5.1

COMMITTEE OF THE WHOLE - OCTOBER 6, 2008

MANDATORY INSTALLATION OF AUTOMATED EXTERNAL DEFIBRILLATORS

Recommendation

The Safe City Committee recommends:

(1) That the attached study (Attachment 1) on Automated External Defibrillators, be received;

(2) That the Province of Ontario be requested to pass Province-wide legislation on Mandatory Installation of Automated External Defibrillators in all public buildings;

(3) That the Province of Ontario be requested to forward the regulation on Mandatory Installation of Automated External Defibrillators to the necessary and appropriate agencies, boards, or commissions, responsible for affecting the Ontario Building Code;

(4) That staff review the standard and practices as it existed in other jurisdictions and provide a report by the end of the next quarter to examine opportunities on Automated External Defibrillators; and

(5) That the report be forwarded to the Association of Municipalities of Ontario, the Federation of Canadian Municipalities, and MPP Greg Sorbara, Member of Parliament for Vaughan.

Economic Impact

N/A

Communications Plan

N/A

Purpose

To advise Council of the Safe City Committee's recommendation regarding the Mandatory Installation of Automated External Defibrillators.

Background - Analysis and Options

At the Safe City Committee meeting of January 22, 2008, an initiative on the mandatory installation of Automatic External Defibrillators (AEDs) in all public buildings in the City of Vaughan was cited as a potential project for 2008. The committee had before them various articles and studies that were published by the New England Journal of Medicine, the American Heart Association, and the St. John Ambulance, on AEDs.

The Safe City Committee at its meeting on February 21, 2008 and again on September 16, 2008 had before them copies of various articles on the studies published by the New England Journal of Medicine and the American Heart Association, and the St. John Ambulance, on Automated External Defibrillators (AEDs). It was noted in the articles that sudden cardiac arrest is a leading

cause of death in the United States/North America. Unlike many other life-threatening illnesses and conditions, sudden cardiac arrest occurs outside of a medical setting. In such settings, the victim's only chance of survival rests with the arrival of an emergency medical service (often unavoidably delayed beyond the critical first few minutes), and the use of a defibrillator, a device that delivers a shock to the heart to restore normal rhythm. The article from the American Heart Association (AHA) indicated that the use of automated external defibrillators (AEDs) in community settings nearly doubles the survival rate of cardiac arrest victims when measured against CPR alone. With voice and light prompts, AEDs are accurate and easy to use. As a result, the AHA recommends placing them in targeted public areas where cardiac arrest is likely to occur.

The articles also mentioned that a number of communities in California and beyond have piloted programs to place AEDs in public buildings and are incrementally expanding their programs, but few have already implemented programs that provide broad coverage. The City of Los Angeles and San Diego County have placed over 500 AEDs each in public buildings. In California, Legislature passed a law that went into effect July 1, 2008, requiring all fitness clubs in California to have AEDs. The article also cited examples of separate incidents, one in Georgia and one in California in 2003 where two young boys died from sudden cardiac arrest after being hit in the chest by a baseball. In both cases, CPR was applied to no avail, and the victims died within a few minutes. The victims' families supported by community members, medical professionals, and politicians called for implementation of AEDs at sporting events. The articles also mentioned that AEDs can now be found in airplanes, airports, schools, shopping malls, and various workplaces in the United States. Furthermore, the studies indicated that in order to make a significant impact on the sudden cardiac mortality rate, AEDs must be accessible to, and usable by, untrained bystanders or lay responders. In an ideal scenario, by the time the fire department arrives, there should already be someone there with a defibrillator.

It was noted that the City of Vaughan has no clear policy for mandatory installation of AEDs within City-owned public facilities and a proposal was put forward that City of Vaughan Council be requested to implement a program on mandatory installation of AEDs.

At its meeting on September 16, 2008, the Safe City Committee requested that the following recommendation be brought to City of Vaughan Council for consideration.

(1) That the attached study (Attachment 1) on Automated External Defibrillators, be received;

(2) That the Province of Ontario be requested to pass Province-wide legislation on Mandatory Installation of Automated External Defibrillators in all public buildings;

(3) That the Province of Ontario be requested to forward the regulation on Mandatory Installation of Automated External Defibrillators to the necessary and appropriate agencies, boards, or commissions, responsible for affecting the Ontario Building Code;

(5) That staff review the standard and practices as it existed in other jurisdictions and provide a report by the end of the next quarter to examine opportunities on Automated External Defibrillators; and

(5) That the report be forwarded to the Association of Municipalities of Ontario, the Federation of Canadian Municipalities, and MPP Greg Sorbara, Member of Parliament for Vaughan.

The Safe City Committee was instrumental in raising awareness for the need to install Carbon Monoxide detectors in dwelling units. This initiative resulted in By-Law 166-98 being adopted. The by-law amended the Property Standards By-Law to require the installation of Carbon Monoxide detectors in dwelling units (Refer to Attachment 2). The Safe City Committee continues to bring forward initiatives addressing community safety and security.

Relationship to Vaughan Vision 2020

This report is consistent with the priorities previously set by Council to serve our citizens and promote community safety, health and wellness.

Regional Implications

N/A

Conclusion

In view of the foregoing, the Safe City Committee's recommendation is before City of Vaughan Council for consideration and approval.

Attachments

Attachment #1 – Articles on Automatic External Defibrillators
Attachment #2 – By-Law 166-98

Respectfully submitted,

Councillor Bernie DiVona
Chair, Safe City Committee

5.4 Attachment 1

When Every Minute Counts, All Automatic External Defibrillators Are Not Created Equal

Anthony D. Andre, Ph.D.

A recent study, published in the New England Journal of Medicine, documented the ability of innocent bystanders with no defibrillator training to use an automated external defibrillator (AED) in actual cardiac arrest incidents. In the present study, sixty-four adults with no prior exposure to, training with, or understanding of AEDs were asked to rush into a room, one at a time, and attempt to use an AED to resuscitate a victim of sudden cardiac arrest. Each of four different AEDs available in the United States was used by a different group of sixteen participants. From our results we conclude that the Philips HeartStart OnSite device is appropriate for use in public settings where laypersons and innocent bystanders are expected to use these devices in an unexpected emergency. With some reservation, we also conclude that the Medtronic CR+ AED is appropriate for this context; however, we do have a concern regarding the high number of instances where users inaccurately placed the Medtronic defibrillator pads, which could result in degraded shock effectiveness, and the propensity of the pad plug to become detached from the Medtronic device during use. Finally, we conclude that the Cardiac Science Power Heart and Zoll AED Plus devices are not suited for use by untrained laypersons in public settings. Simply stated, these devices do not provide a sufficient amount of guidance and specific instructions required in the context of public use. This study, the most comprehensive and quantitative comparative AED study to date, clearly demonstrates that all AEDs are not equally usable by untrained laypersons.

Introduction

Sudden cardiac arrest is a leading cause of death in the United States. The American Heart Association (AHA) estimates that about 250,000 people die of coronary heart disease before reaching the hospital each year.[1] Unlike many other life-threatening illnesses and conditions, sudden cardiac arrest often occurs outside of a medical setting. In such settings, the victim's only chance for survival rests with the arrival of an emergency medical service – often unavoidably delayed beyond the critical first few minutes – and the use of a defibrillator, a device that delivers a shock to the heart.

During sudden cardiac arrest the heart abruptly stops pumping, usually due to an electrical malfunction, and the victim collapses and quickly loses consciousness. Death quickly ensues unless a normal heart rhythm can be restored in a matter of a few minutes. Because effective treatment for sudden cardiac arrest – defibrillation of the heart – cannot routinely be delivered within three to five minutes of the victim's collapse, the estimated survival rate is less than five percent. During sudden cardiac arrest, every minute counts. In fact, for every minute that goes by without defibrillation, the chance of survival decreases by about 7% to 10%.[2]

Recently, there has been a surge of interest in the placement of automated external defibrillators (AEDs) in public environments. For example, in separate incidents, one in Georgia and one in California, during the month of April 2003, two young boys died from sudden cardiac arrest after being hit in the chest with a baseball. In both cases, CPR was applied to no avail, and the victims died within a few minutes. The victims' families, supported by community members, medical professionals, and politicians, called for implementation of AEDs at sporting events.

These and other, similar tragic events have led to an increased proliferation of AEDs in public and corporate environments. For example, AEDs can now be found in airplanes, airports, schools, shopping malls, and various workplaces. In most of these environments, selected individuals (e.g., flight attendants) are trained to use the devices. However, it is clearly the case that in order to make a significant impact on the sudden cardiac arrest mortality rate, these devices must be accessible to, and usable by, untrained bystanders, often referred to as lay responders.

The Usability Factor

Of course, in order for these devices to be practical for broad public use, they must be designed in a way that allows untrained "ordinary" people to use them quickly, easily, and effectively in the context of an unexpected and dramatic emergency medical situation. This premise represents a significant challenge to AED manufacturers, many of whom have historically designed devices to be used by trained medical professionals (e.g., nurses, EMTs) and, more recently, by selected and trained lay individuals (e.g., flight attendants, lifeguards, airport personnel).

Given that success with untrained users is a critical goal for the broad public deployment of AEDs, it is important to determine if AEDs can be used effectively, and without undue difficulty and stress, by the average person. Previous studies suggest that this is possible with some AEDs. For example, the majority of patients who survived a sudden cardiac arrest in Chicago airports over a two-year period were saved by persons who had no duty to act and no prior training in the use of automated external defibrillators.[3] Another study showed that untrained persons as young as sixth grad-

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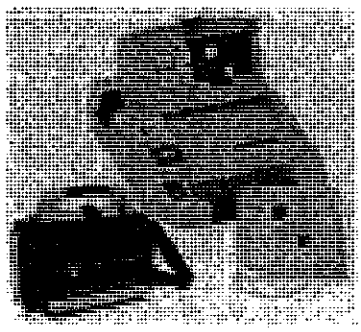
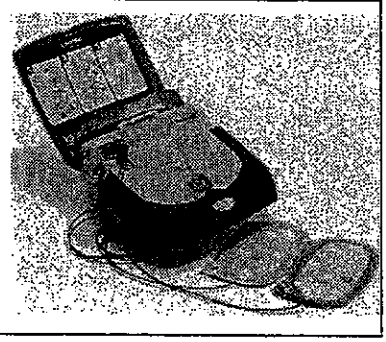
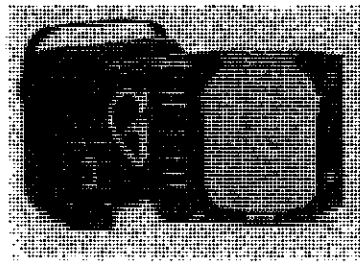
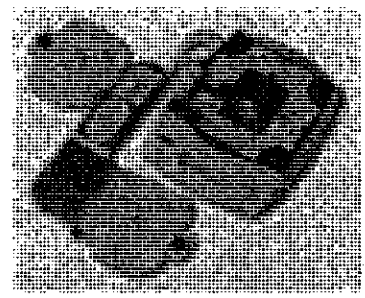
ers can indeed successfully employ some AEDs.[4] However, it is not known if all AEDs can equally support the successful use by untrained persons.

As usability professionals, we make a clear distinction between a product's functionality (what a product can do) and its usability (what users can do with the product). While all AEDs share a common set of functionality and, if used correctly, result in the delivery of a shock to the victim, the objective and subjective experiences of the users are likely to vary based on the presence or absence of critical usability design attributes. Usability evaluations typically involve a comprehensive set of measures that fall into four main categories: 1) *intent* (What are the users trying to do?), 2) *behavior* (How are they trying to do it?), 3) *performance* (Are they succeeding? How long does it take?), and 4) *impact* (Was it difficult or stressful? Was it safe?).

Given the growing media attention being paid to all AEDs as part of the same general class of product, it is critical to advise the public as to specific differences that might exist among AEDs in terms of their usability. It might well be the case, and it is true of most products, that only some AEDs are designed to be intuitive enough to be effectively used by untrained laypersons, while others are not. To date, there is little if any empirical information on usability differences between AEDs intended for public use.

A Comparative Study

To address this concern, Interface Analysis Associates, at the request of Philips Medical Systems, recently conducted an independent, comprehensive, and comparative study of four leading AEDs, all marketed for public use. The four devices included in the study were:

Cardiac Science Powerheart	
Medtronic CRPlus	
Philips HeartStart OnSite	
Zoll AED Plus	

The study was conducted in the context of a scenario where AEDs are available in a variety of public settings such as shopping malls, schools, parks, sporting events, government buildings, hotels, convention centers, large corporate offices, and other public environments.

Sixty-four adult participants, ages 35 to 55, and representing a variety of occupations, were asked to rush into a room and attempt to use an AED to resuscitate a victim of sudden cardiac arrest. None of the participants worked in medical or related fields, nor did they have any exposure to, prior training, or familiarity with AEDs. In this study they were provided only basic information about the main functions of an AED prior to their entering the room, where they found a fully clothed manikin (Resusci Anne, Laerdal Medical) on the floor and one of the four AEDs nearby. The manikin was wired with a simulator that allowed it to transmit signals to the electrode pads of each AED, which prompted the unit to advise a simulated shock to the manikin (under conditions similar to those that would produce a shock command in actual use).

Each of the four AEDs was used by a different group of sixteen participants. A comprehensive variety of quantitative, behavior, and subjective measures was collected and analyzed. Selected electrode pad placement measures were confirmed by an independent reviewer.*

What We Found

The results showed significant statistical differences among the four products across most measures. Below we present a brief summary and discussion of the main performance, behavior, and subjective measures.

* Dr. Jeanne E. Poole, Associate Professor of Medicine, Acting Director of the Arrhythmia Service and Electrophysiology Laboratory, and Attending Physician, University of Washington Medical Center

Failure to Deliver Therapy

Clearly, the most important measure was the frequency with which untrained users could deliver a shock with the AED. Most noteworthy was the finding that 9 of the 16 Zoll users (56%) and 4 of the 16 Cardiac Science users (25%) failed to administer a shock to the simulated victim. In contrast, the Philips and Medtronic users were successful in delivering a shock in all completed trials. (See Figure 1.)

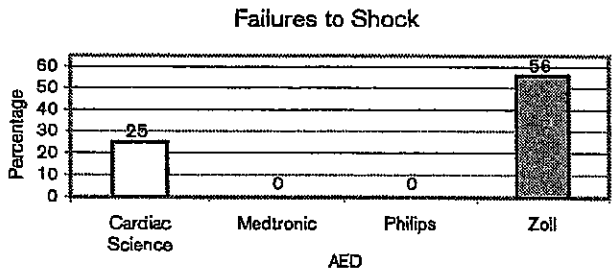


Figure 1. Percentage of failures to deliver a shock.

Perhaps even more disturbing was the user behaviors that resulted in these failures to deliver therapy. For example, two of the Zoll users and three of the Cardiac Science users never managed to open the electrode pad package. (See Figure 2.)

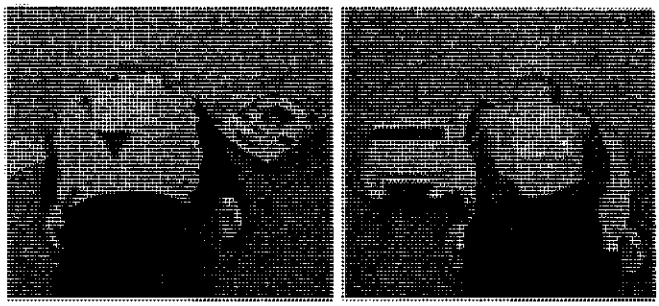


Figure 2. Electrode pads never removed from packaging during use of Zoll (left) and Cardiac Science (right) AEDs.

Another two Zoll users and four Cardiac Science users failed to remove the backings from one or both electrode pads. (See Figure 3.) Interestingly, three of the four Cardiac Science users who failed to remove one or both electrode pads from the backing still received a shock command. This occurred because the Cardiac Science pads have small holes in the back of the pad that allow a small fraction of the pad to contact the skin even with the backing left on. However, with the backing liner in place, the contact made by these pads clearly does not meet the minimum industry standard[5] and would likely result in an ineffective shock.

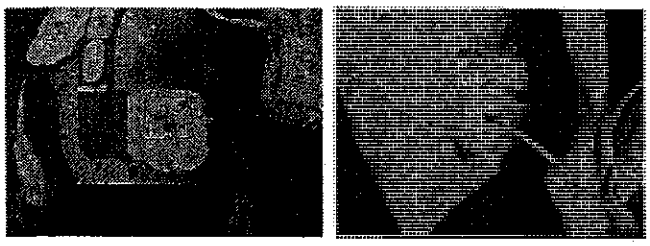


Figure 3. Electrode pad backing not removed during use of Zoll (left) and Cardiac Science (right) AEDs.

Finally, another group of five Zoll users placed the electrode pads directly over the victim's clothes. (See Figure 4.)

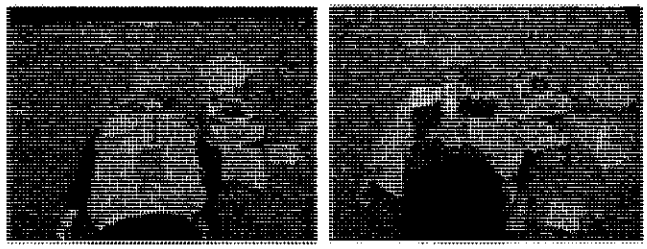


Figure 4. Electrode pads placed over jacket (left) and shirt (right) with Zoll AED.

Time to Deliver Therapy

Managing to get the device to deliver a shock is a necessary but not sufficient goal, as the victim must be shocked within a short period of time from the point of collapse (usually three to five minutes maximum). Early defibrillation, in which an electric shock is quickly and safely delivered to the heart, is the most important predictor of survival among people who suffer sudden cardiac arrest.

In our study, the Medtronic and Philips devices were statistically equivalent in the time it took their users to deliver a shock, both averaging well under two minutes at 101.0 and 101.5 seconds, respectively. The other two devices were substantially slower, with the Cardiac Science AED averaging 151.6 seconds, just over 2.5 minutes, and the Zoll AED averaging 225.1 seconds, just under 4 minutes. (See Figure 5.)

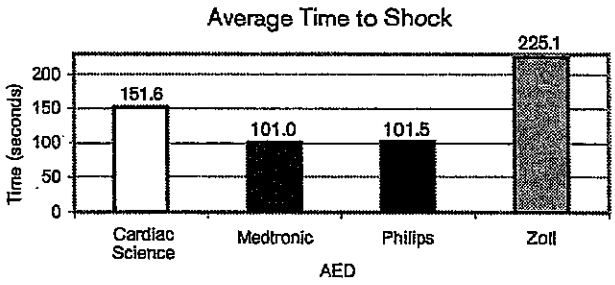


Figure 5. Average time to administer shock.

It is not surprising that the Zoll device resulted in the longest time to shock because it is the only unit that has to be manually turned on; the other three devices automatically turn on when their covers are opened. In fact, the average time taken by participants just to turn on the Zoll device was nearly equal to the average time taken by participants to administer a shock with the Medtronic and Philips devices. In other words, on average, by the time (or just shortly after) the AED had been turned on in the Zoll trials, the user had already delivered a shock in the Medtronic and Philips trials.

In all trials, there were no clinically significant instances of participants contacting the manikin during shock delivery.

Electrode Pad Placement

Pad placement has been well documented as the Achilles heel for lay responders and those with advanced training alike.[6,7] Incorrect pad placement results in a reduced percentage of the current passing through the heart, thus reducing the chance of successful defibrillation.[8] Failing to place pads on the skin or failing to remove backings from pads also results in an ineffective shock.[9]

As noted earlier, several Zoll and Cardiac Science users demonstrated difficulty in manipulating the electrode pads, either failing to remove them altogether from the package, failing to remove one or more backings, or placing the electrode pads over clothing.

For those users who managed to remove the electrodes from their package and place them on the victim's bare chest, the quality of the resultant shock was evaluated as a function of the following parameters: 1) percentage of pad contact with the skin, 2) the placement of the pads relative to the instructed position, 3) the distance between the pads, and 4) the relative alignment of the two pads. Table 1 shows how each AED fared across these measures.

Table 1. Pad Placement Measures

AED Device	Cardiac Science	Medtronic CR+	Philips Heart-Start OnSite	Zoll AED Plus
% Skin Contact	84%	94%	97%	76%
Rank	3	2	1	4
pad location error (average cm)	7.0	10.4	5.4	4.9
Rank	3	4	2	1
separation of pads (average cm)	10.4	9.0	14.7	13.9
Rank	3	4	1	2
% pads placed adjacent	0%	56%	6%	11%
Rank	1	4	2	3

Skin Contact. Good skin contact is important in order to assure that the maximum surface area of the pad delivers electrical current. The Philips device resulted in the highest percentage of skin contact for both electrode pads, closely followed by the Medtronic and Cardiac Science devices, while the Zoll device resulted in the lowest percentage of skin contact.

Pad Location. Ideal pad location was determined by several independent observers based on the centerpoint of each manufacturer's recommended location, as depicted on the pad icon. The closer a pad is to the ideal location, the smaller the pad location error. For both the left and right pads, the Zoll and Philips devices facilitated more accurate pad placement than the Cardiac Science device, while all three devices considerably outperformed the Medtronic device.

Pad Separation. The closest distance between the two pads is another important dimension of pad placement, as pads placed too close to each other can cause shunting and/or reduce the efficacy of the defibrillation. Thus, a larger distance between pads is better. In our study, the Philips and Zoll devices showed the largest distances between electrode pads, followed by the Cardiac Science device and lastly the Medtronic device.

Relative Pad Alignment. A related measure to pad separation – the proportion of pads placed adjacent to one another (as opposed to placed on separate sides of the chest) – also shows a performance difference among the devices. Here we define adjacency as pads that are placed side-by-side, and/or on the same side of chest, and/or at the same vertical level, and/or touching each other. Any of these arrangements is likely to result in shunting between the pads, and a less effective shock. Our results showed that the Medtronic device produced an inordinate number of these arrangements, with over 50% of the users placing the pads adjacent to each other. (See Figure 6.)

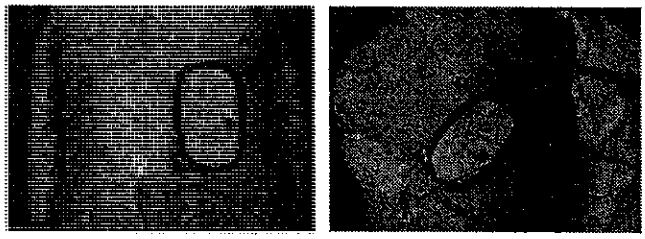


Figure 6. Electrode pads touching (left) and placed adjacent to each other (left and right) during use of Medtronic device.

Electrode Pad Plug Detachment

An astonishing 31% of the Medtronic users inadvertently pulled the pad connector plug out of its socket while attempting to open the pad package, causing them to spend precious time hunting for the place to put the plug back in. We attribute this frequent problem to both the design of the pad package (which encourages users to grasp a red handle and pull the entire package away from the device) and the ineffectiveness of the design of the cable strain relief. (See Figure 7.)

Use of Zoll Cover

Zoll users are instructed, via graphics, to use the device cover to help prop up the victim and open their airway. Of the sixteen participants, only two attempted to use the cover as described; one correctly and one incorrectly. (See Figure 8.)

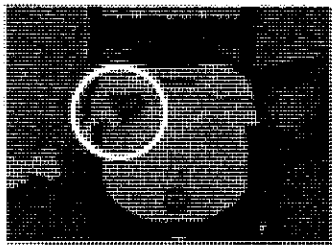


Figure 7. Electrode pad plug (circled) easily becomes detached during use of the Medtronic device.

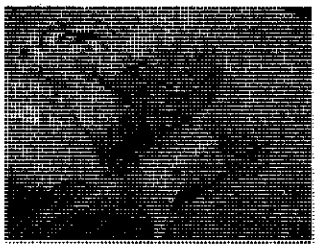


Figure 8. Zoll device cover used incorrectly; obstructing, rather than opening the victim's airway.

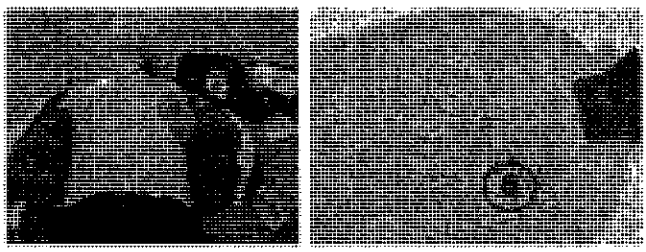


Figure 10. Philips HeartStart OnSite AED depicts the relative placement of both pads on each pad graphic.

Subjective Data

The Philips and Medtronic devices were consistently rated as easier to use, across a variety of dimensions, relative to the Cardiac Science and Zoll devices.

When asked to provide an overall rating of their experience with the device, more users rated the Philips device as "Excellent," the highest rating, and more users rated the Zoll device as "Terrible," the lowest rating. (See Figure 9.)

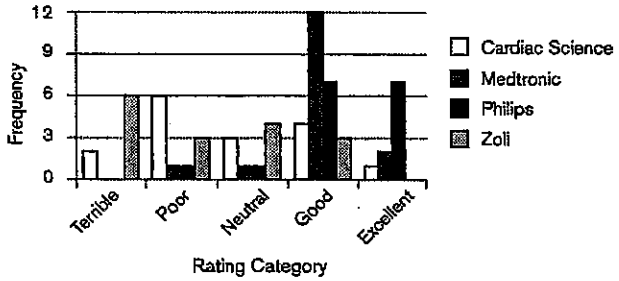


Figure 9. Overall AED ratings.

Our Conclusions

In this study, across nearly all measures of performance, behavior and subjective experience, the Philips AED showed superior performance over the three other devices. The Philips users typically showed significantly better compliance with instructions, more accurate pad placement, and higher subjective ratings relative to the users of the other AEDs. For example, none of the Philips users failed to place pads on the manikin and none of the Philips HeartStart OnSite connectors came out of the device, primarily because this device is designed so that the connector is inaccessible to the user, hidden inside the device. The Philips and Medtronic devices were roughly equivalent in terms of timing measures, such as time from entry into room until administration of shock.

Two design elements that were observed to have helped Philips users to achieve better pad placement performance are the voice instructions ("Look carefully at the pictures on the white adhesive pads... Place pads exactly as shown in the picture,") and the fact that both pads are shown on each pad icon, giving users a good sense of the relative placement of the two pads. (See Figure 10.) These two features often resulted in the users briefly pausing and explicitly reviewing the pad placement graphic.

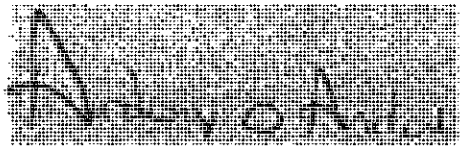
In addition, and perhaps most important, the Philips device includes sensor technology that detects the current action of the user and adjusts the instructions to match that action. Indeed, we observed many instances where the Philips users were aided by the intelligent pacing of the device's audio instructions. In contrast, we observed many instances with the other devices where the audio instruction and the user's current action were incongruent.

Recommendations for Public Deployment of AEDs

Defibrillators that are to be used by lay responders should be designed from a human-centered perspective. That is, they should provide useful and timely guidance, include effective and salient graphics, and induce acceptable levels of workload and stress. This study demonstrates that all automated external defibrillators are not alike; while all are potentially *useful*, only some are *usable*.

We conclude that the Philips HeartStart OnSite device is appropriate for use in public settings where laypersons and innocent bystanders with no prior exposure to, training with, or understanding of AEDs are expected to use the devices in an unexpected emergency. With some reservation, we conclude that the Medtronic CR+ AED is also appropriate for this context; however, we do have a concern with the lack of accuracy in the placement of Medtronic defibrillator pads (which could result in degraded shock effectiveness) and the propensity of the pad plug to become detached from the Medtronic device during use.

Finally, we conclude that the Cardiac Science Power Heart and Zoll AED Plus devices studied here are not suited for use by untrained laypersons in public settings. Simply stated, these devices do not provide a sufficient amount of guidance and specific instructions required of layperson users in the public-use context simulated during this study.



Anthony D. Andre, Ph.D.
Founding Principal,
Interface Analysis Associates
June 2003

About Interface Analysis Associates

Interface Analysis Associates (IAA) is a successful human factors, ergonomics, and usability consulting firm, located in the Bay Area, CA. IAA provides workplace ergonomics, user interface design, usability evaluation, and usability testing services across a wide variety of product domains, with a focus on transportation, medical, software, input device and high-tech product domains. Since 1993, some of the largest and well-known corporations and government agencies, such as Microsoft, Honeywell, Abbott Labs, Hewlett Packard, Kodak, Siemens, Logitech and NASA, have relied on IAA to conduct objective, independent and unbiased empirical evaluations of their products or services. Their unique usability testing facility, located in San Jose, CA, has been used to evaluate dozens of products using actual consumers.

Dr. Anthony D. Andre, IAA's founding principal and the lead investigator in this study, is the author of over 100 publications on human factors and usability research and is an adjunct professor of Human Factors and Ergonomics at San Jose State University. There he teaches courses on cognitive engineering, professional ergonomics, research methods and usability testing.

Dr. Andre is a member of the Human Factors and Ergonomics Society (HFES), the Usability Professionals Association (UPA) and the Bay Area Chapter of the Association for Computer Machinery Special Interest Group on Computer-Human Interaction (BAYCHI).

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Board of Supervisors

Automatic External Defibrillators (AEDs)

(OLA #: 032-04)

LEGISLATIVE ANALYST REPORT

To: Members of the Board of Supervisors

From: Andrew Murray, Office of the Legislative Analyst

Date: December 1, 2004

RE: Local Government Programs for Siting Automatic External Defibrillators (AEDs) in Public Spaces (File No. 041403)

Summary of Request

Supervisor Daly sponsored a motion requesting that the Office of the Legislative Analyst (OLA) examine the City's current policy on siting defibrillators in public buildings and analyze what other cities have done on this topic.

Executive Summary

Improvements in the ease of use and the falling cost of automatic external defibrillators (AEDs) have made their placement in emergency response vehicles widespread throughout San Francisco and other communities. In addition, because emergency responders often cannot reach cardiac arrest victims in sufficient time to provide aid, AEDs are being purchased by businesses and other organizations and placed in publicly accessible locations so that non-medical personnel can use them to attend to people who experience cardiac arrest at these locations. Programs to site AEDs in public places are called public access defibrillation (PAD) programs and are becoming increasingly widespread. As most PAD programs are relatively new, little long-term research on their cost-effectiveness has been conducted.

A number of communities in California and beyond have piloted programs to place AEDs in public buildings and are incrementally expanding their programs, but few have already implemented programs that provide broad coverage. The City of Los Angeles and San Diego County are exceptions, having placed over 500 AEDs each in public buildings. Some City and County of San Francisco department heads and facility managers have taken individual initiative to purchase and install AEDs in their buildings, but the City as of yet has no formal policy directing agencies to site AEDs in City-owned buildings. The fire department drafted a proposed policy, in response to a request from then Supervisor Newsom in 2000, which has not been implemented. The City is therefore in a position to consider adopting a program siting AEDs in public buildings and expanding its other AED programs.

Background, Current Law

Heart disease is currently the leading cause of mortality in the United States, and results in more than 1,500 deaths in San Francisco each year (average 1998-2000)[1]. Most of these deaths occur from a syndrome called sudden cardiac arrest, which strikes twice per day in San Francisco[2], and is usually caused by a disturbance in the heart rhythm called ventricular fibrillation. The only procedure to successfully treat ventricular fibrillation is applying an electric shock to the chest, called defibrillation.[3] For every minute that a person remains in ventricular fibrillation and defibrillation is not provided, the chances of resuscitation drop by almost 10 percent, until after 10 minutes, the chance of resuscitating a victim of cardiac arrest is near zero.[4]

In the mid-1980s, a new generation of defibrillators, called automated external defibrillators (AED), was

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introduced that was capable of interpreting a person's heart rhythm and automatically delivering a defibrillation shock when appropriate. People with basic medical training could safely use these. By the early 1990's it had become common for fire engines and ambulances (including basic life support ambulances not staffed by paramedics) to be equipped with AEDs, and more recently police patrol cars are being equipped. As a result, the survival rate of out-of-hospital cardiac arrest victims improved dramatically. However, fire engines, ambulances, and patrol cars often cannot reach cardiac arrest victims within ten minutes.

The ease of use of AEDs, the need for fast response, and the steadily decreasing price (now approximately $3,000, installed, with annual upkeep costs of $100)[5], led to the concepts of early access defibrillation and public access defibrillation (PAD). Early access (or emergency employee) defibrillation and PAD attempt to reduce the time before defibrillation can be administered to a cardiac arrest victim by locating AEDs throughout communities and increasing the number of users by providing training to non-medical personnel. In early access defibrillation programs, specific non-medical personnel are trained in operating AEDs and are the only people authorized by the owner of the AED to use the device in responding to cardiac arrest emergencies. PAD is a situation in which the owner of an AED places it in a publicly accessible location and authorizes its use by any lay community member (not just designated individuals) who is in a position to respond to a cardiac arrest emergency. Appendix A contains a list of publicly accessible locations identified by researchers as being of high cardiac arrest incidence. The American Heart Association estimates that widespread availability and use of AEDs could save 50,000 lives in the U.S. each year.[6]

An increasing number of government agencies have acted to expand the prevalence and use of AEDs by adopting the following practices and programs:

- Public education to promote awareness;
- Training to volunteers in operating AEDs;
- Information to buyers on AED devices and vendors;
- Requiring registration of AEDs with the local emergency medical services department;
- Requiring registration of physicians who prescribe AEDs with the local emergency medical services department;
- PAD program management guidelines;
- Siting AEDs in publicly-owned buildings; and
- Requiring or requesting AEDs in publicly leased buildings.

Most government programs addressing PAD are relatively new, and little long-term research has been conducted on the value and cost effectiveness of the programs. Recent studies have shown that the use of AEDs by trained volunteers nearly doubled the survival rate of cardiac arrest victims in community settings when measured against the survival of people who only received CPR.[7] However, some researchers have also concluded that PAD is excessively expensive in terms of the number of quality-adjusted life years gained.[8] More thorough research findings should soon be forthcoming as more local government programs are implemented, many of which have a reporting requirement regarding incidence of public AED use.

Federal and state law relating to PAD

The federal government has passed a number of laws that address AEDs. Among other things, these laws govern liability, regulate their manufacture, require federal buildings to site AEDs, require commercial airlines to site AEDs, and provide limited funding to urban and rural communities to purchase AEDs and train non-medical personnel in their use.[9] A more thorough discussion of federal

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policies regarding PAD programs and liability issues can be found in Appendix B.

Between 1997 and 2001, all fifty states adopted regulations addressing PAD programs. According to the American Heart Association[10], California state law[11] provides Good Samaritan protection from civil damages liability to any person who renders emergency care in good faith using an AED, whether or not they have received certified CPR and AED training. California law also protects from liability any person or entity that owns an AED provided that the person or entity has complied with provisions of the Health and Safety Code[12,13]. An overview of legal issues relating to PAD programs can be found in Appendix C, an American Heart Association factsheet.

Current San Francisco AED Programs

The City and County of San Francisco currently has a number of programs involving AEDs. All of the City's fire engines and ambulances are currently equipped with AEDs, as the result of an effort started in 1987. The San Francisco Police Department is currently engaging in a pilot project to equip patrol cars with AEDs, as police officers are often the first responders on the scene of medical emergencies. MUNI will kick off an effort in late 2004 to install AEDs at each of their major maintenance facilities as well as site an AED at the Powell Street Station, an initiative undertaken jointly with the fire department.

The San Francisco Department of Public Health, Emergency Medical Services (EMS) section oversees a program to promote and regulate the placement of public AEDs. The department regulates AEDs by requiring that any doctor that wishes to prescribe an AED must be registered with EMS and specifies user training and equipment maintenance requirements. The department also promotes the placement of AEDs by providing a list of physicians who are registered to prescribe them, a list of equipment vendors, and a list of individuals and organizations qualified to train volunteer AED users. The registry of that program indicates that there are currently 108 organizations/facilities throughout the city that have AEDs, of which 15 are public organizations/facilities (see Appendix D for a complete list). The placement of AEDs in City-owned buildings is a result of individual initiative on the part of department heads and facility managers at the City, not the result of a particular central policy promoting placement. The fire department drafted a proposed policy, in response to a request from Supervisor Newsom in 2000, but that has not been implemented.

Programs In Other Jurisdictions

In an effort to determine the standard and best practices of local government PAD programs, the OLA communicated with local and regional experts and collected information on leading programs. These programs include the cities of Anaheim, Los Angeles, Oakland, Seattle, and Sunnyvale, the counties of Contra Costa and San Diego, the California Department of General Services, the federal General Services Administration, and San Jose International Airport. The OLA's findings are summarized below.

The City and County of San Francisco's program to promote placement of AEDs by public and private organizations by providing guidance and support services, but no funding for the purchase of AEDs, is an approach emulated by other jurisdictions. San Francisco's program was the first of its kind in the state, and now 5 other jurisdictions, including Contra Costa and San Diego counties, have similar programs. Some of these programs are funded on a fee for service basis.

A number of communities have pilot or small-scale programs to place AEDs in public buildings, including Oakland and San Jose. Apart from formal pilot programs, many jurisdictions have sited AEDs on an ad hoc basis at a limited number of public buildings as the result of individual initiative on the part of department heads and facility managers absent directives from local policy makers.

A small number of jurisdictions have large-scale programs. These include the federal government, the State of California, and the cities of Los Angeles, San Diego, and Seattle. The federal government is requiring that all federal facilities site AEDs, and the State of California will soon likely issue a management memorandum directing all department heads to site AEDs in their buildings. In addition, the State is considering requiring that state leased buildings also be equipped with AEDs. Los Angeles

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has sited over 600 AEDs at public facilities such as the airport, city office buildings, community centers, convention center, golf courses, harbor, parks, swimming pools, and zoo. Seattle has sited more than 700 devices at similar locations. The State of New York requires that all public schools with 1,000 or more students have AEDs, which is the only requirement of this kind in the country. See Appendix E for additional information on the number of public AEDs, locations, and funding sources employed by other jurisdictions. Government policies to establish PAD programs can take many forms, including directives by executives like fire chiefs, city managers, department heads, and mayors and acts of city councils and other elected bodies (see Appendix F, the City of Los Angeles motion).

The sources of funding of public PAD programs are diverse. Some pilot projects have been supported by seed grants from the federal government or donations of equipment from vendors. Others have been funded by donations, such as those to fire department related charities which in turn are used to purchase AEDs. Some jurisdictions have solicited donations from charitable organizations such as the Rotary Club to place AEDs in locations like schools and senior centers. In Contra Costa County, funds from a local measure for paramedic enhancement (Measure H) were used to purchase AEDs. In some cases firefighters or paramedics provide training on time they have volunteered. Few jurisdictions have large pools of resources that can be devoted to PAD programs, which partially explains why there are few programs that thoroughly place AEDs in public buildings. Seattle and the State of California both require that departments budget for them. The City of Los Angeles' initial 600+ AEDs were acquired using general fund, but a new motion that is being considered and would require all of the City of Los Angeles' public buildings to have AEDs directs departments to find sources of funding other than the general fund.

Not a single case could be uncovered of a jurisdiction requiring that private organizations provide AEDs in places where large numbers of people pass or assemble, with the exception of the FAA requiring such of commercial airlines. Although no private companies are required to site devices, many companies that operate large facilities have implemented programs of their own accord. As such, some communities have determined that they do not need many AEDs in public buildings, because most of their large places of assembly are private, and already served by a public AED. One example is the City of Vallejo, whose largest places of assembly include Marine World and the ferry building, both of which are operated by companies that have sited AEDs.

Conclusion

The low cost and obvious benefits of AEDs have encouraged many local government agencies and other organizations to site them in their buildings on a pilot or more widespread basis, despite uncertainty regarding their cost effectiveness and liability issues. San Francisco already has a number of programs in place involving PAD and AEDs. The City is therefore in a position to consider the following additional actions, beyond maintaining its current programs:

- Broader placement of AEDs in City buildings;

- Additional effort to encourage the siting of AEDs by private organizations, particularly those with large facilities or with large places of assembly;

- Requiring or encouraging the placement of AEDs in City-leased buildings;

- Wider placement of AEDs through the police department; and

- Placement of AEDs in MUNI and BART transit vehicles.

Appendix A - Locations Recognized by Researchers as Being of High Cardiac Arrest Incidence[14]

Airports
Businesses

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County jails
Dialysis centers
Gaming establishments
Golf courses
Homeless shelters
Hospitals
Industrial sites
Nursing homes
Physician offices
Shopping malls
Sports complexes
Streets and highways
Trains and ferries

Appendix B - Federal policies regarding AEDs

The federal government has enacted a number of policies that address AEDs. These policies regulate their manufacture, require federal buildings to site AEDs, require commercial airlines to site AEDs, and provide funding to urban and rural communities of limited resources to purchase AEDs and train non-medical personnel in their use.

According to the National Center for Early Defibrillation, the Federal Cardiac Arrest Survival Act (CASA) (HR 2498, 2000) directed the Department of Health and Human Services to develop guidelines for PAD programs in federal facilities. The "Guidelines for Public Access Defibrillation Programs in Federal Facilities" provide guidance on where to place AEDs and suggest procedures for training, maintenance and testing, medical oversight, and coordination with local emergency responders. CASA also provides Good Samaritan liability protection to AED owners, users, trainers, and prescribing physicians.

The Rural Access to Emergency Devices Act (public law 106-505) authorized federal funds to help rural communities purchase AEDs and train lay rescuers. The Community Access to Emergency Defibrillation Act (public law 107-188, 2001) is an urban counterpart that provides limited funding ($50M in 2001) for local government agencies to establish PAD programs.

The Airline Passenger Safety Act (1998) required that the Federal Aviation Administration (FAA) review the required contents of medical kits carried on commercial airlines. As a result, the FAA established a rule requiring that commercial airline carriers provide AEDs by 2004 and train flight crews.

Because AEDs are medical devices, the Food and Drug Administration oversees their manufacture, and also determines, along with state level regulators, who can use AEDs and how they can be used.[15]

Appendix C - American Heart Association PAD Program Legal Issues Factsheet (PDF)

Appendix D - AEDs Registered with the San Francisco Department of Public Health, Emergency Medical Services Section (PDF)

Appendix E - California Jurisdictions that have Placed AEDs in Public Locations[16]

Jurisdiction	# of AEDs	Locations	Funding
Anaheim	50	Community centers, convention center, golf courses, police stations, and various	General fund and individual agency

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		city offices	budgets
California (Department of General Services)	>1,200 buildings	State office buildings	Individual agency budgets
Gilroy	4	City Hall, maintenance yard, public assembly building, and senior center	Fire department's capital outlay budget
Los Angeles (City)	600+	Airport, city office buildings, community centers, convention center, Department of Water and Power facilities, golf courses, harbor, parks, swimming pools, and zoo	General fund
Malibu	6	Unknown	Sale to public of emergency access decals
Marin (County)	18	Civic Center, Department of Health and Human Services sites, and performing arts center	General fund
Menlo Park Fire District	6	Various public buildings	Public funds with private donation match
Newark	8	City Hall, community center, fire administration offices, library, recreation/swim center, and senior center	Emergency Medical Services funds
Oakland	9	City Hall and other city buildings	Federal grant to fire department
Redwood City	21	City buildings	Capital improvement project account
San Diego (County)	550	Various locations throughout County	Various sources including Councilmember discretionary funds, individual agency budgets, general fund, private donation, and tobacco tax

Jurisdiction	# of AEDs	Locations	Funding
San Jose	45	Airport, City Hall, civic center, convention center, parks, performing	Mayor's discretionary fund

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		arts center, senior centers, skating rink, and swim center	and airport budget
San Rafael	6	City Hall, high schools, and recreation centers	Private donation
San Ramon Valley Fire District	Approx. 10	Community centers, high schools, libraries, and senior centers	Private donation and local measure funds for paramedic enhancement
Santa Maria	3	Unknown	Private donation
Sunnyvale	26	Various city buildings	Unknown
Temecula	6	City Hall, maintenance yard, pool, recreation center, and senior center	General fund

Appendix F - City of Los Angeles Motion Preparing for the Rollout of the PAD Program

File Number
99-0186

Last Changed Date
5/21/2002

Title
DEFIBRILLATORS AND TRAINING

Initiated By
Svorinich, Jr. Mover 1999 / Chick

Subject
Motion - According to the American Heart Association, approximately 350,000 people a year are stricken with sudden cardiac arrest. The arrest is caused when the heart spontaneously starts to quiver as the result of the normal electrical pulse going out of control. When the arrest occurs the only effective way of treating the heart is with an electric shock. What is important to note is that for every minute that the heart quivers rather than beats regularly, the chance to survive diminishes ten percent.
Statistics show that only 5% of sudden cardiac arrest victims survive and in large cities where it can take several minutes for a paramedic ambulance to arrive at the scene every minute can count. A recent article in U.S. News and World Report stated that fewer than 2 out of 100 persons survive cardiac arrest in New York City.
However, new and relatively inexpensive technology is now available to increase the chances of persons surviving a sudden cardiac arrest if deployed strategically. Now available on the market are small, automated external defibrillators which can be utilized with a minimum amount of training to the operator. The instrument is available through various distributors for approximately $3,000 and is relatively easy to use. Recent statistics have shown a survival rate as height as 7 out of 10 when the defibrillator was deployed in an emergency situation.
THEREFORE MOVE that the Fire Department, with the assistance of the City Administrative Officer (CAO) and City Legislative Analyst (CLA), report back to the Council's Public Safety Committee within 45 days on the feasibility of deploying automated defibrillators strategically at city facilities where the public gathers frequently and a plan to train city personnel is in use.

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FURTHER MOVE that the City Attorney be requested to report on any potential city liability that could be incurred by trained city staff deploying such a device in an attempt to save a life, whether successful or not.

FURTHER MOVE that the City Administrative Officer (CAO) and City Legislative Analyst (CLA) make contingent preparations to include funding for these devices for citywide distribution in the 1999-2000 city budget - all other issues having been addressed - by the time budget deliberations begin in May 1999.

Date Received

2/2/1999

File History

2-2-99 - This days Council session
2-2-99 - File to Calendar Clerk for placement on next available Council agenda
2-9-99 - CONTINUED TO February 10, 1999
2-10-99 - Motion ADOPTED
2-16-99 - File in files
2-22-99 - File to Public Safety Committee Clerk
7-19-99 - City Administrative Officer (CAO) 0220-03458-0000 report received re: Bicycle Medic Program - to Public Safety Committee Clerk
9-14-99 - City Administrative Officer (CAO) 1000-00001 report received re: Request for the Emergency Operations Board (EOB) to coordinate a Citywide Automated External Defibrillator Implementation Plan - to Public Safety Committee Clerk.
9-15-99 - Los Angeles Fire Department (LAFD) report received re: Bicycle Medic Program - to Public Safety Committee Clerk
11-16-99 - No Quorum
11-17-99 - Public Safety Committee report ADOPTED to:
a. Coordinate the establishment of, and convene an AED Implementation Task Force consisting of representatives of the Fire, Personnel, Police, Zoo, and Library Departments; the Departments of Aging, Airports, General Services, and Recreation and Parks; the Los Angeles Convention Center; other City departments as necessary; the American Red Cross; and, the American Heart Association to evaluate the feasibility of specific Automated External Defibrillator (AED) programs, such as deploying bicycle Automated External Defibrillators (AEDs) at major public events.
b. Report back to the Public Safety Committee in 45-60 days with a detailed Automated External Defibrillator (AED) deployment cost analysis and with recommendations for implementation, funding, and pilot programs.
11-24-99 - File to Public Safety Committee Clerk OK
11-30-99 - File in files
2-24-00 - For ref - City Administrative Officer (CAO) 0220-03458-0001 - Request Council approve formation of an Automated External Defibrillator (AED) Implementation Task Force.
2-25-00 - Ref to Public Safety, Budget and Finance and Personnel Committees
2-25-00 - File to Public Safety Committee Clerk
3-14-00 - File to Budget and Finance Committee Clerk per Public Safety Committee Clerk request
5-15-00 - RECEIVED and FILED
5-23-00 - File to Public Safety Committee Clerk OK
5-25-00 - File in files
10-3-00 - File to M.Gonzales-Kimbrough - City Attorney -x57112
10-23-00 - File in files

[1] San Francisco Department of Public Health, 2002 Overview of Health Status: Who We Are, How We Live, Our Health

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[2] San Francisco Fire Department, per conversation 11/16/04 with Medical Director Marshal Isaacs.

[3] www.emedicinehealth.com, National Center for Early Defibrillation

[4] www.emedicinehealth.com, National Center for Early Defibrillation

[5] Per conversation 11/12/2004 with Robert Cavaglieri of the City of Beverly Hills Fire Department, corroborated by other sources, including SFFD Medical Director Marshal Isaacs. Includes AED, medical cabinet, signage, and supplies, not training.

[6] American Heart Association

[7] Medical College of Wisconsin study primarily funded by the National Institutes of Health Heart, Lung and Blood Institute and the American Heart Association.

[8] http://www.heartcenteronline.com/myheartdr/home/research-detail.cfm?reutersid=4007

[9] National Center for Early Defibrillation

[10] American Heart Association, AED Legislation Update (Good Samaritan)

[11] California Health and Safety Code Sections 1797.5, 1797.107, 1797.190

and 1797.196, California Code of Regulations Title 22, Division 9, Chapter 1.8 Sections

100031 through 100043, SB 911 (1999), and AB 2041 (2002)

[12] Health and Safety Code Section 1979.196 (b) and Title 22, California Code of Regulations, Division 9, Chapter 1.8

[13] American Heart Association, AED Legislation Update (Good Samaritan)

[14] National Center for Early Defibrillation

[15] National Center for Early Defibrillation

[16] Information gathered through communication with agency staff and online resources.

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Introduction

St. JohnAED is an innovative AED program designed to provide an easy step-by-step process whereby Company can achieve its strategic health and safety objectives.

Sudden Cardiac Arrest can strike anytime, anywhere, anyone. Every year 40,000 Canadians die of cardiac arrest. Without proper intervention, the chance of survival decreases 10% for every one minute.

The well-known cardiac chain of survival outlines the four important links in cardiac well-being. In order, they are;

EarlyRecognition>Early Access>Early CPR>Early Defibrillation>

St. JohnAED specifically addresses the links, Early Access to Medical Care, Early CPR and Early Defib, in a comprehensive fashion.

A groundbreaking study released in the New England Journal of Medicine in August of 2004 concluded the following:

Advanced Cardiac Life Support in Out of Hospital Cardiac Arrest, August 12, 2004. The New England Journal of Medicine

- [redacted] with the first three links in the "chain of survival" [redacted], early cardiopulmonary [redacted]
- This multi-centre, controlled clinical trial took place in 17 cities involving 5,638 patients who had had cardiac arrests outside the hospital. The study occurred across a broad geographic area and the results can be generalized to most "communities with populations less than 1 million".
- Cardiac arrest witnessed by a bystander, CPR by a bystander, and use of a defibrillator in eight minutes or less were each strongly associated with improved survival.
- Overall conclusion to the study: "In order to save lives, and do so efficiently, public health planners should make CPR by bystanders and a rapid defibrillation response major priorities for the allocation of resources."
- The study was positioned to answer the question: will the rate of survival after out-of-hospital cardiac arrest increase if laypersons are trained to attempt defibrillation with the use of automated external defibrillators (AEDs)
- [redacted]

St. JohnAED Partners. 5.20

The AED chosen for the ST. JOHNAED program is the Medtronic LIFEPAK CR Plus Automated External Defibrillator.

Physio-Control Inc., a division of Medtronic Inc. is the world leader in medical technology providing lifelong solutions for people with chronic disease. Medtronic offers products, therapies and services that enhance or extend the lives of millions of people. Each year, 2.5 million patients worldwide benefit from Medtronic's technology, used to treat conditions such as heart disease, neurological disorders, and vascular illnesses. Medtronic is the only manufacturer that offers Direct Service Technician across Canada. Medtronic's Canadian head Office is located in Mississauga. More information can be obtained at www.medtronic.com

The Medtronic LIFEPAK CR Plus offers the following advantages:

- Uses the latest ADAPTIV biphasic technology, which automatically adjusts energy based on the patient's needs.
- Provides additional shocks, up to 360joules, if the heart doesn't respond to the first shock. This can enhance the chance of defibrillation success, with the goal of saving lives.
- Most importantly it has been proven to be the easiest to use among the minimally trained rescuer, which means less time to the delivery of the first shock.

Program Details

ST. JOHNAED is a 4-step process.

1. **Planning Stage**
   This stage involves site and need assessment.

2. **Equipment Placement Stage**
   This stage involves the purchase arrangement, delivery and installation of the chosen AED unit(s)

3. **ST. JOHNAED Implementation**
   This stage involves delivery of training, tracking of said trainees and recertification notification, along with ongoing knowledge updates.

4. **Continuing Follow up**
   This stage involves post sudden cardiac event service including downloading and clinical reviews. Further services include all medical direction and over sight per provincial regulations, and complete AED unit maintenance tracking.

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Pricing for The St. JohnAED Program

Equipment

- LIFEPAK CR Plus Defibrillator KIT

  - Includes: 1 pair QUIK-PAK™ Pacing/Defibrillation/ECG Electrodes with REDI-PAK™ preconnect system, 1 CHARGE-PAK™ and 1 protocol card installed in the device. Also includes operating instructions, orientation video, 1 carrying case, 1 spare pair QUIK-PAK Pacing/Defibrillation/ECG Electrodes, AED Program Implementation Starter Kit, Accessories Catalog, 5-year warranty.

Price : $2489

- Surface Mount Wall Cabinet & Signage
  - The Surface Mount Wall Cabinet and signage prominently displays the AED to increase the awareness of its availability and location in the case of an event.

Price: $ 334

- **Training: (At customer location)**
  - 8 people per AED class.
  - 6 hour course. Allow additional time for breaks or meals. Emergency Scene Management and CPR are components of this course. AED certification includes Medical Direction.

Price: $125 per person **(Annual AED recertification required).**

Training fee also includes:

- Provide tracking of device locations, serial numbers and expiration dates of electrodes and batteries.
- Provide tracking of trained personnel and notification of upcoming recertification.

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Data Management Service Agreement. EventCheck™

- In the event that your unit(s) is used in a resuscitation/attempt, the unit will either be picked up or shipment arranged (depending on geographic location), and a replacement unit provided within 24 hours. Your event data will be transferred to the AED Medical Director

Benefits of the Data Management Package:

- No computer, software, extra cables, modem, or data card purchases required for data management/download.
- No extra training required for data management/download
- At the end of the two year period, your AED machine will receive a service call, which will include replacement of the AED pads and the battery.

Price: $590 for two year coverage*

St. John Ambulance provides Medical Direction

The Medical Director plays a significant role in setting standards, protocols, and ensuring the highest standard of care. The St. John Ambulance Medical Director, Dr. Edward Wasser, brings more than twenty years experience in emergency medicine and emergency medical services (EMS). The Medical Director oversees national training standards and quality assurance, and provides a quality review and feedback on all cardiac arrest events that occur at your facilities. Once a cardiac arrest event occurs, the information is stored in the AED and downloaded to the Medical Director who reviews the report for quality, errors & omissions, and ensures that the data is forwarded to the receiving hospital and treating physicians to ensure continuity of care. Information is then shared back with the facility and rescuers as feedback, as well as reassurance and a debriefing to the rescuers &/or their supervisors &/or EAP provider if required.

*Pricing valid for 30 days

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Table of Contents

Teaching Colleagues and the General Public about Automatic External Defibrillators

from Progress in Cardiovascular Nursing
Estelle Beaumont, RN, PhD

Abstract and Introduction

Abstract

Every year 250 000 or more people with cardiovascular disease die within an hour of symptom onset and before they arrive at a hospital. With appropriate early defibrillation and follow-up treatment many people who might have died can now live. Nurses are key health care professionals for using automatic external defibrillators in hospitals and for teaching other first responders -- inside and outside hospitals -- how to use automatic external defibrillators. Features of automatic and semiautomatic external defibrillators are reviewed as well as ethical considerations for the use of automatic external defibrillators.

Introduction

Probably nothing has affected traditional cardiopulmonary resuscitation (CPR) as much as the development of automatic external defibrillators (AEDs). In fact, these relatively new devices not only have resulted in changed protocols concerning CPR procedures, but also have led to some controversy about who should operate defibrillators and manage AED programs.

According to American Heart Association statistics, coronary heart disease caused over 475,000 deaths in 1996 and is believed to be the leading cause of death in America today. One reason AED proponents would like to change the statistics is that approximately one sixth of those who die of cardiovascular disease are under the age of 65. Moreover, every year, approximately 250,000 people with cardiovascular disease die within 1 hour of onset of symptoms and before they reach a hospital.[1] Help needs to be given quickly -- generally before victims even get to the hospital. Because ventricular

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fibrillation is the primary cause of sudden cardiac arrest, prompt resuscitation and prevention of recurrence of ventricular fibrillation are necessary.[2] Defibrillation can increase survival rates dramatically if administered within the first few minutes.

Statistics also show that early CPR and early defibrillation combined with early advanced care can result in long-term survival rates for witnessed ventricular fibrillation, as high as 40%.[3] The purposes of this paper are to describe the importance of AEDs, the role of cardiovascular nurses with respect to AEDs, and the types of AEDs currently available.

Section 1 of 10 Next Page

Prog Cardiovasc Nurs 16(1):26-29, 2001.

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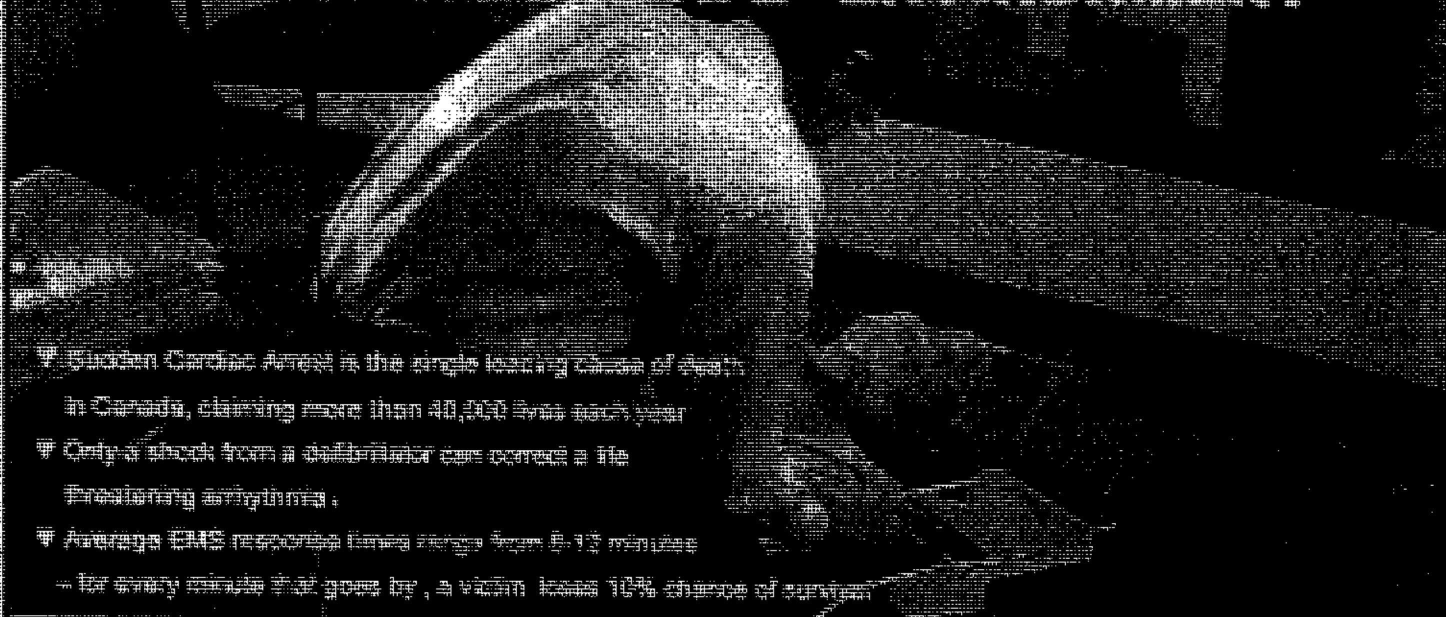
WEBER SUPPLY

Automated External Defibrillator (AED)

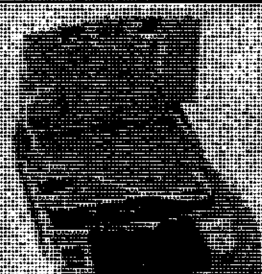
CARDIAC SCIENCE

Industrial MRO • Abrasives • Cutting Tools • Safety Supplies

CREATE A "HEARTSAFE" ENVIRONMENT



- Sudden Cardiac Arrest is the single leading cause of death in Canada, claiming more than 40,000 lives each year
- Only a shock from a defibrillator can correct a life threatening arrhythmia.
- Average EMS response times range from 8-12 minutes – for every minute that goes by, a victim loses 10% chance of survival



What is AED?

- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]

$1997.00

Order No. 2F1101A1

MROP source.com

Certified Product
Direct Ship Only

Each AED package includes:

1 – [illegible] Lithium Battery
1 – [illegible] Pads
1 – Quick Start [illegible] Kit: Includes Quick Start Guide, CD-Rom with AED Manual, [illegible] and [illegible] Communication Cable
1 – [illegible] Carrying Case
1 – Rescue Kit

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5.26 Attachment 2

THE CITY OF VAUGHAN

BY-LAW

BY-LAW NUMBER 166-98

A By-law to amend the Property Standards By-law to require the installation of Carbon Monoxide Detectors in dwelling units.

Whereas Section 31 of the Planning Act, 1992 (R.S.O. 1990 c.P.13) provides in part that the Council of a municipality that has an official plan with provisions relating to property conditions may pass a by-law prescribing standards for the maintenance and occupancy of property within the municipality;

And Whereas the City of Vaughan has passed, and from time to time amended, a Property Standards By-law (By-law 129-75, as amended);

And Whereas the Council of The Corporation of the City of Vaughan deems it appropriate, expedient and necessary to take steps to minimize the dangerous risk of harm that may be caused by Carbon Monoxide Gas in dwelling units as defined in the Property Standards By-law;

Now Therefore the Council of The Corporation of the City of Vaughan ENACTS AS FOLLOWS:

1. By-law No. 129-75, as amended (the Property Standards By-law) is further amended by inserting the following as Section 6.1(8.1) after Section 6.1(8):

"(8.1)

(a) At least one carbon monoxide detector shall be installed in each of the following dwelling units:

(i) dwelling units in which there is installed a fuel-burning appliance;

(ii) dwelling units where there is an attached enclosed garage, other than an underground parking garage of a multiple dwelling building;

(iii) in multiple dwellings, dwelling units on the same floor level as, and on the first and second floor levels above, the floor level containing a fuel burning appliance.

(iv) the term "fuel" includes coal, natural gas, kerosene, oil, propane, wood or any other substance the combustion of which creates heat.

(b) Subject to subsection (c) below, the detector may be installed on a wall or ceiling of the room containing the appliance, or on the wall or ceiling of a lobby, corridor, stairway, or habitable room of the dwelling unit;

(c) A detector shall be installed on or near the ceiling in each room in which a solid fuel burning appliance is installed;

(d) The carbon monoxide detector shall conform with CAN/CGA-6.19 "Residential Carbon Monoxide Detectors" or UL 2034 "Single and Multiple Station Carbon Monoxide Detectors" , shall at all times be operable, and shall:

(i) be wired so that its activation will activate a smoke alarm system required otherwise by law, or

(ii) be equipped with an alarm that is audible within bedrooms when the intervening doors are closed.

(e) The detector shall:

(i) be battery operated, or connected to an electric power outlet that does not have a disconnect switch or,

(ii) be permanently connected to an electrical circuit with no disconnect switch between the detector and the power distribution panel."

2. This By-law shall come into force on November 25, 1998.

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READ a FIRST, SECOND and THIRD time and finally passed this 25th day of May, 1998.

L.D. Jackson, Mayor

J. D. Leach, City Clerk