

## **Operation Heartbeat Surviving sudden cardiac arrest**

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Approximately 220,000 sudden, out-of-hospital cardiac arrests occur in the United States each year. The majority of these individuals will die before arriving at a hospital and, according to the American Heart Association (AHA), only 5 percent or less will survive.

With a combination of training and readily available equipment, the AHA believes that many of these deaths could be prevented. In hopes of increasing the survival rate to at least 20 percent and saving an estimated 40,000 lives per year, a health initiative dubbed "Operation Heartbeat" was established by the AHA in 1998.

Although Operation Heartbeat is a national program, much of its work is community based. In 2000, the AHA's Northland Affiliate formed a local committee of volunteers, in an important step toward enhancing the effectiveness of pre-hospital care in the Twin Cities metropolitan area.

In addition to physicians, nurses and emergency medical services (EMS) professionals, presently serving on the Twin Cities committee are university professors and EMS training center personnel, as well as representatives from law enforcement, health plans and defibrillator manufacturers. Chairing the multi-disciplinary committee is R. J. Frascone, M.D., medical director of Regions Hospital EMS in St. Paul and former chair of the Minnesota EMS Regulatory Board.

Key to the committee's initiative is the AHA's four-link "Chain of Survival," which includes 1) early recognition of the warning signals of sudden cardiac arrest and immediate activation of the EMS system; 2) early cardiopulmonary resuscitation (CPR); 3) early defibrillation; and 4) early advanced cardiac life support (ACLS). Minimizing the response time for each link in the chain is the committee's objective.

Response times are essential not only for improving survival rates, but also to improve survival outcomes. "We often forget that, even for survivors, heart attack causes a degree of disability in irreversible heart and brain damage," says Beth Rabeneck, the Northland Affiliate's project manager for Operation Heartbeat in the Twin Cities. "That damage can come from not recognizing the signals and not getting medical assistance early."

### **Educating the public**

To lay the groundwork for future improvements, Frascone has formed two metro subcommittees. One, the community education committee, is primarily concerned with the first link. The committee was charged with evaluating the layperson's knowledge of the signals of heart attacks and strokes, as well as the barriers to calling 911 early, and then developing recommendations for a public education campaign.

As predicted, the subcommittee's surveys indicated that most people recognize chest discomfort (pain or pressure) as the classic signal of a heart attack. But few recognize the more subtle signals (e.g., pain in the jaw, down either arm or between the shoulder blades; nausea; sweating; and shortness of breath). Rabeneck

suggests that “the public needs to learn those signs and symptoms, and that they should be calling 911 — not their primary physician, a family member or a neighbor.” Physicians, she says, could help the cause by reinforcing these points with their patients. The subcommittee’s surveys will be used by the full committee as a guide for planning future educational efforts.

### **Encountering delays**

Another regional subcommittee is focused on the third link: early defibrillation. While CPR alone supports the body systems and slows the process of dying, its effectiveness diminishes within minutes. Studies show that a victim’s chance of survival is reduced by 7 to 10 percent for each minute without defibrillation; with as little as a 10-minute delay, the results are nearly always fatal.

“Ambulances usually get to the scene in a relatively short period of time,” Frascone says, “but oftentimes there is a significant delay in locating and reaching the patient.” In particular, delays occur in public gathering sites (e.g., stadiums, concert halls and airports) and highly populated structures (e.g., corporate, industrial and high-rise residential complexes), as well as in secured buildings and gated communities.

Because each minute counts, automated external defibrillators (AEDs) must be readily available to those who quite often arrive at the scene before the ambulance: police officers, firefighters, security officers, lifeguards and flight attendants. Operation Heartbeat research shows that only 26 percent of the 116 law enforcement agencies surveyed in the eight-county Twin Cities metro area own at least one AED, and many of those agencies have too few AEDs to equip each on-duty squad car.

### **Deploying accessible defibrillators**

The American Heart Association believes that public access to AEDs is essential to increasing the survival rates from out-of-hospital cardiac arrests. “Since prompt defibrillation at the site of the arrest can save lives and brains, our eventual goal is to have AEDs staged throughout the community, no more than two to two-and-a-half minutes away from a cardiac event,” Frascone says.

There is no definitive answer as to whether AEDs should be carried by first-response personnel or installed on the wall like fire extinguishers. General recommendations can be made, but deployment decisions need to be made at the local level. “One of the good things about organizations purchasing AEDs,” Frascone notes, “is that it forces them to look at how they respond to medical emergencies in general.”

Perhaps the gold standard of public access defibrillation (PAD) programs is at Chicago’s O’Hare International Airport. Since August 1999, when publicly accessible AEDs were mounted and encased on the walls like fire extinguishers — each within a one-minute walk from any point in the terminals — 11 lives have been saved.

At present, AEDs cost about \$3,500 per unit, yet they are believed to be a cost-effective medical intervention. Today’s AEDs are small, lightweight, durable and low maintenance. They are intuitive, require little training and can be used safely by the general public.

### **Awarding successes**

In honor of his overall contributions in chairing the Operation Heartbeat committee, plus his leadership on two related projects, Frascone has been recognized with the AHA’s 2001 Chain of Survival Award.

One of those projects addressed liability issues around public access to AEDs. “While convincing people that public access to defibrillation was prudent from a public health perspective, the main stumbling block has been corporate legal departments,” Frascione says. “Earlier legislative efforts to protect the general public from prosecution in the use of AEDs actually hindered our ability to get them out into the public.” With Frascione’s guidance, the AHA’s public advocacy committee successfully returned to the 2000 Minnesota Legislature to advocate that the language of the state’s Good Samaritan Law be broadened to clarify the original legislative intent. The law now unequivocally covers compensated, non-emergency professionals in the use of AEDs in the workplace. This new language allows workers who do not regularly work in the delivery of emergency medical care (from security guards to flight attendants to occupational health nurses) to respond with AEDs without fear of legal repercussions. (Note: there are still gray areas in some professions, so consulting an attorney is advised.)

Another successful Frascione-led project was praised by the International Building Owners and Managers Association (BOMA) and is now being duplicated in other parts of the country. Described by Frascione as “an example of a public-private partnership that works,” the joint project of Regions Hospital, the St. Paul Fire Department and St. Paul BOMA managed the deployment of more than 55 AEDs in approximately 30 buildings, primarily in downtown St. Paul. The fire department has agreed to inspect these defibrillators annually and will supply, free-of-charge, any defibrillator pads used in patient care. Rhonda Pape, vice president of St. Paul BOMA, puts Frascione’s role in perspective: “He was hugely instrumental in getting the program off the ground and clearing away the liability obstacles for property managers.”

As operation heartbeat’s goals to improve survival rates are not due to be met until 2010, it’s too early to quantify the results of local efforts to date. However, Rabeneck feels, “we have been successful already in developing key contacts and establishing a committee of committed volunteers who are passionate about moving toward the our ultimate goals.”

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