Public Access Defibrillation Programs:
A Survey of Practices, Procedures and Performance Metrics

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Executive Summary

Public Access Defibrillation (PAD) programs, which distribute automated external defibrillators to the community for use by trained laypersons, have the potential to dramatically improve survival rates from Sudden Cardiac Arrest, a disease that kills as many as 335,000 Americans a year.

Unfortunately, communities that have built PAD programs have often done so without clear guidelines on how to proceed. How to raise money? How fast to deploy automated external defibrillators (AEDs)? Which community organizations to involve? What common program pitfalls to expect? Often the only way a PAD coordinator could answer these questions was to call around to other programs and interview their personnel, or simply figure things out by trial and error.

This document aims to remedy this situation. It summarizes data from a formal survey of nine U.S. PAD programs. Sponsored by Medtronic Emergency Response Systems and conducted in the spring of 2005, the survey captured more than 50 key metrics from these programs.

The key findings:

1. Be patient and start small. Programs took 6.6 months on average to deploy their first defibrillator in the community. While programs eventually grew to manage an average of 332 devices, it took years: the average number of defibrillators deployed per year was 84.

2. Don't expect miracles. Many programs went several years before seeing their first “save” with an AED; some are still waiting. Most communities record just a few saves per year, but given the modest cost of these programs, and the huge impact on survivors’ lives, those are good numbers. And as shown by the experience in Washington, D.C., one PAD program can inspire a series of satellite programs (each operated within a single organization but reporting data back to a central monitoring agency) that collectively save dozens of lives per year across a region.

3. You will need money—but not a lot. Programs reported spending an average of about $107,000 a year, although this figure does not capture all the staff time contributed by sponsoring organizations or all investments made by sites hosting an AED.

4. Expect to do a lot of training. Programs reported an average of 1,132 training sessions per year, and 15 sessions per each AED deployed over the years (this figure includes retraining). Most programs kept training costs low to encourage more volunteers. Many set minimal standards for the number of people trained at a given AED location. Tracking and completing refresher training was a significant challenge for many programs.

5. Don't forget about tracking AED locations and maintenance schedules. Programs reported that this was a significant effort, and several left the entire problem for the site host to figure out—not the best idea. One solution, used by three programs to varying degrees, was to make the AED host site buy a maintenance contract from the AED vendor. Others took care of maintenance as part of the program.

6. When considering program sponsors, look first to the local heart hospitals and EMS departments. These organizations have a natural interest in public health and emergency rescue; hospitals also have substantial in-house marketing and training resources and a healthy self-interest in
promoting their brand through community-minded efforts such as PAD programs. Most surveyed programs were started by hospital or EMS/Fire departments.

7. Expect lots of positive response—and some resistance. Many programs reported overwhelming demand for AEDs once the word got out. At the same time, they reported resistance coming from unexpected quarters, such as school sites wary of liability or emergency-response officials who feared loss of “turf.” Be ready to educate the community and to overcome objections.

8. Invite community stakeholders—but not too many. Invite crucial players who will help your program raise money and spread awareness. But huge committees can slow decision-making and increase the risk of struggles over visibility and credit for successes, an experience noted by several programs.

9. Hire a dedicated program coordinator, even if they work part time. Many programs fretted about finding enough time to handle program duties, especially when the job was deemed a ‘side’ activity for someone. Most coordinators worked 20 to 40 hours a week, but they often got help from marketing or training staff in their organization. Coordinators tended to come from marketing/PR or medic backgrounds, and earned something between $30,000 and $80,000 a year—though data on this point was limited.

10. Impose conditions on AED sites before they can get a unit. PAD programs will have much higher quality control if they require sites to train their members, to place the device in a visible location, to track training and device maintenance, and so on. Alternately, programs can provide these services themselves, or require sites to secure a third party to handle them. Most programs did a good but imperfect job on enforcement.

11. Marketing the program doesn’t have to be hard or costly. Many programs did fine with media coverage of saves, public speaking events and public service announcements. Only the more adventurous programs created brochures and videos or put on major events with celebrities or sports teams. Most had very small marketing budgets.

12. Expect interest in AEDs from unusual places. Most programs fielded requests for AEDs from private individuals as well as from multi-state businesses. These requests are hard to fulfill within a PAD program, and programs tended to avoid getting involved. Those that did help out of area sites reported far more effort being associated with these initiatives.

13. Be sure to integrate AEDs with local emergency response systems. All surveyed programs registered AED locations with local dispatch, and in most, the location shows up automatically on incoming 911 calls. No program has yet included AEDs in fire department building inspections, but several were working on it. Communities with multiple 911 systems and lots of fire department jurisdictions will likely find these steps more difficult.
Introduction

Public Access Defibrillation (PAD) programs are a key weapon in the fight against Sudden Cardiac Arrest (SCA), a leading killer that annually claims as many as 335,000 people in the U.S. alone.

Rather than counting on emergency rescue crews to arrive soon enough to revive a person in sudden cardiac arrest—speedy arrivals are often not feasible—PAD programs distribute easy-to-use Automated External Defibrillators (AEDs) into the community, closer to the arrest victim, so that laypersons can administer treatment within the first crucial 5 minutes.

Dozens of PAD programs have blossomed across the nation over the past five to seven years, as their lifesaving benefits have been recognized by public safety and civic leaders, and as AEDs—the key tool of these programs—have become far cheaper, simpler and fool-proof to use.

However, there are at present no national standards for what constitutes a high-quality PAD program, nor extensive data on how these programs are functioning in real life. What information does exist is primarily prescriptive rather than based on objective data.

This White Paper attempts to fill a gap in the literature by reporting how nine successful PAD programs are actually operating, and what steps they have taken to build their programs. While a limited sample, this survey does represent a cross-section in terms of program geography, size, maturity and sponsorship. It represents a starting point for understanding how successful programs are built—and provides tips for avoiding common program pitfalls and dealing with typical challenges.

An outflow of this effort is a first take on creating a national "Best Practices" standard, with quantitative ratings for how programs handle each key element for building and running a PAD program.

This White Paper is meant to augment several existing excellent guides to building a PAD program and Heart Safe Community. The American Heart Association has postulated a "Chain of Survival" standard that calls for 4 key elements in any Heart Safe program: Early Access to 911, Early Administration of CPR, Early Defibrillation, and Early Access to Advance Care. It can be found at www.americanheart.org.

The National Center for Early Defibrillation, meanwhile, has published an SCA Basic Survival checklist on its Web site, www.early-defib.org. Also, the International Association of Fire Chiefs annually recognizes excellent programs, although it does not publish objective standards for its awards.

Why take the time to document PAD programs? There are several reasons.

For one, research shows that well-designed PAD programs are highly effective. Two formal studies of layperson defibrillation, in casinos and on aircraft, found that SCA survival rates in these locations soared to 74 and 40 percent, respectively, after the programs were implemented.1,2 The survival rate jumped to 74 percent among casino victims shocked within 3 minutes of collapse. Compare this to the dismal national SCA survival rate of about 5 percent.

Both studies mentioned above, however, concern programs created in tightly defined areas—inside casinos, where every person is watched on security cameras, and within the confines of aircraft and airport boarding gates. It is significantly more difficult to create a successful program across the many public gathering places of an entire city, especially amidst the far-flung reaches of a public park, a golf course, an office campus or a sports stadium. To maximize SCA survival rates across entire communities, it is crucial to document how today’s large-scale PAD programs work.

A second driver of this study is its sponsor, Medtronic Emergency Response Systems, Inc. of Redmond, WA. Medtronic is the world leader in defibrillation devices and a leading sponsor of PAD programs nationwide, having helped launch more than 30 programs in the U.S. As new programs launch, founders constantly want to know how earlier programs handled challenges and tracked progress. This White Paper takes a step towards answering such questions.

Finally, successful PAD programs are complex. They involve much more than simply buying a few AEDs and hanging them on the wall in public places. Creating a program requires many supporting activities—fundraising, public awareness efforts, training of responders, maintenance of AED batteries and supplies, registration of AEDs with 911, researching of state and local laws, and so on. Then there are the political considerations. Program champions must build support among community stakeholders and overcome concerns—and sometimes referee the sharing of kudos and control among competing heart
hospitals and ambulance services in the area; among scattered EMS, police and fire departments; and among community agencies.

All these elements come into play for most programs. This White Paper describes how these nine programs have dealt with such issues in the past.

The author extends his heartfelt thanks to the directors of the nine PAD programs who donated their time and wisdom to this research effort. Without them, this paper would not have been possible. The hope is that the outcome will be instructive to these nine programs, and to communities working to start their own PAD program.

PAD Programs and SCA—a Primer

Sudden Cardiac Arrest has emerged as a growing threat to the health of Americans. SCA occurs when an electrical malfunction causes the heart to beat in an irregular manner such that it no longer pumps blood through the body. Unconsciousness and cessation of breathing soon follows; without treatment, brain damage may begin within 4–6 minutes and death is likely after 10 minutes.

While SCA can be triggered by a heart attack, it is not the same thing; heart attacks are caused by a physical blockage of an artery, and cause distress but rarely unconsciousness or complete cessation of circulation. SCA can also be brought on by stroke, an allergic reaction, a blow to the chest or even an asthma attack. Obesity, smoking, advanced age and a history of heart problems are all risk factors for SCA, but it can strike people of any age or lifestyle.

In recent years, many cities, counties, hospitals and emergency response agencies in the United States have launched programs to increase survival rates from SCA, which average about 5 percent.

Until the late 1990s, SCA-response programs for the public were focused on mass trainings in CPR. These programs equipped laypersons to keep a victim minimally oxygenated until medics could arrive and administer a lifesaving shock to the heart, thereby restoring normal rhythm—and as a result restoring blood circulation, breathing and consciousness.

However, CPR alone cannot revive an SCA victim. It merely buys a bit more time until an AED is available. However, the fact that national survival rates from SCA remain so low bears grim testimony to the fact that CPR by itself cannot remedy the problem.

More recent public efforts to address SCA have shifted the focus to deploying automated external defibrillators out into the community, so that trained laypersons can resuscitate the victim themselves.

The logic for PAD programs is compelling: SCA victims start to lose brain function within minutes, and are unlikely to be revived at all after about 10 minutes. Indeed, studies have shown that the odds of surviving SCA decline by 7 to 10 percent for every minute that the victim goes untreated. Counter that with the fact that the average response time for EMS departments is 6-12 minutes, and the need for PAD programs becomes clear: the best way to save an SCA victim is to have a defibrillator close at hand, in a visible, well-marked location, and with trained laypersons on site ready to help at a moment’s notice. Such elements represent the focus of a PAD program.

How others have actually assembled these elements, and what seems to work best, constitute the subject of this White Paper.

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Survey Design

During the spring of 2005, the author of this study surveyed nine existing PAD programs operating across the United States. Some of these programs had been in operation for many years; others were relatively new. Five were founded by hospitals, three by EMS departments, and one by a hospital foundation. Interview subjects were generally PAD program coordinators, although marketing persons and PAD medical directors were sometimes interviewed as well. Each interview subject was administered the same 60 to 90-minute formal survey over the telephone, with opportunity to review and correct the written transcript. No interview subjects were paid for their assistance. All surveyed programs were customers of Medtronic Emergency Response Systems and used Medtronic products as their primary (not necessarily their sole) AED device for their PAD program. The reason for this selection choice was simply a matter of access: the PAD program managers were known and readily available to Medtronic research efforts and willing to cooperate in sharing program details, including sensitive political issues encountered in starting a program. Medtronic’s pre-existing familiarity with these programs also helped, in that the research sponsor already understood the feature set and pricing of the AEDs used by the program, and had verifiable information as to the degree of financial and planning assistance provided by the vendor in establishing the program.

The nine programs surveyed were as follows (AED data as of May 2005).

<table>
<thead>
<tr>
<th>Program Location</th>
<th>Program Sponsor</th>
<th>Year Started</th>
<th>#AEDs Deployed</th>
<th>Survey Respondent(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minneapolis, MN area</td>
<td>Allina Hospital Systems</td>
<td>2001</td>
<td>590</td>
<td>Dr. Charles Lick, Program Medical Director; Allina</td>
</tr>
<tr>
<td>Washington, DC</td>
<td>DC Fire and EMS</td>
<td>1999</td>
<td>900</td>
<td>Lt. Arthur Bradley, DC FEMS; Capt. La Shon Frazier, Head of Continuing QI Project</td>
</tr>
<tr>
<td>Bergen County, NJ</td>
<td>Hackensack U. Medical Ctr.</td>
<td>1997</td>
<td>250</td>
<td>Ken Christensen, Mobile ICU Director; Valerie Schoen, EMS Educator</td>
</tr>
<tr>
<td>Des Moines, IA area</td>
<td>Iowa Heart Hospital</td>
<td>2001</td>
<td>500</td>
<td>Ken Schweers, Hospital Director of Marketing and Public Relations</td>
</tr>
<tr>
<td>Kansas City, MO area</td>
<td>St. Luke’s Mid-America Heart Institute</td>
<td>2000</td>
<td>300</td>
<td>Marcia McCoy, Executive Director; Colleen Lad, Community Coordinator (hospital staff)</td>
</tr>
<tr>
<td>Monterey County, CA</td>
<td>Salinas Valley Memorial Healthcare System</td>
<td>2004</td>
<td>80</td>
<td>Liz Lazar, Program Coordinator (hospital contractor)</td>
</tr>
<tr>
<td>Sioux Falls, SD</td>
<td>Sioux Falls Fire &amp; EMS</td>
<td>2003</td>
<td>350</td>
<td>James Sideras, EMS Battalion Chief</td>
</tr>
<tr>
<td>Pittsburgh, PA suburbs</td>
<td>St. Margaret’s Foundation (hospital foundation)</td>
<td>2001</td>
<td>150</td>
<td>Brian Hoebel, PAD Coordinator (foundation employee)</td>
</tr>
<tr>
<td>Talbot County, MD</td>
<td>Talbot County EMS</td>
<td>2001</td>
<td>120</td>
<td>Mark Cummings, Director of EMS</td>
</tr>
</tbody>
</table>
Survey Findings

1 GENERAL PROGRAM METRICS

1.1 Program age:
Average: 4.6 years
Range: 1 to 8 years

1.2 Program population served:
Average: 587,000
Range: 76,000 to 1 million residents

1.3 Number of AEDs per program deployed to date:
Average: 332 (29 in initial deployment)
Range: 80 to 900 (2 to 65 in initial deployment)

1.4 Number of AEDs deployed, by program, per 100,000 population:
Average: 89
Range: 20 to 250

The figures above may help programs benchmark just how prevalent AEDs are in their communities. However, it is not only the total number of AEDs deployed that matters but where they are deployed. Also note that these PAD programs do not capture the AEDs deployed outside of the program. Evidence from internal Medtronic data suggests that most communities already have substantial numbers of AEDs deployed into private and health-related institutions.

1.5 AEDs deployed, by program, per year:
Average: 84
Range: 21 to 175

1.6 Saves per program (7 of 9 programs reporting):
Average: 28.7*
Range: zero to 162*

*Washington, D.C., data skewed the average higher. Without D.C. the range was 0-20 and the average was 6.5. Most programs had saves ranging from zero to nine.

1.7 Saves, by program, per hundred AEDs (7 of 9 programs reporting):
Average: 4.6 per 100*
Range: zero to 18*

*The range was 0-6 and the average was 2.3 excluding D.C. data. Also keep in mind that this metric does not factor in how long any given set of AEDs have been out in the community, so this metric should rise over time for any given program.

1.8 Saves per year by a program (7 of 9 programs reporting):
Average: 5.4*
Range: zero to 27*

*The range was 0-5 and the average was 18 saves without D.C. Most programs had zero to five saves per year.

1.9 Cumulative number of people receiving AED training, per program:
Averaged: 4,967
Range: 150 to 18,000

Newer programs, of course, had fewer training sessions under their belt while mature programs often were conducting repeat training sessions for many people. Thus 18,000 sessions reflects repeat and refresher classes for some trainees.

1.10 Average trainings per year by a program:
Average: 1,132
Range: 150 to 2,750

1.11 Trainings per AED:
Average: 15
Range: 2.4 to 120

This may be the most useful training metric, because it helps suggest how many classes to plan for each AED deployed. Refresher training almost certainly skews this number somewhat higher, so the number of initial trainings per device is likely less.

1.12 Time from program launch to first deployment of an AED:
Average: 6.6 months
Range: 2 to 10 months

Clearly, launching an AED program takes time, and new programs should accept and plan for that.

1.13 Lead program sponsor:
• Hospital (4)
• EMS department (2)
• Foundation (2) (One hospital foundation, one EMS foundation)
• Hospital-owned ambulance service (1)

None were started by local government agencies outside of Fire and EMS departments, and none by a health agency such as the American Heart Association, although both these models have been used elsewhere. Hospitals appear particularly suited for starting PAD programs because they have both the resources (marketing departments, access to EMS data, medical direction) and the motivation to start a program (PAD programs can be good marketing). However, they hardly represent the only successful model.
1.14 Key catalyst to starting a program:
Most programs reported a mix of program drivers. Four realized that there was a major shortcoming in SCA responses. Two started a program primarily as a marketing and charitable effort; one did so as an extension of earlier health campaigns, one was driven by the personal interest of a doctor, and one was prompted to exposure to the entire PAD concept at a trade show. Interestingly, while none of the surveyed programs were spurred by the SCA death of a person in the community, such deaths are often cited as a driver in launching PAD programs.

1.15 Funds raised to date by a program:
Average: $488,000
Range: $70,000 to $1.1 million

The average works out to about $107,000 per program-year. Such figures typically exclude in-house labor performed by marketing departments and other support groups of the program sponsor, as well as funds expended by AED sites to buy and maintain AEDs or to train their users (not all programs charge for training).

In short, actual program expenditures are almost certainly higher than the numbers stated, although how much higher is hard to say. However, given the number of saves per year realized by these programs, those costs seem quite reasonable—less than $60,000 per life saved, even if one excludes the unusually high number of saves from one program.

1.16 Funding sources:
Funding sources were many and varied, as seen in the list below. The list excludes funds from site hosts for supplies, training or AED purchase.

- AED vendor or vendor foundation (5)
- Hospital (5)
- Private foundation (4)
- Local business (4)
- Individual donations (2)
- Civic organizations (1)
- United Way (1)
- Federal grants (1)
- Program fundraisers (1)
- AHA/ARC (1)
- Local government (1)

2 PROGRAM IMPLEMENTATION METRICS

2.1 Program Champions
All programs surveyed were essentially championed by the organizations that ended up sponsoring them. It was perhaps surprising no program was driven by a prominent SCA death in the community or by a determined citizen-advocate. One possible takeaway could be that these programs are difficult and complex enough to start that they really need organizational backing from the outset.

2.2 Participating Agencies
Many hospital-led programs tended to go it alone in terms of setting up their program, at least in the launch stages, while EMS-led programs tended to be more inclusive. Five of the nine programs surveyed did employ launch committees of a sort with outside stakeholders, often because the participants were lending legal or financial assistance.

The list of those invited onto formal committees is as follows:

- Local EMS (3 programs)
- American Heart Association or American Red Cross (2 each)
- United Way (2)
- Local foundation (2)
- Local business or government official (2) (1 other program secured Mayoral and Health Dept endorsements)
- Local Chamber of Commerce (1)
- TV health reporter (1)
- Police chiefs (1)
- Fire chiefs (1)
- Medical Association lobbyist (to track state AED laws) (1)

New programs will need to make its own choices as to which key players to invite to the table. Two program founders expressed the wish that they had brought in fewer stakeholders at the start, because of turf battles and lost time in building consensus.

2.3 Program’s Founding Mission
All programs coalesced around just a few key missions, which focused on health results and publicity aims.

- Save lives (5 programs)
- Blanket the area with AEDs (3)
- Generate good publicity for the program sponsor (2)
- Increase awareness of Sudden Cardiac Arrest (1)
2.4 Biggest Launch Challenge

Programs reported a wide range of challenges, with none dominating the list. The only multiple vote-getter was community skepticism or opposition to the program, in both cases from state or local volunteer EMS groups who saw PAD programs as an intrusion on their turf. Since EMS support is critical to PAD success, these comments highlight the need for outreach to EMS, early and often.

- EMS opposition (2 programs)
- Managing training (1)
- Documenting AED locations (1)
- Money (1)
- Internal buy-in (1)
- Planning time (1)
- Handling program demand (1)

2.5 Medical Direction

No surprises here. All program Medical Directors came from either a heart hospital or local EMS department, and none were paid extra for their role as PAD Medical Director. Two-thirds of the Medical Directors held largely figurehead roles, in which they signed the prescription for AEDs and then generally were uninvolved. In two programs, MDs had moderate involvement that entailed reviewing AED usage records and perhaps attending a monthly meeting. In only one program, Allina, did the medical director assume a major role in marketing and operating the program—and he was the program founder.

2.6 PAD Coordinator

The survey found much more variability in the degree of commitment to the PAD coordinator role. Only four programs created an actual job (usually part time) to run the program, while others added this task as a ‘side job’ to an existing staff position. When it was made an add-on responsibility, staffers were not paid extra. These staff persons were generally employees of the program sponsoring organization: that is, a hospital (4 programs) EMS department (4), or a foundation (1). Most such part-timers came from training, education or marketing positions, or were line managers in an EMS department. Several had actual paramedic training, which they considered an advantage. One was a registered nurse.

In terms of pay, the stipend for coordinator ran from nothing (for those moonlighting at it) to $30,000 to $80,000. Earnings metrics were available for just a few programs, however.

While PAD coordinators carried the main load, most programs also involved other players. Many hospitals, for instance, tapped their marketing departments to develop Public Service Announcements and press releases, or their nursing and education departments to conduct CPR/AED training. EMS departments also leveraged training departments. Several programs used a purchasing staff person to manage the acquisition and distribution of AEDs. In all, programs reported about 10 extra hours of work performed by supporting organizations beyond the coordinator role. It is important to note that time demands were often cyclical, with commitment ramping up sharply during training, fund raising campaigns and device-maintenance cycles. An actual SCA rescue event also triggered extra work, in terms of downloading AED data and replenishing AED supplies.

3 AED PLACEMENT METRICS

3.1 How AED Sites Were Chosen

Programs chose AED sites using a wide range of metrics. Many simply responded to requests, on the theory that sites that want the devices are the easiest place to start. Others did target public-sector locations such as police cars and schools, while a good number went for sites that had the money to buy AEDs or the political clout to help the program become visible and accepted in the community. Only one program put together a formal, ranked list of high-risk sites based on public health research. It would be a welcome development if more programs pursued such a conscious strategy.

Four of the nine programs set up a formal site-review committee to choose AED locations and screen requests: hospital programs tended to eschew committees.

Leading targets for placing AEDs:

- Public safety vehicles (5 programs)
- Schools (4)
- Request-based (4)
- Financially strong or influential supporters (3)
- Local business (3)
- Churches, golf courses, nonprofits (1 each)
- Researched list of high-risk areas (1)
3.2 Location of First AED Installations
Pilot locations were wide-ranging; programs seemed intent on making a visible splash with their first unit, which is a good step towards building community awareness and support. At least two PAD programs explicitly targeted organizations that helped launch the program.

- Police Department (2)
- School (2)
- YMCA (2)
- Large local employer (2)
- Airport (1)
- Elected official’s office (1)
- Fire Department (1)
- American Heart Association chapter (1)
- Local professional firms (1)
- Government building (1)
- Church (1)

3.3 Sites Resistant to AED Placement
Those contemplating a new PAD program should not assume that everyone will want AEDs in their facility. Many companies and schools are worried about liability risks; others balk at the cost and time required to train staff in AED use. In any case, program coordinators should expect to educate some target sites about Good Samaritan Laws, manufacturer indemnification policies, and other risk-mitigating protections.

Resistant sites (1 each):
- Airport
- Community college
- Secondary schools
- Retirement centers
- Large national retailer

3.4 Conditions of AED Placement
Among the most important means of creating a high-quality PAD program is for program sponsors to set standards with which an AED host site must comply before they can receive a device. PAD programs have a vested interest in setting such standards; after all, they are writing a medical prescription for a regulated device, and potentially face some liability should the device not be maintained properly or made inaccessible to trained responders. Certainly, legal agreements can transfer much of the liability to the site host; even then, however, programs should be concerned about possible damage to their program’s reputation should an SCA event occur and a host site not be ready to use the AED provided.

Despite the importance of quality control, the nine programs surveyed displayed a mixed record on setting conditions for providing AEDs. Some were quite rigorous and broad-reaching; others set standards for some practices but not others. Training of on-site responders was the most common requirement imposed. One or two imposed no conditions, asserting that they lacked the money or staff to do so, or expressing the belief that site hosts were generally doing a good job even without strict standards being imposed.

A number of programs did report offering advice and help on process and procedures. Five, for example, said they sometimes help with site walkthroughs (which establish the distance of an AED from various points at the site). Only one program, however, required such walkthroughs.

In any case, standards-setting for site hosts represents an area that PAD programs would do well to focus on.

Placement conditions imposed:
- Commit to/receive training (7)
- Buy vendor maintenance contract or commit to maintenance (4)
- Place AED in visible location (3)
- No requirements (3)
- Written response plan/policies & procedures (3)
- Alarmed cabinets (2)
- Appoint a site coordinator (1)
- Conduct site walkthrough (1)
- Register AEDs with 911 (1) (registration does occur in most programs)
- Commit to monthly inspection schedule (1)

3.5 AED Provision Model
This represents another key program differentiator. Some programs donate all AEDs to sites after buying the units at a discount; others pass on the cost of the unit to the site entirely. Still others pursue a mixed agenda, donating to non-profits and public agencies and passing the cost on to private business. One program actually acquires AEDs, bundles in training, a cabinet and other services, and sells the package at its own unique price.

Depending on program resources, either donation or cost pass-through can work. Obviously, programs that donate units can grow more quickly, and gain more leverage in enforcing program standards. But they also will spend a lot more money.
Common provision models:
• Donate (3)
• Donate to some, resell to others (2)
• Pass on unit at PAD program price (2)
• Resell with additional bundled services (1)
• Don’t sell at all; merely register and track AEDs acquired in the service area (1)

3.6 AED Initial Site Assessment: Who Does It
• PAD coordinator (6)
• Site host (3)
• AED vendor rep (2)
• Hospital or EMS (1 each)

4 TRAINING METRICS

4.1 Who Provides AED Training
Often the training programs are organized through the PAD program sponsors, which again gives hospitals and EMS departments a natural advantage; they, after all, do CPR training all the time. Many programs use the AHA curriculum but others use alternative courseware offered by ASHI or other organizations.

Training providers:
• EMS (5)
• Hospital nurses or education department (3)
• Fire Department (1)

4.2 Who Covers Cost of AED Training
• Programs charge everyone (3)
• Program provides it free to everyone (3)
• Mixed (free to nonprofits/public agencies, but businesses pay) (2)
• Program bundles training with higher AED sale price (1)
Even where training comes with a fee, programs try to keep costs down to encourage as many volunteer trainees as possible.

4.3 Training Prices
• Free (3)
• $30-$35 per person (2)
• Group rate for 10-12 people of $120 to $400 (2)
• Bundled with unit (1)
• Price varies by provider (1)

4.4 Numerical Goals for Site Trainees
Six of nine programs had some kind of numerical training goal per site. Even those who had no quantitative metric did aim to train lay responders on each shift and each floor or building of a site. Having adequate trainee coverage is crucial to program quality. PAD programs should be prepared to be flexible in setting up training, because many site hosts are nervous about lost work time for training exercises.

Training targets:
• 100 percent (generally public safety agencies) (1)
• Four trainees per site (1)
• 10 percent of site residents, at minimum (1)
• One full class of 12 to 20 people (2)
• Bundled training unit of 5 people (1)

4.5 Refresher Training Efforts
Refresher training was a weak spot in many programs. It can be difficult to track turnover in on-site personnel, and time-consuming to remind lay responders to be retrained. Fortunately, modern AEDs are designed to be so simple that refresher AED training is far less critical than CPR refresher training. Many programs, in fact, rely on biannual CPR training cycles (required to maintain certification) to accomplish AED training as well. It is worth noting that none of the programs reported using any of the online tools that are now available to track AED maintenance and trainee schedules: those that did have a tracking tool relied on a homemade database.

Refresher training plan:
• Rely on the two-year CPR certification cycle (5)
• Annual retraining cycles (3)
• Up to site host (1)

4.6 Site Signage Plan
All programs that place AED in buildings do place AED notification decals in the front windows of host sites. Several programs also place signage next to the AED itself. Two hospital-based programs pay for specially etched glass for their alarmed cabinets, to showcase the logo of the sponsoring organization. This serves as a marketing tool for the program.
5 PROGRAM DOCUMENTATION AND DATA TRACKING METRICS

5.1 Integrating AEDs with Emergency Dispatch (911) Programs

Most programs register AEDs with 911 dispatch programs so that when a citizen calls in to report a victim, the dispatch person can pull up data showing that an AED is on site and inform the caller where it is. A further step is to train dispatch professionals to walk a caller through the use of an AED over the telephone. Both measures greatly increase the likelihood that an AED will be found and used during an SCA event.

Most surveyed programs were far along on these efforts. All programs registered AEDs with EMS, and eight of nine could coach a caller on AED use. But two acknowledged that AED information may not be embedded into 911 software. Areas with highly fragmented dispatch services, such as states with Home Rule provisions or multiple EMS departments, tend to require special care to ensure that AEDs are registered and readily retrieved by dispatch.

On another front, no program had yet integrated AEDs into fire department building inspections, which would ensure that AEDs are checked at least once a year for battery life and freshness of electrodes. Two programs were working on this initiative for 2005 implementation.

Finally, programs should aim to make the registration of AEDs as easy and inclusive as possible. One logical step is to enable online registration, so that AED sites can register with dispatch even if the unit is not acquired through the PAD program. However, only a few programs enabled online registration, and one respondent reported that online registration was illegal in their state (Maryland). Several programs admitted that they probably are unaware of many local AEDs purchased outside of the PAD program—an unfortunate situation.

Integration levels:
• Dispatch alerted to AED (9)
• Dispatch trained to walk caller through AED use (8)
• AED info embedded into 911 software (7)
• Online registration enabled (2)
• AEDs included in fire department building inspections (0)

5.2 Tracking EMS Response Times

One key factor in assessing a community’s preparedness for SCA is the response time of EMS to emergency calls. Programs should aim to know their local EMS response times.

Seven of nine programs said their communities do track response times, but only five could readily cite the numbers off the top of their head. This suggests that programs could do more to rigorously track how well EMS is serving the community. Indeed, one program manager noted that he uses EMS statistics to build a case for the PAD program—since slow response times proved the need for on-site AEDs.

5.3 Tracking Survival Rates

Survival rates are even more critical for programs to track, given that most have targeted higher survival rates as the key mission of their program. Seven of nine programs did track survival rates, and those who could cite “before and after” PAD data could point to impressive results. The city of Washington, D.C., for instance, raised SCA resuscitation rates from 1 percent to 17 percent, and Hackensack boosted the rate for SCA survival to discharge threefold, from 10 percent to 30 percent. (The two metrics are not the same; some communities have difficulty in obtaining survival-to-discharge information from hospitals because of privacy concerns engendered by federal HIPAA legislation, and so merely track the percentage of SCA victims who achieve spontaneous circulation after being treated on site. PAD programs should push for discharge data since hospitals can easily scrub personal information from such data before release; failing that, communities can post a recirculation standard like that used by Washington, D.C. The key is to be consistent and to clearly define what “survival” means in the given community).

5.4 Tracking AED Maintenance

Along with the tracking of training cycles, AED maintenance tracking is a major challenge for many programs. The effort is important because batteries do wear out, electrodes do dry out, and both need replacement. Someone needs to track these service intervals, and someone needs to actually service the unit. An AED that is not maintained will not be worth much over time—in fact, it will breed a false sense of security. Newspaper articles have recounted stories of SCA victims who could not be resuscitated because rescuers resorted to an AED with a dead battery. One such incident occurred at the Atlanta airport in early 2005.

Despite the importance of tracking device maintenance, surveyed PAD programs adopted uneven levels of diligence regarding this activity. A third of surveyed programs left it to the site hosts to figure out the whole thing and to pay any costs as well—not the optimal situation. Another third provided device tracking to some sites for free, and yet another third required some sites
to buy a maintenance contract from an AED vendor. One program provided the service but billed sites for the effort. Any of these latter approaches is better than dumping the full responsibility on the site host.

In terms of the tools used to track AEDs, all PAD programs that handled tracking themselves relied on homegrown databases. AED vendors, meanwhile, used their own tools. No surveyed program used any of the online tracking tools that are offered by various AED vendors and web services, though several were looking into these options.

5.5 Post-event Analysis and Quality Improvement

Actual SCA resuscitations are the main goal, yet just five of nine programs reported that they routinely conduct post-event analysis of all SCA events. Three others do distribute data-management software (used to extract AED event information from the devices) to all host sites, but these programs reported some doubt whether all data was being faithfully reported by the sites. Some program managers questioned whether they had sufficient leverage to require AED sites to report device usage and the attendant data, while others were adamant about their right to the data, given that the PAD program supplied the medical prescription for the device. It appears that securing post-event data requires a mixture of political will and staff time.

6 MARKETING METRICS

6.1 Marketing Tools and Strategies

Program marketing efforts tended to lean heavily on media coverage, community presentations, civic events and public service announcements. By all accounts these awareness efforts worked quite well. Several programs reported that they did not need to create brochures, advertising or even a web site, because community response was so rapid and widespread. Most did build at least a few web pages on their organizations’ sites, but anecdotal evidence indicates that these sites draw minimal traffic.

One program pursued the unique idea of including a local TV health reporter on its PAD launch committee. This idea generated excellent media coverage.

SCA survivors can provide dramatic testimony to the power of a PAD program, and six programs secured their involvement to some degree. However, programs often reported that many survivors were reluctant to talk about their traumatic experiences. Most programs that managed to recruit survivors did so on a limited basis.

Advertising and marketing expenditures tended to be quite modest—measured in the few thousands of dollars a year. Just three programs went for big-splash efforts: two developed partnerships with their city’s professional sports teams, and one raises most of its annual budget through a major annual hockey tournament. Cash expenditures, however, are not the whole marketing story. Hospitals, especially, augmented their marketing dollars with in-kind labor provided by hospital marketing departments. Just two programs reported having a formal marketing budget.

Organizers of new PAD programs who do not have access to in-house marketing resources will need to spend time and effort to figure out how to secure these resources.

Marketing efforts:

- Media coverage (9)
- Program Web site (6)
- Survivor testimonials/involvement (6)
- Program Public Service Announcements (5)
- TV specials on local TV or cable (4)
- Program brochures (4)

6.2 Follow-on Interest Generated by PAD Programs

PAD programs need to anticipate demand for AEDs from unexpected quarters.

Eight of nine surveyed respondents reported that their programs generated interest in AEDs from private individuals, with the intensity of interest ranging from "a few" inquiries to "quite a bit." Programs were not prepared to serve these inquiries and generally passed these inquiries onto an AED vendor or family doctor. Given that PAD programs are all about "public access" to defibrillation, this decision seems reasonable.

In the same vein, most respondents reported fielding inquiries from corporations and other organizations having locations outside the PAD service area. These prospective clients, too, are a challenge. Who does site assessment for an out-of-state location? Who trains lay responders in a remote area, or registers the unit with remote dispatch departments? Who figures out liability and Good Samaritan laws for multiple jurisdictions?

Despite the challenges, four programs reported that they did help multi-state organizations acquire AEDs for remote locations, and that they tried to connect these organizations with local resources in the remote communities. But most also said that these out-of-state locations generated extra burdens in terms of travel time, differing legal standards, etc. In general, programs should approach these efforts with caution.
7. LESSONS LEARNED

7.1 Key Program Benefits
The top three program benefits cited were saved lives, positive publicity for the sponsoring organization and greater community awareness about SCA. Most programs listed a combination of these benefits.

7.2 Cross-Jurisdictional Issues
Four of nine programs reported encountering some kind of cross-jurisdictional issue, with political coordination or friction among agencies being the most common (three programs) and varying state or county laws being the other. Five programs reported no significant jurisdictional problems. In general, PAD organizers should be sensitive to turf issues among EMS, police or hospital departments, but need not be fearful that such issues will be crippling.

7.3 Best Decision by the Program
Three programs cited the efficiency of housing the program within a hospital, thanks to its resources and, at the same time, its ability to be seen as not beholden to the profit motive or a particular AED vendor. One program cited the value of creating its own in-house database to track devices and training. Other single citations were the decision to form community partnerships and the decision to appoint a paramedic as PAD coordinator.

7.4 Weakest PAD Program Components
Clearly the issue programs struggled most with was tracking of device maintenance and training schedules (four programs); overcoming resistance to AEDs in schools was listed by two programs.

Weaknesses:
• Tracking training and/or devices (4)
• Overcoming resistance in schools (2)
• Handling growth (2)
• Finding marketing funds (1)
• Administering extensive training (1).

7.5 What Programs Would Have Done Differently
• Hire dedicated PAD coordinator from the start (2)
• Limit initial planning-committee stakeholders, to reduce conflicts (2)
• Create more structure/enforcement rules at the start (2)
• Be more open minded with resistant sites (1)
• Create formal training committee at the start (1)

7.6 Biggest Program Surprise
• That some sites/community leaders would resist AEDS (4)
• Fast growth of program (3)
• Amount of tracking and maintenance work (1)
• Rapid growth in community willingness to rescue SCA victim (1)

The greatest surprises came from opposite ends of the spectrum. Clearly, PAD coordinators need to be nimble in responding to both rapid growth as well as unexpected roadblocks.
For further information, please contact Medtronic at 1.888.351.LIFE, option 5, or refer to our Web site at www.keepthebeat.org.

Medtronic Emergency Response Systems
11811 Willows Road NE
P. O. Box 97006
Redmond, WA 98073-9706
Tel 425.867.4000
Toll free 800.442.1142

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