common reason divers die - behind only drowning.
- One tool can save a lot of people, if it's there when you need it.

Those three facts begin to explain why DAN is developing the Automated External Defibrillators (AEDs) for Scuba Diving course to complement the range of other scuba-oriented first aid programs.

Normally, the four chambers of the heart beat in a rhythm; for anyone who has ever used a stethoscope on a friend, this is the familiar lub-dub rhythm. For various reasons, the heart can begin fibrillating, or losing its rhythm, and all the chambers of the heart try to pump at the same time. This causes the heart muscle to quiver without actually accomplishing anything; this lethal absence of heart rhythm is called ventricular fibrillation (VF).

Among the several causes of VF, cardiovascular disease tops the list; drowning and electrical shock are also causes. Unless the heart has sustained some kind of trauma, any time the heart suddenly stops beating, there is a good chance the heart is experiencing VF.

A person's sudden death might be attributed to a massive heart attack. Technically, a heart attack occurs when blood is cut off from the heart muscle, causing a portion of the heart to die. On the other hand, sudden cardiac arrest occurs when the heart stops beating and begins to fibrillate, or move with the absence of rhythm. Cardiovascular disease is one such cause of sudden cardiac arrest.

When the heart begins to quiver, no blood moves throughout the body. Without some assistance, in just a few moments, the person will die. Cardiopulmonary resuscitation (CPR) helps add fresh oxygen to the blood and pumps it through the person's body, delaying the onset of brain damage and death, but CPR cannot reset a heart that is in fibrillation. Only a defibrillator can do that.

What happens is after just a few minutes, VF converts to a systole, a flat line rhythm, and the person's chances of survival are very slim. According to the American Heart Association's Guidelines 2000 for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care, "CPR appears to prolong VF and preserve the heart and brain function. However, it is unlikely CPR will convert VF to a normal heart rhythm." Survival rates from sudden cardiac arrest decrease 7 to 10 percent for every minute defibrillation is delayed. After 10 to 12 minutes, the chance of survival is low.

AEDs and Divers

Cardiovascular disease is the leading cause of death in the United States and other industrialized countries. As the diving population ages and older people begin diving, divers are at the age where risk of cardiovascular disease is significant. The mean age at death for divers in the fatality database has been increasing over the last several years and so has the average age of DAN Members.

When Dr. James Caruso, a DAN On-Call Physician, examined the dive fatality statistics DAN collects, he discovered that 66 of the 549 fatalities from 1990 to 1995 listed cardiovascular disease as the cause of death or as a major contributing factor to the cause of death. This represented 12 percent of all fatalities in the database. Among divers who were older than 35, cardiovascular disease was a factor in 26 percent of the fatalities.

Additionally, cardiovascular disease is the most common health problem associated with dive fatalities

and heart medications are the most common medications taken by divers involved in fatalities.

What is a Defibrillator?

Defibrillators are the machines you've seen in all the medical TV shows. The doctor pulls up the crash cart, sets some dials, looks at a readout and rubs two paddles together. The paddles go on the person's chest, the doctor yells clear and the person arches into the air. After a couple more shocks, the person is saved.

For years, defibrillators were solely in the domain of the medically trained. But recent advances in technology, software and hardware have made defibrillators something anyone can use.

Automated External Defibrillators (AEDs) are now appearing in airplanes, airports, casinos and other places where people feel a lot of stress. For example, The Chicago Airport System created the HeartSaver Program and placed AEDs throughout all its airports, including O'Hare International Airport. Thus, no one is more than a one-minute walk from one anywhere in the airport.

Getting defibrillators in places where people live and are likely to have a sudden cardiac arrest is key to saving lives. By reducing the amount of time from when the heart stops beating to defibrillation raises the chances of a full recovery.

How It Works

Normal heart rhythms are controlled by the body's electrical system. The body has its own pacemaker that sends out electrical charges, causing the heart muscle to contract in rhythm. AEDs reset the heart by delivering an electric shock across the heart that completely overrides and scrambles the confused rhythm and electrical charges.

A moment after the shock, the heart's natural pacemaker begins sending out the normal electrical charges again. This allows the heart to resume its normal rhythm.

Time Delays and Using AEDs

It is rare to live in a place where emergency medical services can respond and get set up within 10 minutes after a call, much less within 10 minutes of a person's experiencing a sudden cardiac arrest. Consider that a rescuer has to notice that a person is having a problem, determine that he or she needs medical attention, and find a phone and call, all before EMS can even start the ambulance and head to the scene. All of that takes time.

Now place the person on a dive boat on a typical dive site. If the diver experiences sudden cardiac arrest in the water, add the time it takes for the diver's buddy to get the diver back to the boat. Also, there is little or no chance of getting EMS personnel to the boat and set up within 10 minutes.

Therefore, AEDs need to be on charter boats and at local shore-based dive sites. That is the only way divers will be able to provide defibrillation in time.

Training Divers to Use AEDs

To purchase an AED, you have to have medical direction and training. By participating in the DAN Automated External Defibrillators (AEDs) for Scuba Diving course, you will have the training and DAN will provide the medical direction that will enable you to buy an AED and have it at your dive site.

DAN is currently developing a training program to teach divers to use AEDs. Similar in scope and content to the Oxygen First Aid for Scuba Diving Injuries and First Aid for Hazardous Marine Life Injuries, DAN Instructors will be able to teach divers to use the units. There will also be a DAN Services version of the AED course for Aquatic Emergencies, similar to the Oxygen First Aid for Aquatic Emergencies course that takes DAN's medical expertise and applies it to the pool, swimming and boating arenas.

One wonderful feature about AEDs is that they are so simple, you really don't have to know a lot about the units to use them. All you have to do is turn the unit on, and it will tell you both verbally and visually what to do. This is one of the reasons AEDs are so effective in airports. Bystanders don't have to know how to use

an AED, they just have to know they should use it and it will walk them through the steps.

So why offer a training course? Time is critical, and in dive emergencies, there is already time lost just getting the diver out of the water. Divers trained to use AED units will respond more confidently in setting up the unit and will apply such training more appropriately to the injured diver. They will recognize the signs of sudden cardiac arrest and realize the need for the AED. This familiarity and confidence can make all the difference when minutes count.

Getting AEDs Out There

AEDs are expensive. They will appear on liveboards and charter boats long before the average person will have them. For example, the Aggressor dive fleet is currently working to place AEDs on all of their boats. Once the cost comes down a little bit more and more divers realize just how instrumental AEDs are to saving lives, AEDs will show up everywhere.

