

**UPDATE: Petition by Mr P J Hill  
to the Welsh Assembly Government:  
Legislation to ensure access to Automated External Defibrillators (AEDs)  
in all public places in Wales.**

*Requested personal\* response to following  
recent public services evidence (updated).*

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*\*The evidence and recommendations here-in are not necessarily reflective of my professional body,  
my NHS employer or any other Organisation.*

*It is not meant to reflect negatively on any existing services.  
These views are purely personal.*

*This work has been undertaken without support (financial or otherwise) from any Organisation.*

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## **1. Introduction**

In the United Kingdom 60,000 people a year will suffer an *Out of Hospital Sudden Cardiac Arrest* (OHSCA) with a variable survival rate below 12% (British Heart Foundation 2011) *BHF*. It is estimated that between 80-90% of these will initially present with a heart rhythm that could be treated with a defibrillator (Engdahl et al. 2001). When a famous person survives such an incident, modern communication means their experiences can be used to raise public awareness. Examples include the explorer Sir Ranulph Fiennes who suffered an OHSCA in Bristol airport in 2003 and the singer “Shakin” Stevens who was resuscitated at home in 2010 (Elevaed 2011; BHF 2011). Most recently the successful resuscitation of footballer Fabrice Muamba who “died” for over an hour has raised awareness about Cardiopulmonary Resuscitation (CPR) and the importance of defibrillators (BBC online 2012; Resuscitation Council UK *RCUK* 2013). This coincided with a popular nationwide campaign launched by the BHF employing actor Vinnie Jones to promote CPR. The first annual European-wide “Restart a Heart” day on 16<sup>th</sup> 2013 October was launched by the European Resuscitation Council and was widely promoted on social media sites (ERC 2013).

### **Defibrillators – a brief history.**

Within the “Chain of survival” concept (**Appendix I**) each rapidly instigated link is essential for increased survival from an OHSCA (where the heart stops). The sooner a defibrillator is used to restart the heart the more likely it is the victim will survive (McNally et al. 2011; Ornato 2000b; RCUK 2011a) **Appendix II.**

Since the 50’s defibrillator technology has developed from large manually-operated machines found only in hospitals to automated portable units. Automated External Defibrillators (AEDs) have a recognition component that recommends if a life-saving “shock” should be delivered to a victim’s chest (Scripps Howard News Service 2013).

AEDs have been installed in many public areas for deployment before an ambulance arrives. A growing body of evidence suggests that untrained bystanders can safely deploy and use an AED on OHSCA victims (Caffrey et al. 2002; Eames, Larsen & Galletly 2003; Jorgenson et al. 2003; Andre et al. 2004a; Andre et al. 2004b; Colquhoun et al. 2004; Abella et al. 2007; Andre et al. 2009; Mosesso et al. 2009). This led to a statement from the RCUK citing the International Liaison Committee on Resuscitation (ILCOR 2010):

*“An AED can be used safely and effectively without previous training.  
Therefore, the use of an AED should not be restricted to trained rescuers.  
However, training should be encouraged to help improve the time to shock  
delivery and correct pad placement.”*

<http://www.resus.org.uk/pages/AEDsecst.htm>

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If bystanders (whether previously trained or not) are to safely deploy AEDs, the unit itself must be recognisable and user-friendly and fears related to possible harm and potential litigation must also be addressed (Eames, Larsen & Galletly 2003; Andre et al. 2004a; 2004b; 2009; Woollard 2006; Harrison-Paul 2009; Bogle et al. 2012). The UK has no laws in relation to AED provision (RCUK 2012) whereas by comparison the French principality of Monaco has a national PAD scheme (Bouquier 2010). In the United States (US) cities like Seattle also have state legislation on CPR training and PAD schemes and this seems to impact on survival rates that are between 30%-50% (Caffrey et al. 2002; RCUK 2007; BHF 2011). It seems improbable that many untrained members of the public would chose to respond in places where there is no statutory impetus to learn CPR and First aid coupled with a lack of PAD legislation and fear. MacNally et al. (2011) and the (RCUK 2011c) suggest that even with the aforementioned programmes the overall survival rate remains very poor as most OHSCAs occur in private residence.

It is argued that even if the survival rate was 1% it would be worth it for those individuals.

*Rationale.*

OHSCA continues to be a significant cause of death and disability across the world each day, with an estimated 1000 per day in Europe alone (Caffrey et al. 2002; Colquhoun et al. 2004; Hazinski et al. 2005; Hallstrom AP et al. 2005; MacNally et al. 2011; RCUK 2011b; Ornato 2011a; Bogle et al. 2012, ERC 2013). Despite this awareness of resuscitation in the general public remains poor in the UK. A large quantitative survey demonstrated that only 30% (n=1011) of those interviewed had received CPR training (Donohoe, Haefeli & Moore 2006). Only 25% of interviewees felt confident in CPR and that every year, up to 140,000 people die in situations where basic aid could have given them a chance to live (England and Wales). Despite fewer than one in 10 people are said to be trained (St John Ambulance 2009, 2013). Worse still the BHF (2011) cite their own research that nearly 75% of the UK population are not CPR trained. They contrast this with other European countries where around 80% of people are said to have CPR skills. Despite the number of PAD's proliferating in the last 20 years, the problem exists that the ILCOR guidelines may not be reflective of how bystanders and service providers react. There therefore needs to be a unified approach to raising awareness, access to AEDs which includes recognised signage and the promotion of evidence based practice where it exists. For example, David Lloyd Leisure won "Heart safe Gym of the year 2013" and has worked hard over 15 years to install AEDs (and train staff) in all 91 of its clubs (mostly in the UK). They claim to have saved 100 lives with these units during this time (David Lloyd Leisure 2013).

The Disney Corporation in the US has also been at the forefront by equipping all parks and hotels with AEDs but also have marked them at the sites, on interactive e-media and on all handheld (paper) maps (Watwood 2013).

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## **2. The Literature review.**

### *Search Strategy.*

Searches were undertaken using the databases in Medline, The Royal College of Nursing Online Portal, Science Direct/SCOPUS with the *Search terms* highlighted using *Boolean logic* (Holland and Rees 2010) found in Table 1 (**Appendix II**). Of the 375 results, 32 were relevant. Three relevant studies were found after the initial literature search using a general internet search engine. Social media has been used to follow “themes” of emerging evidence (anecdotal through to scientific).

### *Relevant search results.*

The following themes emerge from the searches: previous training, PAD location, those who deploy the AED, survival rates and legal considerations. This body of research seemed rigorous. Most of the studies had multiple authors and were all quantitative with one mixed method. The search did not reveal any previous research on AED use in the UK by untrained bystanders and there was very limited data available internationally. It is noted that the response from Dyfed Powys Police was dated 2009 but similar documented concerns reflect these themes.

### *Training.*

Continuous first responder training has previously been considered important for skill retention (Harrison-Paul 2009; Woollard 2006) but there are now calls for alternative training methods (Riegel B et al. 2006; Cleland et al. 2007; RCUK 2010a; 2013). For example the “no training” model of regularly repeated short public announcement videos would incur less cost and might encourage a previously untrained bystander to access an AED. The world’s first CPR training “kiosk” (complete with rubber chest, interactive scoring screen, playing the Bee Gees song “Staying Alive”) was recently installed in Dallas/Fort-Worth Airport enabling bored, waiting travellers to learn hands free CPR (Sommers 2002; Caffrey et al. 2002; Park et al. 2008; Ornato 2011a; Sudden Cardiac Arrest Association 2013).

However Eckstein (2012) cited Schober et al. (2011) revealing that over 50% of (non-medical) bystanders were able to recognise an AED but less than 50% of them were willing to use one. Even in countries with targeted campaigns, Riegel et al. (2006) said that awareness remained “unacceptably” low despite suggesting that AED is easier to learn/retain than CPR. Enabling AED access for the person nearest the victim has been described as the “Fire Extinguisher” model by Caffrey et al. (2002) and Mell and Sayre (2008). The London Ambulance Service (2011) support this view saying that in that year 56 people died in fires in London yet 10,000 people died from OHSCA.

The development of cellular/mobile “face-time” video calling has also been suggested a method for “talking through” untrained responders by an Ambulance dispatcher Bolle, Johnsen and Gilbert (2010).

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Some have also questioned the funding of PAD schemes comparing them to other preventative programmes (such as smoking cessation and weight management) and First responder schemes – “uniformed” or trained “lay responders” as volunteers (Kellermann 2005; Pell, Walker & Cobb 2007; Mell & Sayre 2008; Cairnes 2010). Others continue to argue that compared with standard responses by professionals and lay rescuers alone, modern PAD schemes are effective (Sommers 2002; Colquhoun et al. 2008; Cave et al. 2011; Eckstein 2012).

Only two studies in the search incorporated UK schemes and although valuable, were not fully relevant as they related to trained responders (Colquhoun 2008; Harrison-Paul 2009). They assessed the deployment of the UK Defibrillators in Public Places Initiatives DiPPI (n=113 of 437) with a survival rate of 26%. There was recognition that providing defibrillation to the victims of OHSCA was a key feature of the National Health Service (NHS).

McIntyre (2013) and McMahon and Pattison (2013) describe incidents where basic resuscitation attempts failed in public places (by first aiders on scene) where there were delays in getting defibrillators to the OHSCA victim (one in a supermarket and one on a train). This again reinforces the Chain of Survival as an essential concept (**Appendix I**). Alarming, it can be easy to assume that certain services must have AEDs (an obvious example being on a commercial aeroplane for use mid-flight) but during an emergency it can then transpire they do not (Clancy 2013). This further strengthens the argument for a legally enforced “level playing field” like the “fire extinguisher model”.

*Location of AEDs in Public places.*

Authors often examined where AEDs are most likely to be used. With regard to minimal training Jorgenson et al. (2003) looked at AEDs in/near patients’ homes (n=2828) with a deployment rate of nearly 12% per year. Kellermann (2005) later expressed reservations about the procurement and placement of AEDs in high risk homes (for example: of aged persons with previous heart problems) without medical authorisation. He cites an earlier study by Eisenberg & Cummins (1989) suggesting that survival rates from such incidents could be worsened at home by breaking the chain of survival by *delaying* dialling for help to use the AED.

It is assumed that because of the very high numbers of visitors involved, airports seem to be the commonest place for PAD schemes but also included is shopping centres, leisure centres, educational establishments and gated communities (Sommers 2002; Caffrey et al. 2002; Eckstein 2012). Page et al. (2013) and Goodier (2013, citing Drezner 2013) found that despite a higher incidence of OHSCA at Leisure and Fitness facilities they also had better survival rates compared to other locations and they suggest this may be because of the better availability of AEDs and preparedness at such sites. Beasley (2013) describes the successful resuscitation of 33 year old squash player and father of three. Sadly, some facilities and their patrons do not consider the importance of on-site AEDs until a tragedy occurs. This can often be a child or young person (South Wales Argus 2013; Louca 2013, LAS 2013).

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When individual survival rates are extrapolated for a population the size of North America, Weisfeldt et al. (2010) anticipated the survival of 474 individuals per year and the Scripps Howard News Service (2013) has cited various experts, suggesting that AEDs could save 20,000 OHSCA victims a year (in the US). They advise that providers make the ones they have available to all and raise local awareness of placement. Several novel ideas are being implemented including making AEDs available in old red “telephone boxes” or even delivering them via unmanned “Drones” driven via a smart-phone technology. This would be especially relevant for hard to reach places such as Golf courses. It could be argued one of these may altered the chance of survival in the victim stuck on the train some miles outside the station (The Community Heartbeat Trust 2013; Martin 2013; McMahon and Pattison 2013).

*Who deploys AEDs in Public places?*

A range of “responders” were discussed in the results. Sanna et al. (2008) noted that only 7% of victims received “lay public” care and the remaining had care delivered by coincidentally trained personnel. It could be argued this figure of 7% could be lower than this as some bystanders were “unknown” on follow-up. Eckstein (2012) confirmed that “uniformed” responders (not lay public) delivered AED “shocks” in 66% (n=39) of OHSCA cases. The remaining figure (n=11) looks promising but it transpires 7 of these (63%) were coincidentally professionals who had previous medical training (doctors, nurses, fire fighters). Clancy (2013) describes a similar situation where the actions of such off-duty professionals have probably saved lives, despite the fact the cabin crew were apparently untrained and there was no AED available mid-flight. The statement is noted from the Company suggesting there is no legal requirement to provide them, so they do not provide them.

*Survival.*

Important evidence was elucidated with regard to which type of PAD responder was the most effective. Jorgenson et al. (2003) reported a 100% (n=4) survival for those treated by minimally trained members of the public, although the very small sample size is noted. Sanna et al. (2008) performed a meta-analysis of 1583 resuscitation attempts by non-health care professionals and concluded that mortality improved with CPR alone but further improved with rapid AED deployment (**Appendix III**). Weisfeldt et al. (2010) undertook a population-based cohort study of (non-trauma) OHSCA victims (n=13,769) and noted the survival rate increased to 38% (n=64 of 170) where CPR was administered with a “shock” from a bystander. MacNally et al. (2011) analysed the outcomes of nearly 32,000 OHSCAs in the US (with a mortality rate of over 92%) suggesting an “almost invariable” poor prognosis where the victim had not achieved a *return of spontaneous circulation* (RoSC - no pulse) prior to arrival at hospital. This challenges the previously held belief that PAD AED availability (in the community) correlates with survival rates comparable to in-hospital events.

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*The legal status of providing (or not providing) AEDs.*

Because everyone has the right to seek legal redress if harm occurs as the result of an emergency intervention, technically any rescuer (health professional, first aider/responder or even member of the public) can be sued. However, there has never been a successful case brought against someone for using an AED. In the US most states have passed "Good Samaritan" legislation protecting the lay rescuer from lawsuits (Zoll © 2013; MedChannel 2013).

*"... a person who attempts resuscitation will only be liable for damages if negligent intervention directly causes injury which would not otherwise have occurred, or if it exacerbates an injury. In the circumstances under discussion, where without resuscitation the victim would almost certainly die, the risk of incurring such liability is extremely small" RCUK (2010b).*

It is often argued there is currently no legal requirement for services to make AEDs available where the risk of an OHSCA is low (and unexpected). It is also thought having AEDs may even increase the risk of litigation. On this basis there have been decision makers who block the wider statutory implementation of PAD AEDs on the basis of financial constraints or litigation fears. This is even where they appreciate PAD scheme "cover" at work themselves (Owens 2013; Mail Online 2013; UK Parliament 2013). Conversely, it is counter argued that the people expect increasingly high standards of health and safety provision whilst in public places. They might equally compare the availability of AEDs (or not) in the event of a preventable death following an OHSCA in such a place (RCUK 2010b; Clancy 2013; Martin 2013).

### **3. *Petitioners recommendations.***

*Awareness: Public.*

It has been suggested that the public have become aware of AEDs (and their purpose) in public places (RCUK 2013b) and the petitioner is undertaking (pilot) research as an MSc student in Cardiff University to test this hypothesis. Regardless, in the same way the BHF (2012) has tried to raise the awareness of CPR, sustained efforts are required to raise general awareness of AEDs, including where they are located, who can use them and how to use them. This has already begun with the development of "Lifesaver" <https://life-saver.org.uk/>. This is a free interactive, decision based – scenario film via a website/app by the RCUK (2013). They might need assistance in the wider promotion of this to the general public/service providers. Traditional and Social media should be widely used on a regular basis to raise this awareness.

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*Awareness: Businesses and Service Providers.*

Those that provide services to the public require engagement to assist them in the establishment of the risks versus the benefits of providing PAD AEDs to all consumers / clients. This should be from a sound evidence base via expert opinion to help them perform proper risk assessments. There should be a period of evidence gathering within Wales to establish who has AEDs (in addition to the 450 PAD sites mentioned by the Welsh Ambulance Service). They should be encouraged to ensure training for staff, recommending that their AEDs are accessible to all in unlockable cabinets with recognised signage (RCUK 2010c) – **Appendix IV**. To allay fears of vandalism / theft, cabinets can be fitted with coded locks and Ambulance dispatchers can give access during 999 calls.

Traditional and Social media should be widely used on a regular basis to raise this awareness.

For those that do not have PAD access, research should be undertaken to establish the actual / perceived barriers that exist.

*A single AED Device for Wales (PAD sites).*

The Welsh Ambulance Services NHS Trust could be assisted in a scoping exercise to pilot a tendering process with a single AED across Wales. It is anticipated this will:

- 1) Improve recognition
- 2) help with discounting for all participating
- 3) Assist with standardised training
- 4) provide cost effective replacement of cabinets, consumables and devices.

It is recognised this will require high level risk versus benefit analysis and legal input.

*Location of AEDs.*

Public services (coordinated by the Welsh Ambulance Service NHS Trust) could make use of a site similar to “AED Locator” (<http://www.aedlocator.org/AEDLocations.php>) to help raise awareness and data log the location of the available PAD AEDs in Wales. At the time of this report there are apparently only 10 PAD AEDs available in Wales, although it is acknowledged there are many more. AED locations must be shown on area maps (traditional paper and interactive E-displays) provided by local businesses and services (such as shopping centres). Traditional and Social media should be widely used on a regular basis to raise this awareness. One aspect of coordinated PAD schemes awareness is their availability during civil emergencies and major incidents. If not already this information should be incorporated into such plans.

*Checking of AEDs.*

As more PAD AEDs are implemented, plans could be developed to ensure equipment is checked at the same time as *Fire Extinguishers* by these contractors. This would be in collaboration with the AED manufacturer/s and the Welsh Ambulance Service NHS Trust.



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*Training and re-training.*

The Welsh Ambulance Service “Dispatchers” currently ask “is there a Defibrillator available” during 999 calls. This should be developed and the increased use of technology explored to enable visual, remote support of untrained lay rescuers during an emergency.

Training providers should also meet the simple skills assessment and competency standards of the RCUK (2011d). All Instructors should now be suitably qualified in accordance to the Health and Safety Executive (HSE) “Guidance on selecting a First Aid Training provider” (HSE 2013). The Welsh Government could consider setting a “Fee cap” on recognised training providers to ensure that training (ongoing) fees are not expensively prohibitive to the public service and business sectors.

This could ensure parity of standards and quality across Wales.

*Eventual legislation.*

Relevant legal and legislative procedures should be undertaken to ensure the above recommendations have an implemented time frame. The aim is to ensure that Wales has legally binding legislation to ensure PAD AEDs are available in all services that have public areas. This might also include the investigation of protective “Good Samaritan laws” for such providers and individuals who use an AED in an OHSCA situation.

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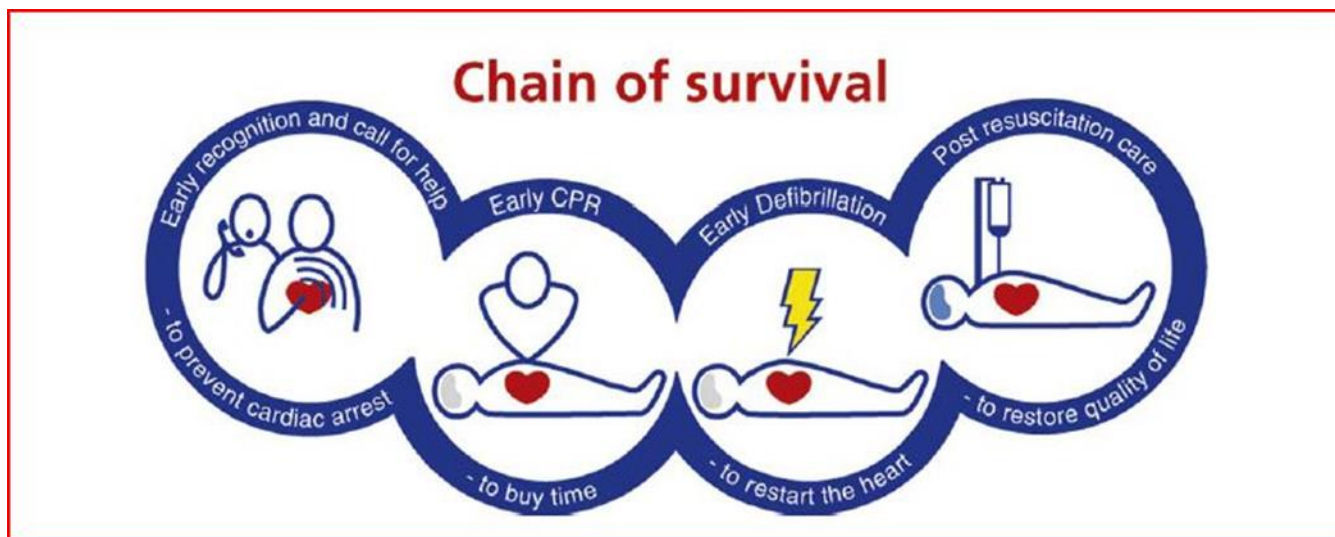
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**SECTION 5.**

**Appendix I.**



Accessed 28<sup>th</sup> November 2012.

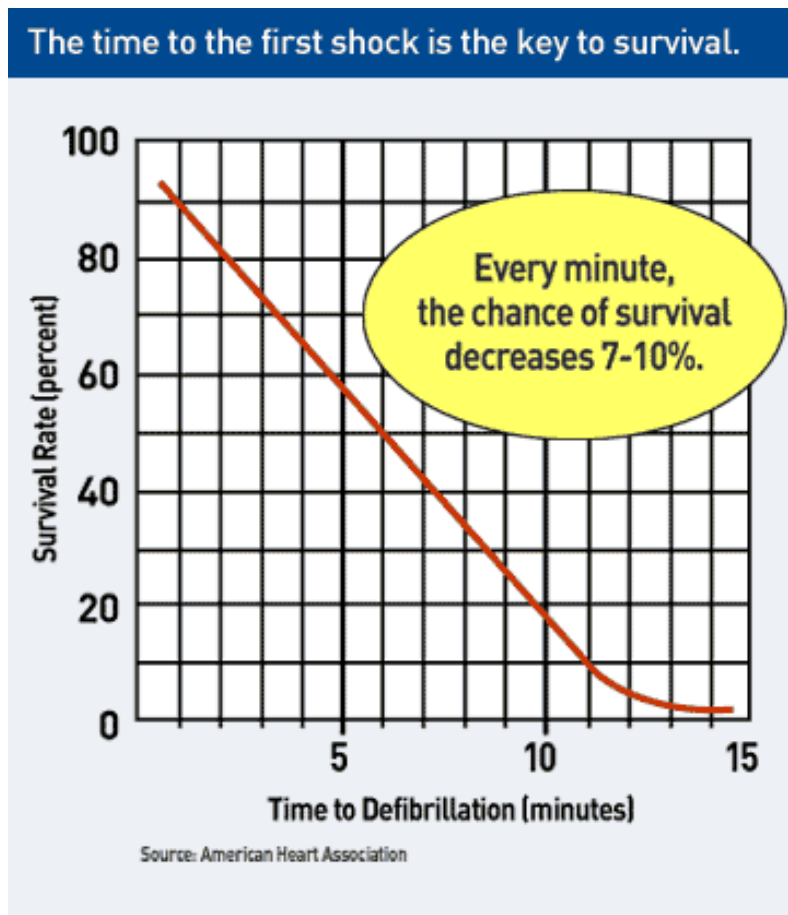
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**Appendix II**

<b>Table 1:</b>	<i>Search terms used to conduct the literature review:</i>							
Untrained members of the public	AND	Automated External Defibrillators  Or  AEDs	AND	Public Access Defibrillators  Or  PADs	AND	Willingness to access and deploy an Automated External Defibrillator  Or  AED	AND	Willingness to use an Automated External Defibrillator  Or  AED
<b>Search results across four databases:</b> <i>Articles selected, reviewed and analysed from 1<sup>st</sup> April to 27<sup>th</sup> November 2012.</i>								
<b>Inclusion criteria:</b> <i>Any country (within the time frame) in relation to the untrained lay public deployment of AEDs in OHSCA.</i>								
<b>Exclusion criteria:</b> <i>Non-English language articles. Companies and manufacturers selling AEDs and AED training providers. Implementation of PAD schemes. PAD schemes in Clinical / Hospital areas (due to a high incidence of health professional respondents and organised onsite responses). First Responder Schemes (training / implementation and audit).</i>								
<b>Time frame:</b> <i>Articles published between 2002 – 2012 (10 years).</i>								

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**Appendix III.**



Accessed 23<sup>rd</sup> November 2012.

Appendix IV

