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Welsh Government

Out of Hospital Cardiac Arrest Plan

Improving the care of people with an out of hospital cardiac arrest (OHCA) in Wales

Produced by the Out of Hospital Cardiac Arrest sub-group of the Heart Conditions Implementation Group

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Contents

1. Introduction

A patient's chance of surviving an out of hospital cardiac arrest (OHCA) decreases by an estimated 10% with every passing minute. Between April 2016 and March 2017, the Welsh Ambulance Service responded to 5800 OHCA of which 2832 resulted in a resuscitation attempt.

There is significant variability in the survival of OHCA to hospital discharge, ranging from 0.6% to 25%[1], in the United Kingdom. Countries that have implemented national strategies, to improve each stage of the pathway, notably Sweden and Denmark, have increased their 30-day mortality survival rate from 4.8% and 3.5% to 10.7%[2] and 10.8%[3] respectively. Globally, in the best performing emergency medical services the rate of survival is between 20-25%[4]. Information on survival is not routinely collated in Wales and will be addressed through the implementation of this plan.

We never know when we might come across situations where action needs to be taken to help save a family member, friend, colleague, neighbour or stranger. Providing skills and knowledge would enable people to start the chain of survival and give individuals who suffer an OHCA the best chance of survival. We need to ensure these opportunities are available to all communities across Wales.

In response to the National Assembly for Wales Petition's Committee report on mandatory Welsh legislation to ensure defibrillators in all public places, Welsh Government reinforced their commitment to developing an OHCA plan. In late 2016, Welsh Government sought the support of the Wales Cardiac Network and its partners from across cardiac communities in Wales to produce a single plan that aligns guidance and describes a clinically agreed whole system pathway and approach to improving OHCA outcomes.

It is known that people in deprived communities are more likely to suffer from cardiovascular diseases and OHCA and are less likely to survive than people from more affluent areas. The Well-being of Future Generations (Wales) Act 2015 puts in place Public Service Boards' (PSBs) which bring together all elements of public services in each area of Wales. It is envisaged this integrated arrangement is well placed to be a key mechanism for delivery of this plan, with oversight from the All Wales Cardiac Network.

Some good partnership working is already in place between the Welsh ambulance services, police forces and fire and rescue services in response to OHCA by the emergency services collaboration working group[5] and national strategies should be actively built upon.

A set of priorities for fire and rescue services supporting NHS Wales have been agreed by Welsh Ministers. These include models where fully-trained and equipped fire crews attend and respond to OHCA until the arrival of ambulance services. Such models have been shown to improve response times and patient outcomes whilst also reducing costs[6]. There are already a number of projects across Wales where

firefighters attend such incidents and work in partnership with the ambulance service in this way.

Optimising the Chain of Survival:

The chain of survival is an internationally recognised approach to resuscitation and summarises the essential interventions to improve patient outcomes. The chain of survival and this plan applies to all OHCAs in adults, young people and children and is underpinned by high quality evidence where available. The chain is only as strong as its weakest link.

Early recognition of OHCA, immediate cardiopulmonary resuscitation (**CPR)** and early **defibrillation** remain the key to improving outcomes. The evidence for high quality **post resuscitation** care continues to evolve and the development of pre-hospital pathways and cardiac arrest centres aim to improve outcomes further. Figure 1 depicts the chain of survival, which frames the approach taken in developing this plan and the structure of the document.

Figure 1 - Chain of Survival - Welsh Government 2017

This plan covers early recognition of a cardiac arrest, immediate CPR, early defibrillation and optimal post resuscitation care. It is anticipated, as part of the on-going implementation of this plan further work will be undertaken to map out the organisations that provide CPR training within communities across Wales.

This further work will identify and make the most of the similarities between the emergency / lifesaving services and their shared commitment to keep people and communities safe focusing on the priorities between the NHS and others. Effective partnership will mean people in Wales are not only given every opportunity to survive a cardiac arrest, but they are also provided with CPR skills and resources such as defibrillators enabling them to save lives.

2. Early Recognition

Cardiac arrest often occurs without warning with approximately 80% happening in the home. Without early recognition and immediate and effective action, survival is highly unlikely. Recognising the signs of cardiac arrest may seem straight forward to health professionals, but bystanders often doubt their judgement, often relying on others to call for help delaying the resuscitation process[7].

The mapping and sharing of information should be utilised to improve OHCA survival. Education environments continue to be a major area of focus for many charities within Wales who train numerous children and adults in CPR throughout the year and assist in the placement and training of public access defibrillators.

Key Outcomes:

- Early and effective recognition of signs of cardiac arrest and bystander intervention during OHCA, with prompt reactions, phoning 999 and administering immediate CPR and use of a defibrillator where available, until support arrives.
- Enhanced public awareness of the need for bystander CPR at an OHCA.

The response of those who happen to be present during OHCA is crucial.

Raising public awareness is paramount in ensuring early recognition and prompt intervention in OHCA. Early recognition and immediate initiation of bystander CPR can double or quadruple survival from OHCA whilst the use of a defibrillator within 3-5 minutes of collapse can significantly improve survival rates.

There should be a clear aim to increase the incidence of bystander CPR; this would ideally be started whilst the on-going call for help is instigated.

The public should be assured when they call 999 in an emergency; they will receive expert help, advice and instruction from the call handler.

Early recognition by call handlers, whether they are working within the 999 service or in NHS Direct Wales / 111 service, and chest compression only CPR advice for adults is a ‘strong’ recommendation by the 2015 European Resuscitation Council guidelines. This has been shown to increase bystander CPR and time to initiation of CPR[8].

Education continues to be a major area of focus for many charities in Wales. Many provide learning resources or direct learning opportunities for children and adults throughout the year and assist in the placement and training of public access

defibrillations. Services should map and share information regarding their educational activities to identify gaps, reduce duplication and maximise resources and reach. To increase and maximise survival rates in Wales, opportunities to learn life-saving skills should be incorporated into all settings including education, workplace and communities.

Messages around recognition and reaction need to be repeated and supported by accessibility of learning opportunities through face to face interaction, online resources, mobile technologies and social media.

We acknowledge the advantage of promoting these skills within schools and confirm all learners in Wales can learn about emergency aid procedures through Personal and Social Education (PSE) which forms part of the basic curriculum for all registered children and young people in maintained schools. It is up to the schools to decide if this is appropriate for the learners. Additionally, third sector organisations provide training and resources to aid CPR training both in schools and for the wider population.

The OHCA steering group, whilst acknowledging the challenges, believes CPR is an important component of health education of all the population, and all schools, further and higher education students should be provided with opportunities to learn CPR techniques. Furthermore refresher training should be offered regularly to all those who wish to participate and maintain skill levels[9]. The outcome of all educational initiatives must be to influence a positive change in public attitude to CPR.

Key Actions:

- Increase awareness with consistent messaging that once a OHCA has occurred, early recognition is critical to enable immediate and effective action;
- Increased number of people able and ready to respond in the event of an OHCA.
- Review relevant new and emerging technologies and their application in improving survival from OHCA.

3. Early Cardiopulmonary Resuscitation (CPR)

CPR is an emergency procedure in which a person presses up and down on the casualty's chest (chest compressions) and gives them a series of rescue breaths to help save their life when they are in cardiac arrest. Chest compression only CPR advice is given on all appropriate 999 calls so as to increase uptake of bystander CPR. Calls to NHS Direct Wales and / or 111 service for urgent care, will be transferred to the 999 service as soon as the call is identified as life threatening.

In 2015, the International Liaison Committee on Resuscitation (ILCOR) reported their International Consensus on CPR and Emergency Cardiovascular Care (ECC) Science with Treatment Recommendations (CoSTR)[10]. The committee reviewed all the available evidence and graded treatment recommendations based on the strength and quality of evidence. Subsequently CoSTR recommendations were incorporated into guidelines from the Resuscitation Council (UK), National Institute for Clinical Excellence (NICE) and the Joint Royal College Ambulance Liaison Committee (JRCALC).

The time to initiating CPR in cardiac arrest is critical to outcome. Even the highest-performing emergency medical services will be unable to get to a patient and start CPR more rapidly than a bystander who is present at the scene of the cardiac arrest. The link between increased survival of OHCA and early CPR has been consistently demonstrated[11]. Evidence also shows compressions should be uninterrupted and of high quality[12].

Key Outcomes:

- Increased access to CPR training
- Increased bystander CPR
- Actively promote CPR training and how to use a defibrillator

Whilst we understand knowledge and skills in CPR are not currently universally distributed across the population, work should be undertaken to ensure the public are not disadvantaged due to geography or social challenges. The outcome must be to influence a positive change in public attitude to CPR and increasing the number of bystander CPR interventions. To create a future generation of lifesavers the public should be educated that early continuous chest compressions are vital and effective in improving outcomes.

There is a clear need to ensure the closest available CPR and defibrillator equipped resource is dispatched to an OHCA to support the caller. The potential for better

outcomes is achieved with a coordinated response which includes a minimum number of responders, real-time CPR quality feedback and an ambulance clinician experienced in the management of leading the resuscitation.

In order to achieve this capacity and resources will require alignment. There is clear scope to increase the availability and utilisation of relevant public services in response to OHCA and some public services are already engaged in local resilience building.

Police Forces in Wales will continue to ensure all police officers and police community support officers (PCSOs) maintain their first aid training in line with the College of Policing First Aid Learning Programme which includes CPR and use of defibrillators.

There is considerable potential for fire and rescue services to support the NHS by attending OHCA. There are already a number of areas in Wales where fire and rescue service colleagues attend, working in partnership with the ambulance service. We will aim to sustain and expand this work. However, we recognise firefighters and their unions have some legitimate practical concerns, and will work with them and with fire and rescue authorities to address these.

The commitment and drive of third sector organisations in Wales plays a key role in engaging with all communities and contributing to the training of CPR and the placement of defibrillators. The provision of CPR training and its relationship to improved outcomes for those who suffer an OHCA cannot be over emphasised and all these elements of work should be built upon and expanded to become standard across Wales. Building closer working relationships between public services and third sector partners will lead to the transformational change we are seeking and improved outcomes from OHCA[13].

Key Actions:

- Ensure CPR training opportunities at all levels are mapped across Wales.
- All responder communities must work closer to ensure a coordinated response to an OHCA.
- Increase CPR training across Wales

4. Early Defibrillation

A patient's chances of surviving an OHCA decrease by up to 10% with every passing minute[14]. It is therefore essential for communities to understand the very best care for patients is often through their intervention –early recognition of an OHCA and prompt initiation of CPR supported by the placement of a defibrillator in communities near to where the incident occurs.

The public should be reassured regarding the use of a defibrillator; with simple audio and visual commands, they are designed to be simple to use for the general public and can only defibrillate a patient who is in cardiac arrest. The defibrillator automatically diagnoses the life-threatening cardiac arrhythmias in a patient[15], and is able to treat them through the application of electrical therapy (shock) which stops the arrhythmia, allowing the heart to re-establish an effective rhythm.

This, combined with effective CPR, provides the patient with the best chances of survival. The ambulance service notifies callers when there is a defibrillator within the vicinity of their current location with instructions on retrieval and use. All communities, groups, public and private sector organisations should notify the ambulance service when they purchase a defibrillator using the online notification form[a]. Once notified these will be mapped and utilised in the event of an emergency.

The Directory of Service supporting NHS Direct Wales and 111 service also holds key information about the location of defibrillators in the community and can assist in directing professionals and the public to their nearest resource.

There may also be scope to build on the fire service's fire safety work with businesses to encompass the provision of defibrillators in the workplace, and help maintain public access defibrillators.

Key Outcome:

- Defibrillators are readily available and accessible to the public.
- Public are aware defibrillators are easy to use and can do no harm.

[a] https://www.nhsdirect.wales.nhs.uk/fs/fs.aspx?surveyid=87006d5283a4e309b216889d0b53e78&fsl=en-gb

Many communities, when purchasing a defibrillator nominate a guardian to supervise and monitor the unit, this should be actively encouraged.

Key Actions:

- Work collaboratively to ensure all defibrillators are mapped to increase accessibility and availability.
- Ensure clear protocols and procedures are in place so defibrillators are available for operational use at all times.

5. Post Resuscitation Care

Pre-Hospital Resuscitation

Pre-hospital resuscitation aims to deliver CPR, defibrillation, airway management, appropriate drug therapies and other interventions rapidly and in accordance with evidence based practice. Once an OHCA is identified, coordinating an appropriate timely response is the key to optimising outcomes.

Ideally, bystander CPR will be started immediately after an OHCA in order to buy time until additional help can arrive. Ambulance staff, first responders and other lifesaving personnel are all trained in Basic Life Support (BLS) and the use of defibrillators. Paramedic staff and other healthcare professionals are Advanced Life Support (ALS) trained including advanced scene management and care. ALS is a set of life-saving protocols and skills that extend BLS to further support circulation, airway and ventilation (breathing).

It is important to have systems in place that quickly identify patients who do not wish to be resuscitated or those who unlikely to benefit and have the appropriate documentation.

Key Outcome:

- High quality and appropriate resuscitation is delivered consistently in the pre-hospital care environment.

Work is required to develop a detailed understanding of the respective roles of the fire and rescue services, ambulance service and other NHS organisations to ensure sustainable and equitable arrangements for responding to OHCA's.

CPR and defibrillation increase the chances of return of spontaneous circulation (ROSC); this is the first step towards the goal of complete recovery.

Following a ROSC clinicians at the scene will need to assess the likely cause of the collapse. It is essential to gain as much relevant information as possible. A thorough assessment of the patient must be undertaken and all relevant interventions should be carried out to stabilise the patient prior to transfer to hospital.

This will involve coordination between the ambulance service, pre-hospital critical care providers and cardiac arrest centres.

With the exception of a cardiac arrest where the cause is believed to be trauma, ambulance personnel will ensure an ECG is undertaken at the earliest opportunity post ROSC. This enables crews to interpret and recognise life threatening

arrhythmias.

Key Action for both pre-hospital resuscitation and In-hospital:

- Implement an all Wales ROSC pathway for patients who suffer OHCA to reduce variation and improve outcomes.

In-Hospital Care

People who suffer specific forms of OHCA have a better chance of survival if they are taken to a cardiac arrest centre.

This has been highlighted by the work undertaken in NHS England subsequently endorsed by all the Royal Colleges and relevant third sector partners in the recently published "*Resuscitation to recovery; a national frame work to improve care of people with out of hospital cardiac arrest".*[16]

There are three cardiac arrest centres in Wales providing 24/7 primary percutaneous coronary intervention (PCI) services, these are Morriston Hospital; University Hospital of Wales and Glan Clwyd Hospital. These centres have **24 hour** access to all relevant clinical services including cardiac catheter laboratories and critical care facilities.

Extensive work has been undertaken, and is ongoing, to develop expert consensus guidance on an agreed ROSC pathway by clinical specialists from across Wales. This work has already highlighted operational, capacity and resource issues associated with the implementation of the ROSC pathway on an all Wales basis, including related areas such as critical care capacity across Wales.

Key Outcomes:

- The patient needs to be taken to the right hospital
- All people treated in hospital following OHCA receive optimal care.
- All OHCA survivors should be assessed by a heart rhythm specialist prior to hospital discharge.

After the initial successful pre-hospital resuscitation phase, patients in whom a cardiac cause is likely should be transferred to a cardiac arrest centre. Once in the most appropriate centre a series of investigations and therapies will be required to ensure the best chance of a patient's long term survival and optimal recovery. After initial stabilisation and investigations patients may be referred to an appropriate critical care unit for ongoing support.

Rehabilitation and Aftercare

The overall aim of this plan is to see the person who has suffered an OHCA not only survive the event but be discharged from hospital with the highest quality of life possible. We know within the rehabilitation and aftercare phase, as with those previously described, there is scope for improvement.

As well as considering the survivors perspective, it should be noted their family, friends and bystanders may have lived through the experience and may be affected by the event. Referral to appropriate counselling or other support services including primary care should be considered if deemed appropriate.

Health professionals may also find some circumstances distressing, and their employing organisations should have appropriate support systems in place when required.

There should be consideration given to the provision of care to those who have lived through the loss of a loved one and their needs should be understood and addressed.

Key Outcomes:

- Early identification and referral of people and their families to appropriate services who require care and support after OHCA.
- All OHCA survivors should be assessed by a heart rhythm specialist prior to hospital discharge.

These aims will not be achievable though a single intervention or service, but will require integrated and co-ordinated co-production between public and third sector partners across Wales. Both NHS Direct Wales and the Information, Advice and Assistance service (underpinning the Social Services and Well-being (Wales) Act 2014), community navigators, and the Dewis Cymru online database can provide professionals and individuals with information and advice on preventative and community services in their locality which can support them in their recovery and ability to regain their independence.

A rehabilitation assessment should be completed in accordance with national guidelines.

Key Actions:

- Ensure appropriate pathways and protocols are in place for referral to rehabilitation services including cardiac rehabilitation.
- Ensure all OHCA survivors are assessed by a heart rhythm specialist prior to hospital discharge.
- Ensure the provision of high quality individually tailored information relating to the potential psychological, physiological and social impact of OHCA.

6. Enablers for Delivery

Culture and Public Attitude

Key Outcome:

- Confidence amongst members of the public, NHS staff and emergency services that with effective action an OHCA can be a survivable event.

To enable improvement of survival from OHCA it is recognised there needs to be a nationwide change in the public's attitude towards CPR and the use of defibrillators.

This change needs to support a cultural shift to achieve greater awareness, understanding and normalisation of bystander CPR and a willingness to respond.

High quality effective education and training for both the public and staff alike with a sustained focus on OHCA is essential for development and sustainability of this shift in culture. In order to operationalise all the actions contained within this plan a co-ordinated structure and practical approach to implementation is required.

Key Action:

- To implement a structured program of OHCA awareness and CPR education and training across communities in Wales.

Out of Hospital Cardiac Arrest Registry

Improving the outcomes of OHCA requires a whole-system approach with the availability of high quality, timely and comparable data. We have already stated this is not routinely collected. We need to establish an OHCA registry which will evaluate only OHCA events where individuals receive resuscitative efforts, including CPR or defibrillation.

Key Outcome:

- A whole pathway OHCA dataset for Wales

There is currently a co-ordinated collaboration by the ambulance service, Wales Cardiac Network and Warwick University to provide the UK OHCA registry which will give NHS Wales the ability to benchmark itself against the rest of the UK. The use of national cardiac audit data will also support NHS Wales health boards and trusts measure the quality of care for patients following OHCA.

Key Actions:

- Collect, analyse and report accurate and complete data in order to inform decision making and improve outcomes after cardiac arrest in Wales
- Ambulance service to collect standardised data and contribute to national and international registries.

Research and Innovation

Key Outcome:

- Ambulance service and other key partners support innovation and research leading to improved outcomes from OHCA.

NHS Wales needs to use and contribute to the science, research and innovation around OHCA. This will include ensuring Wales is equipped to recognise, assess, and where justified, implement the latest clinically proven and cost effective innovations.

Research and innovation (R&I) has consistently been identified as a priority function of the Welsh Ambulance Service. These functions of the ambulance service are delivered through the Pre Hospital Emergency Research Unit (PERU), which is funded by Health and Care Research Wales (HCRW). PERU and WAST have long established reputations for developing, delivering and collaborating on high quality research and innovation involving OHCA.

This plan offers an opportunity for the ambulance service to develop further resources to provide leadership in improving systems, processes and outcomes relating to OHCA for the benefit of the people of Wales.

Technology around OHCA continues to evolve and it is important Wales can efficiently and effectively adopt and promote new technologies when it is appropriate, and cost effective to do so.

Research and innovation is essential across the whole chain of survival as many necessary questions currently remain unanswered, including – how do we increase the efficiency of interactions between the initial bystander and the ambulance service call handler, or an understanding of the impact of OHCA on patients, families and rescuers.

Key Actions:

- Work with Health and Care Research Wales and researchers to support and delivery service to increase the number of OHCA research studies undertaken in Wales;
- Ensure research feeds into organisations' mechanisms for the uptake of best practice and service improvement.

7. Implementation

The key factors in determining survival from an OHCA are early, high quality CPR and defibrillation. Optimising the chain of survival across the whole system of OHCA management means delivering:

- Prompt recognition of OHCA and call for help
- Early CPR to buy time
- Early defibrillation to restart the heart
- Rapid access to advanced resuscitation skills (e.g. airway management, oxygen therapy, fluid resuscitation and drugs) for those requiring further resuscitation
- Prompt, high quality post resuscitation care
- Transport to the nearest appropriately equipped centre after ROSC
- Co-ordinated rehabilitation services to care for patients and their families

Welsh Government has shown its commitment through this work to improve OHCA outcomes and cross party political support has been shown to be a key factor in other national strategies. The success of this plan depends upon the commitment and action of many individuals and organisations. It will require concerted public/community support, clinical and organisational leadership and a change in culture around OHCA.

A co-productive approach including emergency services, healthcare providers, third sector and communities will be required to ensure delivery of a national solution to increased survival from OHCA.

Whilst considerable work on some elements of the pathway have been taken forward, focus and pace is now required to develop the detail across the whole plan and embed its implementation across Wales. An implementation group will develop the detail required and maintain a continuing national focus on OHCA.

Key Action:

- Establish an Implementation Group to:
  - Develop the structure
  - Implementation and monitor the plan.

A key component within this plan is to improve how outcomes of resuscitation care are measured and reported. This information is needed to monitor the progress of this plan, but more importantly, to inform everyday clinical practice and service delivery, and so help shape the quality of care delivered to all our communities.

Stakeholders individually and in collaboration need to develop their improvement programmes to determine how best to take forward the necessary actions.

8. Summary of Actions

Key Actions:

- Increase awareness with consistent messaging that once a OHCA has occurred, early recognition is critical to enable immediate and effective action;
- Increased number of people able and ready to respond in the event of an OHCA.
- Review relevant new and emerging technologies and their application in improving survival from OHCA.
- Ensure CPR training opportunities at all levels are mapped across Wales.
- All responder communities must work closer to ensure a coordinated response to an OHCA.
- Increase CPR training across Wales
- Work collaboratively to ensure all defibrillators are mapped to increase accessibility and availability.
- Ensure clear protocols and procedures are in place so defibrillators are available for operational use at all times.
- Implement an all Wales ROSC pathway for patients who suffer OHCA to reduce variation and improve outcomes.
- Ensure appropriate pathways and protocols are in place for referral to rehabilitation services including cardiac rehabilitation.
- Ensure all OHCA survivors are assessed by a heart rhythm specialist prior to hospital discharge.
- Ensure the provision of high quality individually tailored information relating to the potential psychological, physiological and social impact of OHCA.
- To implement a structured program of CPR education and training across communities in Wales;
- Collect, analyse and report accurate and complete data in order to inform decision making and improve outcomes after cardiac arrest in Wales
- Ambulance Service to collect standardised data and contribute to national and international registries.
- Work with Health and Care Research Wales and researchers to support and delivery service to increase the number of OHCA research studies undertaken in Wales;
- Ensure research feeds into organisations' mechanisms for the uptake of best practice and service improvement.
- Establish an Implementation Group to;
    - Develop the structure
    - Implementation and monitor the plan.

9. Key Links

Heart Conditions Delivery Plan	http://gov.wales/topics/health/nhswales/plans/heart_plan/?lang=en
British Association of Cardiovascular Prevention and Rehabilitation	http://www.bacpr.com/resources/15E_BACPR_Standards_FINAL.pdf
British Heart Foundation; Cardiac Arrest	https://www.bhf.org.uk/heart-health/conditions/cardiac-arrest
National Assembly for Wales Petitions Committee Mandatory Welsh legislation to ensure Defibrillators in all public places - Report	http://www.assembly.wales/laid%20documents/cr-ld10284/cr-ld10284-e.pdf
National Institute for Health and Care Excellence (NICE). Acutely ill adults in hospital: recognizing and responding to deterioration. Clinical guidelines 50	https://www.nice.org.uk/guidance/cg50
National Institute for Health and Care Excellence (NICE). Myocardial infarction: cardiac rehabilitation and prevention of further cardiovascular disease. Clinical guideline 172	https://www.nice.org.uk/guidance/cg172
National Institute for Health and Care Excellence (NICE). Myocardial infarction with ST-segment elevation: acute management. Clinical guideline 167	https://www.nice.org.uk/guidance/cg167
Resuscitation Council (UK) Guidelines 2015	https://www.resus.org.uk/resuscitation-guidelines/
Welsh Government. Shared Purpose: Shared Future statutory guidance on the Well-being of Future Generations (Wales) Act 2015.	http://gov.wales/topics/people-and-communities/people/future-generations-act/statutory-guidance/?lang=en
NHS Direct Wales - information, including directory of services and defibrillator locations	https://www.nhsdirect.wales.nhs.uk/
Welsh Ambulance Service – Webpage for all communities, groups, public and private sectors organisations to notify the ambulance service when they purchase a defibrillator	https://www.nhsdirect.wales.nhs.uk/fs/fs.aspx?surveyid=87006d5283a4e309b216889d0b53e78&fsl=en-gb
Dewis Cymru is the place for information about well-being in Wales including the information and advice service	https://www.dewis.wales/
Out of Hospital Cardiac Arrest Outcome Registry	http://www.warwick.ac.uk/ohcao/
National Joint Council for Local Authority Fire and Rescue Services (NJC): Broadening Responsibilities: Consideration of the potential to broaden the role of uniformed fire service employees - January 2017	https://www.fbu.org.uk/sites/default/files/attachments/Broadening%20Responsibilities%20of%20FRS%20-%20Main%20Report%20-%20Final%20with%20Summary%20Fo....pdf

10. Glossary of Terms

ALS	Advanced Life Support
BACPR	British Association of Cardiovascular Prevention and Rehabilitation
BLS	Basic Life Support
CoSTR	International Consensus on CPR and ECC Science with Treatment Recommendations
CPR	Cardio Pulmonary Resuscitation
ECC	Emergency Cardiovascular Care
ECG	Electrocardiogram
HCIG	Heart Conditions Implementation Group
HCRW	Health and Care Research Wales
ILCOR	International Liaison Committee on Resuscitation
JRCALC	Joint Royal Colleges Ambulance Liaison Committee
NHS	National Health Service
NICE	National Institute for Clinical Excellence
OHCA	Out of hospital Cardiac Arrest
OHCAO	Out of Hospital Cardiac Arrest Outcomes
PAD	Public Access Defibrillator
PCI	Percutaneous Coronary Intervention
PCSO	Police Community Support Officer
PERU	Pre Hospital Emergency Research Unit
PSE	Personal and Social Education
R&D	Research and Development
R&I	Research and Innovation
ROSC	Return of Spontaneous Circulation
UK	United Kingdom
WG	Welsh Government

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