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Cardiac Arrest: Who ya gonna call?

by Geraldine Johns

Every day, cardiac arrests kill 12 New Zealanders who could be saved by an affordable, easy-to-use device.

Look around the next time you're at your local shopping mall. You'll see signs pointing to the nearest fire exit and the nearest fire extinguisher. There'll be signs alerting you to toilets, ramp access and all manner of other mall features.

But where's the sign telling you where the nearest defibrillator is? And would you know how to use it if you did locate one?

Eighteen New Zealanders die every day as a result of cardiac arrests. Of those, only six are in hospital; the remaining 12 are going about their normal lives.

"So, 12 of those lives could potentially have been saved by a defibrillator," says Dr Harvey White. The director of coronary care at Auckland City Hospital is on a major defibrillator drive. He thinks there should be one in every major building – both public and commercial.

"They should be in every church, every airport, school, supermarket and shopping mall. I think they should be in every general practice, on every marae; at all sporting and other major events." The list goes on. "Dental practices, all transport centres, gyms. They should be available more frequently than McDonald's."

White advocates we all learn cardio-pulmonary resuscitation (see CPR story on page 22). He also advises training in the use of a defibrillator – although they're pretty much idiot-proof. Lay people faced with an emergency situation have repeatedly demonstrated their ability to use one to life-saving effect.

So, what are defibrillators? Automated external defibrillators (or AEDs) perform the heart-starting task needed when a patient suffers a cardiac arrest known as ventricular fibrillation. This occurs when the heart begins contracting uncontrollably and stops pushing blood around the body. The defibrillator delivers a controlled electric shock to the heart, which stops the spasms and allows a return to normal contractions. In adults,

over 90% of cardiac arrests are a result of ventricular fibrillation.

But the likelihood of being saved by an on-site defibrillator in any place other than a hospital is very much hit-and-miss in New Zealand. Currently, there's no official national database of defibrillators. St John does not have one; nor does the Red Cross. Instead of a 111 caller being told by an emergency-services operator where the nearest defibrillator is, they must wait – when there could be a device just around the corner that could be called into good use before the ambulance arrives.

Where are they? Who knows where to locate them? Even in buildings where AEDs are held there can still be problems. Sometimes the devices are kept behind locked doors. More often than not, there are no signs pointing to their whereabouts. Add to that a fair degree of ignorance about their use and applicability and the chance of them being successfully deployed in an emergency further diminishes.

There is the reported story of a visitor to a major Auckland public building collapsing from a cardiac arrest. The building had two defibrillators on site, but it took some time to find one. When it was finally located, bystanders were cautioned against putting it into use.

Fly to the US and defibrillators are one of the first things you'll see. They're in place, in abundance, at airports. "You'll be struck by the sight of them," White says. Their benefits are demonstrated by the statistics relating to their use. In Chicago, automated defibrillators were placed at the city's three main airports in 1999 (O'Hare Airport alone has 70). The devices, installed in glass cases, are placed 60-90 seconds' walking distance apart throughout the passenger terminals. During a two-year study, 21 people suffered a cardiac arrest at one of the airports; 18 of them presented in an initial ventricular fibrillation rhythm. Of those 18 patients who received defibrillation, 11 survived – giving a survival rate of 61%. Between 2000 and 2006, 36 lives were saved with automated defibrillators at Chicago airports.

Heathrow Airport has 96 automated defibrillators; Honolulu has 60. Best, then, to have your cardiac arrest on the other side of the world. Auckland airport has none; nor does Wellington. There are four at Christchurch; one each in Queens-town, Te Anau and Palmerston North.

Perish the thought that it should ever happen – but were you to have a cardiac arrest in public, then you'd do well to have Gareth Jenkin by your side.

Jenkin is a walking, talking resuscitation authority. The 44-year-old paramedic trains others in it: doctors, nurses, dentists, optometry students, lifeguards and members of the

public. Jenkin not only is good at the hands-on stuff, but also has perhaps the most comprehensive database of information detailing the whereabouts of cardiac defibrillators around the country. These are the deeds of a man driven by a cause: he's collated all the information and funded the project himself. Now he's trying to set up a website that makes this information available to the public. His grand scheme is to have the information accessible via Google Maps.

With his notebook computer constantly at his side, Jenkin can pinpoint the address of the nearest defibrillator in the town nearest you. Within minutes of taking his seat at a Mt Eden, Auckland, cafe, he is able to locate the whereabouts of the nearest known device (it's a reassuring hop and a skip away at the medical centre just across the road).

"Lucky we're not at the Auckland Ferry Terminal," says Jenkin, himself brimming with good health. "It doesn't have one. The nearest is 300m away."

This could be a matter of life or death – in a very real sense. For every minute lost after a cardiac arrest without defibrillation, the chances of survival drop by up to 10%. Only 5% of those who suffer a cardiac arrest outside a hospital survive.

Consider next the average ambulance- response time to a cardiac arrest: five to eight minutes. If the patient was defibrillated before emergency services arrived, survival rates would, demonstrably, increase.

In addition to his own personal defibrillator dossier, Jenkin has designed a sign that clearly points to the whereabouts of the nearest defibrillator. "We have mandatory signs for fire extinguishers and fire hoses, which are predominantly used to save property, but we keep defibrillators out of sight behind closed doors with no signage, and they're designed to save lives."

Some important facts: you cannot harm a person by erroneously attaching them to a defibrillator when they have not had a heart attack. Because the machine will not charge unless its computer detects a shockable rhythm, you cannot accidentally deliver a shock to the patient.

However, it's important to know the difference between a cardiac arrest and a heart attack. A cardiac arrest occurs when the heart stops or it goes into a very fast rhythm, so insufficient blood is pumped to the brain and the person loses consciousness. They may either turn blue or go very pale. A heart attack involves the death of heart muscle, due to blockage of a heart artery. The two conditions may co-exist.

AEDs are simple to use. You switch them on, and an automated voice tells you what to do in three simple, short steps. Ideally a user would have had training, but AEDs can and

have been used successfully numerous times by lay people responding to an emergency event.

They cost from about \$4000 for a standard device suitable for general use to \$5200 for an industrial model for use in workplaces such as mines.

Says Jenkin: "It is well recognised that it often takes the death of an individual to encourage a sports club or facility to buy an AED, and it is always sad that this happens after the fact." The purchase of a defibrillator almost becomes a memorial to the deceased. Such was nearly the case for the late Sir Kerry Packer. The media magnate had a near-fatal cardiac arrest while playing polo in Sydney in 1990. He was eight minutes without a heartbeat and declared clinically dead. But as luck would have it, a passing ambulance had on board what was then a rare piece of equipment: a defibrillator.

Packer was shocked back to life. He subsequently donated A\$3 million to the New South Wales ambulance service to ensure every ambulance in the state had a defibrillator on board. Thus was the introduction of "Packer Whackers". (The incident did not, however, persuade him to change his opinion of the afterlife. "Son, I've been to the other side – and let me tell you, there's nothing there," he said of the life-saving event later.)

In New Zealand, MP Jackie Blue is lending her voice to the call for more defibrillators. A petition sponsored by her was presented to Parliament's Health Select Committee last month. It calls on the Government to ensure there is ready access to automated external defibrillators and training in all communities and workplaces.

There is plenty of evidence to support the petition. A paper this year in the journal *Resuscitation* says of a total of 2126 patients in out-of-hospital cardiac arrest in the Netherlands, those who received defibrillation from an on-site AED had a survival rate of 43%. Those patients end up costing the taxpayer less money, as their intensive-care stay is shorter.

Closer to home, first-aiders at the Melbourne Cricket Ground are trained in the use of automated defibrillators. They have also been deployed at Anzac services at the city's Shrine of Remembrance. Of the 25 cardiac arrests at the MCG and the three at the Shrine of Remembrance between 1989 and 1998, 20 (71%) survived to hospital discharge. All had been defibrillated on site.

Blue, a breast physician before she became a National list MP, was prompted to polish up her resuscitation skills after deciding to become an MP. She had seen a lot of people collapse in hot, stuffy halls at public meetings during the election campaign. "I thought, 'They're just faints', but the day is going to come when it will be a heart attack and my [resuscitation] skills are rusty."

Then she entered Parliament and her concerns were further amplified. “I looked around Parliament and I saw all these people who were at risk of having a heart attack.” So she signed up for a Red Cross course in resuscitation. There, she met instructor Christine Cleland, who convinced Blue of the need for saturation coverage of defibrillators.

Talk about a rapid-response unit: Blue did the course on Monday and drew up the petition the same day. Cleland was the petitioner; Blue presented it to the House on Tuesday.

“My feeling is that everything is ad hoc right now,” says the MP. “I would personally like to know if there are any mandatory health requirements for health and safety. Some large companies might have them, others don’t.”

The Health Select Committee – of which Blue is a member – is considering the bid. AEDs are a vital part of the community, Blue believes. Furthermore “they’re idiot-proof. You can’t kill anyone.”

White agrees. He believes that if automated defibrillators were installed in greater numbers around the country, and if there was greater awareness of the simplicity of their use, the survival rate for those who suffer a cardiac arrest outside a hospital would double.

Better to act now than regret later, he says – offering a particularly timely illustration of the need for his call to be heeded.

“The face of New Zealand will be on display during the Rugby World Cup. There will be cardiac arrests, and it would be tragic if lives were lost and the world was to learn that we didn’t have automated defibrillators at our stadiums. All Rugby World Cup venues should have automated defibrillators installed. So should ‘Party Central’ locations. It would be catastrophic if the Rugby World Cup was marred by preventable deaths.”

St John, however, is not convinced of the merits of a national database. Medical adviser Tony Smith says AEDs have a role in improving survival from cardiac arrest. “However, the evidence from outcome and economic studies does not support widespread introduction of AEDs into public areas.”

St John carries a defibrillator in every ambulance. It also has a record of all AEDs it has placed, or sold, across the country (980 as at the end of September). But it does not have a database of where they are. Nor does it have any information on the other types of defibrillators – which it does not sell, but which are also in place at various addresses – around the country.

Although Smith acknowledges there's good evidence for the introduction of AEDs where there are large numbers of people (sports stadiums, airports and casinos, for example), he says they are only effective in combination with a set of additional factors: recognition of cardiac arrest; calling an ambulance; CPR and using the AED.

“We are currently working out ways to include the location of defibrillators in emergency ambulance-dispatch systems so that we can help bystanders to get and use a defibrillator in cases of cardiac arrest.” And despite scepticism of its value, St John has plans to develop a database of the location of AEDs in New Zealand. “It will help in the relatively small number of cases where a cardiac arrest occurs and the person calling does not realise that an AED is on site.

“The more likely bene-fit of such a database is being able to find out that an AED is very nearby to a cardiac arrest (but not on site) and then asking someone to take the AED to the scene of the emergency.”

Harvey White wants the Cardiac Society, of which he is a member, to take charge of pushing for acquisition of more defibrillators, as well as creating a national record of where they are and where they should be. “This could be used by the 111 response system.”

Too many lives are being lost for want of a relatively inexpensive and simple-to-use piece of equipment, he says. “It's not like you're saving people at the end of their life [with defibrillators].”

Often, minimal damage may have occurred after a cardiac arrest, and it may be eminently treatable. “In those cases, I would say the heart was too young to die and it was unnecessary to die.”

A complete copy of this article with supplementary content is printed in the October 30 issue of the Listener magazine.

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