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The Case for Universal AEDs - Nurses Programme

Saturday, 22 June 2013

Start 11:30am

Duration: 30mins

Sportsdrome



Rotorua GP CME 2013

NZMA
New Zealand Medical Association

General Practice Conference & Medical Exhibition

20-23 June 2013 | Energy Events Centre | Rotorua

AED Initiative in NZ



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Automated External Defibrillation AED



What is an AED?

- Device that looks for shockable heart rhythms
- Delivers a defibrillation shock if needed
- Small, portable, size of a laptop computer
- Simple, automatic



AEDs are well suited for use by non-traditional responders

- Today's AEDs are more practical for use in the workplace and public places
 - Voice prompts are more intuitive
 - Non-rechargeable batteries are the norm
 - AEDs do daily self tests and are virtually maintenance free



Automated External Defibrillators

- Analyse patient ECG
 - only for unconscious, pulseless victims with no spontaneous breathing and no signs of circulation
- Determine via computer algorithm shockable or non-shockable rhythm
- Advise operator “SHOCK” or “NO SHOCK”
- Shock ventricular fibrillation and certain ventricular tachycardias



Advantages of AEDs

- Eliminates need to recognise rhythms
- Personnel with minimal training can defibrillate
- May reduce time to therapy—access to more treatable rhythms
- Makes early defibrillation practical and achievable

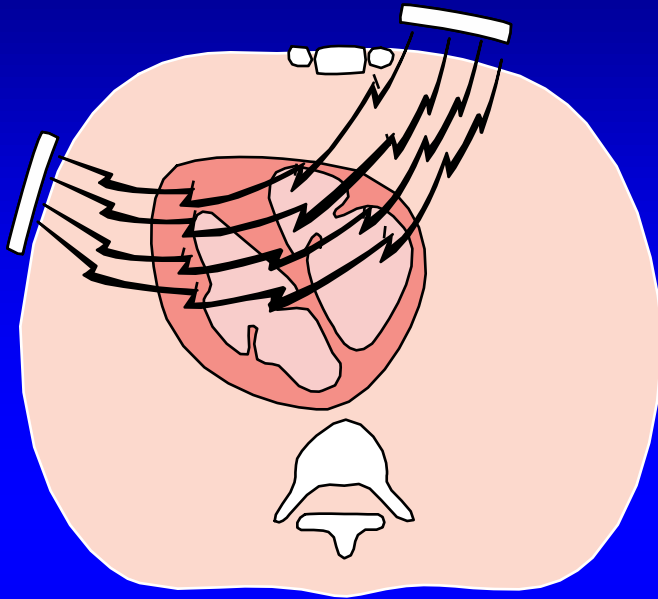


How to defibrillate

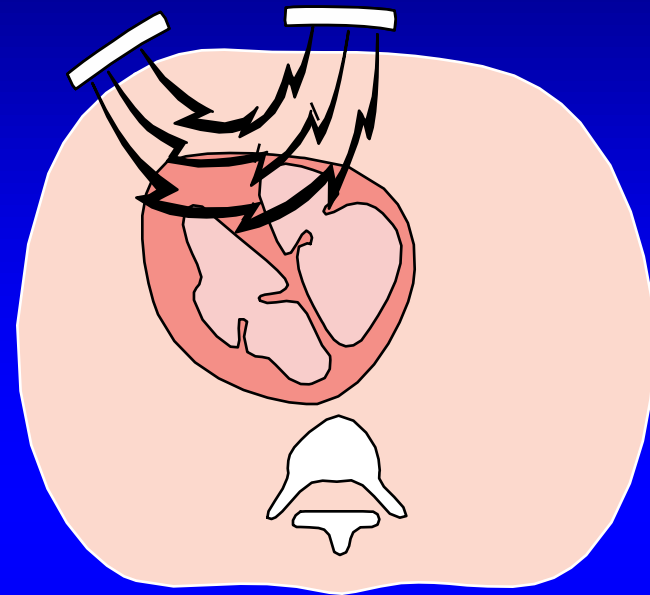
- Verify the victim is
 - unconscious
 - not breathing
 - without a pulse or signs of circulation
- Turn on AED
- Attach electrode pads
- Follow the voice prompts



Defibrillation electrode placement



Correct electrode position



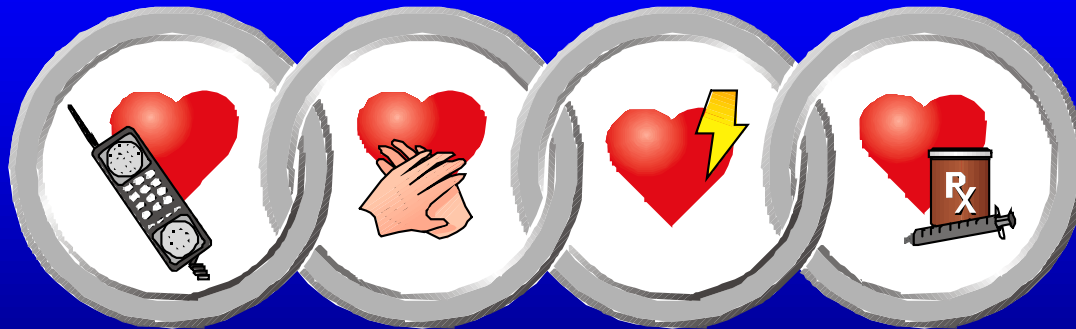
Incorrect electrode position

Correct electrode position optimises the amount of current flowing through the ventricles



“Chain of Survival”

- Early access
- Early CPR
- Early defibrillation
- Early advanced life support



Using the LP1000 AED

- Created for the first person at the scene of a sudden cardiac arrest
- Designed for use by anyone with minimal training and little or no experience



Safety first

- Assess scene safety
- Attach the defibrillator only to someone not breathing and without a pulse or signs of circulation
- Make sure no one is touching the victim
- Be sure the electrodes are firmly adhered to the victim's chest
- Move oxygen away from the rescue effort before defibrillation



Electrode placement

- Remove clothing from patient's chest
- Remove excessive hair
- Clean and dry the skin
- Do not apply alcohol, tincture of benzoin, or antiperspirant to the skin

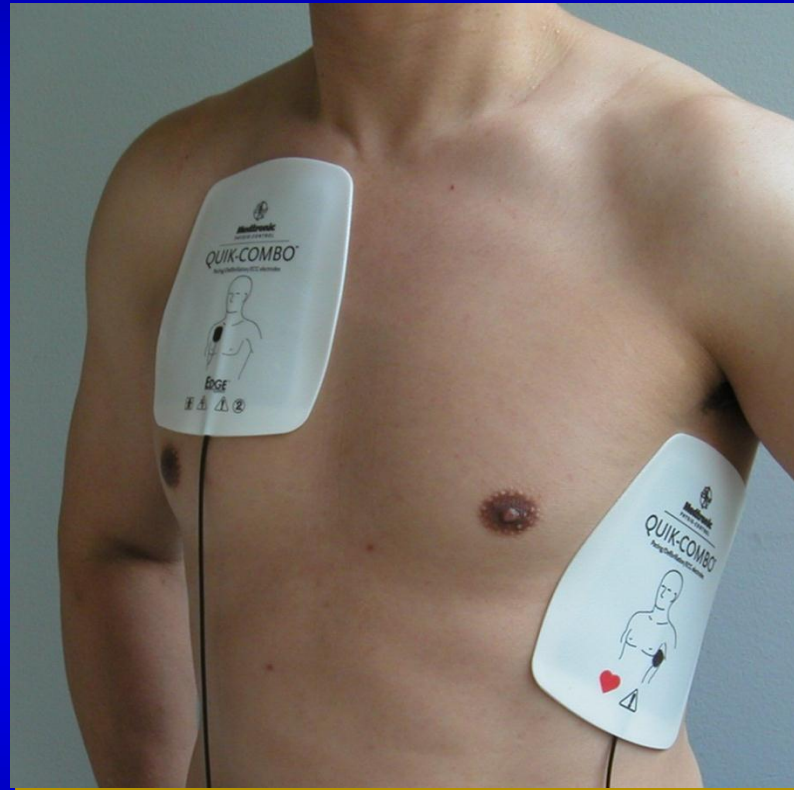


Using the LP1000 AED

- Press the ON button
- Prompts
 - *CONNECT
ELECTRODES*



Defibrillation electrode placement



Anterior-lateral placement



Using the LIFEPAK 1000 AED

- Prompts
 - *STAND CLEAR,
ANALYSING NOW,
STAND CLEAR*
- Do not touch patient during analysis



Using the LIFEPAK 1000 AED

If Shock Advised

- Prompts
 - *STAND CLEAR*
 - *PUSH SHOCK BUTTON*
- AED automatically charges
- Make sure everyone is clear and no one is touching the patient
- Press SHOCK button when instructed to deliver shock



Using the LIFEPAK 1000 AED

- After each shock the AED will prompt the user to begin CPR.
- Prompts
 - *START CPR*
 - *PROVIDE RESCUE BREATHS AND CHEST COMPRESSIONS*
- A 2 minute CPR timer in the AED will begin
- At the end of CPR time, the AED automatically reanalyses the heart rhythm



Using the LIFEPAK 1000 AED

No Shock Advised

- Prompts
 - *NO SHOCK ADVISED*
 - *START CPR*
 - *PROVIDE RESCUE BREATHS AND CHEST COMPRESSIONS*
- AED has determined that the heart rhythm is not shockable
- If signs of circulation are present, put patient in recovery position



Return of spontaneous circulation

- Position the patient according to training if consciousness and/or signs of circulation and breathing return
- Leave electrodes attached
- Keep patient as still as possible
- Electrodes may be connected to another LIFEPAK defibrillator



Summary

- SCA is a leading cause of death worldwide
- Defibrillation is the only definitive treatment for SCA caused by ventricular fibrillation
- AEDs facilitate early defibrillation and are easy to use
- The basic steps to operate the LP1000 are:
 - Turn on the LIFEPAK 1000
 - Apply electrode pads
 - Follow voice prompts, pressing the shock button if needed



AEDs

4 Factors have evolved:

- Cost has come down (~\$4000; \$200 for gel pads every 2 years)
- Increasing awareness that untrained responders can deploy AEDs
- Endorsement of lay responders by AHA
- Increasing awareness of the public



Sudden cardiac arrest

The Facts

- Cardiac arrest occurs in 1500 people each year in NZ
- And 90% die: ~3x greater than the road toll
- **For every one minute delay mortality increases 10%**
- Median call to location interval for St John is 9 minutes
- Median call to defibrillation interval is 11 minutes



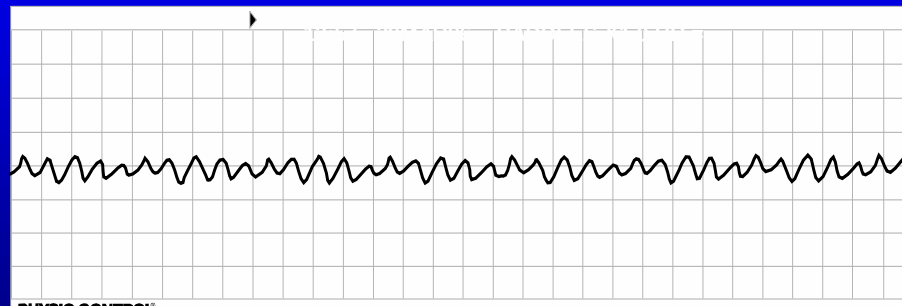
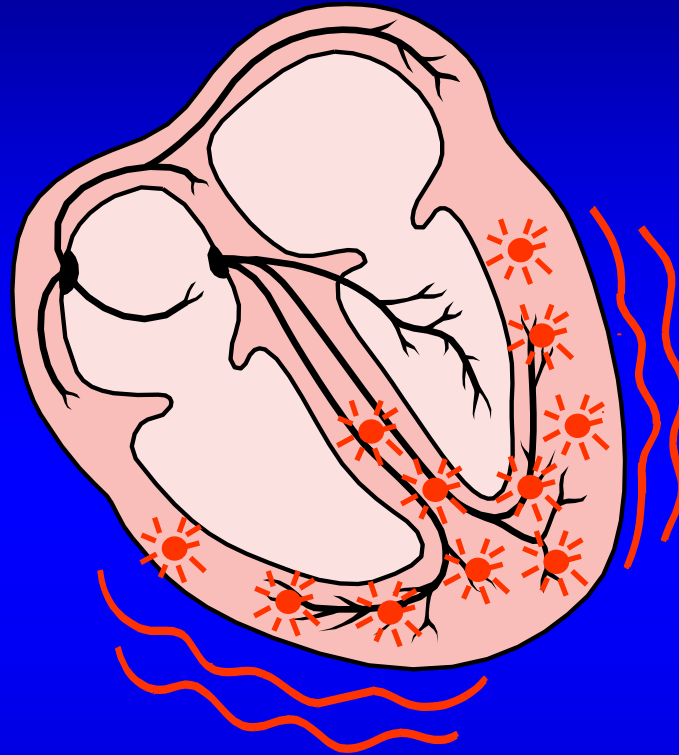
Sudden cardiac arrest

The Facts

- These intervals are slowly lengthening over time
- The best approach is early defibrillation
- Early CPR is important - Defibrillation will be more successful

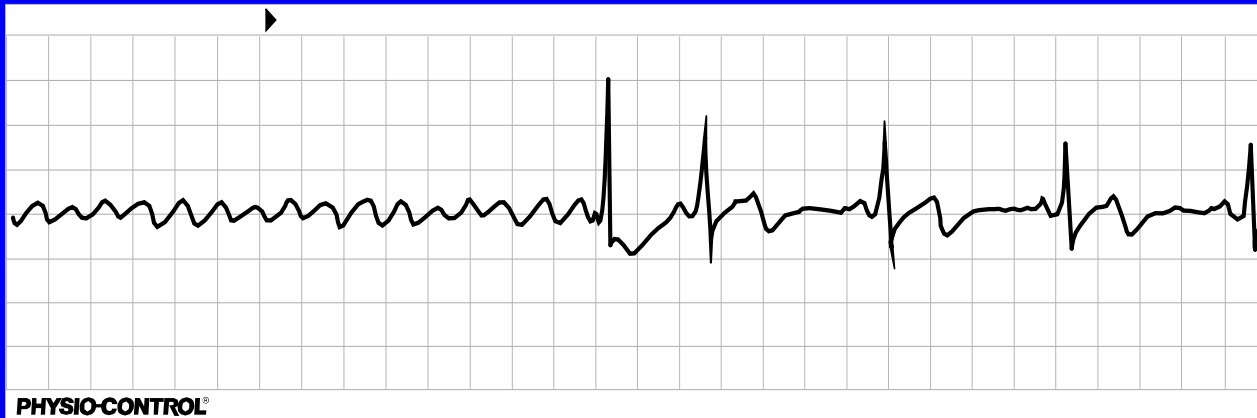


Ventricular fibrillation



Defibrillation

The only effective treatment for ventricular fibrillation

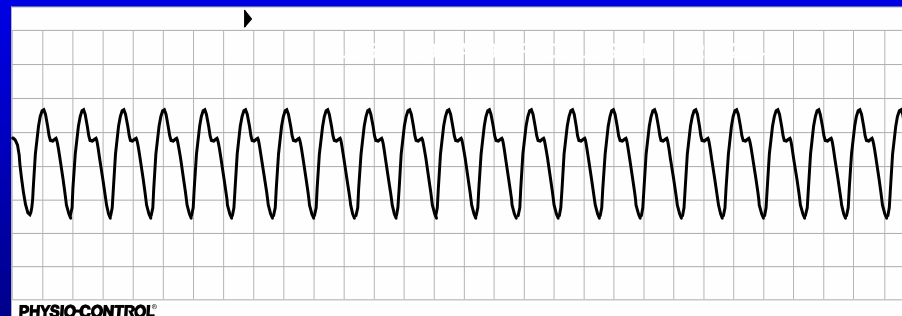
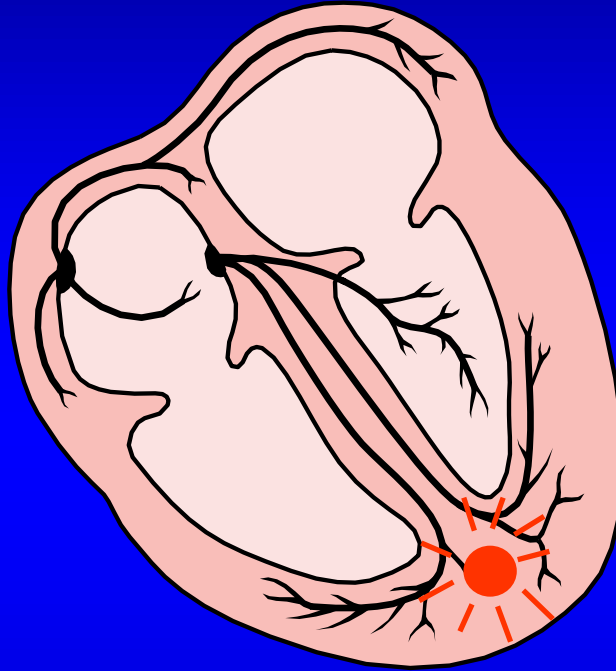


Why early defibrillation?

- VF most frequent initial rhythm in sudden cardiac arrest
- Defibrillation most effective treatment
- Probability of defibrillation success diminishes with time
- VF tends to rapidly deteriorate into asystole

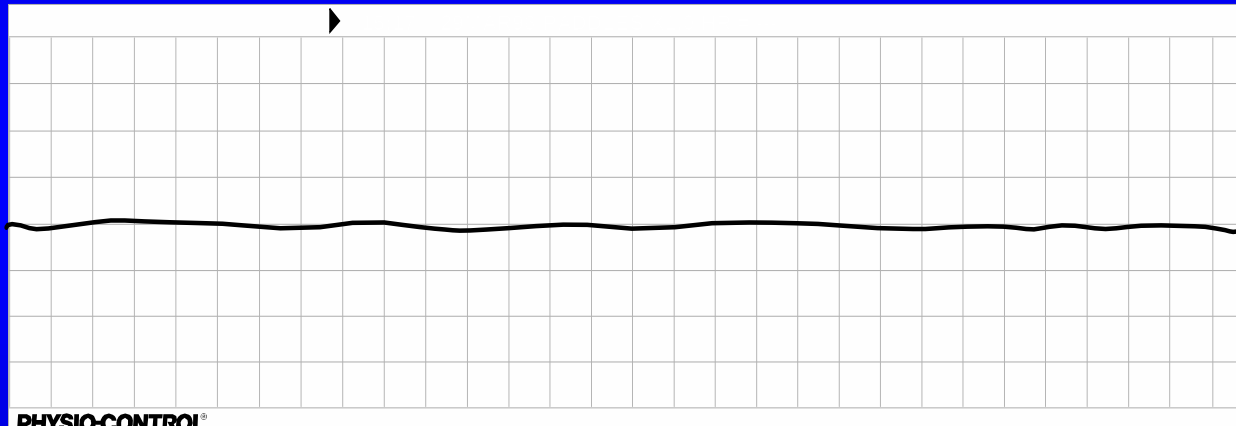


Ventricular tachycardia



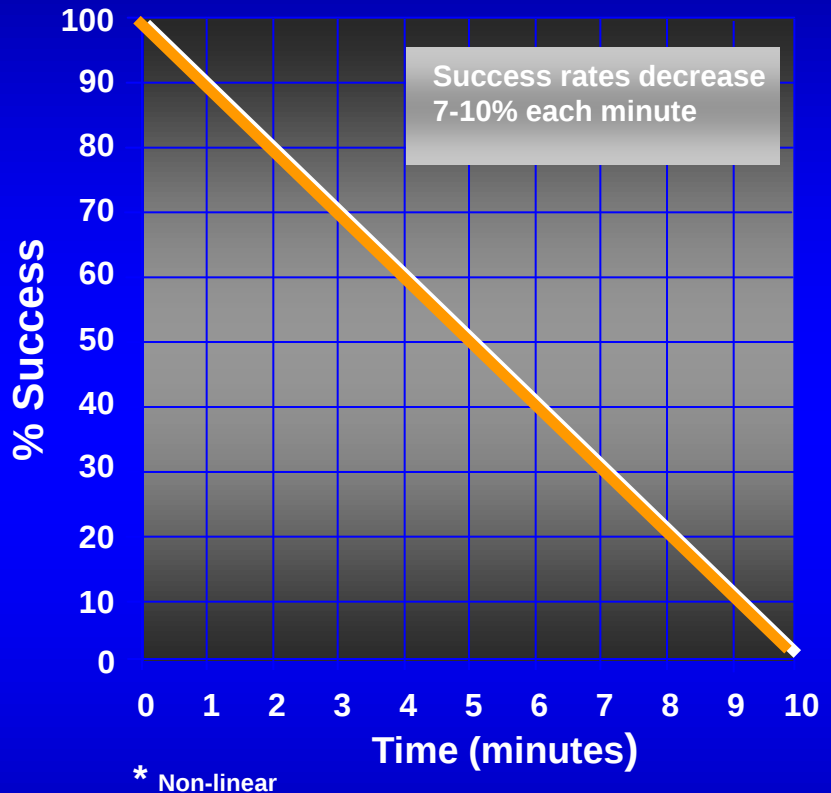
Asystole

Not a shockable Rhythm



Sudden cardiac arrest

- Survival rates plunge 7–10 percent every minute defibrillation is delayed*
- Emergency service can encounter delays
- Quick action by the first person on the scene can save a life



Guidelines for early defibrillation

- For communities:
 - 5 minutes or sooner
- For hospitals:
 - Less than 3 minutes



Guidelines 2000 for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. International Consensus on Science. p. I-60



Green Lane Cardiovascular Service, Auckland City Hospital, Auckland, NZ

Cardiac arrest is a treatable condition

Early AED defibrillation before emergency service arrival doubles a victim's chance of survival



Cardiac arrest in Wellington

- Time to first shock from receipt of 111 call was 12.2 minutes. This increased in 2007-2008 from 10.5 minutes in 2005-2006
- Survival rate to hospital discharge was 12%.
- Bystander CPR was administered in 51% of cases



Why does it take 12 minutes for the ambulance staff to deliver a shock

- Bystander recognizes cardiac arrest **1 min**
- Bystander calls 111 & gets put through to the ambulance service **30 secs**
- Ambulance control takes details **30 secs**
- Ambulance staff paged and start engine **1 min**
- Ambulance drives to scene **7 mins**
- Ambulance locates, the crew collect equipment **2 mins**
walk to scene, set up defibrillator, perform CPR & deliver first shock
- **Total time to first shock 12 mins**



AED Program: Aims

- Increase public awareness
- Co-ordinate various services and organizations
- Have more AEDs
- Develop a National grid with link to emergency services
- Lay public to recognise their responsibility to be involved



AEDs

Approaches that I am employing:

1. To raise public awareness: initially through The Listener and newspapers, writing to stadiums, casinos, airports, railway stations, police , fire, surf life saving, supermarkets, malls, golf clubs, movie complexes, gyms, Rotary, Freemasons etc
2. To form a Trust ('start a heart') which could co-ordinate a public campaign, raise funds, donations, and advertisements in newspapers and on television
3. To develop a National Grid of where AEDs are. This is supported by the Cardiac Society of Australia and New Zealand and NZMA
4. To connect this grid to the emergency services



AEDs

5. To develop a National Standard of signage of where AEDs are situated
6. To ensure maintenance and standard of equipment.
7. To communicate with the many organisations and individuals who have a stake in this
8. Recognition that CPR is important (should be taught in schools, post MI, PCI, CABG etc)
9. Hands-only CPR is likely to increase lay responders
10. Need for high quality data collection and audit



Heart of the matter

The report of a life saved with an AED (automated external defibrillator) 10 days after it was bought highlights the potential for making a big difference in saving lives of New Zealanders who have sudden cardiac arrest.

Every year, there are 1500 cardiac arrests that could be treated with AEDs. There are about 1100 AEDs but there should be 10,000.

There are no AEDs at Auckland Airport, SkyCity Casino, the Ferry Building or Eden Park. They should be anywhere where lots of people visit or where high-risk people gather.

Hearts that are too good to die are dying for want of a simple device.

**Professor Harvey White,
cardiologist, Auckland.**





The AED National Grid Working Committee

Harvey White
Consultant Cardiologist

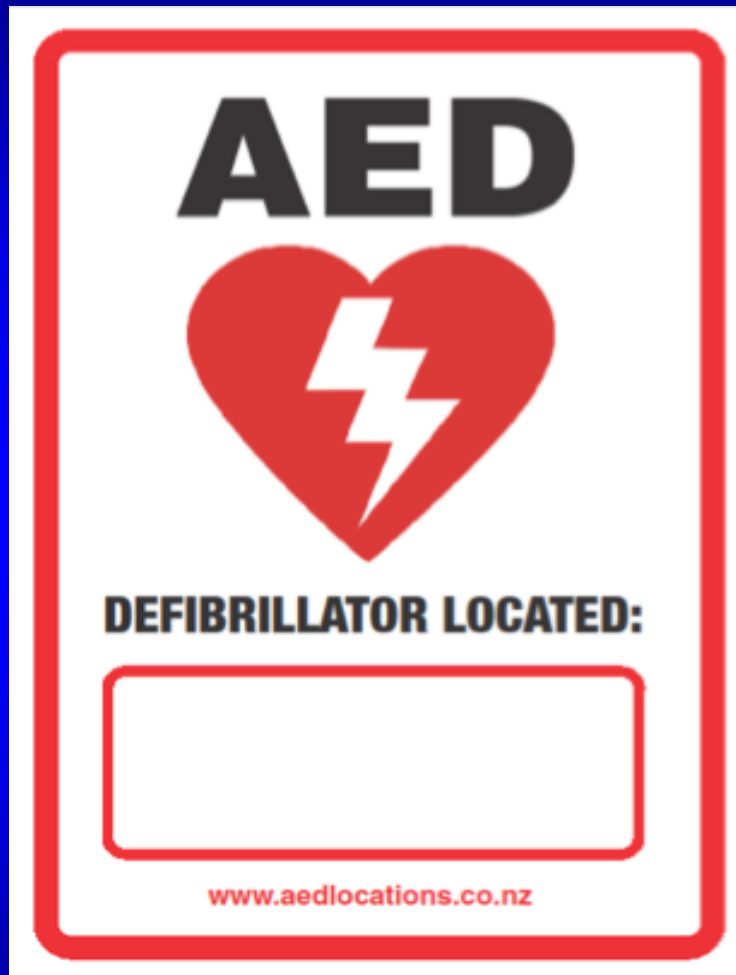


Gareth Jenkin
Resuscitation Co-ordinator



Tony Smith
Intensivist





Use of AED's by trained volunteers is safe and effective



The Airport experience

- Public Access Defibrillators (PAD) were deployed throughout Chicago's 3 main airports: O'Hare(59), Midway(10) & Meigs Field(1)
- They were placed a brisk 60 to 90 second walk apart throughout passenger terminals & housed in glass cabinets
- Over the study 2 year period 21 people suffered a cardiac arrest & 18 presented in an initial VF rhythm
- 11 of the 18 individuals survived (61%)
- The overall survival rate in the US is estimated to be less than 5% & in Chicago 1.8%



The Airport experience

- The rescuers of 6 of the successful resuscitations had no training in AED use
- 19 of the 21 people operating the AED were good Samaritans acting voluntarily
- Between 2000-2006 36 lives were saved at Chicago Airports



Other airports – number of AED's

- | | | | |
|--------------------|-----|--------------|---|
| • Atlanta | 300 | | |
| • Honolulu | 60 | | |
| • Heathrow | 96 | | |
| • San Diego | 19 | | |
| • Queenstown | 1 | Invercargill | 1 |
| • Te Anau | 1 | Napier | 1 |
| • Palmerston North | 1 | Dunedin | 1 |
| • Christchurch | 4 | Tauranga | 1 |
| • Auckland | 4 | Wellington | 4 |
- Federal Aviation Authority ruled in 2001 all aircraft with more than 30 passengers & one flight attendant must carry an AED



The American airlines experience

- Qantas was one of the first airlines to put AED's on all international 747 & 767 aircraft in 1991
- At present JetStar domestic aircraft & Pacific Blue in NZ do not carry AED's but Air New Zealand planes do



The Naïve 11 year olds' experience

- 15 children from a school in Washington State were selected for the study
- A clothed mannequin was placed in an adjacent room
- The students were told the mannequin represented a cardiac arrest patient
- These students had no training in the use of an AED. All they were told was they would be required to peel the pads off the packaging and apply them to the chest



The Naïve 11 year olds' experience

- Mean time to delivery of the first shock was 90 seconds (range 69 to 111 seconds)
- The study was repeated with paramedics. Mean time to deliver shock was 67 seconds (range 50 to 87 seconds)
- All participants remained clear when the 'patient' was shocked



AEDs

Cost effectiveness in Denmark

- \$41,000 per quality-adjusted life year using a survival rate of 25% (several studies report 50%) using the European Resuscitation Guidelines covering 1.2% of Copenhagen and 19.5% of cardiac arrests
- \$33,000 for AHA Guidelines covering 16.8% of cardiac arrests



AED Guidelines

European Resuscitation Council

- AED placement in areas with 1 cardiac arrest every 2 years

Handley AJ., et al., Resus. 2005; 67: 87.

AHA Guidelines

- AED placement in areas with 1 cardiac arrest every 5 years

Aufderheide T., et al., Circulation. 2006; 113: 1260-1270.



AEDs funding

Not from Health budget



AEDs funding

From Community funding



AEDs: where should they be placed

- Appropriate locations include sites that cannot provide Emergency Service (EMS) response within 5 minutes
- Where emergency response times are long AEDs will have a far bigger effect



What's the AHA position on placement of AEDs

- The AHA strongly advocates that all EMS first-response vehicles and ambulances be equipped with an AED or another defibrillation device (semiautomatic or manual defibrillator)
- The AHA also supports placing AEDs in targeted public areas such as sports arenas, gated communities, office complexes, doctor's offices, shopping malls, etc



The Parliamentary sub committee chaired by Dr Paul Hutchison (2011)

**‘the Health ministry supports the introduction of
AEDs in locations that a lot of people visit, such as
Airports, transport terminals, and casinos, including
those that a lot of high-risk people visit, such as
large health centres’**

And

**‘the Health Committee recommended to the
Government that it works towards installing AEDs
in community areas that fit the Ministry of Health’s
criteria’**

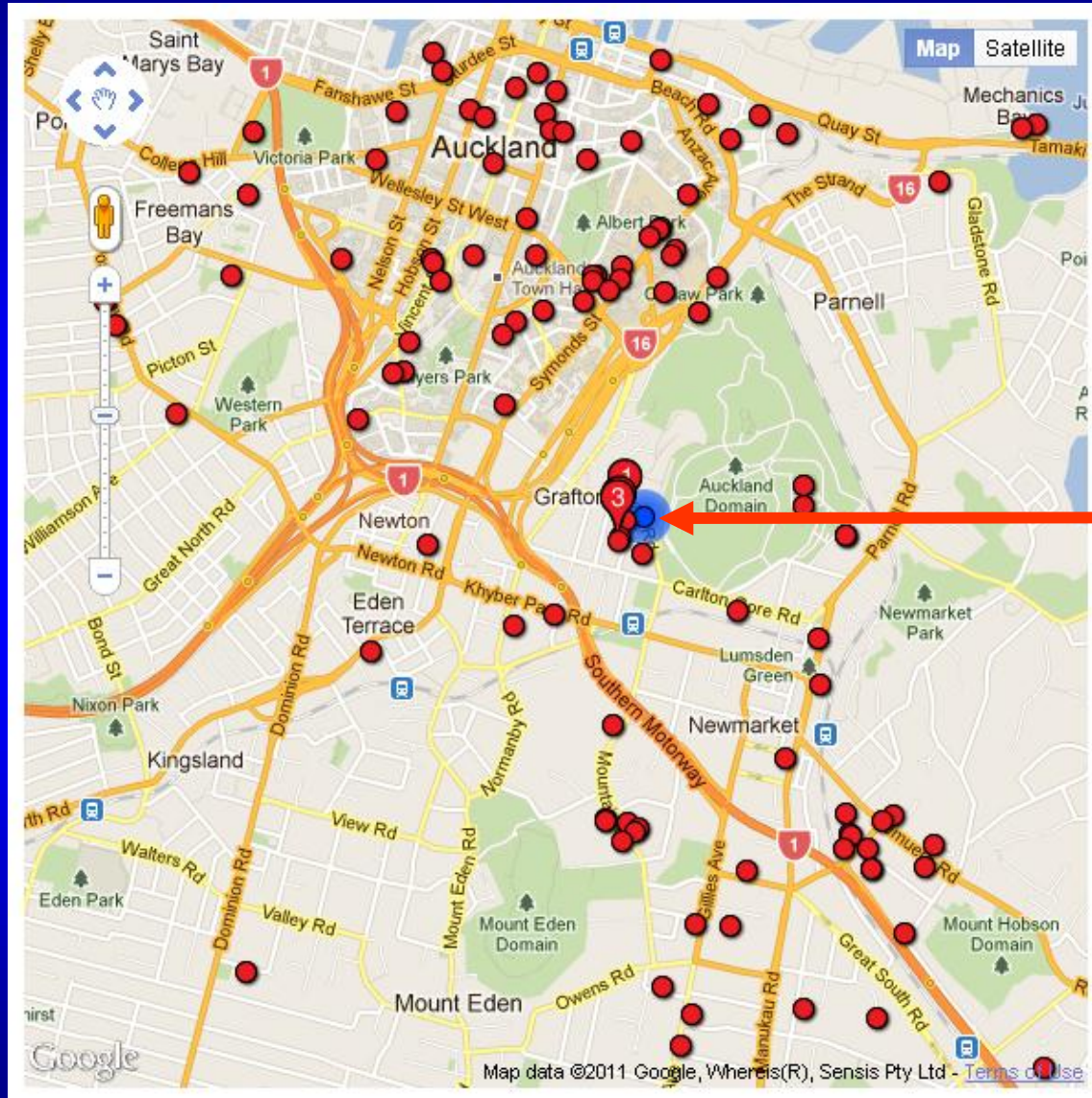


AEDs

- App is available on I phones



<http://www.aedlocations.co.nz>

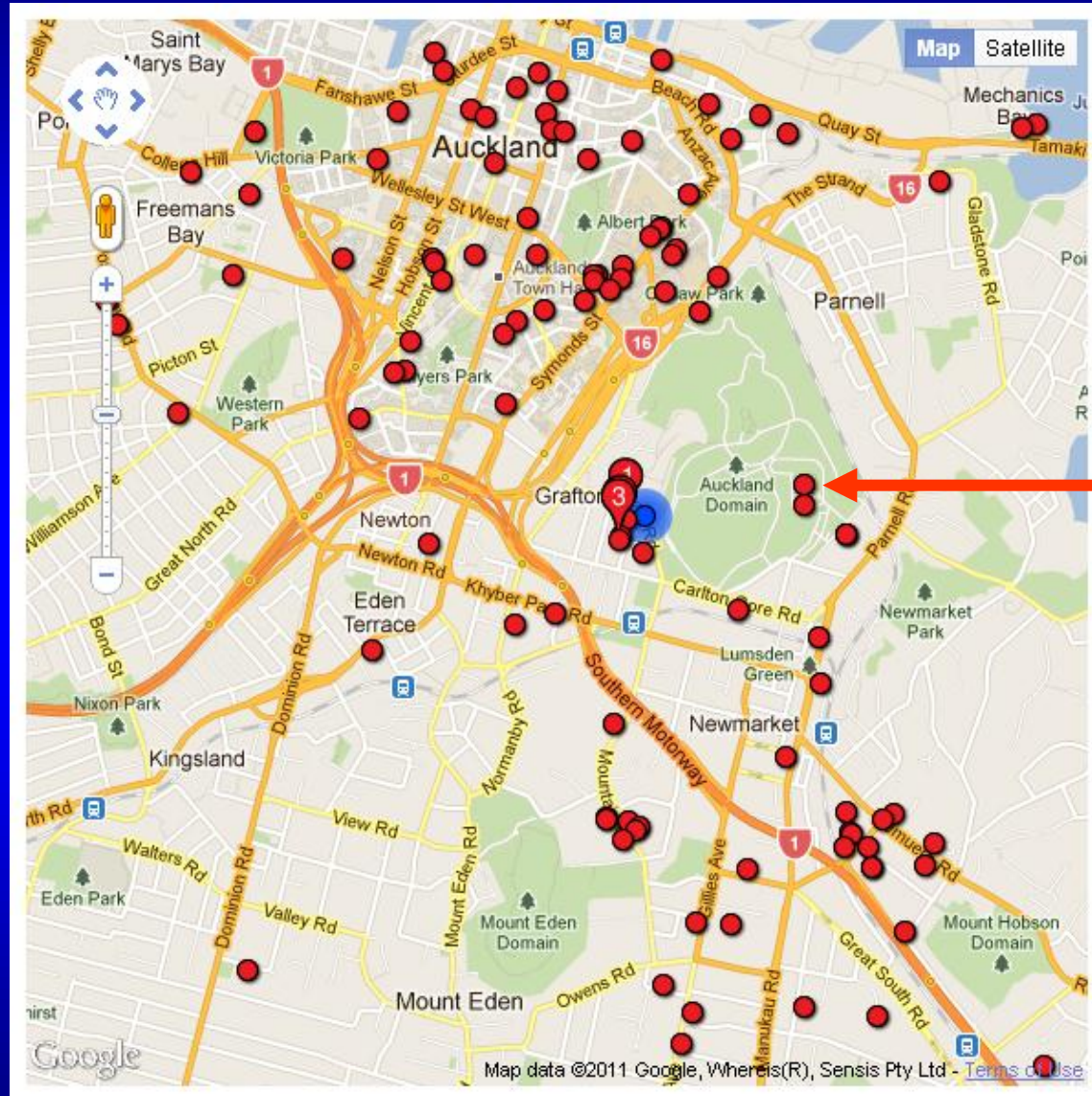


Auckland City
Hospital



Green Lane Cardiovascular Service, Auckland City Hospital, Auckland, NZ

<http://www.aedlocations.co.nz>

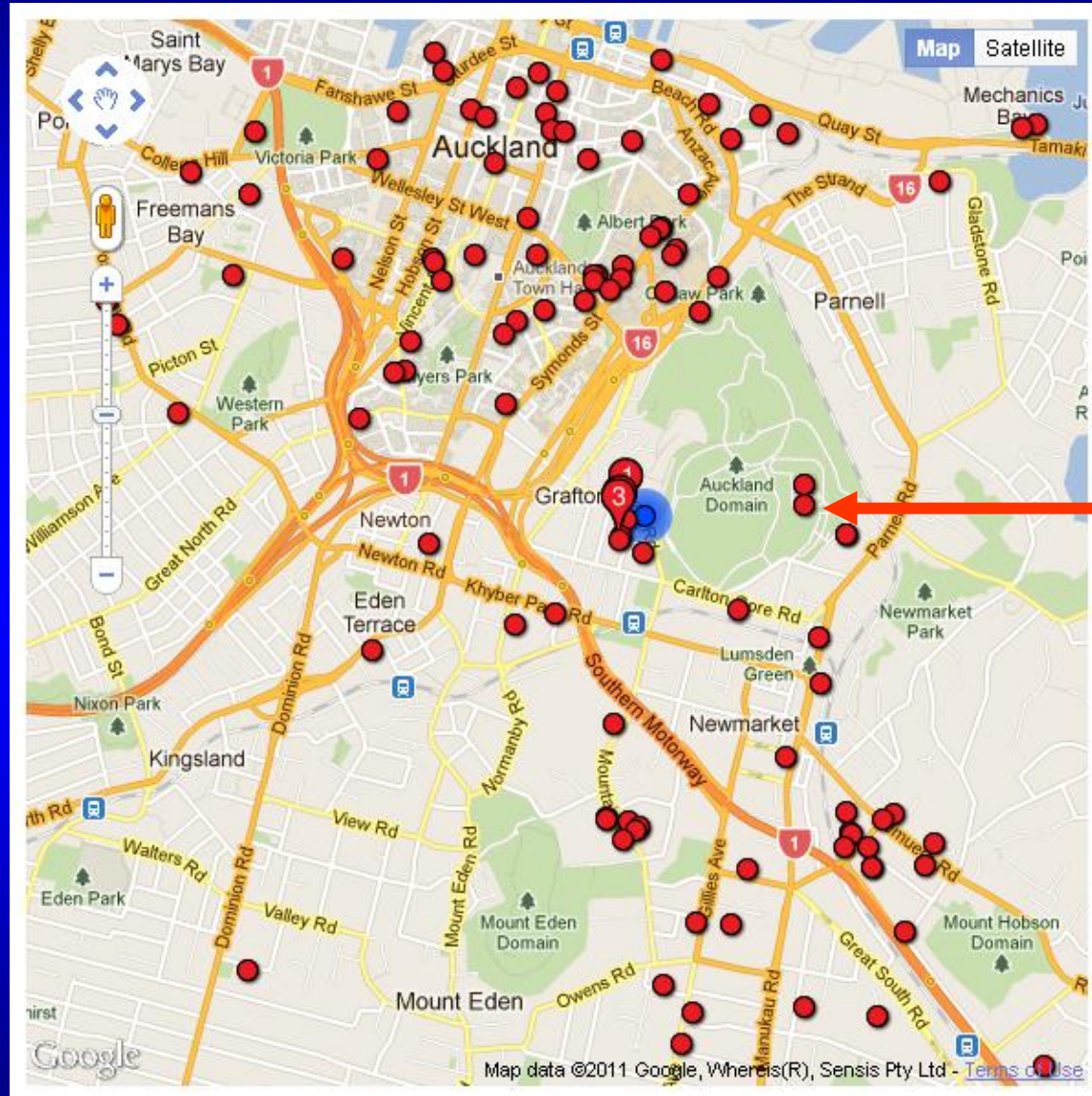


War Museum
Main Entrance



Green Lane Cardiovascular Service, Auckland City Hospital, Auckland, NZ

<http://www.aedlocations.co.nz>

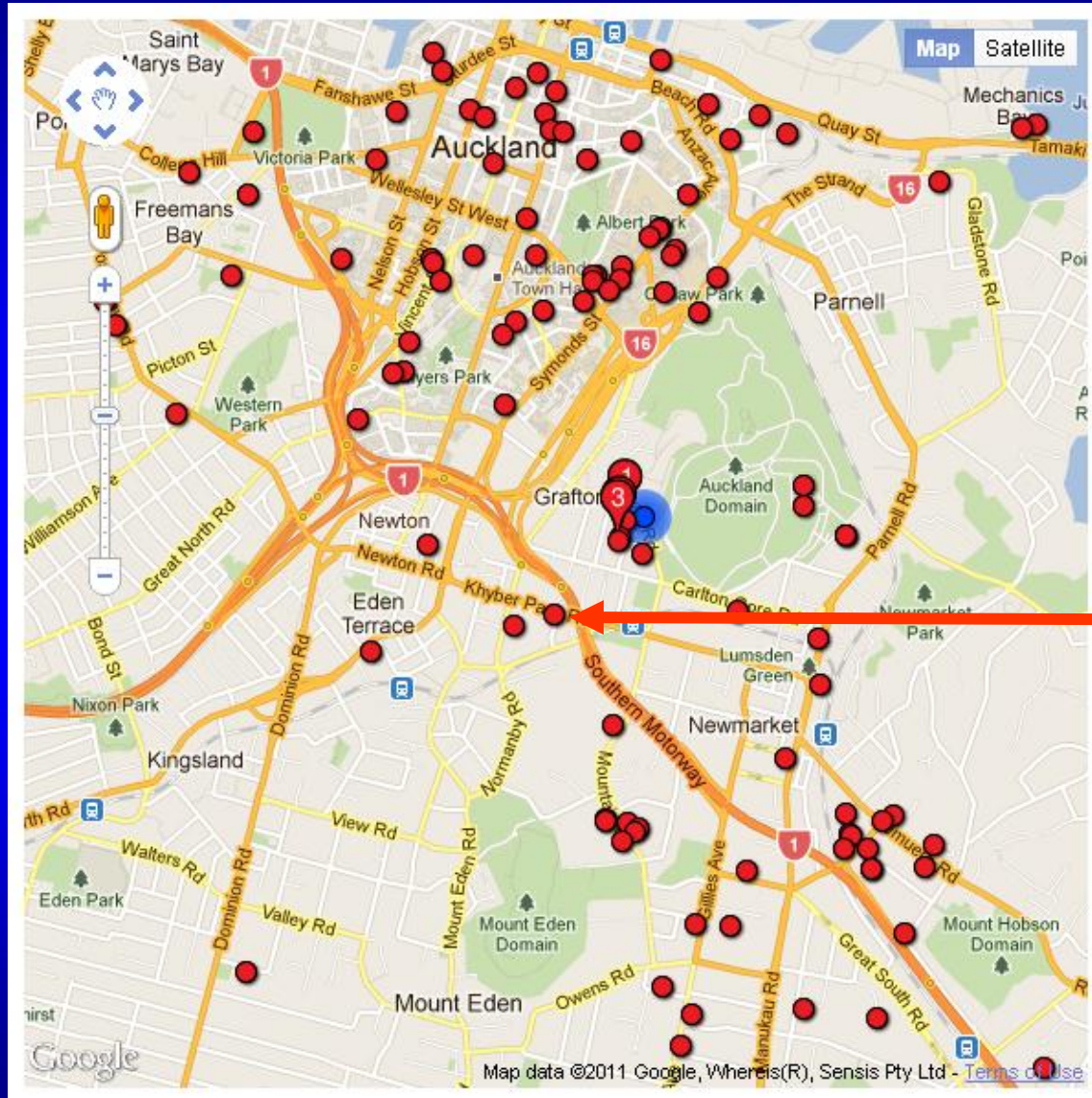


War Museum
Atrium



Green Lane Cardiovascular Service, Auckland City Hospital, Auckland, NZ

<http://www.aedlocations.co.nz>



NZ Red Cross
Khyber Pass



Green Lane Cardiovascular Service, Auckland City Hospital, Auckland, NZ

AEDs

- Early defibrillation increases survival greatly, especially if first shock is delivered within 3 minutes
- They are easy and safe to use
- The operator just follows the AED commands. The decision to shock is made by the AED software, not the operator



AEDs

- Even 11 year olds with no training can use them successfully
- Need to be highly visible, well sign posted
- If they are kept locked behind a door and never seen they are less likely to be used



**The chance of any one AED
being used is small, but if it
is used the chance of
success is higher**



AEDs

AEDs should be available in all Government buildings, transport centres (airports, ferry buildings, railway stations), planes, trains and ferries, sports grounds, including “Party Central”, golf courses, casinos, highway patrols and city traffic cars, gyms, churches, shopping malls, movie complexes, banks, service stations and hotels. They should be in every major building, general practices, specialist rooms, Dental Surgeries etc



Sudden Cardiac Arrest

- Sudden cardiac death is a major health issue in New Zealand
- Survival is low (~4-12%)
- The most important factor that determines survival and good neurological outcome is the time before starting life saving measures



AEDs: where are they in New Zealand

- Oh I think the ASB banks have them don't they?
- **I'm sure my GP would have one wouldn't they?**
- Isn't there one in this conference centre?



AEDs

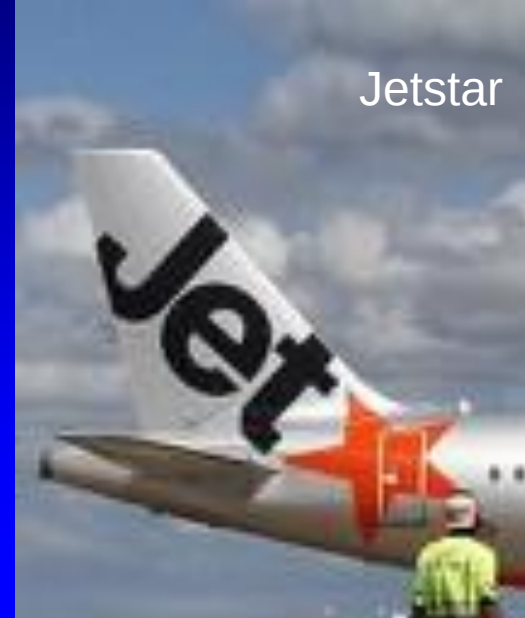
- In New Zealand the College of GPs only recommends them for rural GP's



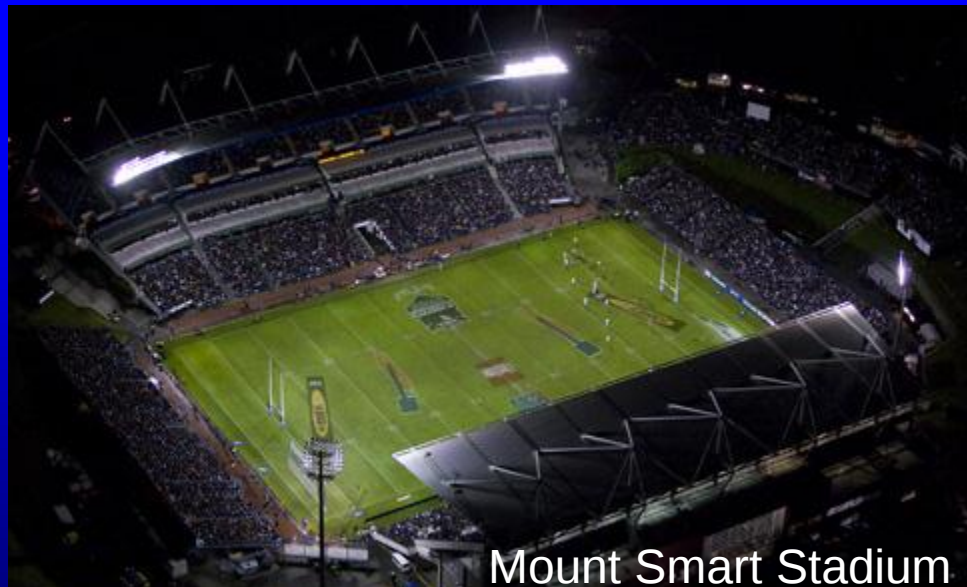
Which Landmarks have an AED



Fullers Ferry



Jetstar



Mount Smart Stadium



Which Landmarks have an AED



This Landmark has an AED



This Landmark has an AED



This Landmark has an AED

But didn't during the World Cup



This Landmark has an AED but didn't until recently



This doesn't



Mount Smart Stadium

This doesn't



This doesn't



This doesn't



AEDs: implications

- If there is widespread implementation of AEDs resulted in a doubling of survival (as seen in trials)
- Then potentially 150 lives could be saved each year in New Zealand



AEDs

- **When we started there were 650 AEDs**
- **There are now 2800**



AEDs

- **There should be 10,000 AEDs in New Zealand**





AED Initiative in NZ



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John Neutze Scholar

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