

Public access defibrillation: community breakthrough or threat to professional standards?

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While government bodies in the USA and England have embraced the use of public access defibrillation ahead of conclusive randomised trials, a more cautious approach is being taking in Australia.

Visitors to the USA and England are likely to be surprised by the presence of defibrillators with prominent signage in major airports, railway stations and convention centres. Defibrillators are available, like fire extinguishers, for members of the public to use – i.e. to be publicly accessible – in the event of a person experiencing a sudden unexpected cardiac arrest from ventricular fibrillation. They will become a more common sight in the USA from April 2004, when legislation comes into effect, requiring such devices to be installed in all commercial aircraft with one or more cabin attendants, and to be readily available in all federal buildings of any size.

What is public access defibrillation?

Public access defibrillation (PAD) is an extension of the legislated plan for defibrillators in aircraft and public buildings. In these sites, legislation also requires staff to be trained in defibrillator use and cardiopulmonary resuscitation (CPR), and for there to be an organised plan of defibrillator use and backup by the conventional emergency service. Legislation allows for the defibrillators to be used and be available for use by volunteers in the event that trained staff are not immediately available. Persons using the devices need no specific training, but need just respond to voice prompts delivered from the device after it is activated. In the USA the devices can be purchased on a doctor's prescription from local drug stores (chemists) for about US\$1000.



PAD completes the most important link (early defibrillation) in the chain of survival of cardiac arrest, following the first two links (early access and early CPR) and preceding the last (early advanced care; see the box on page 105). The link of early defibrillation includes:

- at its top, trained ambulance officers with defibrillator and CPR skills
- at its bottom, persons with implanted defibrillators (such as Dick Cheney, the US Vice-President)
- on one side the safety officers, cabin attendants, security staff, etc, who are trained in defibrillation, and whose job description ensures prompt intervention in the event of any emergency.

PAD is the remaining key component in this link because not everyone at risk can have an implanted defibrillator and response times for other professional attendants (3 to 10 minutes at best) are such that survival is well under 50%, and in Australia closer to 10%, for patients with out-of-hospital ventricular fibrillation.

Multiple studies have shown that survival after ventricular fibrillation is utterly dependent on time from onset to electrical termination, decreasing by 10% in a linear fashion for every minute that passes, even with effective CPR (see Figure 1).

PAD exists because it can be implemented at the time of greatest need and chance of success, and the current devices

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are safe, effective and relatively cheap. Like the implanted devices, the PAD devices are activated only by ventricular fibrillation. Overseas experience shows that they are well respected by the public, like fire extinguishers in buildings and flotation devices at beaches, and are unlikely to be stolen or vandalised.

Evidence of its efficacy

The first study of PAD was in Chicago airports, and recently reported in the *New England Journal of Medicine*.¹ Results were outstanding, with an overall one-year survival rate, neurologically intact, of 56% for patients with ventricular fibrillation treated with one of the many wall-mounted devices (Figure 2). This contrasted with zero survival in the years beforehand with the use of conventional emergency medical services. While over 1,000 airport staff had been trained in the use of the defibrillators, it was almost always a passer-by, acting in a voluntary capacity, who initially used the device in a person with ventricular fibrillation. Most operators were untrained in the use of a semi-automatic defibrillator, but responded appropriately to the voice prompts.

Travellers through Chicago's O'Hare Airport will see these devices every 100 to 200 metres along all concourses, and the signs alerting all to their location. The devices are alarmed locally and centrally, so that backup from airport staff and the central medical response is activated immediately. Similar systems have been installed in Chicago's main convention centre, in other US and English airports (Heathrow has over 90) and in English train stations.

Other reported studies on PAD have been from Piacenza in Italy, where availability of devices without training in CPR has tripled survival from out-of-hospital ventricular fibrillation.²

A major study of PAD will shortly be reported by the US National Institutes of Health. Preliminary informal commentaries on this trial (which compares standard ambulance care alone with such care plus PAD) indicate that the control arm has been corrupted by implementation of PAD at many sites.

The proponents

The champions of PAD in the USA include Leonard Cobb from Seattle, who introduced the first paramedic ambulance service in that city in the late 1960s, together with a community-wide training program in CPR. The Seattle Paramedic Service remains the nation's best, but enthusiasm for CPR has waned, with present emphasis on the need for early defibrillation. Other advocates include John Crewdson, veteran journalist for the *Chicago Tribune*, whose articles on survival in the sky underpinned US Federal legislation on defibrillators in aircraft, and Sherry Caffrey, an emergency medical technician at O'Hare, who devised and implemented the airport system.

Chain of survival

- Early access – getting help
- Early CPR – buying time
- Early defibrillation – restarting the patient's heart
- Early advanced care – stabilising the patient

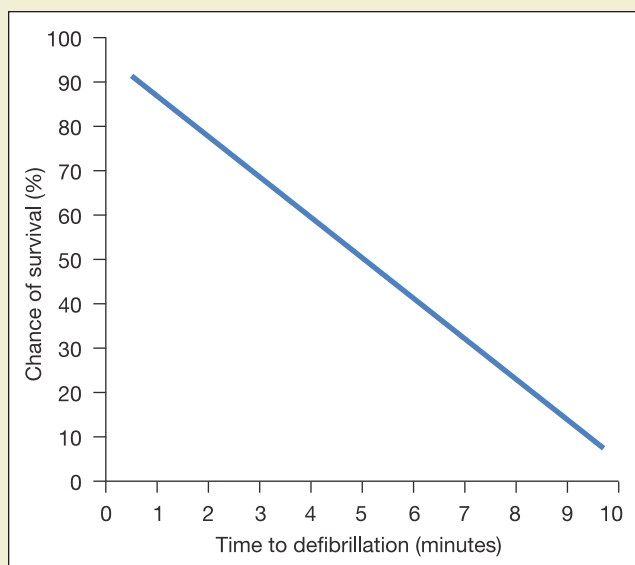


Figure 1. Probability of survival after a sudden cardiac arrest according to the time to defibrillation.

The opposition in Australia

Authorities in the USA, including Cobb, who has been acting on behalf of the American Heart Association, have been campaigning for PAD for over 20 years. While PAD is now embraced by government bodies in the USA and England ahead of conclusive randomised trials, greater caution is being exercised by the Australian Department of Health and Ageing on the advice of resuscitation 'experts'. Such persons clutch for the ideal, which has eluded this writer and the voluntary bodies for which he has worked. The ideal would have every person in the community trained in CPR and defibrillation before being permitted to use a semi-automatic defibrillator. Such an ideal has frustrated the most enthusiastic long-term champions of resuscitation such as the National Heart Foundation (NHF) and St John's Ambulance – because of community inertia.

The NHF, faced with lack of enthusiasm, has withdrawn from community training in CPR in most States and Territories. St John's Ambulance – the nation's largest training organisation (with some 300,000 trainees per year) – has little call on its resources for specific CPR or defibrillation courses. It provides

most courses on request of persons who need resuscitation and first aid training as part of their occupational certification.

New, fledgling training companies see training as a prerequisite to widespread deployment of defibrillators, and oppose PAD as now implemented in the USA and England, with a view from the high ground that standards of resuscitation must be maintained. Such persons have influenced others, notably physicians, nurses, paramedic ambulance officers, general duty ambulance officers and safety officers, each of whom from the top down have opposed the practice of defibrillation at the next tier of professionalism over the past 30 years. The issue of 'turf' persists, and there is opposition to use of defibrillation by members of the public on the basis of required standards of performance, and of safety, despite the fact that defibrillators can and do operate without any human intervention in persons with an implant.

The current situation

At the time of writing, an initiative on implementation of PAD, taken to the Federal Government by St John's Ambulance and based on the US and English experience, remains under consideration within the Department of Health and Ageing,



Figure 2. A wall-mounted, semi-automated defibrillator at Chicago's O'Hare Airport. Although a disclaimer appears on the cabinet door regarding use by trained personnel, passers by can and do use the defibrillators.

where experts and priority committees deliberate the evidence and the priority. Meanwhile, ventricular fibrillation, an acknowledged correctable condition, remains the most common cause of sudden unexpected death in the nation.

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Time for a resolution

It is difficult to understand the attitude of many doctors and other professionals to PAD, and their opposition to this initiative.

Many clinicians have no difficulty recommending implantation of a defibrillator in an individual patient, with a 1% per annum increased chance of survival (based on the recent MADIT2 trial). However, they have difficulty in allowing PAD in a community where there are many thousands at risk – and where the cost of the individual implant is five times the cost of the community program.

There are cases in Australia where defibrillators donated for use in hospital foyers have not been deployed in these areas on the basis that standards would be compromised if an untrained person were to use these devices.

An experienced resuscitation group in Scotland has criticised the initiative of the English Department of Health on a program of PAD in airports and railway stations on the basis of the view that targeted placement of defibrillators in airports 'could, at best, increase overall survival from 5.0% to 6.3%'.³ The Chicago experience was from zero to 57%.

Anomalies in all the above need be confronted and resolved. Is PAD a major advance or should we hold off its implementation in Australia until the evidence is compelling and suitable standards of resuscitation are in place? MT

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