

# The Defib Quarterly

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This is an electronic news and information page. It is intended to keep you informed about community based resuscitation and in particular defibrillation. It is not peer reviewed, however, will be accurate as possible at the time of publication. Where appropriate, source material will be identified and linked if possible.

This page will be updated as news breaks or relevant information comes to light on defibrillation or related matters. This volume will run until the end of March 2004, however, will be updated, amended or extended over that period of time as issues arise or information changes.

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## Public Access Defibrillation (PAD)

Chris Huggins

One of the highest causes of death, in the adult population across the Westernised world, is cardiac arrest. While there is no single cause of this event, heart disease is the most common. Heart disease has a number of risk factors. If you have one or more these risk factors it increases your chances of developing heart disease. These risk factors are;

- smoking
- obesity
- sex (males more common than females)
- stress
- sedentary life style
- family history
- diet
- diabetes.

Heart disease can manifest itself in a number of ways;

- cardiac arrest
- angina
- heart attack
- enlarged heart
- faulty valves
- irregular heart beat.

Cardiac arrest is one of the most devastating, particularly if it happens out of hospital. In the out of hospital setting you have any where between 4 and 40 percent chance of survival. This fact has been long recognised by the medical fraternity. As a result a number of initiatives have been developed over the years. One such initiative has been the development of the “Chain of Survival”. This was promulgated by the American Heart Association and involves four basic steps;

1. early access
2. early cardiopulmonary resuscitation (CPR)
3. early defibrillation
4. early advanced life support (ALS)

This action plan is very time dependent and requires action from those on the scene at the time to;

1. recognise that there is a problem
2. call for the appropriate help
3. get involved and help until the arrival of the emergency medical team.

The first two steps are simple and require easy to use skills. However, these skills are very important in helping to buy some time for the person until the arrival of emergency medical team with the appropriate skills and equipment.

Often this equipment arrives too late to be of any real use. Fortunately, the equipment manufacturers, through the work done by various researches, have taken up the mantle to develop

easy to use equipment. It is now possible for the lay person to assist in the third step in the action plan, and that is defibrillation.

This is the most important step as it is the treatment of choice for the reversion of the most common cardiac arrhythmias that occur during cardiac arrest (heart stopped). These common arrhythmias are;

1. ventricular fibrillation
2. ventricular tachycardia.

While the lay person would not be in a position to determine if these arrhythmias are present, (it should be pointed out that the health care professional without any equipment would be in the same position) the clinical observation of no life signs is all that is needed to commence an attempt to resuscitate. These life signs are;

- absence of a pulse
- the person is deeply unconscious
- the person is non breathing
- and the skin becomes cyanosed (blue).

To put this in more simple terms the absence of any signs of life.

Once a person goes into cardiac arrest, time is of the essence, as we only have three to four minutes before the brain suffers permanent damage. The most effective way to correct this problem is by defibrillation. This treatment was once the domain of health care professionals only. Now with the advances in technology, anybody, with a little instruction, and the correct equipment, can perform this action.

The equipment that is needed is a defibrillator. A defibrillator provides a large electrical impulse through the heart. This passage of electricity causes a rapid depolarisation of the cells in the heart. Effectively, each cell is like battery. It is charged up over time and releases the stored energy when the conditions are right. However, sometimes these messages can get mixed and we end up with an uncoordinated discharge that does not pump blood. This is where the defibrillator causes all activity to stop. If the conditions are correct within the body the heart will then commence an organised charging and discharging of the cells. As a result, we should then get blood being pumped, thus the person lives.

This raises the question, how can we get these machines to the people that need them within the limited time that we have?

The answer to this is public access defibrillation. That is, the general public having ready access to defibrillators. This can be achieved in two ways.

One through first responder programs like;

- community response teams
- workplace response teams
- MFB first responder program
- Victorian State Government public access program that is a variant on the workplace response team.

Or two, what is affectionately referred to as the fire extinguisher model. In this model, defibrillators are placed in areas where large crowds of people gather e.g. large shopping centres, airports, railway stations large sporting venues etc. In this model, and the reason for its name

suggests, is that the defibrillator is hanging on the wall like a fire extinguisher, for all and sundry to have access to as required.

## **The Victoria model**

The model currently in use in Victoria is a responder model. This model is based around the success of a responder model in use at the Melbourne Cricket Ground (MCG or the “G”) instigated by St John Ambulance. This program has the best success rate of any rapid response defibrillation program in the world with a 71.4% of people suffering cardiac arrest at this sporting ground, surviving neurologically intact to home. This is world’s best practice and the “Chain of Survival” working at its optimum,

- cardiopulmonary resuscitation commencing within one to two minutes of collapse
- defibrillation within three minutes,
- advance life support measures as required within twelve minutes.

The effectiveness of the St John program has been one of the drivers for the public access program across Victoria. On the 8 August 2002 the State Government and Victoria’s ambulance services announced the introduction of a public access defibrillation program.

<http://www.dhs.vic.gov.au/humanservicesnews/sep02/defits.htm>

The initial aim is to place defibrillators in 10 key public places under the State Government funded program. The aim of this program is to attempt to reduce the incidence of death from cardiac arrest in public places by fifty percent. The location for the pilot is based on data gathered by the ambulance services. First aiders employed at the locations will be trained by the Metropolitan Ambulance Service and Rural Ambulance Victoria to use the defibrillators. Currently these programs are running at;

- Federation Square
- Healesville Sanctuary
- Melbourne Zoo
- Werribee Zoo
- Croydon Leisure Centre
- Kew Leisure Centre
- Sovereign Hill

It is anticipated that this program will be extended to more sites over the next year to bring the total to twenty. The training and clinical audit is done by the ambulance service. Victoria is the first Australian state to implement a public access defibrillation program.

The effectiveness of programs like this is based on time, and people getting in and helping ones fellow man. This program is fully supported by all who work in the emergency medical field, and is an extension of other community programs like Community Emergency Response Teams (CERT’s) and Workplace Emergency Response Teams (WERT’s). These teams respond to medical emergencies within designated areas.

- Kinglake
- Craigeburn
- Hatzollah
- The MFB first responder program
- or the workplace

The public access defibrillation program, and the other community based programs are not a substitute for professional ambulance service. However, it is a vital link in the chain of survival for cardiac arrest victims, which starts with a prompt '000' emergency call as the first link in the "Chain of Survival". The first aider's will then provide the other links in "Chain of Survival" while the ambulance is on the way, furthermore, assist the paramedics after they arrive.

The community working in conjunction with the emergency medical services is an important part saving lives. Without the involvement of those around at the time of collapse, your chance of survival is very poor. It has been said that the person that saves your life in the case of cardiac arrest is, the person that is standing beside you at the time of collapse. This is even truer, when you add a defibrillator into the equation. **As the Australian Resuscitation Council has stated any attempt at resuscitation is better than no attempt.**

If people are going to survive cardiac arrest, then, it those that are around them at the time that this occurs will need to get involved, and work through the action plan ensuring that the ambulance has been called.

There are many other programs being run by voluntary organisations across Victoria and through out Australia. Organisations like

- St John Ambulance
- Royal and Surf Life Saving
- ETC

Some of these programs will be featured in other editions.

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## Other Public access programs around Australia

Queensland Ambulance Service (QAS) through Central Area Manager Peter Wood has been working to install automatic defibrillators into community venues including major sporting clubs and shopping centres in the Greater Brisbane Region for the past two years.

Queensland Ambulance Service trainers teach resuscitation skills, chain of survival, battery maintenance, and on-the-floor scenarios to key people in the community organisations like bartenders or security guards.

The Public Access to Defibrillation program aims to create a “zone of survival” a response time of approximately four minutes around each defibrillator in the Brisbane region.

The program had its first successful “Automatic External Defibrillator” resuscitation on February 17, 2000 at Brisbane’s Treasury Casino when an employee defibrillated a 70-year-old woman.

There have since been two more successful saves at the Brisbane Airport. Peter describes the program as an excellent example of “a community partnership working at its best”.

“This has the potential to be the greatest advancement in pre-hospital care ever and it will save many lives,” he said.

Brisbane clubs that have installed an automatic defibrillator include:

- Eagle Farm Raceway,
- Treasury Casino,
- Garden City Shopping Centre,
- Chermside Bowling Club,
- South Bank Parklands,
- Kedron Wavell Services Club,
- Brisbane Convention Centre,
- Boondal Entertainment Centre,
- Moreton Island, Wynnum RSL,
- Brisbane Airport,
- Redcliffe RSL club
- Pine River Bowls club.

[http://www.emergency.qld.gov.au/publications/eupdate/2002\\_may/pg03.htm](http://www.emergency.qld.gov.au/publications/eupdate/2002_may/pg03.htm)

At this time we are unable to find any information on public access programs in other states. Public Access Defibrillation within Australia is still in its infancy, however, there is a lot of good work being performed by many voluntary organisations across the country.

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## Dual response to life-threatening medical events

Metropolitan Fire and Emergency Services Board and Metropolitan Ambulance Service dual respond to selected life-threatening Medical Response.

Since 1998 MFESB personnel have been formally trained in emergency medical response to reduce time to defibrillation in cases of sudden cardiac arrest. The MFESB use automatic external defibrillators to determine whether a shock can be delivered whilst also providing high concentration oxygen and CPR. This service is available 24 hours a day, 7 days per week.

The initial pilot study (Monash University) was predicated on the concept of the “Chain of Survival” and demonstrated an improvement in response time and improvement in survivability as a result of reduced time to defibrillation.

There have been since the year 2000, a gradual improvement in positive outcomes and currently, 20 successful saves have occurred (4 in 2000/1, 6 in 2002 and 10 in 2003; to date November).

This added flexibility of the fire service to enhance the medical response to life-threatening events in the area serviced by the MFESB improves survivability of members within that community. At fire calls, MFESB personnel are rendering first aid which includes oxygen administration or provision of basic life support (CPR) and defibrillation whilst waiting for an ambulance to arrive on scene.

Monash University provides the initial First Responder training program and ongoing recertification to practise. MAS provide on station support training through a continuing education program. Some ambulance units co-habitat (share facilities) on certain fire stations. This program and these sharing arrangements provide positive re-enforcement of a team approach and further consolidates the inter-service respect and enhances the professional working relationship which already exist within field operations.

This program continues to mature and provides a broader based emergency medical response framework / service to the community in life-threatening situations.

Do Not be surprised to have a fire truck and fire personnel respond and turn up at an emergency medical event. Remember, an ambulance, if not already on-scene, is also well on the way!!

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## Public Access Defibrillation (PAD) program in the U.S.A

The following is a direct quote from the USA Food and Drug Administration (FDA) site. A link to the site can be found at the end of the article.

### **Automatic External Defibrillators (AEDs) and Public Access Defibrillation (PAD) Programs**

An automatic external defibrillator (AED) is a device used to treat a patient with cardiac arrest whose heart is beating irregularly (fibrillating). If the heart does not return to a regular rhythm within 5-7 minutes, this fibrillation could be fatal. To stop the fibrillation, an AED is used to administer an external electric shock through the chest wall to the heart with the use of conductive adhesive pads. Built-in computers analyze the patient's heart rhythm, and interpret the rhythms that require defibrillation shocks. Audible and/or visual prompts guide the user through the process. Most AEDs require an operator to initiate the delivery of the shock in some way, such as pushing a button.

In order to have AEDs available more quickly for the persons who need them, some facilities (such as hotels, airports, country clubs) are purchasing these devices under what is called a Public Access Defibrillation (PAD) program. However, since AEDs are prescription devices and must be labeled with the prescription statement required by law (CFR 801.109), a physician who oversees the PAD program at a facility must write a prescription for the AED in order for the facility to purchase it.

Public access refers to accessibility for trained users to use AEDs in public places. Public access does not mean that any member of the public witnessing a sudden cardiac arrest should be able to use the device. AEDs are to be used only by individuals with the proper training and certification in accordance with state and local laws.

While our Division of Small Manufacturers Assistance provides guidance to manufacturers on how to comply with the device regulations pertaining to AEDs, the American Heart Association will provide guidance to person(s) who wish to establish a PAD program. Further information on PAD can be found on the American Heart Association's web site at;

[http://www.cpr-ecc.org/cpr\\_aed/cpr\\_aed\\_menu.htm](http://www.cpr-ecc.org/cpr_aed/cpr_aed_menu.htm)

*Updated October 26, 2000*

[http://www.fda.gov/cdrh/consumer/AED\\_PAD.html](http://www.fda.gov/cdrh/consumer/AED_PAD.html)

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## Legal issues for PAD programs

### The position in the USA

The legal position on the use of a semi automatic external defibrillator (ASED) in the USA is at best confusing. The confusion comes from the variation of the laws across the various states. Some of the states have legislated the use of defibrillators by lay responders where as others have not or the laws are vague. The Food and Drug Administration (FDA) view the defibrillator and in particular the SAED or automatic external defibrillator in American terms (AED) is that they are a restricted prescription devices and must be labelled, and can only be used by trained personnel and under the supervision of a medical officer. However, the medical direction or what constitutes an appropriate level of training is not prescribed by the FDA. The defibrillator must also contain instructions on its safe use. This restriction for the AED is currently under review by the FDA. For an organisation to purchase a defibrillator, a medical practitioner that is overseeing the program, must write a prescription for the device.

The definition of Public Access Defibrillation in America is a responder model similar to the model used in Victoria. That is, a group of trained first aiders with a defibrillator that responds to an incident. Not a defibrillator available for all and sundry to use. Litigation is an issue for the American public, however, this is a two edged sword. The situation at present is not completely clear as there have only been a few cases which failed on technical grounds and as such, no precedence has been set. It does appear that some public venue operators may fail in their duty of care if they do not provide for a PAD program within their venue. Where there is the provision of a defibrillator and used by the lay responder, the lay responder is unlikely to be liable for any injury that may occur providing they work within the scope of the training and the correct use of the defibrillator. Some states have introduced limited liability clauses within Good Samaritan section of appropriate legislation.

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### The UK experience

#### What are the legal issues surrounding the deployment or use of defibrillators?

“At present in the UK there are no statutory requirements for the placement of defibrillators, training and retraining for potential users of automated external defibrillators (AEDs). The Department of Health is not a regulatory body in these matters”.

<http://www.doh.gov.uk/>

### Canadian program

#### Canadian Association of Emergency Physicians (CAEP) Statement

Out-of-hospital sudden cardiac arrest, caused by ventricular fibrillation, is a leading cause of death in Canada as it is throughout most of the westernised world. The most effective treatment available to out-of-hospital victims of sudden cardiac arrest is early defibrillation.

Experience has shown that targeted responders (e.g., police, security personnel, flight attendants) can learn to use an automated external defibrillator (AED) safely and effectively. The Canadian Association of Emergency Physicians (CAEP) believes that Public Access Defibrillation (PAD) programs, through targeted responders using AEDs, have the potential to improve survival from out-of-hospital cardiac arrest.

Canadian Association of Emergency Physicians has indicated that a responder program as defined by the American Food and Drug Administration is an appropriate model for the Canadian community. That is, a trained first aider with a defibrillator (SAED) can and will save lives. This must be supported by legislation that limits the liability to the individual who or entity who purchases and deploys an SAED for a PAD program, provided that the personal injury does not result from individual or PAD program gross negligence or wilful or wanton misconduct

Following is a copy of the Canadian act of Parliament on defibrillation.

### **Bill 1852000**

An Act to help save the lives of Ontarians who suffer from cardiac arrest by promoting the widespread availability and use of portable heart defibrillators in public places Her Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:

#### Definitions

1. In this Act, "building" includes an arena, stadium, shopping centre, casino or other structure to which the public has access; ("btiment") " defibrillator" means an automated external medical heart monitor and defibrillator that is capable of,
  - (a) recognizing the presence or absence of ventricular fibrillation or rapid ventricular tachycardia,
  - (b) determining, without intervention by an operator, whether defibrillation should be performed, and
  - (c) automatically charging and requesting delivery of an electrical impulse to an individual's heart as medically required. ("defibrillateur") Defibrillators to be installed and made available
2. Defibrillators shall be installed in a readily accessible and highly visible place in the following locations:
  1. Buildings under the jurisdiction of the Province of Ontario, including buildings to which the Crown in right of Ontario or a Crown agency has title or of which the Crown in right of Ontario or a Crown agency is a lessee.
  2. Appropriate municipal buildings to be determined by the stakeholder advisory board.
3. Privately owned buildings to which the public has general access.

#### Guidelines

3. (1) The Ministry of Health and Long-Term Care shall develop and publish guidelines in the use and maintenance of defibrillators in co-operation with appropriate health and emergency service stakeholders.

#### Same

- (2) The guidelines shall take into account that the defibrillators may be used by lay persons, employees and visitors to buildings and that defibrillators may be temperature sensitive.

#### Training program

- (3) The Ministry shall develop a training program and protocol in the appropriate use of defibrillators in conjunction with stakeholders that provide emergency services.

Good samaritan

4. (1) Any person who uses a defibrillator on a victim of a perceived medical emergency in good faith without gross negligence or reckless misconduct is exempt from civil liability for any harm or damage that may occur from that use.

Definition

- (2) In this section, "perceived medical emergency" means a situation during which the behaviour of a person reasonably leads another person to believe that the person is experiencing a life-threatening medical condition that requires an immediate medical response regarding the heart or other cardiopulmonary functioning of that person.

Commencement

5. (1) This Act, except for sections 2 and 3, comes into force on the day it receives Royal Assent.

Same

- (2) Section 2 comes into force three years after this Act receives Royal Assent.

Same

- (3) Section 3 comes into force six months after this Act receives Royal Assent.

Short title

1. The short title of this Act is the *Portable Heart Defibrillator Act, 2000*.

**EXPLANATORY NOTE**

The Bill would require that portable heart defibrillators be made available and installed in significant public buildings, including privately owned buildings such as shopping centres, arenas, and stadiums that have significant public access. The widespread installations would be completed within three years after the Bill is enacted. The Ministry of Health and Long-Term Care in consultation with emergency health stakeholders is required to develop and issue training and education guidelines for the use of portable defibrillators within six months after the Bill is enacted.

The Bill has a "good samaritan" provision that protects, from civil liability, anyone who administers emergency assistance in good faith.

[http://www.ontla.on.ca/documents/Bills/37\\_Parliament/Session1/b185\\_e.htm](http://www.ontla.on.ca/documents/Bills/37_Parliament/Session1/b185_e.htm)

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**The Australian position**

At present there is no information available on the legal position in Australia. Common law in Australia would provide some guidance in this area. That guidance would be the provision of what is reasonable in the circumstances. PAD programs in Australia have medical supervision, and the training is based on best practice principles from local and overseas experiences.

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## Survival Rates Doubles When Defibrillator is used with CPR

The following is quoted from the USA Pittsburgh Post-Gazette

By; Byron Spice, Pittsburgh Post-Gazette      November 12, 2003

### **Selected Material.**

People whose hearts suddenly stop beating in public places are twice as likely to survive if they are **treated by a trained lay person** using an automated external defibrillator and cardio-pulmonary resuscitation than if they receive only CPR, a major new study has shown.

The findings of the Public Access Defibrillator Trial, performed over 21 months in Pittsburgh and 23 other cities, suggest that AED's could play an important role in reducing cardiac arrest deaths.

An AED restores a normal heart rhythm by delivering an electrical shock.

This information was presented at meeting of the American Heart Association in Orlando, Florida by Dr. Joseph P. Ornato, chairman of the study's steering committee and emergency physician at Virginia Commonwealth University Medical Center.

He reported that 29 people with cardiac arrest survived until hospital discharge after being treated with AED and CPR, compared to just 15 who survived to discharge after being treated with CPR alone.

Once attached by electrical leads to the victims chest, an AED can determine whether a shock can be administered. None of the patients in the study received any unnecessary shocks and the AED's never failed to shock those who needed one.

### **Summary by reviewer.**

This article identifies that lay people were not only trained in AED use, but an emergency management action plan was put into place – who should call 911, who should get the AED, CPR performed whilst waiting for AED, etc. – in the event of a cardiac arrest.

It would appear that when the criteria of the “Chain of Survival” are met by people on scene prior to medical support arriving, lay members of the public can reduce mortality by not only being trained in CPR, but also, the early intervention and use of AED's. Lay people are making a difference by meeting the first 3 links in the “chain of Survival” by reducing time to defibrillation.

1. **Early Access**
2. **Early CPR**
3. **Early Defibrillation (AED)**
4. Early Advanced Cardiac Life Support (ambulance)

[Full Article: http://www.post-gazette.com/pg/03316/238666.stm](http://www.post-gazette.com/pg/03316/238666.stm)

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