"Powerful. Heartfelt. A must read reference."

Associate Professor Tony Walker ASM

BACK IN A HEART BEAT

Busting the myths about sudden cardiac arrest and why bystanders can safely use defibrillators

ANNE HOLLAND

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INTRODUCTION

'When we least expect it, life sets us a challenge to test our courage and willingness to change; at such a moment, there is no point in pretending that nothing has happened or in saying that we are not yet ready. The challenge will not wait. Life does not look back …'

PAULO COELHO

Five pieces of luck

On the day that he died in 2009, Jon Delaney was a lucky man five times over. Two weeks after his fortieth birthday, Jon was busy at work. He had things to do. A family man and a businessman with a high-flying corporate lifestyle, Jon didn't have time to stop – *until his heart did!*

Jon, just 40, had suffered a heart attack. His first bit of luck was that his heart did not stop beating immediately. Although he experienced some warning signs and symptoms – chest pain and feeling unwell and sweaty – he initially ignored them. He had work to do and phone calls to make – he'd go to the doctor later.

His second bit of luck was the insistence of a work colleague that he be driven to hospital without any further delay.

His third bit of luck was that he did not go into cardiac arrest in the car. If a driver suddenly stops in traffic and tries to perform cardio-pulmonary resuscitation (CPR) on a casualty – who is seated in an upright position and wearing a seatbelt, with no control of the casualty's airway – while also phoning for help, the situation is not going to end well. Just removing the casualty from the vehicle takes vital minutes.

That delay dramatically reduces the cardiac arrest victim's chances of survival.

Jon's fourth bit of luck was that he made it to hospital – where it seemed his luck had run out. Jon suffered a sudden cardiac arrest on arrival in the emergency department and he 'died'.

Luck, however, was still on Jon's side. His final and most important stroke of luck was that he had made it to a hospital before his heart went into cardiac arrest and emergency medical assistance was immediately available to save him. He was quickly defibrillated in the emergency department and revived.

Had Jon suffered his cardiac arrest at work, he more than likely would not have survived because his workplace did not have an automated external defibrillator (AED) on the premises. His life was saved by the quick thinking and insistence of his colleague and by reaching the hospital emergency department in time.

As happened to my husband, many people who suffer a sudden cardiac arrest get no warning and literally 'drop dead' on the spot. A sudden cardiac arrest means that the victim is deceased and needs rapid defibrillation to restore a normal heart rhythm. Without an AED, a rescuer can still perform CPR at the scene while waiting for paramedics to arrive with a defibrillator. This would prolong survival and give the victim a chance but, more often than not, there would not be a happy ending.

Jon made the near-fatal mistake of not taking his symptoms seriously and he delayed getting help until he finished important tasks that needed his attention. Those tasks would never have been completed if some good fortune had not been on his side!

Today, over five years later, Jon is indeed a very lucky man. He recovered from his cardiac arrest and is still a family man and businessman but he has a very different approach to his life and lifestyle. He is also a strong supporter of AEDs in all workplaces because he is living proof that early defibrillation and early access to emergency medical care can save lives.

Sudden cardiac arrest

What is it and who does it affect?

Sudden cardiac arrest (SCA) occurs when the heart's electrical control system suddenly stops the heart beating or pumping blood. Sudden cardiac arrest strikes an estimated 33,000 Australians each year. Cardiovascular (heart and blood vessels) disease (CVD) is the leading cause of death in the industrialised world but there is widespread lack of awareness of its incidence and significance. Cardiac arrest does not discriminate – it strikes males and females, young and old, and can strike anyone, of any age, anytime, anywhere. SCA has no warning signs and 75% (three-quarters) of cardiac arrests will occur outside of a hospital, that is, in the community and workplace. Therefore it is critical that bystanders react promptly by starting CPR and applying an AED to give the casualty the best chance of survival.

CASE STUDY: Sean Purcell's story of survival on a Victorian beach

Another very lucky man who should be dead is Sean Purcell. In July 2014, 37 year old Sean suffered a sudden cardiac arrest while jogging on Whites Beach at Torquay in Victoria. Unlike Jon, Sean did not have a heart attack. He had a viral lung infection which affected his heart and caused it to stop beating; he dropped face first into the water. Unlike Jon, he was not near a hospital or any medical aid.

Sean's life was saved by nine quick-thinking strangers who dragged him from the water and kept him alive for 25 minutes by taking turns to perform CPR. They also had the presence of mind to locate a defibrillator at a nearby golf course and they used it to restore his heart rhythm. One rescuer had to jog 1.5 km and back on sand to deliver the AED to Sean's side.

The tide was coming in and the coastal terrain was rugged. Sean's team of urban lifesavers needed to move his body several times up the beach, away from the rising tide. Twenty minutes after he arrested, the paramedics arrived; however, the beach vegetation and sand dunes made access very difficult. The medical helicopter was unable to land on the beach and his rescuers had to carry him up through the dunes to the waiting chopper.

Sean was air lifted to Geelong Hospital where he was placed in an induced coma for five days. His wife, Kelly, and family were told his prognosis was bleak and that 'if' he woke up, he would be suffering high-end brain damage. But Sean did survive and he thrived. A year later, because of the efforts of strangers, Sean has recovered with 100% brain function and he is back working full-time. He has an implanted defibrillator which recently discharged an internal shock, when his heart went into an unsafe rhythm, and saved his life yet again. He has been given a second chance and is committed to sharing his story in order to shed a light on the importance of CPR training and accessibility to public defibrillators.

Jon's and Sean's stories both ended with the best possible outcomes. Without early implementation of CPR and defibrillation, SCA would have had very different and tragic consequences for their wives and children. Sadly, my husband Paul (a father of five) did not survive because he did not have early access to CPR, defibrillation and emergency medical care – no-one witnessed his cardiac arrest and we did not find him in time to be able to help him.

Is sudden cardiac arrest the same as a heart attack?
Although Jon and my husband, Paul, both suffered heart attacks that precipitated cardiac arrests, Sean's cardiac arrest was caused by a virus. A heart attack is a separate event from a cardiac arrest. Suffering a heart attack does not automatically mean that a SCA will occur. However, the likelihood of a cardiac arrest resulting from a heart attack is extremely high. No-one experiencing symptoms of a heart attack should delay seeking medical attention because there is a very great risk that they may go into cardiac arrest without warning. The difference between cardiac arrest and heart attack is described in further detail in Chapter 13 'Myth 1 – Sudden cardiac arrest is a heart attack'.

Leading cause of death in the world

Cardiovascular disease (CVD) refers to all diseases and conditions involving the heart and blood vessels. Health data compiled from more than 190 countries show that CVD remains the number one cause of

death in the world with 17.3 million deaths each year, according to the American Heart Association. That number is expected to rise to more than 23.6 million by 2030.

CVD is the leading cause of death in Australia and affects one in six Australians (3.72 million people or two out of three families). The main types of CVD in Australia are coronary artery disease, stroke, and heart failure/cardiomyopathy. These diseases are disabling and prevent 1.4 million people from living a full life. According to Australian heart disease statistics, analysed by the Australian Bureau of Statistics (ABS), CVD claimed the lives of 43,603 Australians in 2013, deaths which were largely preventable. On average, one Australian dies as a result of CVD every 12 minutes.[1]

Although the number of deaths from CVD fell by 13.3% between 2002 and 2013 (from 50,294 to 43,603), CVD still accounted for nearly 30% of all deaths in Australia in 2013. CVD is one of Australia's largest health problems. Despite improvements over the last few decades, it remains the most expensive disease group in Australia and is one of the biggest burdens on the national economy, costing billions of dollars.[2]

In a press release on 16 December 2014, National CEO of the Heart Foundation of Australia, Mary Barry, said:

> The *Australian heart disease statistics 2014* inaugural compendium provides some worrying statistics about the changing nature of Australia's leading killer – cardiovascular disease.
>
> Cardiovascular disease remains the biggest killer of Australians and is the most expensive disease to treat nationally. Unfortunately, with it accounting for 11% of direct healthcare expenditure, it remains a national health priority in name only. Unlike other health priorities, there is no nationally funded action plan to drive improvements in prevention, early detection and management of cardiovascular disease.[3]

Comparison with other causes of death

SCA is a leading cause of death among adults over the age of 40 in the United States and other countries. According to the Sudden Cardiac Arrest Foundation, the number of people who die each year from SCA is roughly equivalent to the number of deaths from Alzheimer's disease, assault with firearms, breast cancer, cervical cancer, colorectal cancer,

diabetes, HIV, house fires, motor vehicle accidents, prostate cancer and suicides combined. SCA is a life-threatening condition – but it can be treated successfully through early intervention with cardiopulmonary resuscitation (CPR), defibrillation, advanced cardiac life support, and mild therapeutic hypothermia (lowering of body temperature).[4]

CVD is the most common killer of women, who have caught up with men in the incidence of cardiac disease. It kills more men than prostate cancer and more women than breast cancer. Coronary artery disease, which causes heart attacks, kills 55 Australians each day (one Australian every 26 minutes).

Dr Lyn Roberts, former CEO of the National Heart Foundation of Australia, said in a media release on 1 June 2013:

> Many people are still surprised to learn that heart disease is the number one killer of Australian women and that it claims more than three times as many female lives as breast cancer. We're very concerned that three in five women do not recognise heart disease as a serious female health issue.[5]

Survival rates – out-of-hospital cardiac arrest

It is estimated that over 325,000 out-of-hospital cardiac arrests (OHCA) are attended by emergency medical services (EMS) each year in the United States. In cases where a public access AED is applied at the scene by bystanders, the long-term survival rate is three times greater than those who are defibrillated after arrival of EMS. These trends are similar to Australian survival rates following the application of an AED by urban lifesaver witnesses.

The only definitive first aid treatment for victims of SCA is defibrillation. SCA happens without warning and the majority of people have no previously recognised symptoms of heart disease. For the best chance of survival from SCA caused by a shockable rhythm, an AED should ideally be used within the first three to five minutes after collapse. Currently less than 5% of all victims of SCA survive, largely because a defibrillator does not arrive in time. Prompt use of an AED can dramatically increase the survival rate to over 80%.

Increasing access to AEDs

There are multiple causes of cardiac arrest and in the same way that seat-belts and air bags cannot prevent death in every road trauma casualty, AEDs will not save every victim of cardiac arrest. However, thousands of lives could be restored if ordinary people had immediate access to an AED.

It is well established that if early defibrillation or bystander-initiated resuscitation efforts are not implemented, it is rare for the victim to survive. 'The automated external defibrillator (AED) has been described as the single most important development in the treatment of SCA. These devices are now widely available and increasingly used by people, often with little or no training, to re-start the heart of a victim of SCA'.[6] When an AED is applied soon after a cardiac arrest, the majority of victims can survive.

The primary goals of this book are education and raising awareness about the importance of public access defibrillation. The ultimate objective is to achieve legislative change so that AEDs become an essential and compulsory component of first aid kits throughout the country.

Until legislative change becomes a reality, the most pressing problem is to debunk the mythology surrounding AEDs so that bystanders are more willing and confident to 'have a go' and jolt someone back into life following a SCA.

The myths about AEDs include:

1. Sudden cardiac arrest is a heart attack and only doctors can diagnose and treat it.
2. A rescuer who applies a defibrillator can be held liable and sued if the victim does not survive.
3. An AED can shock someone who doesn't need to be shocked.
4. An AED can cause harm or injury to the victim.
5. An AED isn't needed because all the rescuers need to do is phone emergency services and paramedics will arrive with a defibrillator, or there will be enough time to get the casualty to a hospital.

6. Only medical professionals, paramedics and first aid-trained persons can use an AED.
7. An AED in the workplace increases liability risks for the employer.

Because of these myths, layperson bystanders often believe that it is too late because the victim is dead and there is nothing they can do except wait for more qualified responders to arrive.

The chapters to follow will bust the myths surrounding AEDs, and will increase knowledge and awareness of the critical role that bystander CPR and public access AEDs play in saving lives in the community. Everyone should aspire to be an urban lifesaver. You never know when you or someone you love will need a hero who knows how to use an AED.

Anyone can be an urban lifesaver by applying a defibrillator.

Minutes matter during a sudden cardiac arrest and the victim's very survival depends upon bystanders quickly applying an automated external defibrillator (AED).

Sudden cardiac arrest does not discriminate – it can strike anyone, of any age, anytime, anywhere and is the leading cause of death in the industrialised world. But it is the one cause of death in which the actions of an ordinary person can restore life.

The possibility of a layperson having to deal with a cardiac arrest in Australia is 590 times more likely than a fire related fatality. Fire extinguishers, first aid kits and evacuation plans are mandatory in workplaces and public spaces and have reduced death rates, yet a simple machine that would save many lives is seldom available.

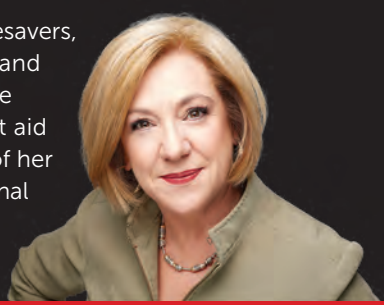
The wisdom of placing AEDs throughout the community seems obvious and long overdue and thousands of lives will be saved as a result.

Back in a Heart Beat is a must read reference focused on busting the myths and fears associated with sudden cardiac arrest and the use of defibrillators by members of the public. It presents an authoritative case for rapid and widespread deployment of AEDs.

No one wants to live with the burden that the sudden loss of their loved one was unnecessary and avoidable. We can all be heroes if we just learn how easy it is to save a life.

Urban Lifesavers know how to use an AED. Do you?

Founder of Defib First and not-for-profit Urban Lifesavers, **Anne Holland** is an educator, presenter, speaker and author. Anne is a registered nurse, with extensive experience in post anaesthetic critical care, a first aid trainer and nurse immuniser. Following the death of her husband Paul from cardiac arrest, Anne's professional and personal experience drives her commitment for change with passion and determination.



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