# OHCAR

## National Out-of-Hospital Cardiac Arrest Register

**SIXTH ANNUAL REPORT**

NOVEMBER 2014

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# OHCAR OVERVIEW

Dr. Geoff King

In August 2014, the resuscitation community in Ireland mourned the untimely death of Dr. Geoff King, Director of the Pre-Hospital Emergency Care Council. Dr. King was a founder member the National Out-of-Hospital Cardiac Arrest Register (OHCAR) and a cornerstone in ensuring OHCAR's establishment and development.

This report is dedicated to Dr. King's memory.

The National Out-of-Hospital Cardiac Arrest Register (OHCAR)

The National Out-of-Hospital Cardiac Arrest Register (OHCAR) project was established in June 2007 in response to a recommendation in the Report of the Task Force on Sudden Cardiac Death[1]. The need for OHCAR has been reinforced in the policy document "Changing Cardiovascular Health[2]" and the Emergency Medicine Programme Strategy (2012)[3]. Since 2012, OHCAR became one of only three national OHCA registries in Europe.

OHCAR data is increasingly used in national reports and documents. Most recently OHCAR data from 2012 and 2013 has been included in Health Technology Assessment of Public Access Defibrillation by the Health Information and Quality Authority (HIQA)[4]. Since September 2014 OHCAR has been providing monthly data to the National Ambulance Service (NAS) to facilitate reporting of OHCA outcomes, which is the first Clinical Key Performance Indicator (KPI) for the NAS.

AIM OF OHCAR

- The aim of OHCAR is to facilitate improved survival from OHCA in Ireland by fulfilling the following objectives:
    - Establish the percentage OHCA survival in Ireland
    - Identify factors that contribute to survival
    - Identify what could be done differently to improve survival
    - Provide REGULAR FEEDBACK to service providers
- There continues to be a wide international variation in outcomes (e.g. survival) from pre-hospital resuscitation following OHCA[5,6]. Availability of reliable and systematically gathered OHCA register data is essential if these variations are to be understood.
- The accuracy, reliability and comprehensiveness of register data may also contribute to variability in reported outcomes[6,7], therefore an important function of OHCAR is to ensure the quality of data included in the OHCAR database.

OHCAR GOVERNANCE AND ORGANISATION

OHCAR is hosted by the Department of Public Health Medicine in the HSE West (North West region) and is jointly funded by the Pre-Hospital Emergency Care Council (PHECC) and NAS. It is administered and supported by the Discipline of General Practice, NUI Galway.

The OHCAR Steering Group (see below) is responsible for ensuring that the aims and objectives of OHCAR are fulfilled. The Steering Group includes representatives from all four supporting organisations. Dr. Geoff King continued as a member of the Steering Group until his death in August 2014. The current membership is as follows:

- Prof. Gerard Bury, UCD Centre for Immediate Care
- Dr. John Dowling, North West Immediate Care Programme
- Dr. Conor Deasy, Consultant in Emergency Medicine, Cork University Hospital
- Mr. David Hennelly, Clinical Development Manager, NAS*
- Ms. Jacqueline Egan, Programme Development Officer, PHECC
- Dr. Joseph Galvin, Cardiologist, Mater Hospital
- Ms. Siobhán Masterson, OHCAR Manager
- Prof. Andrew Murphy, Department of General Practice, NUI Galway
- Dr. Cathal O'Donnell, Medical Director, National Ambulance Service
- Mr. Gerry Clarke, Operational Support and Resilience Manager, NAS
- Dr. Peter Wright, Director of Public Health Medicine, HSE West (NW area)

*Mr. David Hennelly joined the Steering Group in October 2014

The Steering Group met three times from October 2013 to October 2014.

The OHCAR Manager reports directly to the OHCAR Director (Director of Public Health Medicine) and is accommodated in the Department of Public Health Medicine in Letterkenny, Co. Donegal and the Discipline of General Practice, NUI Galway. The OHCAR Manager is guided in her work by the Steering Group and also receives substantial academic support from the Discipline of General Practice, NUI Galway. Administrative support continues to be provided to OHCAR by the NAS.

SCOPE OF PATIENTS INCLUDED IN OHCAR

- OHCAR includes:

"All patients who suffer a witnessed or unwitnessed out-of-hospital cardiac arrest which is confirmed and attended by Emergency Services and resuscitation attempted".

- The primary source of OHCAR data is the statutory ambulance services i.e. the NAS and the Dublin Fire Brigade (DFB). OHCAR has data sharing agreements with other organisations including the Red Cross, Civil Defence and Irish Coastguard and Order of Malta but the bulk of data continues to be provided from statutory services.
- The current scope does not include patients who suffer an OHCA and who are not attended at any stage by Emergency Services. This means that a sub-group of patients are likely to be excluded from OHCAR using the Utstein definition i.e. cases attended by a GP where resuscitation is attempted but death is confirmed and the ambulance is stood down by the GP. The majority of these cases however are within the remit of MERIT[1] therefore such data is available.

DATA COLLECTION

- In order that OHCAR data is comparable with other registries, data is collected using the internationally agreed Utstein data set[8]
- The OHCAR data collection continuum stretches from receipt of the emergency call in Ambulance Control to discharge of surviving patients from hospital.

**Dublin Fire Brigade**

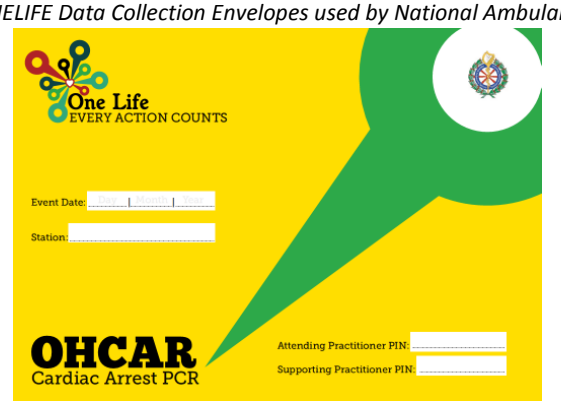
- Data from DFB is provided to OHCAR by the DFB EMS Support Unit in Microsoft Access® database format on a quarterly basis. Data from Ambulance Patient Care Reports (PCRs) is manually entered onto the database by DFB staff. Each case is electronically linked to all corresponding control data for the incident and provided to OHCAR in electronic format. DFB data is encrypted and electronically sent to OHCAR. Once logged in OHCAR, cases are checked to ensure compliance with OHCAR definitions and control data is filtered to provide the relevant time variables. As areas in Dublin are served by both NAS and DFB, the OHCAR database is checked for duplicate cases before DFB data is added to the OHCAR database.

[1] MERIT is the Medical Emergency Responders: Integration & Training Project. Please see http://www.ucd.ie/medicine/ourresearch/researchcentres/centreforemergencymedicalscience/themeritproject/ for further information.

**National Ambulance Service**

- Since July 2014, the method for collecting data from NAS Ambulance Areas has been standardised. In the event of attending an OHCA, ambulance practitioners place completed PCRs in specially provided OHCAR/ONELIFE envelopes (see image). Filled envelopes are then posted into PCR boxes in each ambulance station.
- Envelopes are collected together with all PCRs from each station on a monthly or fortnightly basis and sent for digital processing to IMSCAN (Ireland) Ltd. OHCAR PCRs are prioritised for digital processing and scanned images of the PCRs are created.

*Figure One: OHCAR/ONELIFE Data Collection Envelopes used by National Ambulance Service*




- IMSCAN staff enter OHCAR data from each case onto a copy of the OHCAR database. When complete, the copy database and scanned PCR images are sent to OHCAR for case-by-case validation
- OHCAR also receives monthly reports of control data for all emergency calls, and control data is added to all cases
- Once logging, validation and the addition of control data are completed, cases are entered onto the OHCAR database
- In order to identify cases that may not have been placed in yellow envelopes, missing case searches are performed using the monthly reports sent to OHCAR by each control centre. Potential OHCA cases are identified from monthly reports and an electronic search of the IMSCAN database is performed by the OHCAR Manager. PCRs for potential cases are then sent to OHCAR by IMSCAN and, following logging, validation and the addition of control data, missed cases are also entered onto OHCAR. Missing case searches are perfomed monthly (for NAS monthly reporting) and twice-yearly (for annual report preparation).

*Hospital Services*

- OHCAR now has a data sharing agreement with all hospitals who receive OHCA patients except Crumlin Our Lady's Children's Hospital
- Collection of data from hospitals is facilitated by a range of hospital staff including administrators, resuscitation officers, clinical nurse managers and consultants
- There is some variability in the availability of data from hospitals. This may be due to hospital staff having difficulty in obtaining data either due to (1) limited access to hospital records or (2) because of poor data quality from OHCAR making hospital patient identification difficult.

QUALITY CONTROL

- As described above, each OHCAR case is logged and validated before entry onto the OHCAR database
- Validation includes confirming cardiac arrest and resuscitation has occurred, checking for duplicates cases and checking for invalid or conflicting variables
- An additional tier has been added to the validation process since July 2014, with IMSCAN staff performing initial OHCAR case entry. All cases continue to have final validation performed by the OHCAR Manager in order to ensure a consistent approach to data quality control
- Missing case identification is an important and scheduled part of OHCAR data entry and quality control process, helping to ensure that OHCAR data is comprehensive and representative of OHCA incidence, management and outcome nationally.

THE OHCAR DATAHUB

- While great improvements in standardising OHCAR data collection have been achieved in the last twelve months, further improvements are needed
- A proposal for an OHCAR 'Datahub' which would facilitate standardised data collection by all pre-hospital practitioners and hospital staff via a web-based platform was made via the NAS Medical Director to the HSE ICT Directorate
- The Business Case for the proposal was recommended by the ICT Directorate to CMOD in the Department of Public Expenditure and Reform and approved.

OHCAR MEETINGS

*Meetings*

- EuReCa meetings March 2014 and May 2014
- Public Health Research and Health Research Alliance meetings, NUI Galway 2013 & 2014
- European Resuscitation Congress, Bilbao, May 2014
- NAS ONELIFE project meeting, Galway January 2014
- PCR Scanning project, Belfast May 2014
- Irish Heart Foundation, Dublin May 2014
- Pre-Hospital Emergency Care, Information Management and Clinical Audit Seminar, Athlone, June 2014
- HIQA Public Access Defibrillation HTA Expert Advisory Group, Dublin June and September 2014
- Irish Association of Emergency Medicine, Cardiac Arrest Seminar, Dublin October 2014.

RESEARCH

*European Registry of Cardiac Arrest Study ONE (**EuReCa ONE**)*

EuReCa ONE is a study of the European Resuscitation Council (ERC) and is a prospective, multi-centre, one month survey of epidemiology, treatment and outcome of patients suffering an out-of-hospital cardiac arrest in Europe. Twenty-seven countries have agreed to participate in this pan-European study, including Ireland.

The aim of EuReCa ONE is to provide a one-month snapshot of OHCA so that differences in incidence, management and survival across Europe might be investigated. Data collection for EuReCa ONE took place during October 2014, with analysis and reporting of results planned for 2015. Irish data will be processed and submitted through OHCAR and ethical permission for Ireland to participate in the study has been granted.

The OHCAR Director is the EuReCa ONE National Coordinator for Ireland and the OHCAR Manager is part of the EuReCa ONE Study Management Team. OHCAR representatives have attended two EuReCa ONE meetings in the past twelve months (Hamburg, March 2014 and Bilbao, May 2014) as well as attending regular teleconferences with the other National Coordinators and the Study Management Team.

*Articles Accepted for Publication*

- Masterson S, Vellinga A, Wright P, Dowling J, Bury G, Murphy AW. General Practitioner Contribution to Out-of-Hospital Cardiac Arrest Outcome: a National Registry Study [Accepted by *European Journal of General Practice* . Expected publication date: March 2015]
- Nishiyama C, Brown SP, May S, Iwami T, Koster RW, Beesems SG, Kuisma M, Salo A, Jacobs I, Finn J, Sterz F, Nürnberger A, Smith K, Morrison L, Olasveengen TM, Callaway CW, Shin SD, Gräsner JT, Daya M, Ma MH, Herlitz J, Strömsöe A, Aufderheide TP, Masterson S, Wang H, Christenson J, Stiell I, Davis D, Huszti E, Nichol G. Apples to apples or apples to oranges? International variation in reporting of process and outcome of care for out-of-hospital cardiac arrest. *Resuscitation* 2014 Jul 8. pii: S0300-9572(14)00641-8. doi: 10.1016/j.resuscitation.2014.06.031. [Epub ahead of print]
- Gräsner JT, Böttiger BW, Bossaert L; European Registry of Cardiac Arrest (EuReCa) ONE Steering Committee and the EuReCa ONE Study Management Team*. EuReCa ONE - ONE month - ONE Europe - ONE goal. *Resuscitation* 2014 Oct;85(10):1307-8.
  *OHCAR Manager is a member of the EuReCa ONE Study Management Team

*Oral and Poster Presentations*

- "OHCA resuscitation in Donegal". Acute Coronary Syndrome Group, Letterkenny General Hospital. November 2013
- "OHCAR and the National Ambulance Service". Presentation to Paramedic Trainees, National Ambulance Service College, Dublin. December 2013
- "A geographic model for improving cardiac arrest survival in Ireland". Public Health Research and Health Service Research Alliance, NUI Galway. December 2013
- "The importance of CFR in OHCAR". RESPOND 2014 – National Cardiac First Responder Conference. March 2014
- "OHCAR" GP training Scheme. GP Training Scheme, Letterkenny. July 2014.

*Study: The potential for uncontrolled organ donation (Category II) after circulatory death in Irish Emergency Departments*

- Lead Investigator: Mr. Brian Doyle; Chief Investigator: Dr. Conor Deasy; Other Investigator, Ms. Siobhan Masterson (on behalf of OHCAR)
- At present over 600 people are awaiting an organ transplant in Ireland. Both internationally and in Ireland, demand for organs outstrips the supply. The vast majority

of organ donations in Ireland are Donations after Brainstem Death (DBD) and are procured in most cases from intensive care units following brain trauma

- This project aims to examine to potential for increasing organ procurement through Donations after Circulatory Death (DCD), specifically in patients who had a witnessed cardiac arrest, received resuscitation and subsequently died in the Emergency Department. These patients are not presently used for organ donation purposes in Ireland
- Following receipt of ethical approval, a research application was made by the Lead Investigator to OHCAR, requesting data on patients matching the study criteria who were brought to CUH. The application was approved and this study is currently ongoing.

*Study: Out of Hospital Cardiac Arrest Functional Outcomes and Quality Of Life (Qol). Follow up Study of Survivors in Munster, Ireland.*

- Chief Investigator: Dr. Conor Deasy; Other Investigators, Mr. Kieran Henry, Ms. Alice Kirby, Ms. Siobhan Masterson (on behalf of OHCAR)
- The purpose of this investigation is to assess the functional and quality of life outcomes for survivors of out-of-hospital cardiac arrest in the Munster region who were attended to by the National Ambulance Service and treated in a Munster Hospital. The research questions to be investigated are:
    - Is it feasible to follow up survivors on OHCAR and perform Patient-Related Outcome Measures for Survivors?
    - What are the Patient-Related Outcome Measures for OHCAR Survivors?
- Following receipt of ethical approval, a research application was made by the Lead Investigator to OHCAR, requesting data on patients matching the study criteria who were brought to CUH. The application was approved and this study is currently ongoing.

*Health Research Board Health Professions Fellowship Award 2014*

- The OHCAR Manager was awarded a Health Professions Fellowship from the Health Research Board. This three year award will allow the OHCAR Manager to undertake research entitled “A Geographic Model for Improving Out-of-Hospital Cardiac Arrest Survival” with a view to obtaining a PhD. The fellowship also provides funding for the OHCAR Manager to be replaced in her current role, thereby adding substantially to the research capacity of OHCAR. It is envisaged that this fellowship will start in January 2015.

OHCAR IN THE FUTURE

The key themes for OHCAR improvement that were described in previous Annual Reports will continue to be built upon.

## Theme 1. Data Collection and Data Quality

*OHCAR Datahub*

The OHCAR Datahub project has received approval. It is hoped that the project can be commenced in 2015 and that the Datahub would further streamline OHCAR data collection and develop reporting functionality that can be extended to other conditions commonly managed by Ambulance Services.

*Standardisation of Data Requests from Control*

Standardised monthly data requests are now received from Ambulance Control centres nationally. With the introduction of a single national control centre, full reporting standardisation is expected to be possible in 2015.

*Missing Case Identification*

Missing case searches are now carried out monthly and twice yearly for National Ambulance Service cases. Ways to improve data collection from non-statutory services will continue to be sought.

## Theme 2. Research

*Mapping OHCAR cases*

Two full years of OHCAR data has now been geocoded. This data has already been submitted to HIQA for use in the Public Access Defibrillator Health Technology Assessment report. Geocoded data will now be used to inform research into development of a geographical model of OHCA incidence, management and outcomes.

*Development of the OHCAR Research Agenda*

As described earlier, a number of research projects using OHCAR data have been initiated in 2013 and 2014. An OHCAR research forum will be held in December 2014 to discuss further opportunities for OHCAR research.

*EuReCa involvement*

Ireland's involvement in EuReCa has grown and is a participant in the EuReCa ONE study with OHCAR providing national data, national coordination for Ireland and participating in the management of the EuReCa ONE study. It is intended that this level of participation in EuReCa projects will be maintained.

*Identification of confirmed OHCAs*

The feasibility of using control data to identify all confirmed OHCAs has been confirmed. The EuReCa ONE study requires that all "confirmed OHCAs" are reported for October 2014. The feasibility of continuing to report all confirmed cases as part of routine OHCAR data collection will be assessed following submission of the confirmed cases to the EuReCa ONE project.

Theme 3. <u>OHCAR and Improved Outcomes</u>

*Development of Monthly Reporting*

- Since July 2014, OHCAR has commenced monthly reporting to National Ambulance Services. It is intended that monthly reporting will be continued during 2015.

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2. Changing Cardiovascular Health: National Cardiovascular Health Policy 2010-2019 (2010) Department of Health and Children.

3. HSE, ICEM-T, IAEM, College of Emergency Medicine. The National Emergency Medicine Programme: a Strategy to Improve Safety, Quality Access and Value in Emergency Medicine Ireland (2012) RCSI:Dublin

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8. Nishiyama, C. et al. Apples to apples or apples to oranges? International variation in reporting of process and outcome of care for out-of-hospital cardiac arrest. Resuscitation 2014;

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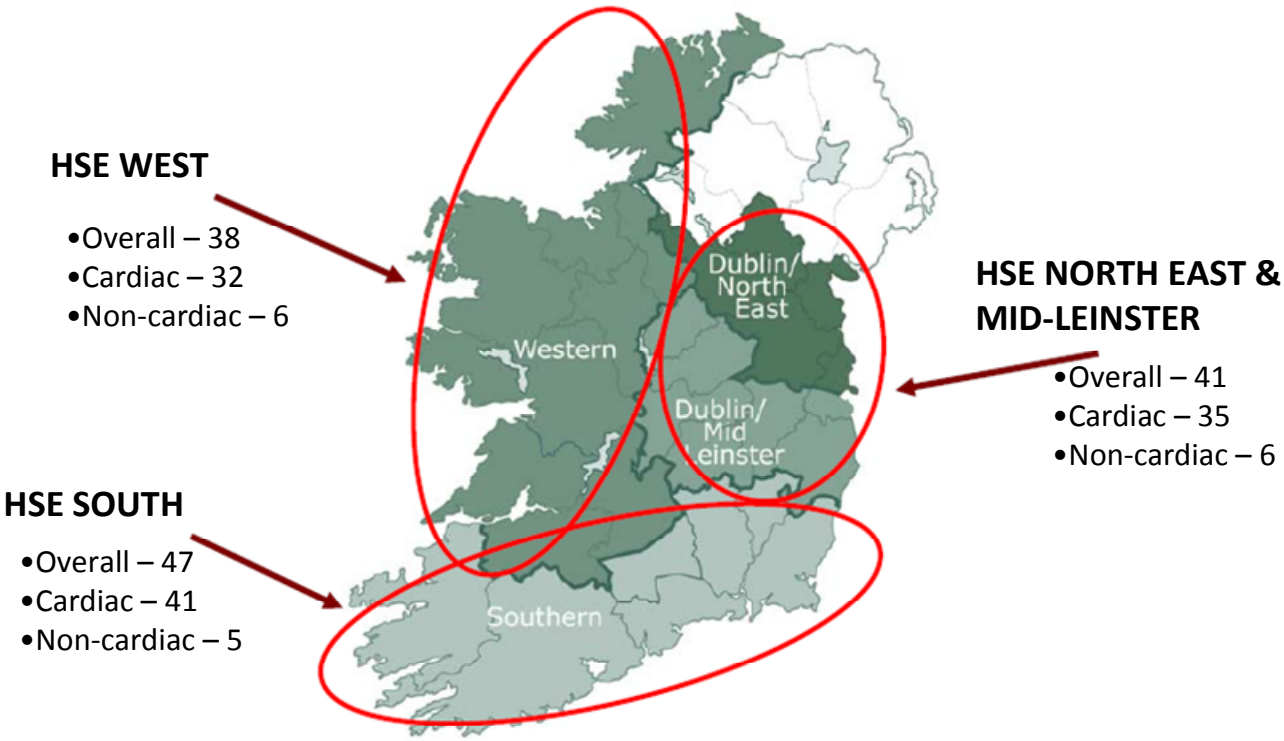
# OHCAR RESULTS 2013

# ALL CASES

INCIDENCE

In 2013, a total of 1903 OHCA resuscitation attempts attended by the National Ambulance Service, Dublin Fire Brigade and Dublin Airport Authority were either reported directly to OHCAR or identified during missing case searches. Nationally, this equates to 41 OHCA resuscitation attempts per 100,000 persons during 2013, a marginal increase in incidence since 2012. The majority of incidents were presumed to be of cardiac origin (36/100,000 persons) compared to a small proportion of cases of non-cardiac origin (6/100,000 persons). There was variation in incidence between the three National Ambulance Service Areas, with the South Area reporting the highest incidence of 41/100,000 persons.

*Figure Two: Incidence of OHCA resuscitation attempts per 100,000 Population during 2013 stratified by presumed cardiac/non-cardiac cause*



URBAN RURAL DIFFERENCES

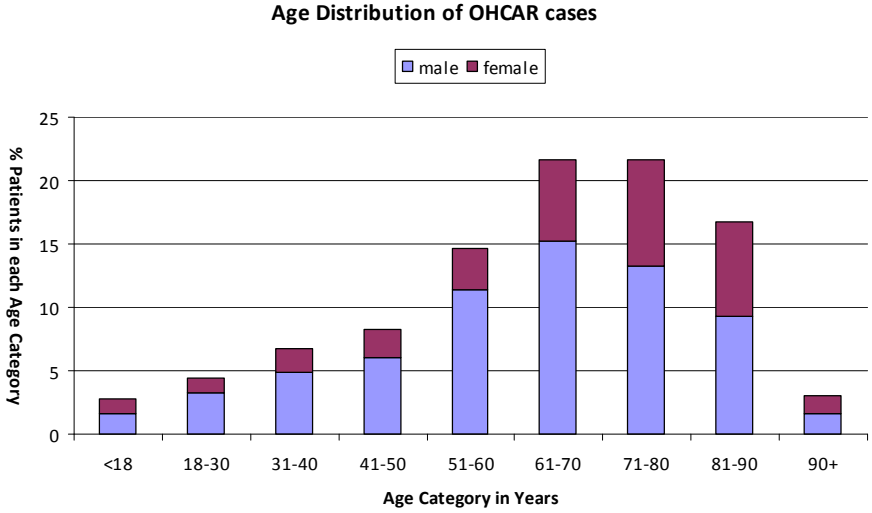
- The geographical coordinates of incidence locations were identified using the HSE application 'Health Atlas'. Geographical coordinates were available for a total of 1861 cases (98%)
- The majority of incidents occurred in urban areas (n=1172; 62%) however the incidence of cases per 100,000 cases was similar in both urban and rural[2] areas (41/100,000 vs. 40/100,000 respectively).

*Figure Three: Geographic distribution of OHCAR cases stratified by urban rural setting*


[2] Urban and rural areas are classified according to the definition used by the Central Statistics Office in Census 2011

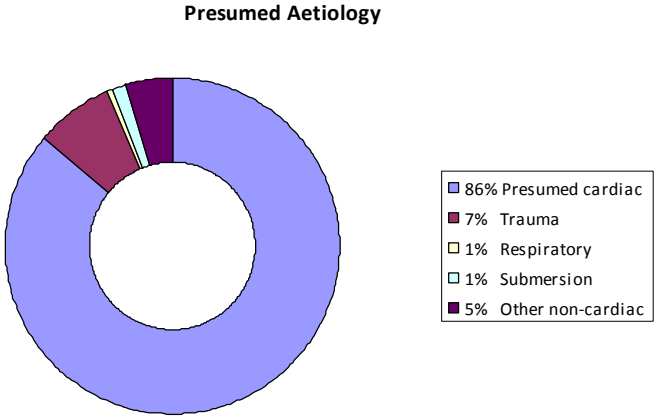
PATIENT DEMOGRAPHY

- Two thirds of patients were male (n=1270; 66.7%) and one third were female (n=631; 33.3%). Gender was not specified for two patients
- Patients ranged in age from less than one to 100 years old (median age 67 years)
- In 2013, the median age of female patients was significantly older than male patients (71 years vs. 65 years (p<=0.001))
- The median age of patients in urban areas tended to be younger on average than patients in rural areas (66 vs. 68 years 95%CI (p<=0.004)).




PRESUMED AETIOLOGY

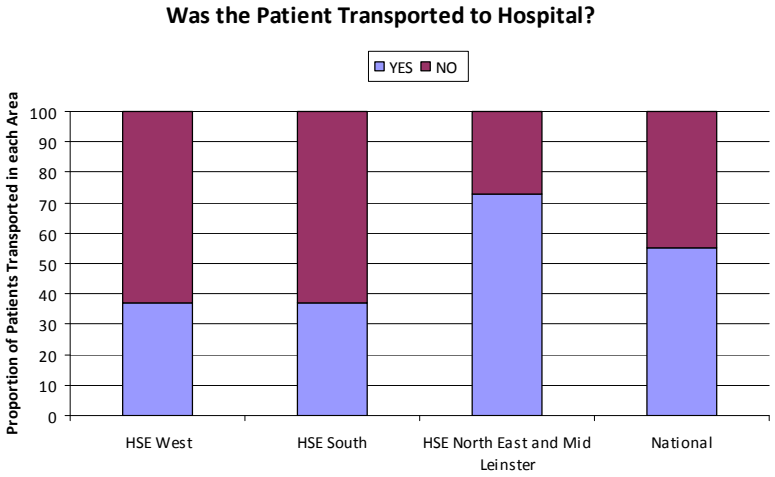
- The vast majority of incidents were presumed to be of cardiac cause (n=1637; 86%)
- Non-cardiac causes included trauma (n=142); respiratory (n=13), submersion (n=24). At least 40 cases of non-cardiac origin were suspected to have been caused by a drug overdose.




- Of all OHCAR cases, 84% of male patients had a presumed cardiac aetiology compared to 89% of female patients
- The median age of patients with a presumed cardiac aetiology was 66 years compared to 43 years for the non-cardiac group (p<=0.003).

TRANSPORT TO HOSPITAL FOR FURTHER TREATMENT

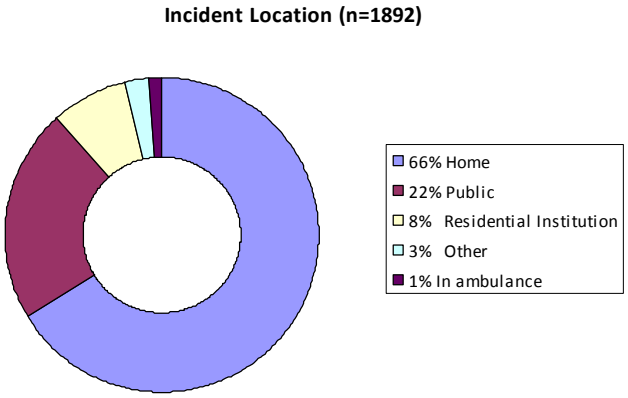
- Over half of patients were transported to either an Emergency Department or a catheterisation laboratory (n=1050; 55%)
- There was a wide variation in the proportion of patients transported to hospital across the three ambulance service areas ranging from 37% in HSE West to 73% in HSE North East and Mid-Leinster.




- While there was a slight decrease in the overall proportion of patients transported compared to 2012, patients in urban areas were still four times more likely to be transported than patients in rural areas (68% vs. 32%; p<=0.001).

EVENT LOCATION

- Of the 1892 cases for which data was available, two-thirds of incidents occurred at home (n=1258; 66%)) with a further one in twelve incidents occurring in a residential institution (n=48; 8%). Twenty-four arrests occurred during transport
- More than one in five incidents occurred in a public place (n=411; 22%)

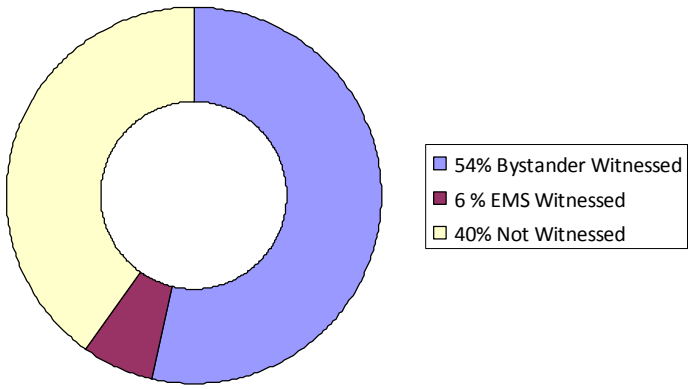



- In urban settings, a higher proportion of patients collapsed in a public place compared to rural settings (23% vs. 18% p=0.022). This difference was not significant in 2012
- In rural settings, a higher proportion of patients collapsed at home compared to urban settings (72% vs. 66% p=0.006).

WITNESS STATUS

- Of the 1827 events for which data was available, 981 incidents were witnessed by a bystander and 111 events were witnessed by Ambulance Service personnel. A total of 735 incidents were not witnessed. Data was missing for 76 incidents
- The proportion of patients in each category was similar to 2012
- The proportion of patients who had a bystander-witnessed arrest was lower in urban settings than in rural settings (51% vs. 58% p=0.004).

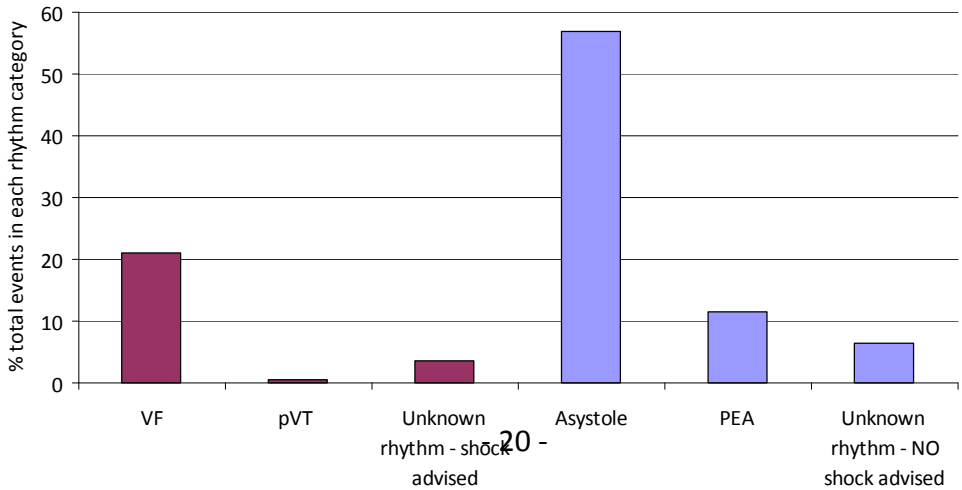
**Witnessed Status (n=1827)**




PRESENTING RHYTHM

- Of the 1850 cases for which data was available 463 patients (25%) were in a shockable rhythm at time of first rhythm analysis. This is an increase of 3% since 2012
- Patients with a presumed cardiac aetiology were more likely to present in a shockable rhythm than patients with a non-cardiac aetiology (28% vs. 7% p<=0.001)
- There was little difference in the percentage of patients presenting in a shockable rhythm according to urban or rural setting (26% vs. 23%).

**Presenting Rhythm (n=1742)**



BYSTANDER CPR

- A higher proportion of patients in a rural setting received bystander CPR compared to urban settings (73% vs. 59% p <=0.001)
- Of the 1716 cases that were not EMS-witnessed, data on bystander CPR was available for 1671 cases. Bystander CPR was attempted in 69% of these cases. **This is an increase of 9% since 2012**

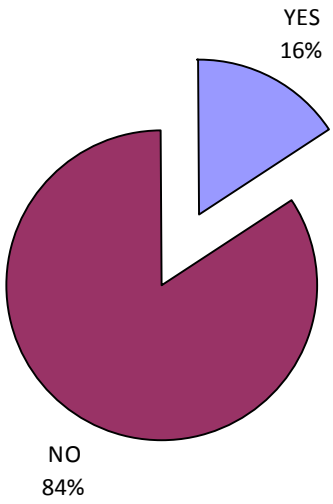
MECHANICAL CPR

- Use of a mechanical CPR device was reported in 88 cases only.

DEFIBRILLATION

- Of the 1832 patients for whom data was available, 691 had defibrillation attempted (38%) – a 3% increase from 2012
- The proportion of patients who had defibrillation attempted was similar in urban and rural areas (38% vs. 36%)
- In the 680 cases for which identity of assistance was available, the first shock was delivered before ambulance services arrived in 108 cases, a 3% increase since 2012
- In the subgroup of patients who had defibrillation attempted, 19% of patients in rural areas had defibrillation attempted compared to 14% of patients in urban areas. This difference however was not significant.

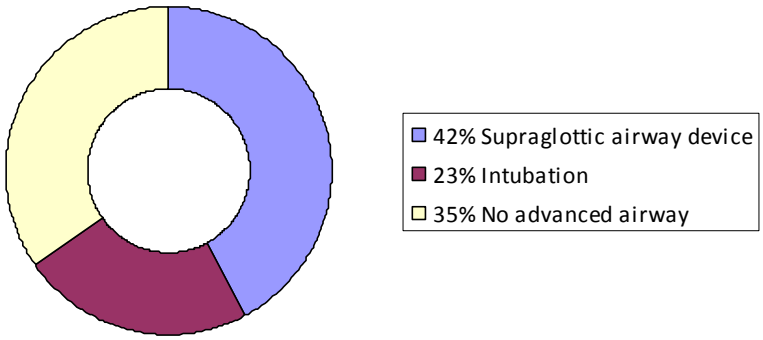
**Was Defibrillation Attempted before Ambulance Service Arrival? (n=680)**



USE OF ADVANCED AIRWAY ADJUNCT

- Of the 1692 cases for which data was available, advanced airway techniques i.e. supraglottic airway device or intubation were used in 1103 cases (65%)

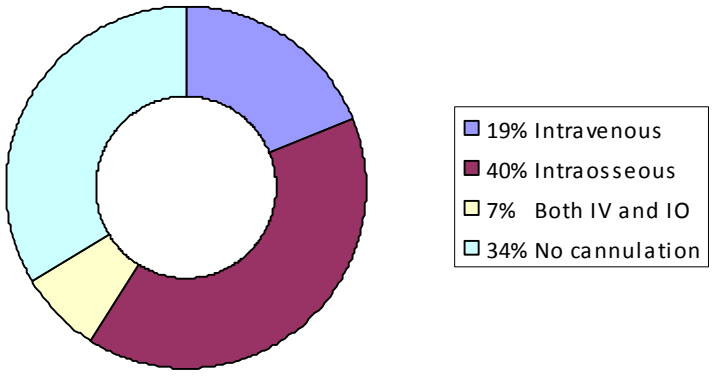
**Airway Adjunct Use (n=1692)**




CANNULATION

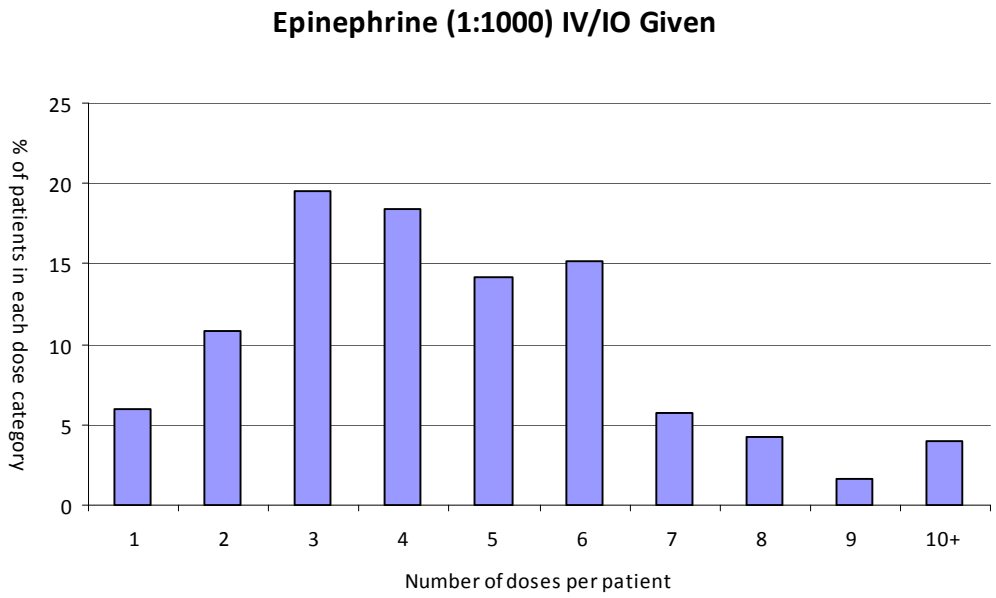
- Of the 1852 cases for which data was available, cannulation was performed in 1228 cases (66%)
- Intraosseous cannulation only was performed in the majority of cases (n=742; 40%), while intravenous cannulation only was performed in almost one in five cases (n=351; 19%). A combination of both techniques was used in 135 cases (7%)

**Cannulation Type (n=1852)**



CARDIAC ARREST MEDICATION

- Of the 1887 cases for which data was available, epinephrine was administered in 1168 cases (62%)
- Data on the number of epinephrine doses given to each patient was available for 1143 patients. The number of doses given ranged from one to sixteen.

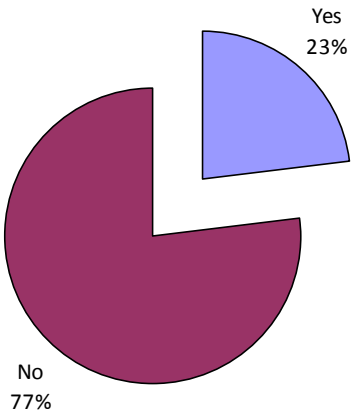



- Of the 1883 cases for which data was available, one in ten patients were administered amiodarone (n=189; 10%).

ROSC AT ANY STAGE

- Of the 1818 cases for which data was available, 419 patients had return of spontaneous circulation (ROSC) at some stage pre-hospital. Data on ROSC was missing for 85 patients. There was no change in reported ROSC between 2013 and 2012

**Was ROSC achieved at any Stage Pre-Hospital? (n=1818)**

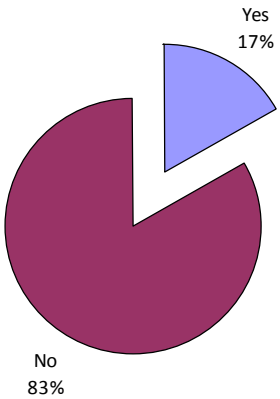



- Patients with a presumed cardiac aetiology were significantly more likely to achieve ROSC at any stage compared to patients with a non-cardiac aetiology (24% vs. 15% p<=0.001)
- Patients in urban areas were significantly more likely to achieve ROSC at some stage pre-hospital compared to patients in rural settings (27% vs. 17% p<=0.001)

ROSC ON ARRIVAL AT THE EMERGENCY DEPARTMENT

- Of the 1791 patients for whom data was available, 303 had ROSC on arrival at the Emergency Department. Data was missing for 112 patients.

**ROSC on arrival at the ED?**

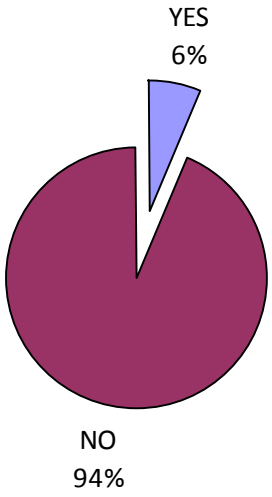



- Patients with a presumed cardiac aetiology were more likely to have ROSC on arrival in ED than patients with a non-cardiac aetiology (18% vs. 10%; p=0.003)
- Patients in an urban setting were significantly more likely to have ROSC on arrival at ED compared to patients in a rural setting (21% vs. 10%; p<=0.001).

DISCHARGED ALIVE FROM HOSPITAL

- Of the 1885 patients for whom data was available, 120 patients were discharged alive from hospital. Data on eighteen patients who were transported to hospital could not be obtained. There was an increase of over 1% in reported percentage survival between 2012 and 2013.

**Percentage of Patients Discharged Alive (n=1885)**

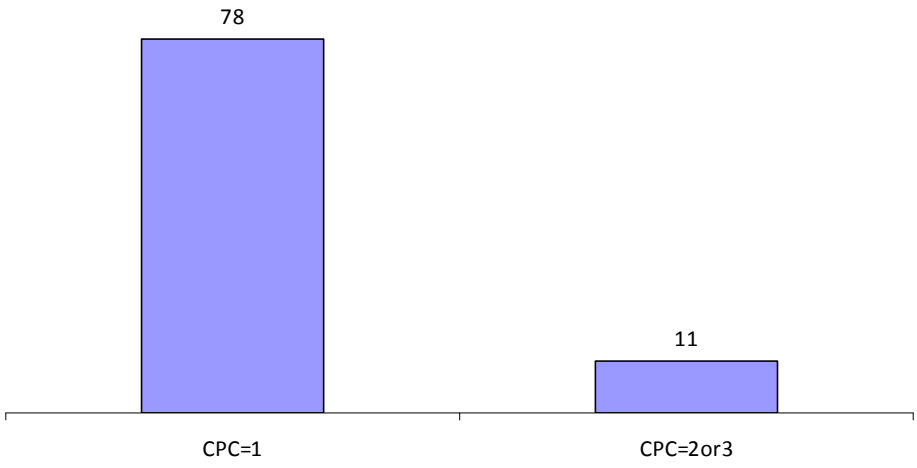



- Surviving patients were:
    - Younger on average than non-surviving patients (59 years vs. 64 years (p<=0.03))
    - More likely to have a presumed cardiac aetiology (p=<0.001). Survival in the presumed cardiac group was 7.1% (n=116) compared with 1.5% (n=4) in the non-cardiac group.
    - More likely to collapse in a public than in a private location (16% vs. 3.7% p<=0.001)
    - More likely to collapse in an urban than a rural setting (8.0% vs. 3.3% p<=0.001)
    - More likely to present in a shockable than a non-shockable rhythm (22% vs. 1.1% p<=0.001)
- In the non-EMS witnessed group:
    - 91% of survivors had a witnessed arrest
    - 82% of survivors received bystander CPR
    - 30% of survivors had defibrillation attempted prior to ambulance service arrival (n=26)

Neurological Function at Discharge

- The Cerebral Performance Category (CPC) Score is an instrument developed to assess both traumatic and anoxic cerebral injuries and has is used to evaluate outcomes in studies of cardiac arrest survivors. It is classified as a core Utstein data element for recording of both in and out-of-hospital cardiac arrest cases[9]
- CPC score data was available for 89 surviving patients only. Of the patients for whom data was available, 88% of patients had a CPC score of one

**Cerebral Performance Category Score for Surviving Patients (n=89)**



# OHCAR 2013

# COMPARATOR

# SUBSET

## OHCAR COMPARATOR SUBSET

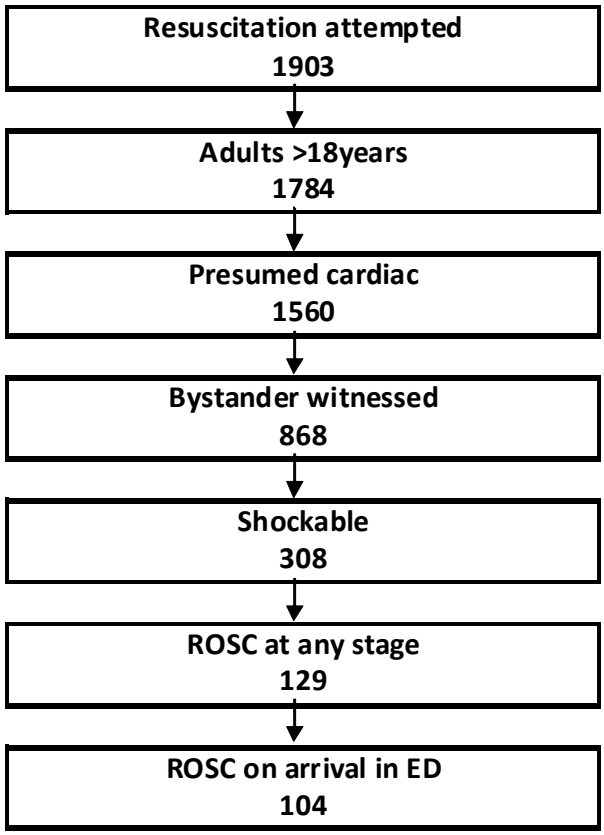
There is wide variation in the reported incidence of and outcomes from OHCA. One reason for this is the variability of patients for whom resuscitation is attempted. One way to control for this variation is to use the OHCAR Comparator Subset. This subset has been adapted from the Utstein Comparator Subset and includes only patients who fulfil the following criteria:

- Adult (>18 years)
- Presumed cardiac aetiology
- Bystander witnessed
- Presenting shockable rhythm.

The subset includes patients who have been shown to have the greatest chances of survival from OHCA. Improvements in each link of the chain of survival can improve the chances of patients in this subset surviving.

**UTSTEIN COMPARATOR SUBSET**

**Reporting Period: 2013**

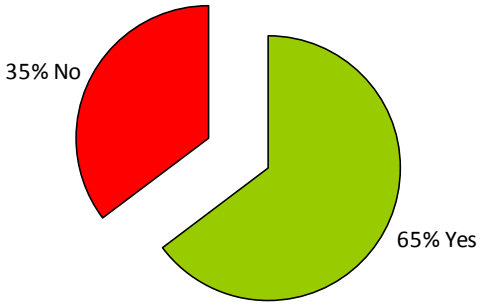



In 2013, this subset accounted for 16% of all OHCAR patients (n=308), which was similar to 2012.

CARDIAC ARREST RECOGNITION

- Of the 293 cases for which data was available, 190 cases were recognised as cardiac arrest at the time of ambulance dispatch

**Was Cardiac Arrest Recognised at time of Ambulance Dispatch? (n=293)**

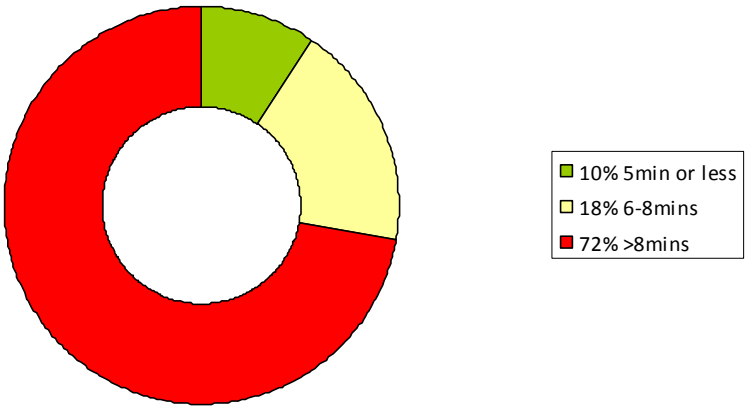



AMBULANCE CALL-RESPONSE INTERVAL

*Overall*

- The median ambulance call-response interval (CRI) was twelve minutes (range: less than one minute to 1 hour 18 minutes)
- The proportion of incidents responded to in five minutes or less was 10%
- The proportion of incidents responded to in eight minutes was 28%

**Percentage of Events in Each Time Category (n=296)**



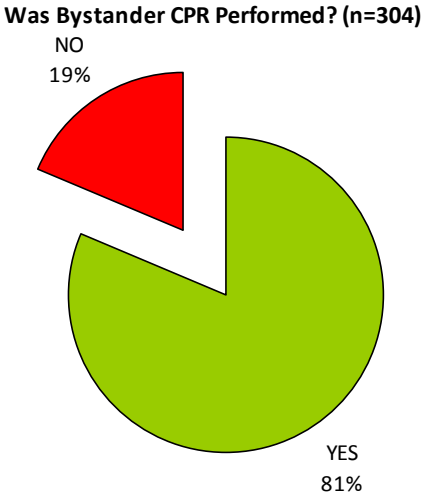

*Urban vs. Rural Setting*

- Of the 303 cases for which data was available, almost two thirds of cases (n=197; 65%) occurred in an urban setting. The median CRI in an urban setting was ten minutes (range: less than one minute to 56 minutes) compared with eighteen minutes in a rural setting (less than one minute to 48 minutes)
- The proportion of incidents responded to in five minutes or less was 12% in urban areas compared to 5% in rural areas
- The proportion of incidents responded to in eight minutes or less was 38% in urban areas compared to 10% in rural areas.

BYSTANDER CPR

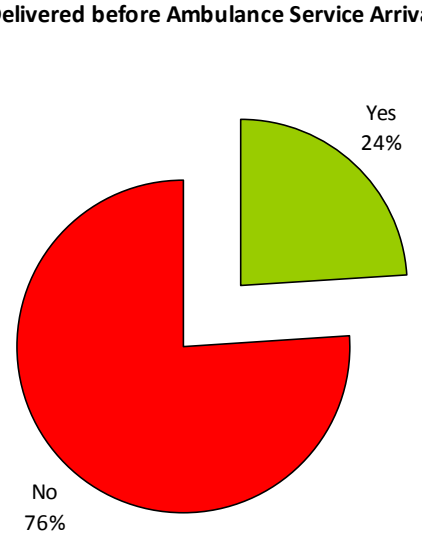
- Of the 304 cases for which data was available, 81% of patients in the subset had bystander CPR performed (n=247)

- No data is currently available on the following items:
    - Provision of CPR instructions to bystanders by Ambulance control staff
    - Quality of CPR provided by bystanders or ambulance personnel.




EARLY DEFIBRILLATION

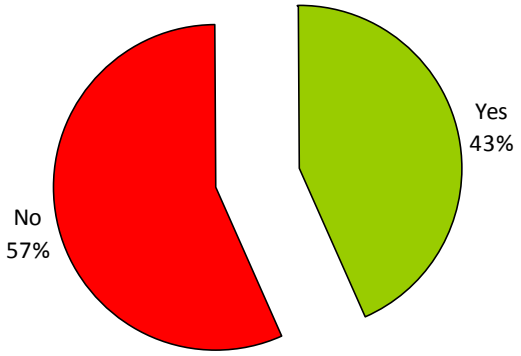
- Of the 300 patients for whom data was available, 72 patients (24%) had defibrillator pads applied before Ambulance Service arrival. All of these patients had defibrillation attempted before Ambulance Service arrival.



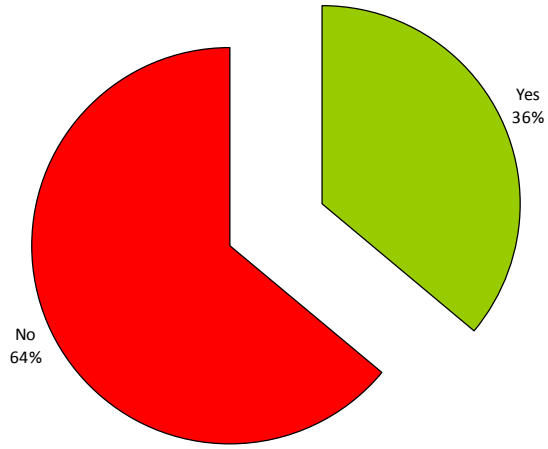
OUTCOMES

- Of the 298 cases for which data was available, 129 patients achieved ROSC at some stage pre-hospital (43%)
- Of the 288 cases for which data was available, 104 patients had ROSC on arrival at the Emergency Department (36%)
- Of the 303 cases for which data was available, 69 patients were discharged alive from hospital (23%)
- Of the 51 patients for whom CPC score was available, 43 patients had a CPC score of one (84%).

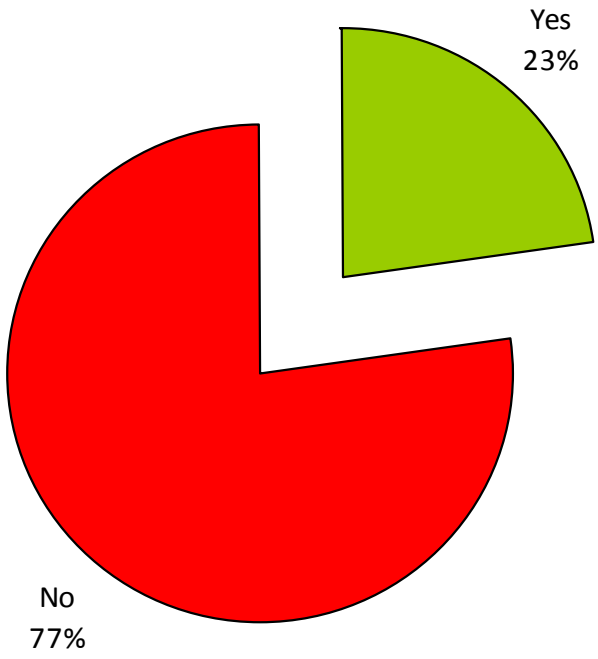
**Was ROSC achieved at any stage pre-hospital? (n=298)**




**ROSC on arrival at ED? (n=288)**




**Discharged Alive? (n=303)**



Surviving patients:

- Had a shorter median CRI (10 minutes (range: <1 minute to 78 minutes) vs. 13 minutes (<1 minute to 48 minutes)
- Were more likely to collapse in an urban setting (75%)
- Had bystander CPR performed in the vast majority of cases (85%)
- Had defibrillation attempted before Ambulance Service arrival in 34% of cases
- Were less likely to be administered epinephrine than non-surviving patients (31% vs. 74%)
- Were less likely to be intubated than non-surviving patients (11% vs. 30%).

# OHCAR 2013

# KEY MESSAGES FROM THE RESULTS

## KEY MESSAGES

*All OHCAR Patients*

- There were 1903 OHCAR cases recorded during 2013
- Percentage survival for all OHCAR cases was 6.4%
- In common with patients in 2012, surviving patients were more likely to:
  - BE younger than non-surviving patients
  - Have a presumed cardiac aetiology
  - Collapse in a public place and in an urban setting
  - Have a witnessed arrest
  - Present in a shockable rhythm
  - Receive bystander CPR (non-EMS witnessed group)
- Bystander CPR in the non-EMS witnessed was attempted in 69% of these cases. **This is an increase of 9% since 2012**
- Twenty-six survivors had defibrillation attempted before arrival of Ambulance Services – an increase of seven people since 2012

*OHCAR Comparator Subset*

- The OHCAR comparator subset includes patients most likely to benefit from improvements in pre-hospital resuscitation
- In 2013 there were 308 patients in the Comparator Subset.
- Percentage survival in the Subset was 23% - the same as in 2012
- When compared to non-surviving patients – in common with 2012 – surviving patients in the Comparator Subset were more likely to:
  - Have a shorter median ambulance call-response interval
  - Were more likely to collapse in an urban setting
  - Have bystander CPR performed
- At least one third of survivors in the Comparator Subset had defibrillation attempted before Ambulance Service arrival.

# APPENDIX ONE

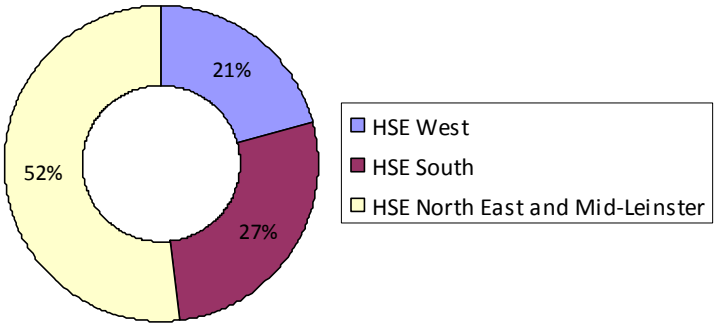
# OHCAR 2013

# COMPARATOR SUBSET

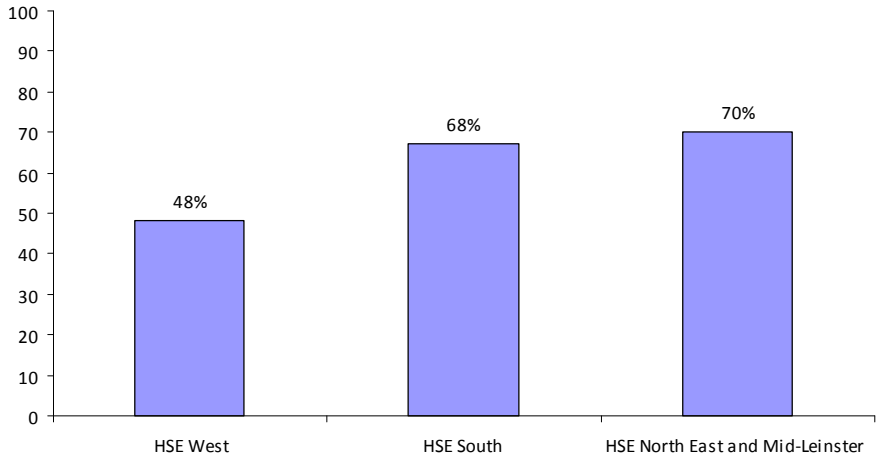
# RESULTS BY HSE AREA

## INCIDENCE, SETTING AND RESPONSE

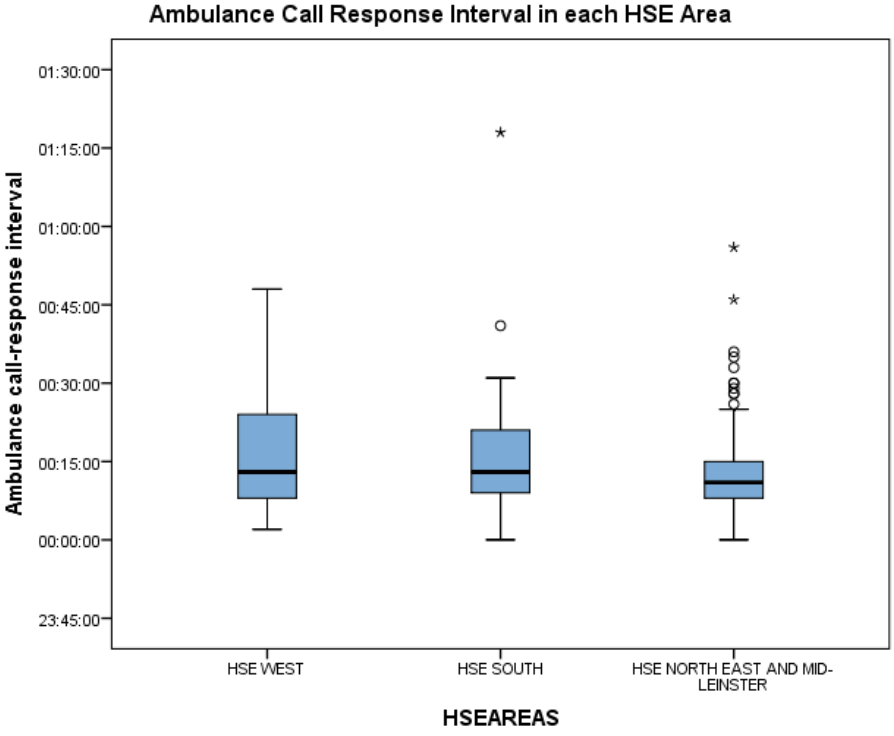
**Proportion of Comparator Subset Cases in each HSE Area**




**Percentage of Cases that Occurred in an Urban Setting**

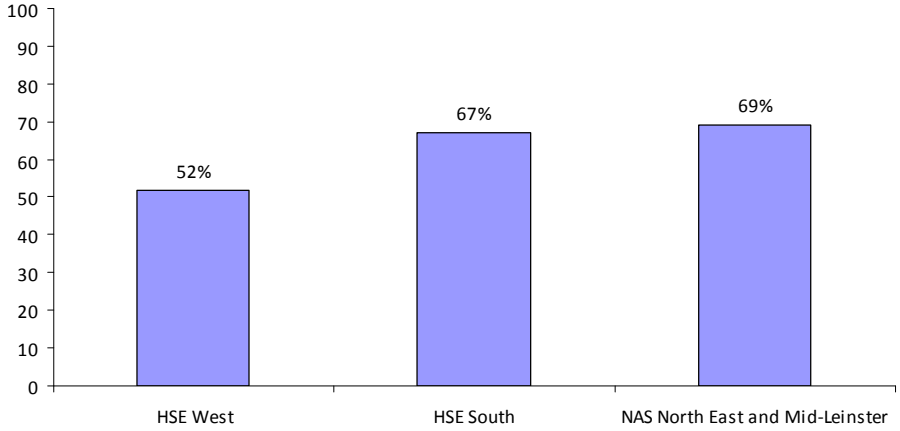



**Ambulance Call Response Interval in each HSE Area**

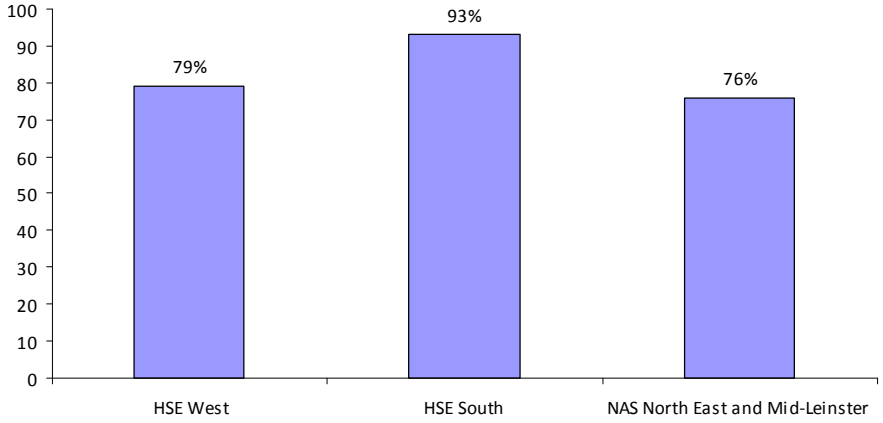


BEFORE AMBULANCE ARRIVAL

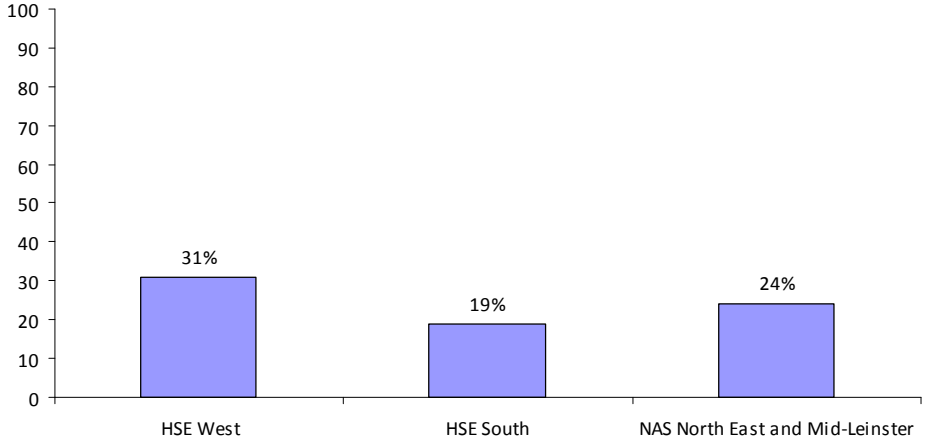
**Percentage of Cardiac Arrest Recognised at Time of Ambulance Dispatch**




**Percentage of Bystander Witnessed and Bystander CPR Cases**

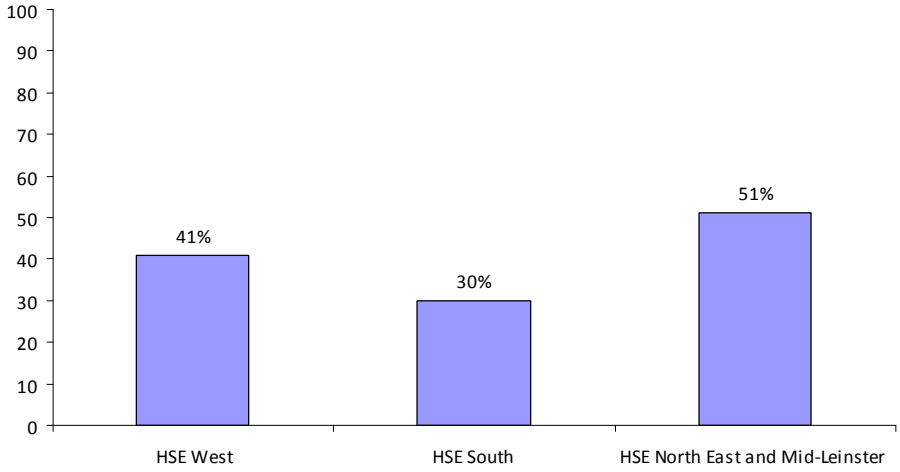



**Percentage of Cases with Attempted Defibrillation before Ambulance Service Arrival**

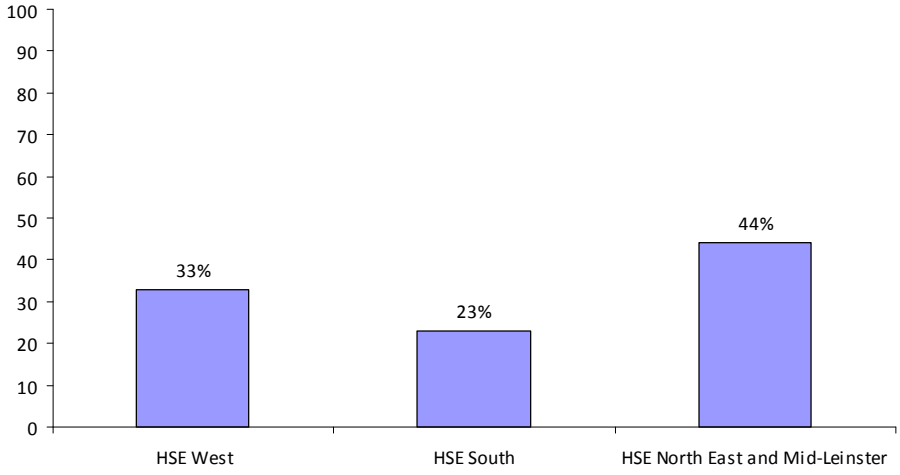


OUTCOMES

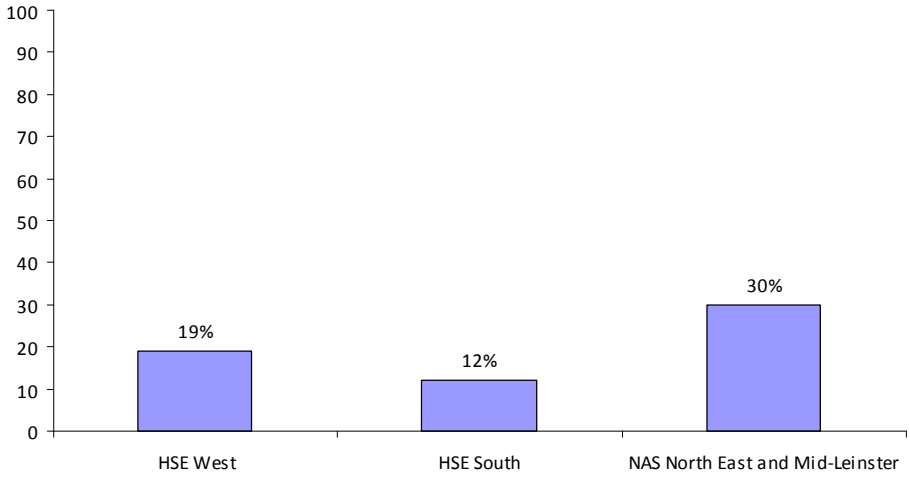
**Percentage of Cases with ROSC at any Stage Pre-Hospital**




**Percentage of Cases with ROSC on arrival at the ED**




**Percentage of Cases with Survival to Hospital Discharge**



# APPENDIX TWO

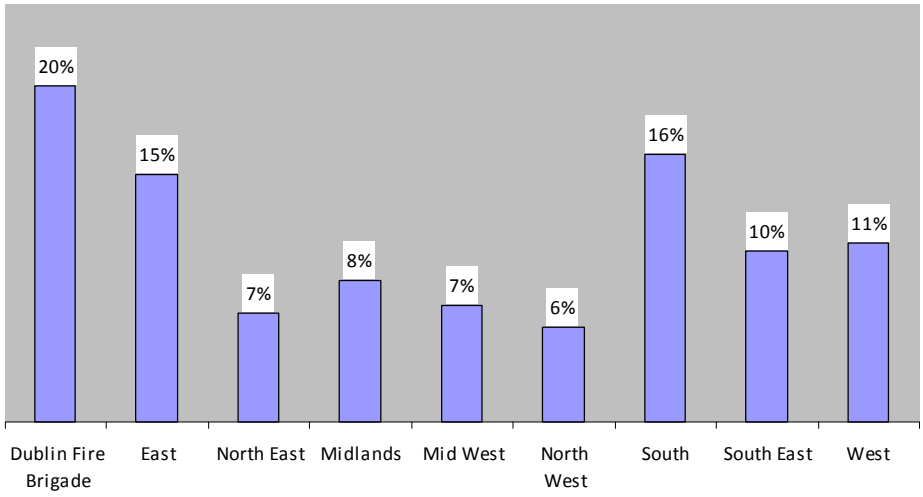
# OHCAR 2013

# ALL DATA

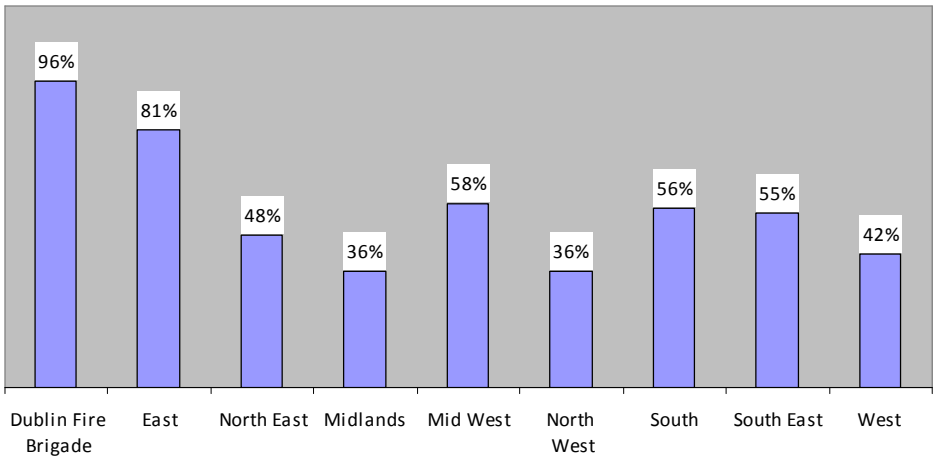
# RESULTS BY FORMER

# AMBULANCE DIVISION

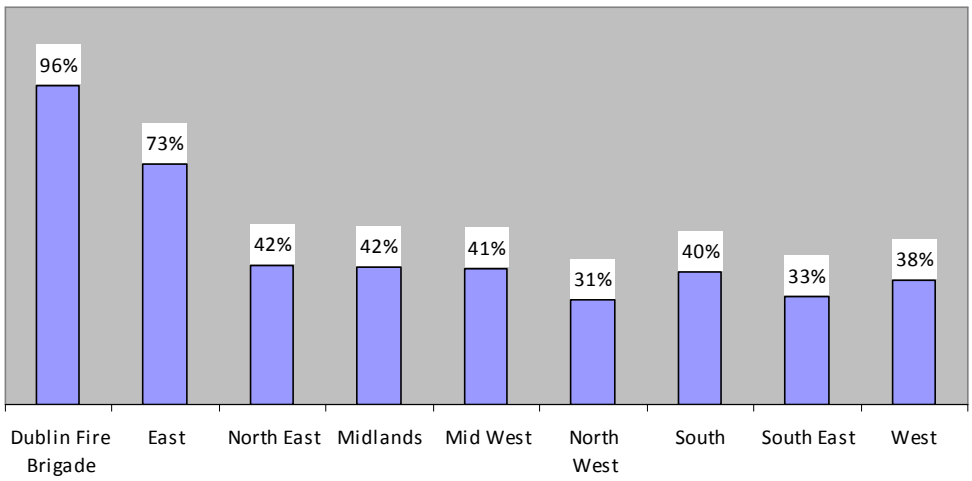
**Percentage of Total OHCAR cases in Each Division**

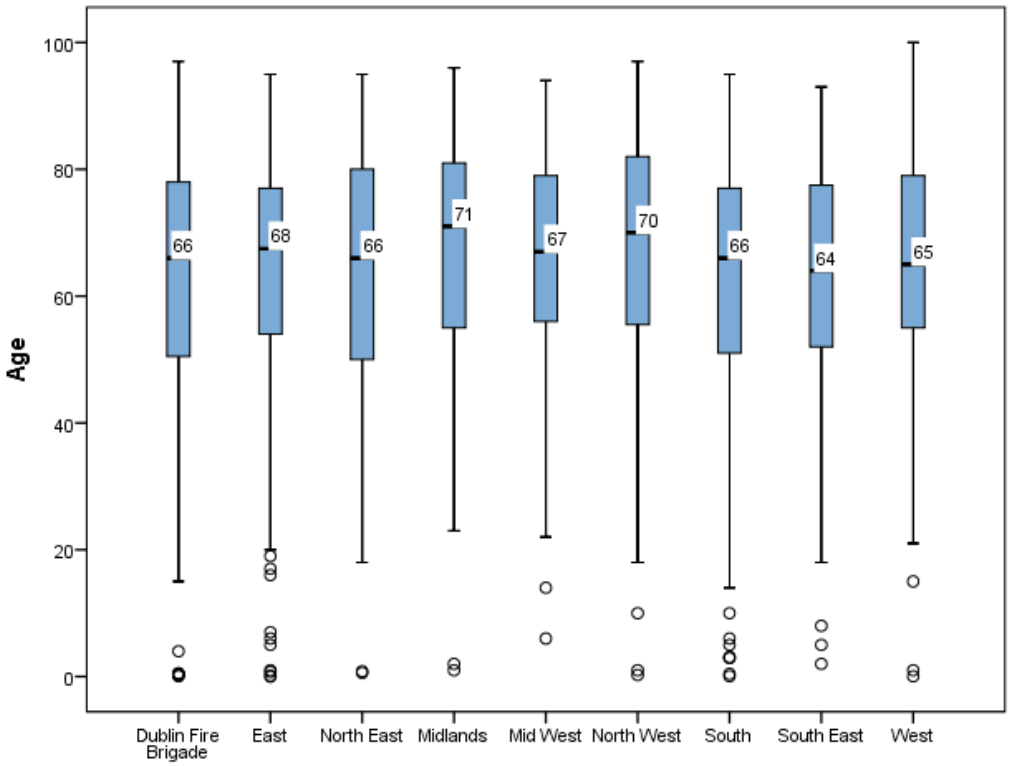



**Percentage OHCAR Cases in an Urban Setting in Each Division**




**Percentage OHCAR Cases Transported to Hospital in Each Division**

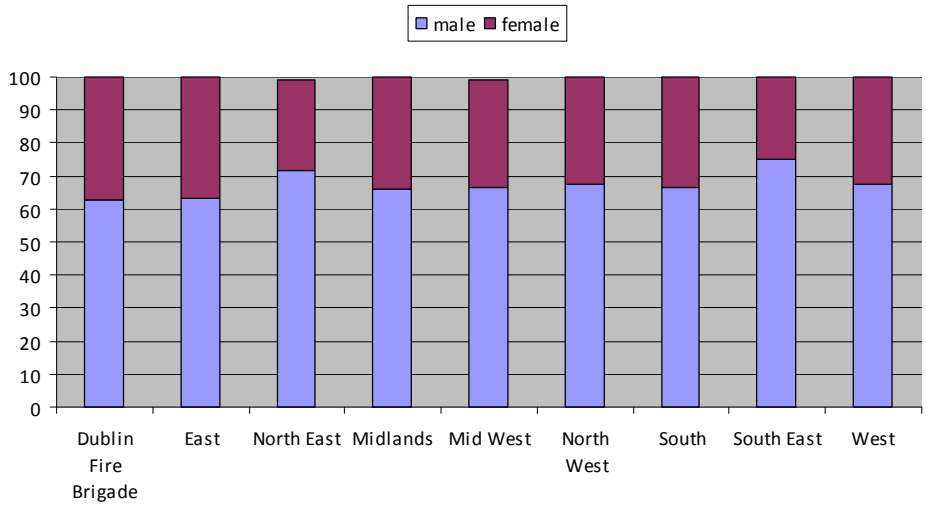




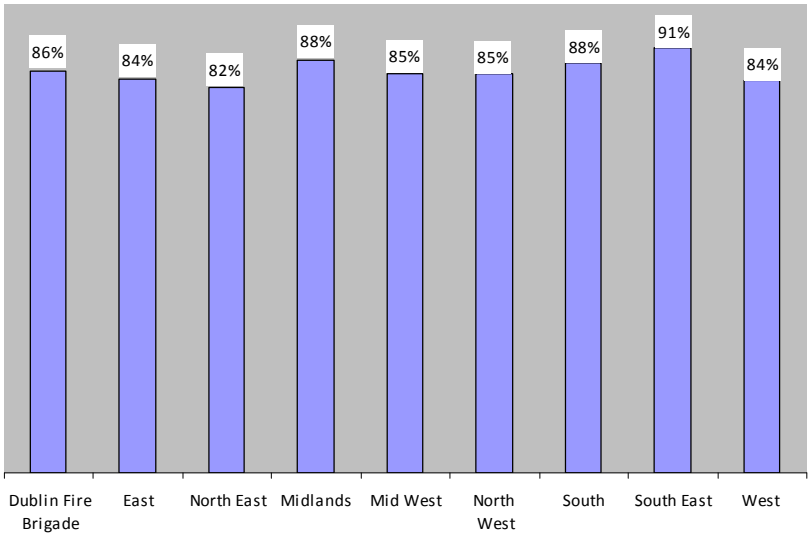

**Age Distribution in Each Division***

*Median Age noted on each boxplot

## Proportion Female/Male Patients in Each Division

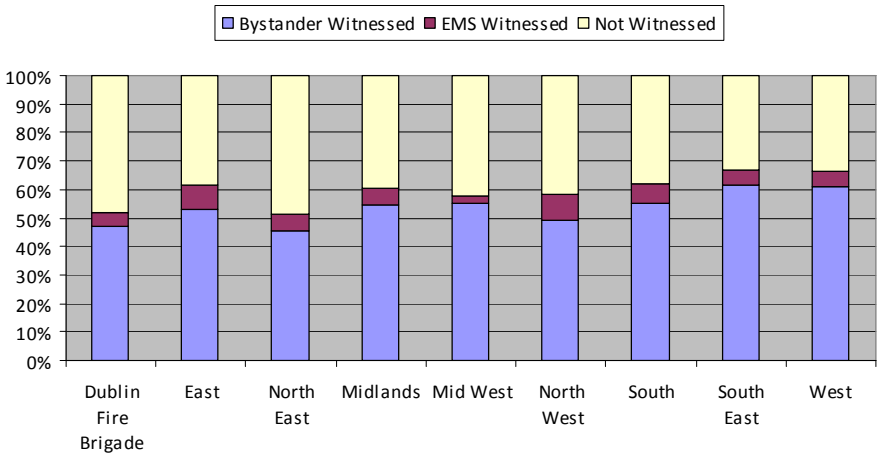



## Percentage Presumed Cardiac OHCAR Cases in Each Division

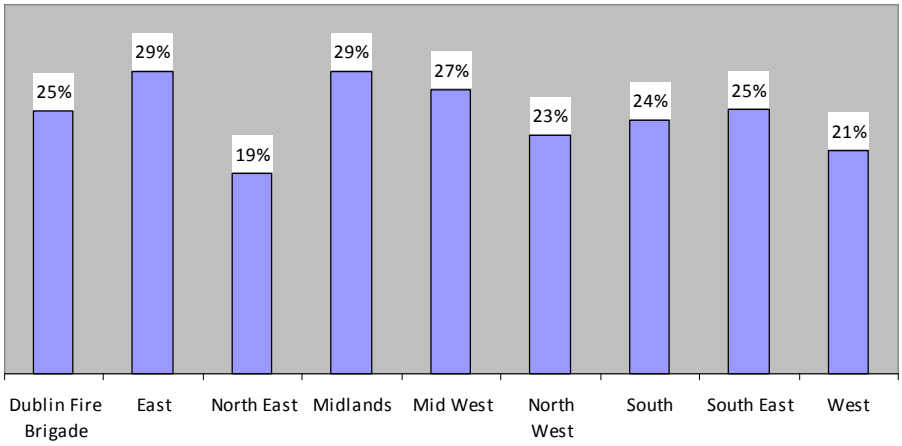



## Percentage of OHCAR Cases Occurring in a Public Location in Each Division

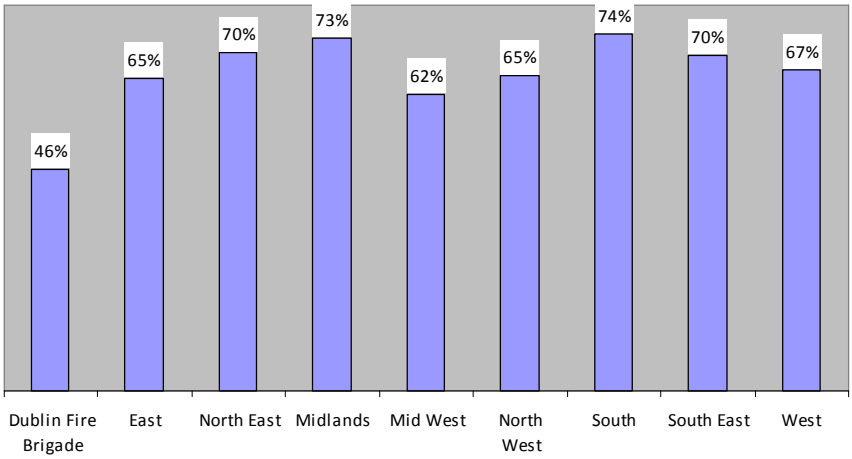
## Proportion of Witnessed and Non-Witnessed OHCAR Cases in Each Division



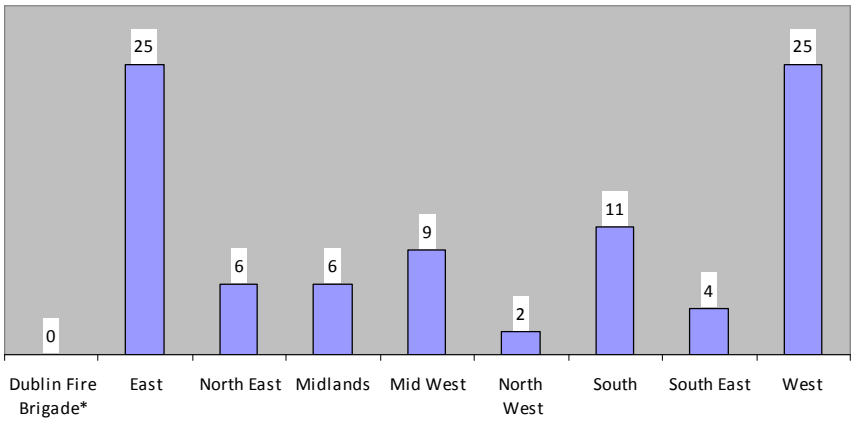

## Percentage of OHCAR Cases in Initial Shockable Rhythm in Each Division




## Percentage Bystander CPR in Each Division

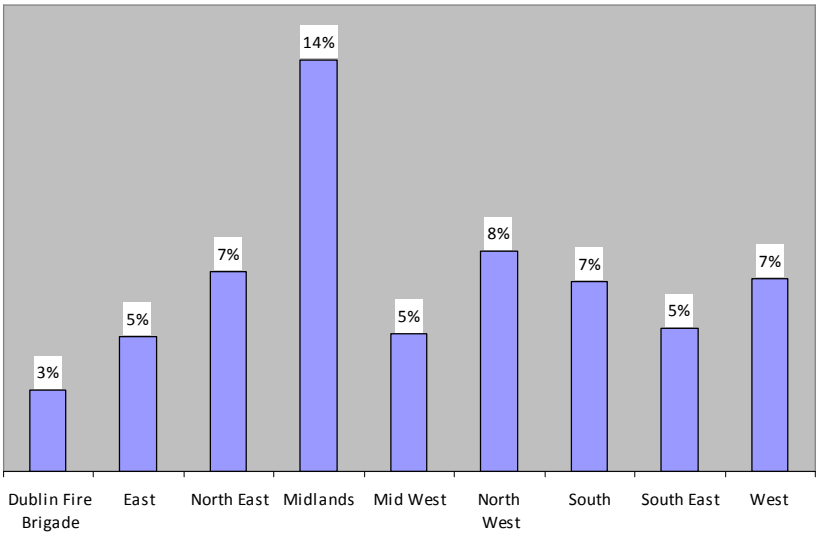


**Number of Incidents where Mechanical CPR Device Used in Each Division**

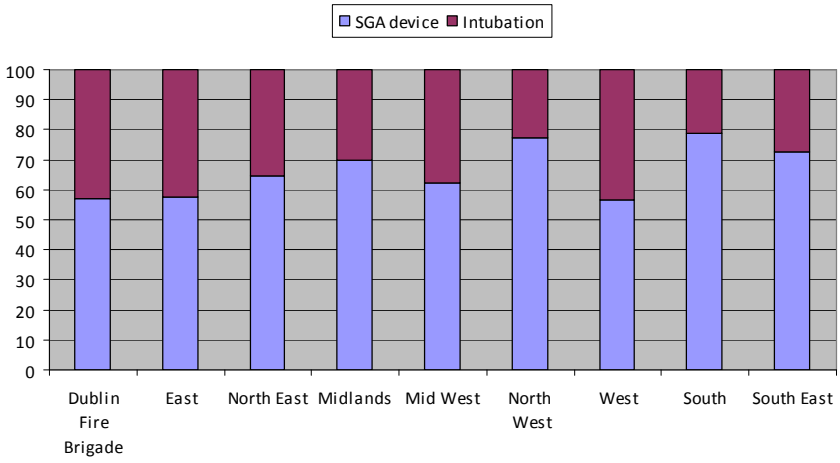



*Please note, mechanical CPR devices were not in use by DFB personnel in 2013

**Percentage of OHCAR Cases where Defibrillation Attempted Prior to Ambulance Service Arrival**

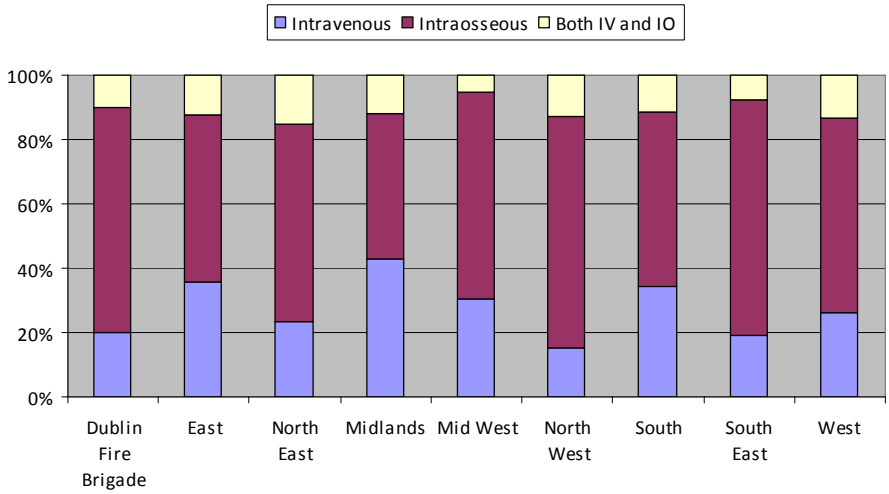



**Proportion of SGA vs. Intubation use in Each Division**



**Percentage of Cases where Cannulation Performed in Each Division**


**Proportion of Cannulation Types Used in Each Division**




**Percentage of OHCAR Cases where Epinephrine Admininstered in Each Division**