Three Lives Saved: UWA’s Experience With Defibrillators

Eddie Stoelwinder
BACKGROUND

Sudden Cardiac Arrest (SCA)

• Death occurs instantly or shortly after the onset of symptoms

• The most common cause of SCA is ventricular fibrillation a life threatening arrhythmia characterised by rapid, chaotic contractions of the heart

• Results in the inability of the heart to pump blood to the body, particularly to the brain
Ventricular fibrillation results when multiple sites in the ventricle fire electrical impulses very rapidly and in an uncoordinated fashion.
Sudden Cardiac Arrest (SCA)

• Different to heart attack where blood flow to part of the heart is blocked
• Almost always occurs in context of other heart conditions
• SCA is one of the leading causes of death in Australia
• Survival rate is between 2% and 5%
Sudden Cardiac Arrest (SCA)

The contributing factors to SCA include:

- Pre-diagnosed heart disease
- Degeneration of the heart muscle
- Enlargement of the heart due to high blood pressure
- Hardening of the arteries
- Unexplained electrical interruption
Sudden Cardiac Arrest (SCA)

- One to two percent of SCAs occur in young people
- Two thirds show heart abnormality
- The risk of SCA in susceptible young people is increased by physical activity
Sudden Cardiac Arrest (SCA)

- For each minute that passes after an SCA, the chance of survival is reduced by 10%
- There is a 10-minute ‘window of opportunity’
- 5% survive beyond 12 minutes
- With immediate defibrillation, survival for SCA is close to 90%
Sudden Cardiac Arrest (SCA)

• The average ambulance response times are between 10 and 12 minutes

• The only alternative is having an Automated External Defibrillator (AED) on campus
Automated External Defibrillator

- The only definitive treatment for SCA is a defibrillation shock, an electrical pulse through the heart, which restores a normal heart rhythm.
- Defibrillation within the first few minutes of a SCA can save up to 30% of victims
Automated External Defibrillator

Public Access Defibrillation (PAD) involves making Automated External Defibrillator (AED) available in the workplace and public areas greatly improving the emergency response.
Automated External Defibrillator

- There are two types of AEDs: Automatic and Semi Automatic
- The AED only delivers a shock when one is needed and is safe for the user and the patient.
- The AED unit self tests daily, weekly and monthly
- AEDs require minimal maintenance consisting of biannual servicing
Age Demographic of the Workforce

- People are living longer and the population continues to grow
- The Australian work force has 32% of it made up by workers in the 45-64 age group,
- At the University of Western Australia (UWA), considering only permanent full time and part time staff, 47% are in the 45-64 age group
THREE INCIDENTS IN TWENTY MONTHS

Incident 1 - 26th February 2007
Incident 2 - 4th June 2008
Incident 3 - 18th November 2008
Incident 1 - 26th February 2007

- 64 year old UWA staff member
- CPR commenced
- UWA Security and Parking attended with their defibrillator
- 5 minutes for the AED to arrive and six shocks were given, more by ambulance officers
- Patient fitted with a pacemaker and returned to work later that year
- Heart attack 5 years earlier
Friends for life

The Year of the Lifesaver: Exactly four months after his heart attack, John Lockhart (centre) thanks Bob Welten (left) and Peter Hacking (right)
Incident 2 - 4th June 2008

- 20 year old UWA student
- CPR commenced
- UWA Security and Parking attended with their defibrillator
- Security call out to application of the AED was approximately 7 minutes
- Four defibrillations over 20 minutes, more by ambulance officers over 30 minutes
- Full recovery following surgery
A life-changing Italian class

Arts student Kaelee Guira was feeling nervous as she sat in her Italian tutorial waiting for her turn to present a conversation with her student partner Heather Whiting.

But she never delivered her work. Heather Whiting said she was looking at Kaelee as her head suddenly lolled back and she turned grey and lost consciousness.

“She actually died in front of us,” Heather said.

A brilliant response from her fellow

The University has recently paid for 164 staff to attend a half-day CPR course.
Incident 3 - 18th November 2008

• 65 year old visitor to the UWA Sports and Recreation Centre

• CPR commenced

• An AED is permanently located at the Sports and Recreation Centre and this was used to provide one shock

• Patient regained consciousness

• Ambulance arrived within four minutes of the alarm

• The patient had three blocked coronary arteries and had triple bypass later in that week.
INTRODUCTION OF THE AEDS

It is not AEDs which save lives “rather the implementation and maintenance of AED programs embedded in the ‘chain of survival’ saves lives” (Zed 2008)
Chain of Survival

The concept of a ‘chain of survival’ emphasises the steps to achieve survival from SCA:

- Early access to the emergency medical system
- Early initiation of CPR
- Early defibrillation
- Early advanced cardiac care
Public Access Defibrillation (PAD)

The plan of Public Access Defibrillation is to eliminate delays by having nontraditional first responders (e.g. security staff) and trained laypersons to apply the technology of defibrillation. PAD is a very effective strategy for patients suffering SCA in public places where AEDs are installed.
Mobile Response

The value of mobile response is supported by a study of security officers working in casinos. When the mean time for delivery of the first shock was 4.4 minutes there was a 53% recovery (where the rhythm was ventricular fibrillation). When the shock was delivered within 3 minutes there was a 74% recovery. A “call-to-shock time interval of 5 min is the goal” (Ramaswamy & Page 2003).
Emergency Preparedness

Drezner et al. (2007) state the essential elements of emergency preparedness are:

• Effective communication system

• Training of anticipated responders in cardiopulmonary resuscitation and AED use

• Access to an AED for early defibrillation

• Acquisition of necessary emergency equipment

• Coordination and integration of onsite responder AED programs with the local emergency medical services system

• Practice and review of the response plan
Criteria for Deployment

The criteria UWA used are outlined below:

• Areas of medical need
• Mobile first response
• Sport venues
• Location – central or distant
• Populated areas
• After hours requirements
• Hazardous environments
## Location, numbers and rationale for placement of AEDs

<table>
<thead>
<tr>
<th>Location</th>
<th>No</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business School</td>
<td>(1)</td>
<td>Distant location, large population, large after hours classes</td>
</tr>
<tr>
<td>Library – Reid Building</td>
<td>(1)</td>
<td>Central location, large population, after hours</td>
</tr>
<tr>
<td>Medical Centre</td>
<td>(1)</td>
<td>Medical</td>
</tr>
<tr>
<td>Molecular and Chemical Sciences Building</td>
<td>(1)</td>
<td>Large population, hazardous</td>
</tr>
<tr>
<td>Oral Health Centre</td>
<td>(2)</td>
<td>Medical, off campus location, large population</td>
</tr>
<tr>
<td>Security and Parking</td>
<td>(2)</td>
<td>Mobile first response</td>
</tr>
<tr>
<td>Sport Science, Exercise and Health</td>
<td>(2)</td>
<td>Medical</td>
</tr>
<tr>
<td>Sports and Recreation Centre</td>
<td>(1)</td>
<td>Medical, large population</td>
</tr>
<tr>
<td>UWA Sports Park (McGillivray)</td>
<td>(1)</td>
<td>Off campus location, after hours, medical</td>
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</tbody>
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Fitness centre placement

According to Norton and Norton (2008) “Fitness centre placement is particularly important if the clientele is older or has a 'high-risk' profile, for example, clients with cardiovascular, respiratory or metabolic disease” and suggest that the standard of care required in health and fitness centres is increasing and that it is prudent for AEDs to be installed.
Dead man's family call for defibrillators in gyms

FLIP PRIOR

A Woodvale man whose brother-in-law died from a heart attack while exercising at a Zest gymnasium in Kingsway has renewed calls to make it compulsory for all gyms and sporting facilities to have a defibrillator.

Steve Carroll said Kingsway staff performed CPR on Kanwar “Kam” Jandu but were unable to revive him.

He died in December.

Mr Carroll said Mr Jandu, 42, could have survived if an automatic defibrillator had been available. “I want to see a law passed that forces gyms, where people put their bodies under stress, to have defibrillators available,” he said.

He does not blame gym staff for Mr Jandu’s death.

His campaign has been backed by Lyn Foreman, the widow of sports commentator Wally Foreman, who died in November 2006, aged 58, two days after a massive heart attack while on a treadmill at a gym.

“A defibrillator restarted his heart — but it was done by the ambulance staff so of course that was too late,” Mrs Foreman said. “I just think it’s something they should have sitting there, just like a first aid kit.”

Zest Health Clubs do not have defibrillators. Executive officer Steven Dole said staff were trained in first aid and CPR and a defibrillator may not have saved Mr Jandu’s life.

“He actually passed away in the ambulance and he was kept alive by the employees,” he said.

Arena Joondalup had a defibrillator that had been used to revive a patron, manager Chris Andrich said.
Shock as gas bills to soar by 23pc

Ralph Botes said changes to tariffs were likely to see a typical household’s gas bill increase $1.70 a week.

Energy Minister Peter Collar said that last year’s gas price rise — up to $83 a year for a big household —
Athletic venues

Drezner et al. (2007) support AED at athletic venues and further state “In any collapsed and unresponsive athlete, SCA should be suspected and an AED applied as soon as possible for rhythm analysis and defibrillation if indicated”.
Placement

Placement of AEDs:

• Located close to where a SCA may be witnessed
• Be visible
• Easily accessible
• Reception, common areas and main corridors may be convenient locations.
Emergency Preparedness

• UWA has an effective communication system with a 24 hour manned control room with an emergency response officer (Security and Parking) in contact via two-way radio

• Officers are trained in cardiopulmonary resuscitation and AED use

• Supported by a comprehensive training programme of other staff

• Twelve AEDs on site

• Member of the St Johns first responder scheme

• Regularly reviews of the need for AEDs

• Debriefing after each incident
Security and Parking

• 26 Security and Parking officers
• Senior first aid and defibrillator trained
• Radio contact and vehicles equipped with first aid kits, oxygen and defibrillators
• Central first responder role
• Emergency phone number (promoted in induction and training, on posters and on all University phones)
First aid officers

- 76 designated first aid officers with senior first aid training
- First aid trained staff as required for the local circumstances support these officers
- Supported by 3.5hr, 1 and 2 day first aid courses (312 staff in 2008 and 160 in 2009 staff)
- Eighty staff members have had specific defibrillator training over the past five years
- Various levels of training in defibrillators are included in first aid training and refresher training
The implementation of AEDs has hurdles apart from costs to the organisation. These include:

- Training and competency requirement
- Logistics of quick response and emergency planning
- Resistance from first responders due to personal and legal concerns
- The latter concerns should be carefully allayed with accurate information
DEBRIEFING FOLLOWING THE THREE INCIDENTS AT UWA

- The earlier, the more clearly the events of the incident can be determined
- Determine the adequacy of the response and areas that can be improved
- Opportunity to engage those involved and to put in perspective any lingering doubts on performance
- Counseling can be offered
- Providing support to the rescuers and bystanders has been appreciated by all of those involved in these incidents
Specific issues raised in the debriefing

- Emergency equipment maintenance
- Lack of practical training simulation
- Emergency response confusion
- Crowd control
- Exposure to body fluids
- Importance of quick and thorough debriefing following collection of accurate information
CONCLUSION

• The modern technology of the Automated External Defibrillator is playing an important role in ‘New Century First Aid’.

• AEDs, along with comprehensive emergency planning to ensure a quick response, and first aid training, have saved three lives at UWA over twenty months.

• As SCA is one of the leading causes of death in Australia, and Medical authorities strongly support and promote the availability PAD, Universities have a responsibility to review the need for PAD on their campuses.
ACKNOWLEDGMENTS

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