

Out-of-Hospital Cardiac Arrest Register

OHCAR ^{Ireland}



At the heart of evidence

Annual Report 2018



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Executive Summary



2,442 cases of out-of-hospital cardiac arrest where resuscitation was attempted



***81%** had bystander CPR performed

67% Male, 33% Female
Median age – 67 years

20% of all cases were initially shockable



22% defibrillation attempts pre EMS arrival



41% transported



26% ROSC pre-hospital



19% ROSC on arrival at hospital



176 patients were discharged alive

***Excludes EMS witnessed cases**

OHCAR Key Messages 2018

Patient and Event Characteristics

- 2,442 out-of-hospital cardiac arrest incidents recorded on OHCAR (51 per 100,000 population in 2018)
 - 71% occurred in an urban area ^a
 - 67% were male (IQR 52 – 78)
 - Median age – 67 years
 - 85% presumed medical aetiology
 - 68% happened in the home
 - 81% bystander CPR attempted
 - 50% bystander witnessed

Defibrillation

- 20% Initial shockable rhythm
- 26% Defibrillator pads applied prior to arrival of the EMS
- 32% Defibrillation attempted
 - 22% had defibrillation attempted before arrival of the EMS
- 26% had Return of Spontaneous Circulation (ROSC) pre-hospital
- 19% had ROSC on arrival at hospital
- 7.2% of cases were discharged alive (176 patients)
 - 96% had good to moderate neurological function on discharge

Utstein Group ^{b 4}

- 13% of patients were in the Utstein Group
 - 54% had ROSC pre-hospital
 - 46% had ROSC on arrival at hospital
 - 63% of surviving patients collapsed in a public location
- 45% of surviving patients had defibrillation attempted pre-EMS arrival
- 30% of patients were discharged alive

^aDefinition of urban confers with the CSO definition of a settlement i.e. defined as having a minimum of 50 occupied dwellings, with a maximum distance between any dwelling and the building closest to it of 100 metres, and where there is evidence of an urban centre¹⁰.

^bThe Utstein subgroup includes patients who are >17 years, with presumed medical aetiology, bystander witnessed event and an initial shockable rhythm.

Annual Trends

- 21% increase in bystander CPR from 2012 – 2018
- 9% increase in bystander defibrillation from 2012 – 2018
- 3% increase in ROSC at any stage from 2012 – 2018
- 3% increase in ROSC at hospital arrival from 2012 – 2018
- The vast majority of people who survive consistently have good neurological function on Hospital discharge
- The percentage survival to Hospital discharge is stable, but in real terms **the number of survivors increased from 152 in 2017 to 176 in 2018.**

Abbreviations

B-CPR	Bystander Cardiopulmonary Resuscitation
BLS	Basic Life Supporter
CFR	Community First Responder
CPC	Cerebral Performance Category
CPR	Cardiopulmonary Resuscitation
CRI	Call Response Interval
CSO	Central Statistics Office
DAA	Dublin Airport Authority
DFB	Dublin Fire Brigade
ED	Emergency Department
EMS	Emergency Medical Services
ePCR	Electronic Patient Care Record
ERC	European Resuscitation Council
EuReCa	European Registry of Cardiac Arrest
GP	General Practitioner
HRB	Health Research Board
HSE	Health Service Executive
IQR	Interquartile Range
NAS	National Ambulance Service
OHCAR	Out-of-Hospital Cardiac Arrest Register
PCR	Patient Care Records
PEA	Pulseless Electrical Activity
PHECC	Pre-Hospital Emergency Care Council
PVT	Pulseless Ventricular Tachycardia
ROSC	Return of Spontaneous Circulation

Chapter 1

1.0 Introduction

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

The 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 was also emphasised in the policy document *“Changing Cardiovascular Health”*² and the *“Emergency Medicine Programme Strategy”*³. Since 2012, OHCAR has been one of a limited number of OHCA registries in Europe with full national coverage.

1.2 The OHCAR Steering Group and Governance

OHCAR is hosted by the Department of Public Health Medicine in the Health Service Executive (HSE) North West region, and was until December 2018 jointly funded by the Pre-Hospital Emergency Care Council (PHECC) and the National Ambulance Service (NAS), and is currently funded solely by the latter. It is administered and supported by the Discipline of General Practice, National University of Ireland Galway, and is guided by the OHCAR Steering Group (Appendix 1).

1.3 The Aim of OHCAR

The aim of OHCAR is to support improved outcomes from OHCA in Ireland by:

- Collecting information on the population who suffer OHCA and the circumstances of the arrest
- Collecting information on the pre-hospital treatment of OHCA patients
- Monitoring the survival to Hospital discharge of OHCA patients
- Establishing a sufficiently large patient database to enable identification of the best treatment methods for OHCA and optimum organisation of services
- Providing regular feedback to service providers
- Facilitating research on best practice nationally and internationally using OHCAR data

Chapter 2

2.0 Methods

2.1 Inclusion / Exclusion Criteria

OHCAR registers “all patients who suffer a witnessed or un-witnessed out-of-hospital cardiac arrest in Ireland which is confirmed and attended by Emergency Medical Services (EMS) and resuscitation attempted”. A resuscitation attempt is defined as performance of cardiopulmonary resuscitation (CPR) and/or attempted defibrillation where there is evidence of a cardiac arrest rhythm. Incidents attended by the EMS where resuscitation is not attempted due to obvious signs of death, injuries incompatible with life, or a ‘do not resuscitate’ order are *not* included in OHCAR. The current scope does not include patients who suffer an OHCA and who are **not** attended at any stage by statutory EMS.

2.2 Source of OHCAR Data

The primary source of OHCAR data are Patient Care Records (PCRs) and ambulance dispatch data from the two statutory ambulance services, the National Ambulance Service (NAS) and the Dublin Fire Brigade (DFB). OHCAR has data sharing agreements with other organisations including the Dublin Airport Authority (DAA), Red Cross, Civil Defence and Irish Coastguard and Order of Malta, but presently almost all data is provided from statutory services.

At present, the work undertaken by Community First Responder (CFR) groups is not fully captured in OHCAR data. These groups are usually community based and voluntary. OHCAR is working to find ways of recording this information for future analysis. The increased use of electronic data capture will help address this.

2.3 Data Collection

OHCAR collects data in the format of the internationally agreed Utstein dataset ⁴.

National Ambulance Service: PCRs are collected from ambulance stations on a monthly basis, digitised and stored on a central database by IMSCAN (Ireland) Ltd. PCRs for OHCA incidents are identified by NAS staff and fast-tracked in order to facilitate OHCAR. IMSCAN enter OHCAR data variables onto a preliminary database and forward this and digitised copies of PCRs to OHCAR. Following validation, OHCAR staff uploads the data onto the OHCAR database.

OHCAR receives NAS dispatch data monthly from the National Emergency Operations Centre (NEOC) in Tallaght and this data is added to each record in the OHCAR database.

NAS are currently phasing the introduction of electronic PCRs (ePCR), and during 2018 29% (n=602/2,054) of cases were received directly to OHCAR office by the electronic PCR system. This development will significantly streamline OHCAR processes in the future.

Dublin Fire Brigade: PCRs are sourced by DFB's EMS Support Unit and data is provided to OHCAR on a quarterly basis in a summarised electronic format. These records are integrated with data from the DFB East Region Command Centre in Townsend Street. Electronic copies of DFB PCRs are also sent to OHCAR to enable case validation.

Hospitals: OHCAR has a data sharing agreement with all hospitals who receive OHCA patients except Our Lady's Children's Hospital, Crumlin. Collection of data from hospitals is facilitated by a range of hospital staff, including administrators, resuscitation officers, clinical nurse managers and consultants. Acute hospitals in Ireland provide information on survival status and Cerebral Performance Category (CPC) score ^{c 5}.

2.4 Aetiology

As per the Utstein definition, where there is no evidence of another cause, e.g. trauma, asphyxiation, drug overdose cases were presumed to be of medical aetiology.

2.5 Data Quality Management

The Utstein guidelines state that, "organisers of OHCA registries should implement monitoring and remediation for completeness of case capture" ⁴. OHCAR operates a 'missing case search' system, which is performed on a monthly basis and repeated annually in order to identify cases that were not processed through the OHCAR data collection system ⁶.

^cCerebral Performance Category (CPC) score is an assessment score developed to assess both traumatic and anoxic cerebral injuries.

The quality of data variables for each OHCAR case is vital to the usefulness of the register. Responsibility for accurate and comprehensive data recording lies with the emergency practitioners who attend the OHCA scene. OHCAR works with NAS and DFB to enhance data quality by providing quarterly reports which include a summary of the availability of some core data elements. NAS then produce and circulates OHCAR summary reports to ambulance stations on a quarterly basis. DFB also provide each practitioner access to their quarterly reports.

The following data quality checks are also undertaken:

- Case duplication searches
- Checking for inconsistent and/or conflicting data values
- Validation of initial data entries and against OHCAR inclusion criteria
- Clinical expertise is provided on a case-by-case basis by the OHCAR Steering Group when required

2.6 Statistical Analysis

Data analysis was performed using IBM SPSS version 24. In all cases $p < 0.05$ was used as the level of statistical significance. Relationships between categorical values were expressed in percentages and examined by the Chi square test for significance ⁷.

Chapter 3

3.0 Results

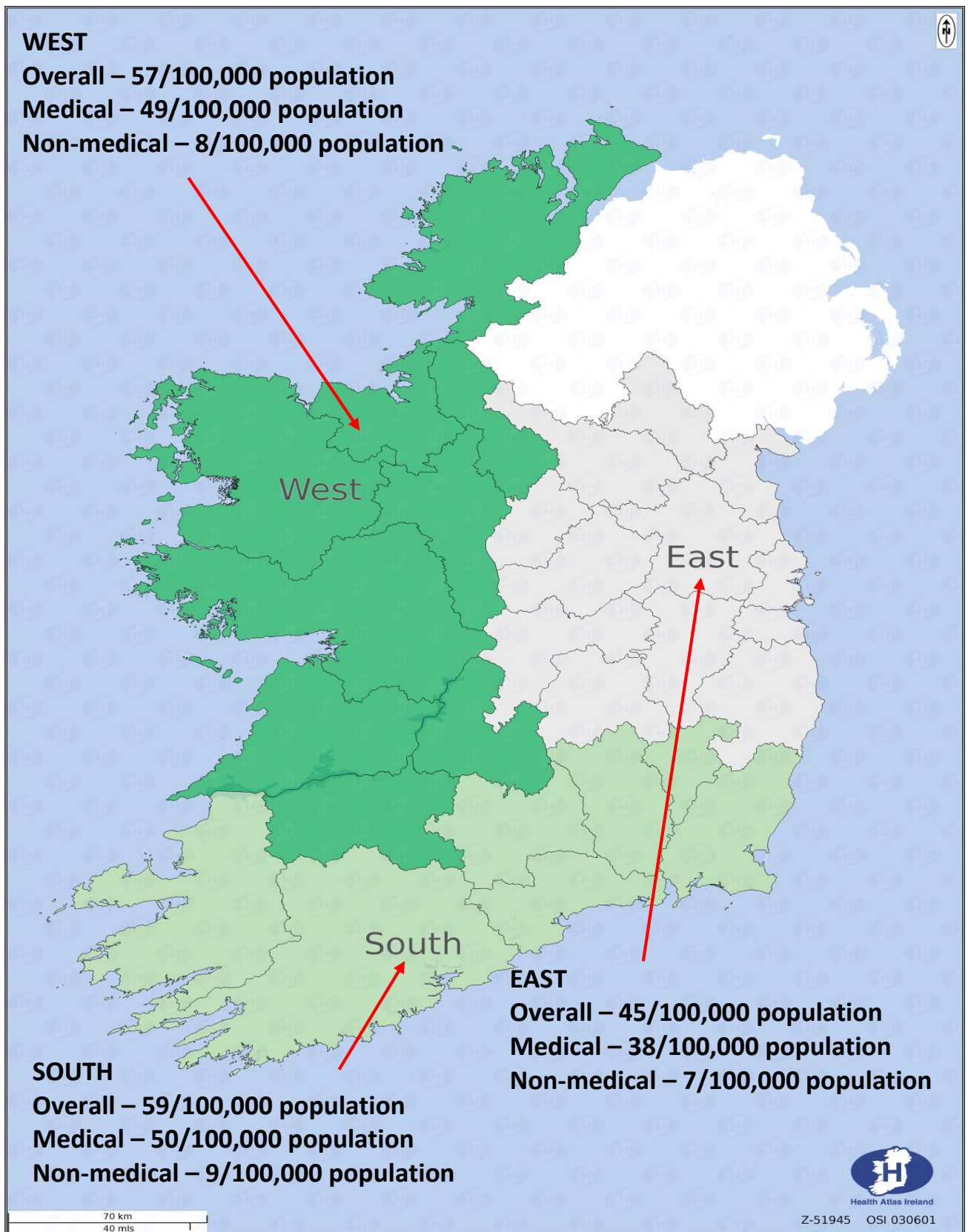
3.1 Incidence

In 2018, a total of **2,442** OHCA were attended where resuscitation was attempted by NAS, DFB and/or DAA. Of these, 67% were reported directly to OHCAR, 25% were identified during examination of ePCRs and 8% were identified during missing case searches. This equates to 51 OHCA resuscitation attempts per 100,000 in 2018¹⁰. In Europe, the incidence of OHCA ranges between 38 and 86 per 100,000 per year^{8,9}.

In 2018, the majority of OHCA incidents were presumed to be of medical aetiology (44/100,000 persons) compared to a small proportion of cases of non-medical aetiology (trauma, asphyxial, drug overdose or submersion) (7/100,000 persons). The HSE South Area reported the highest incidence at 59/100,000 persons (Map 1)^d.

^dPopulation data from Census of Population 2016¹⁰.

Map1: Incidence of OHCA with resuscitation attempts in 2018

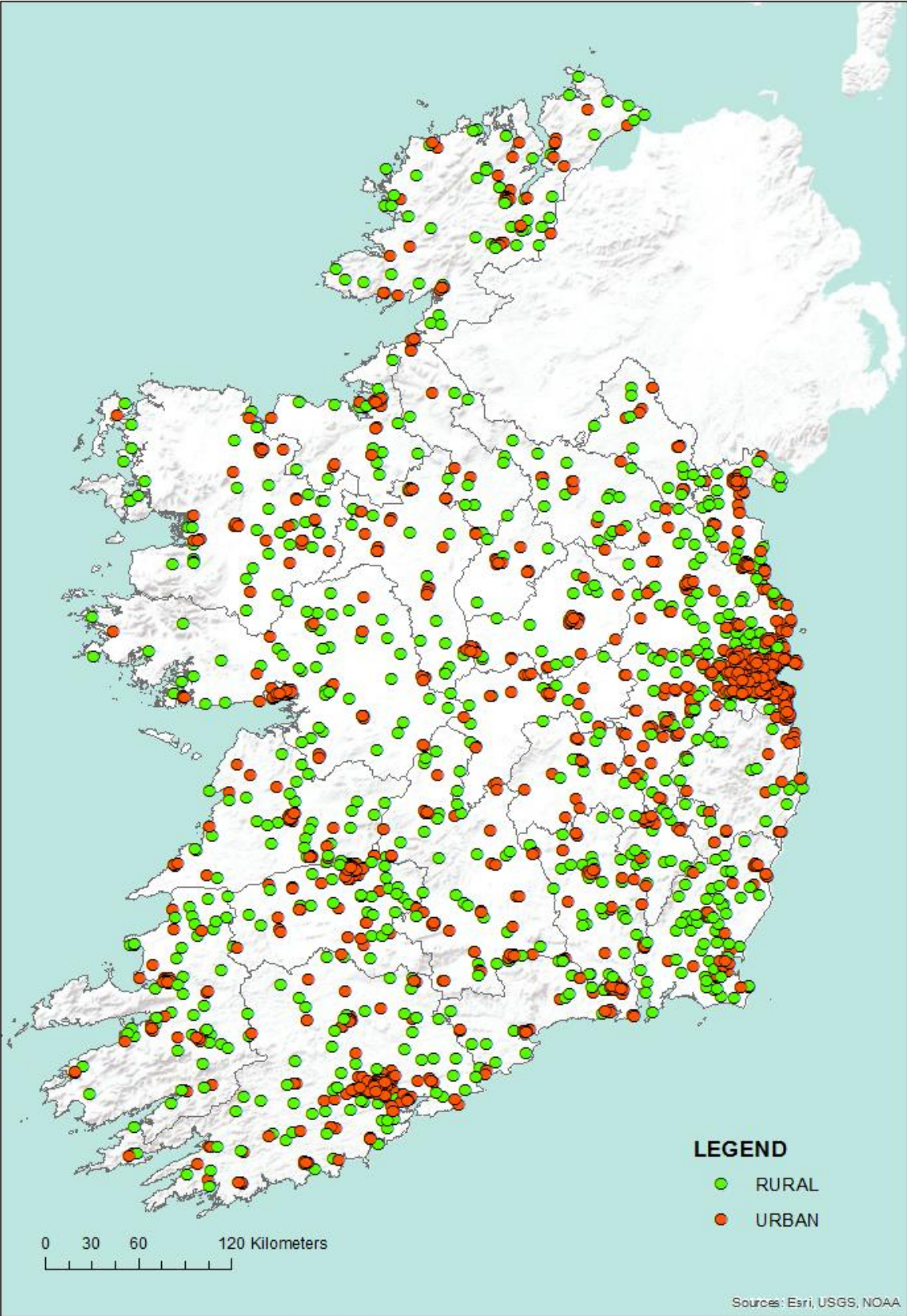


3.2 Geographical Distribution of Incidents

The geographical coordinates of incident locations were identified using the HSE application 'Health Atlas' (<https://www.healthatlasireland.ie/>). Map 2 highlights that the majority of cases occurred in the most populated areas. The classification of an urban area confers with the CSO definition of a settlement i.e. defined as having a minimum of 50 occupied dwellings, with a maximum distance between any dwelling and the building closest to it of 100 metres, and where there is evidence of an urban centre ¹⁰.

- 71% of cases occurred in an urban area (n=1,656/2,333); 109 cases could not be geocoded due to insufficient data or the event having occurred during ambulance transport
- Case incidence was 50/100,000 per year in urban areas and 47 per 100,000 population/year in rural areas.

Map 2: Geographical distribution of OHCAR Incidents with settlement/non-settlement classification



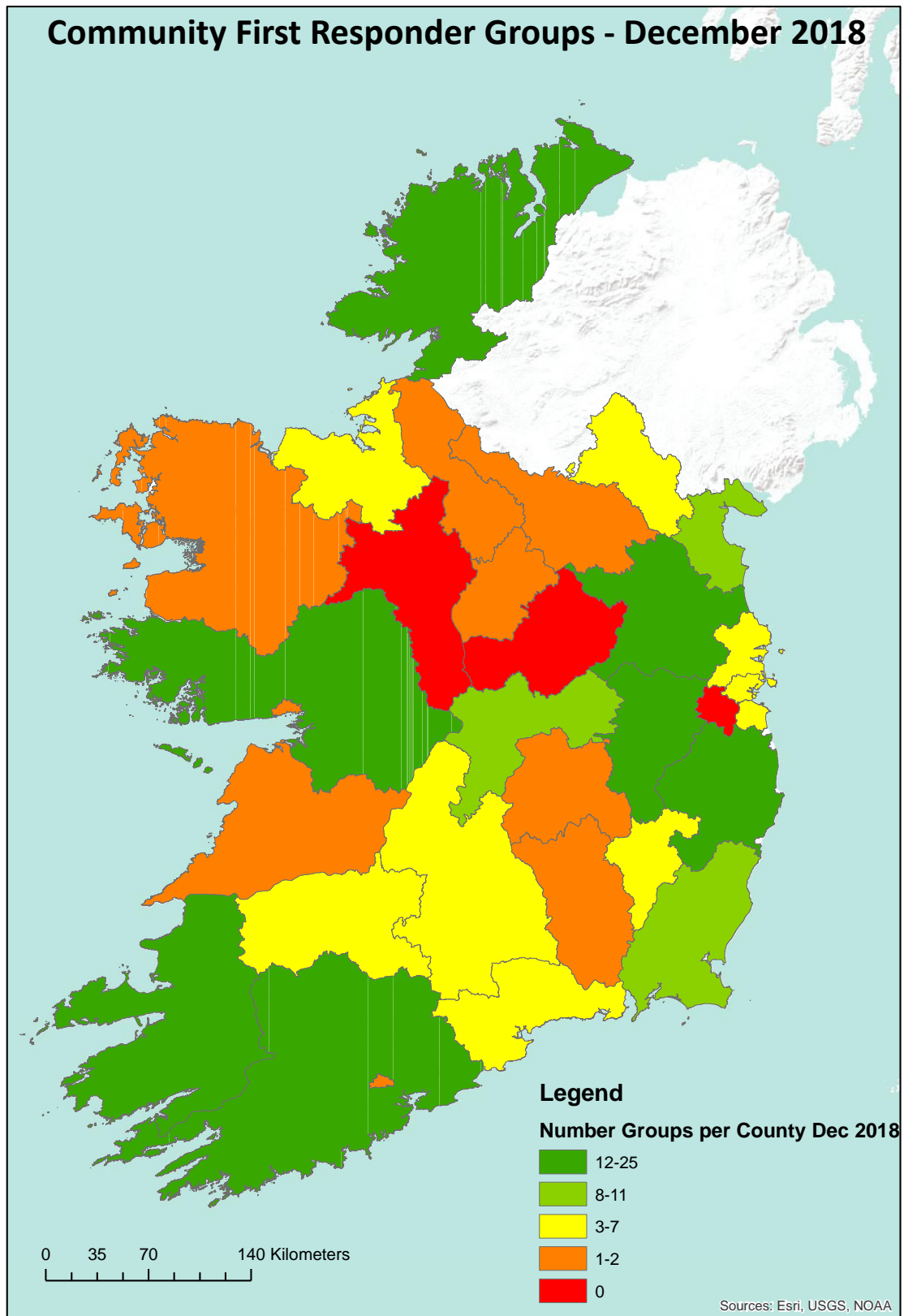
3.3 Demographics

- 1,638 patients were male (67%)
- Patients ranged in age from less than one to 100 years old (median age 67 years, IQR 52 – 78)
- Females were more likely to collapse in a private setting (homes or residential institutions) than males (n=683/800, 86% v 1,212/1,638, 74%), (p<0.001)
- Females were significantly older than males (70 years (IQR 54 – 81) vs. 66 years (IQR 52 – 77) respectively).

3.4 Community First Responders

In December 2018 there were 210 CFR groups linked with NAS and there was approximately 1,400 AEDs identified to NEOC (Map 3). The CFR group members are predominantly made up of lay people with an interest in providing life-saving support in their communities, and receive training prior to activation from the NAS National Emergency Operations Centre. The CFR groups operate on a voluntary basis and are trained in basic life support and the use of defibrillators. They are co-ordinated locally by volunteers, work under the auspices of the National Ambulance Service policy, and are dispatched by ambulance control.

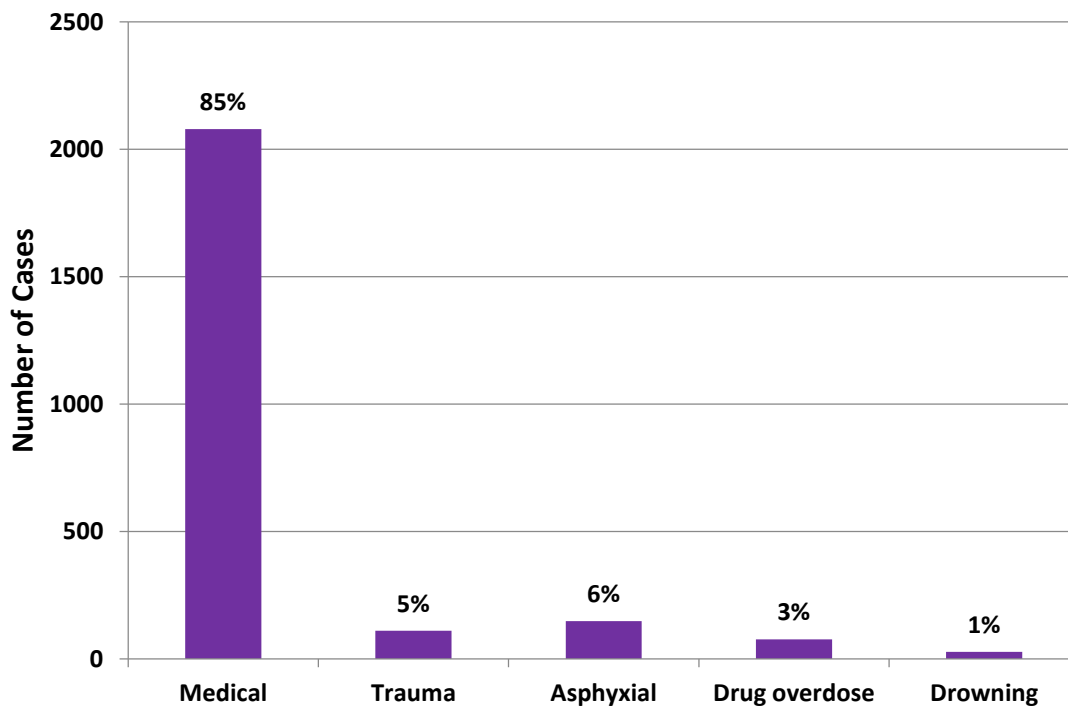
Map3: Geographical distribution of CFR groups linked to the EMS in 2018



3.5 Presumed Aetiology

- 85% of incidents were presumed to be of medical aetiology (n=2,079/2,442)
- Non-medical aetiologies included (Figure 1):
 - 5% trauma (n=110)
 - 6% asphyxia (n=148)
 - 3% drug overdose (n=77)
 - 1% submersion (n=28)
- 84% of male patients had a presumed medical aetiology (n=1,380/1,638) compared to 87% of female patients (n=697/800)
- Patients with a presumed medical aetiology were significantly older than all other aetiologies (**70 years vs. 44 years** respectively).

Figure 1: Presumed aetiology (n=2,442)



3.6 Call Response Interval

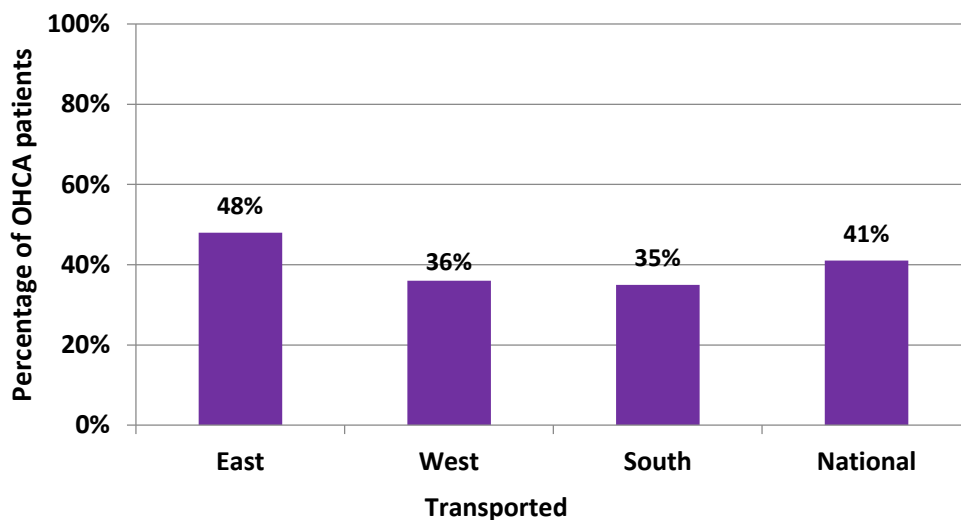
As per the Utstein definition ⁴, the call response interval (CRI) is the interval from the time the call received at the dispatch centre to arrival of EMS at the scene. Only the CRI for non-EMS witnessed cases are included in this analysis (n=2,211/2,391). As call response interval is not normally distributed, the median value for each category is given:

• All non EMS witnessed cases	13 minutes (IQR 8 - 20 minutes)
• Rural non EMS witnessed cases	20 minutes (IQR 13 - 25 minutes)
• Urban non EMS witnessed cases	11 minutes (IQR 8 - 16 minutes)
• Utstein comparator group	12 minutes (IQR 8 - 18 minutes)

3.7 Transported to Hospital

- 41% of patients were transported to either an Emergency Department or a cardiac catheterisation laboratory (cathlab) (n=1,003/2,442); 2% were transported to a mortuary (n=39/2,442) and 57% of patients remained at scene (n=1,400/2,442)
- The percentage of patients who were transported to hospital was 48% in the East, 36% in the West, and 35% in the South (Figure 2)
- Patients in urban areas were more likely to be transported than in rural areas (46% vs. 24%, p<0.001).

Figure 2: Proportion of patients transported to hospital by EMS area and nationally



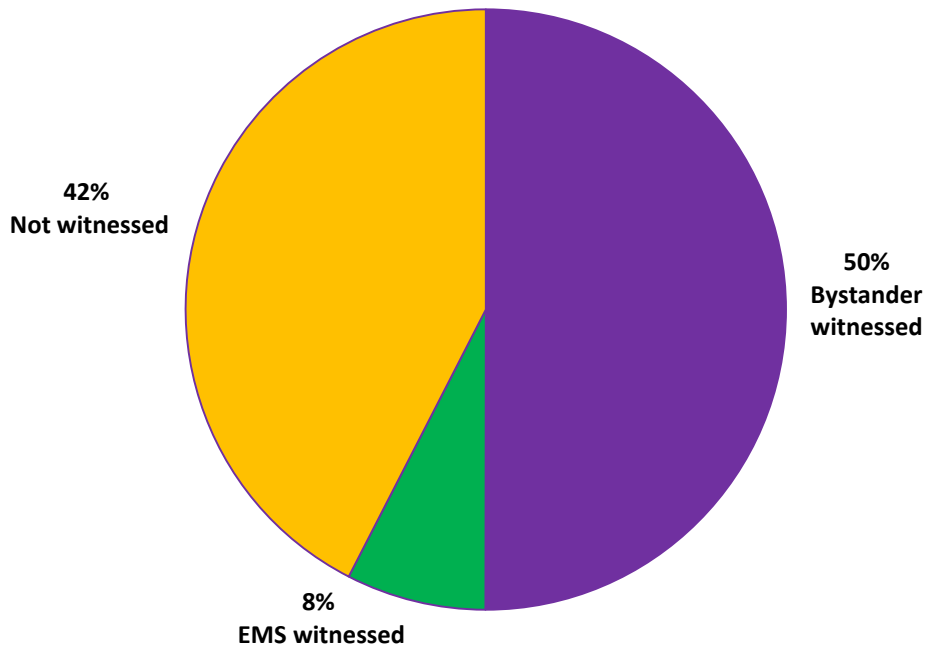
3.8 Event Location

- 68% of incidents occurred in the home (n=1,660/2,221)
- 78% of incidents occurred in a private setting (home, farm or residential institution (n=1,896/2,441)
- 22% of cases occurred in a public setting (industrial place, public building, GP surgery, recreational or sports place, street or road, in the ambulance, and other places such as rivers, lakes or piers (n=545/2,441)
- In urban areas, a greater proportion of patients collapsed in a public place compared to rural areas (22% vs. 15%), (p<0.001).

3.9 Witness Status

- 50% of cases were bystander witnessed (n=1,196/2,391), (Figure 3)
- 50% of urban cases were bystander witnessed (n=805/1,614) and 53% of rural cases were bystander witnessed (n=354/669).

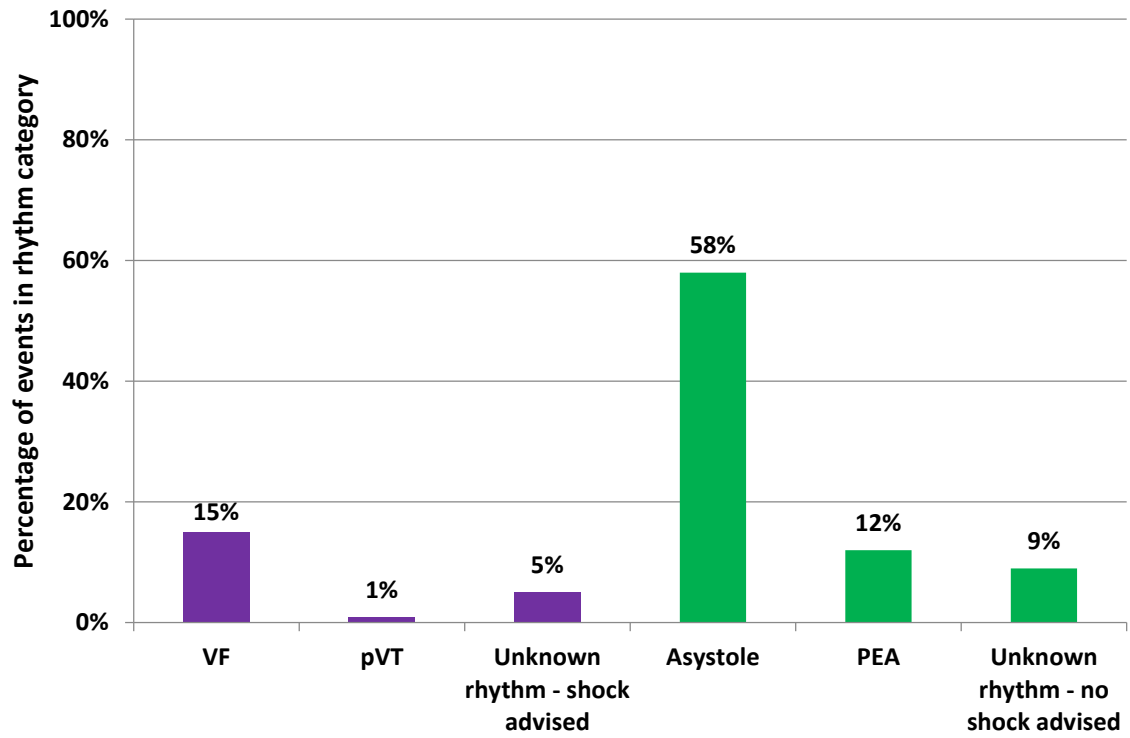
Figure 3: Witnessed status (n= 2,391)



3.10 First Monitored Rhythm

- 20% of cases were in a shockable rhythm at time of first rhythm analysis (n=493/2,433), (Figure 4)
- The initial rhythm was asystole in 58% of cases (n=1,375/2,363).

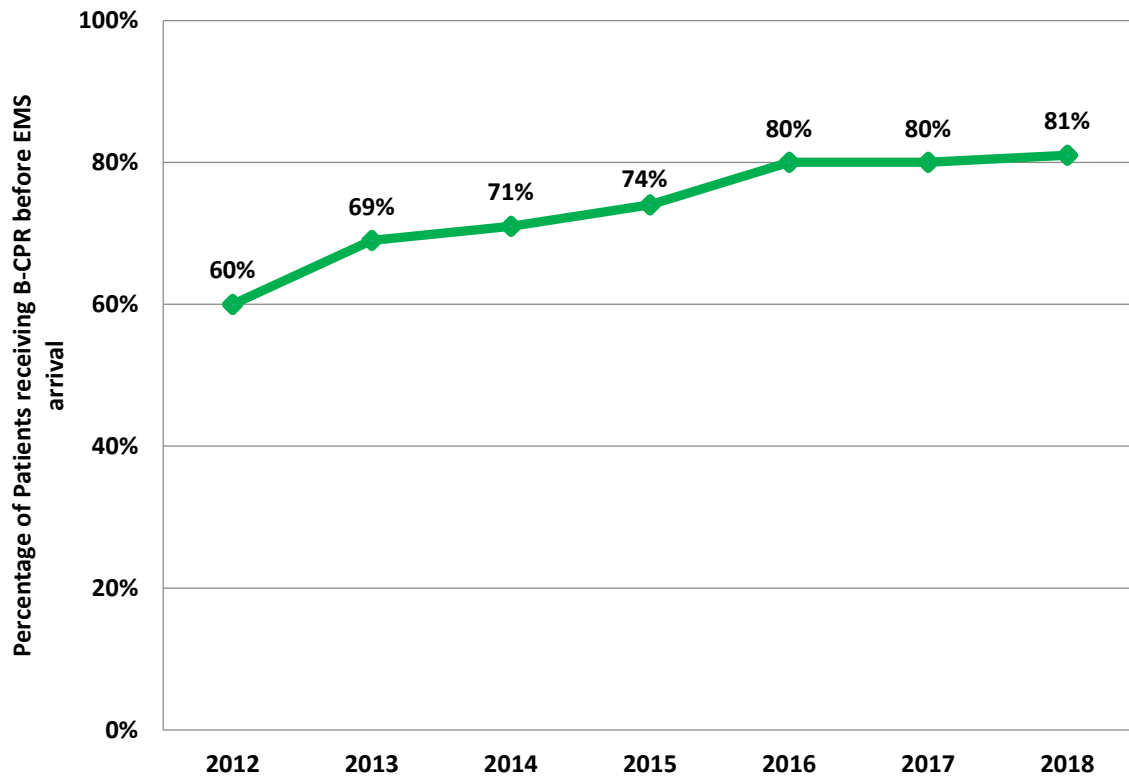
Figure 4: First monitored rhythm (n=2,363)



3.11 Bystander CPR

- Bystander CPR was attempted in 81% of cases (n=1,761/2,183).

Figure 5: Percentage of patients receiving B-CPR before EMS arrival, years 2012 – 2018

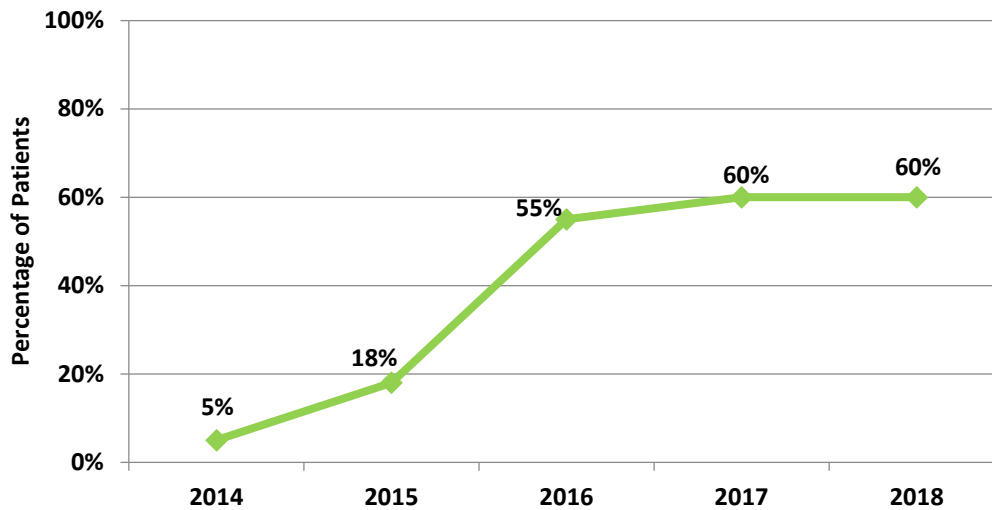


- In the subgroup of patients that had a bystander witnessed collapse (n=1,180) 83% (n=983) of patients had bystander CPR (B-CPR) attempted.
- A higher proportion of cases in a rural area received B-CPR (n=557/677) compared to an urban area (n=1,173/1,656) (82% vs. 71%; p<0.001).

3.12 Mechanical CPR

- 60% of cases involved the use of mechanical CPR (n=1,319/2,203) (Figure 6).

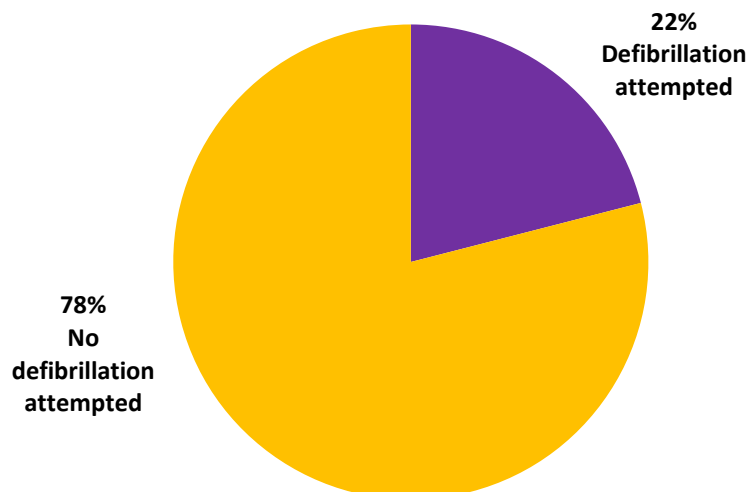
Figure 6 Percentage of patients receiving Mechanical CPR, years 2014 – 2018



3.13 Defibrillation

- 32% of cases had defibrillation attempted (n=773/2,428)
- Of the patients who had defibrillation attempted:
 - 30% had the pads applied pre-EMS arrival (n=231/767)
 - 22% had the first shock delivered pre-EMS arrival (n=170/765) (Figures 7 & 8).

Figure 7: Defibrillation attempted pre-EMS arrival



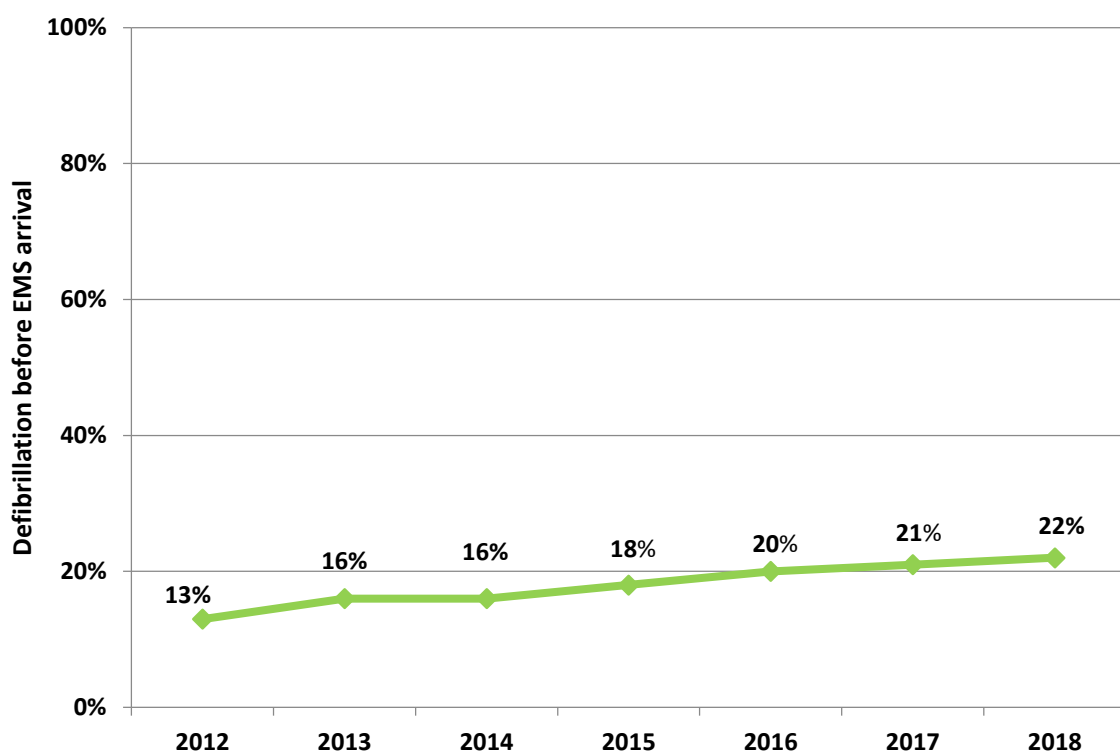
In the 170 cases where first shock was delivered before EMS arrival, the identity of the person who delivered the first shock was as follows:

- Doctors (19%, n=33)
- Nurse (13%, n=22)
- Basic Life Supporter (BLS) / Cardiac First Responder (CFR) trained (28%, n=47/170)
- Local Fire services (11%, n=19)
- Voluntary Services (6%, n=10)
- Members of the general public (18%, n=30)
- Others including Occupational First Aiders and members of An Garda Síochána (5%, n=9).

A total of 291 patients converted to a shockable rhythm during resuscitation. Of these:

- 66% were initially in asystole (n=192/291)
- 21% were initially in PEA (n=60/291, rhythm type not specified for the remainder).

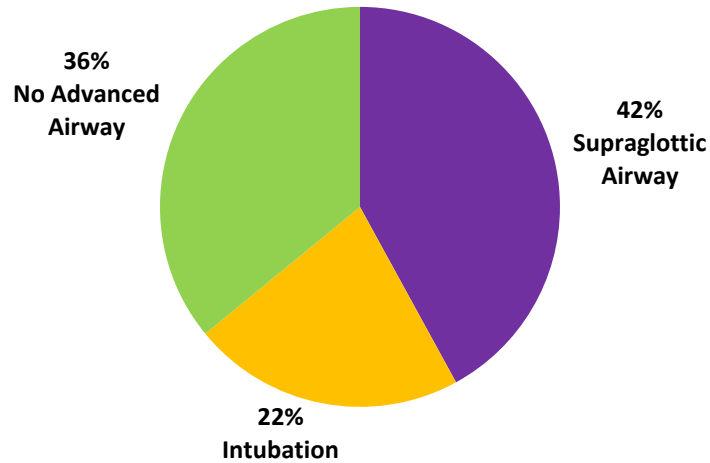
Figure 8: Defibrillation attempted before Ambulance service arrival 2012 – 2018



3.14 Advanced Airway Adjuncts

- In 64% of cases, advanced airway adjuncts were used, i.e. supraglottic airway device or intubation (n=1,430/2,232), (Figure 9).

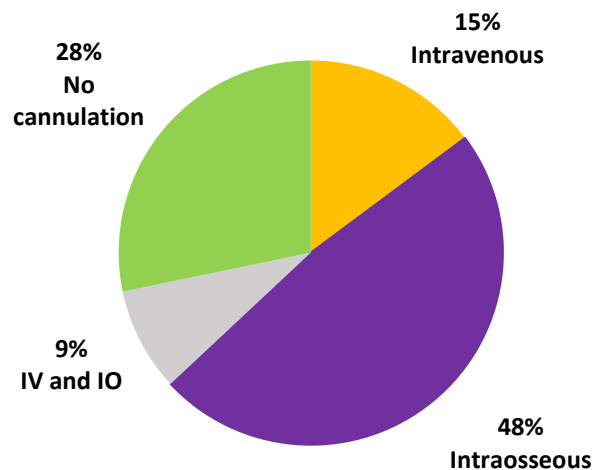
Figure 9: Adjunct airway management (n=2,232)



3.15 Cannulation

- 72% of cases had cannulation performed (n=1,766/2,442)
 - 48% of cases had intraosseous cannulation (n=1,161/2,410)
 - 15% had intravenous only cannulation (n=363/2,410)
 - 9% had a combination of both techniques (n=210/2,410)
 - 28% of cases were not cannulated (n=676/2,442) (Figure 10).

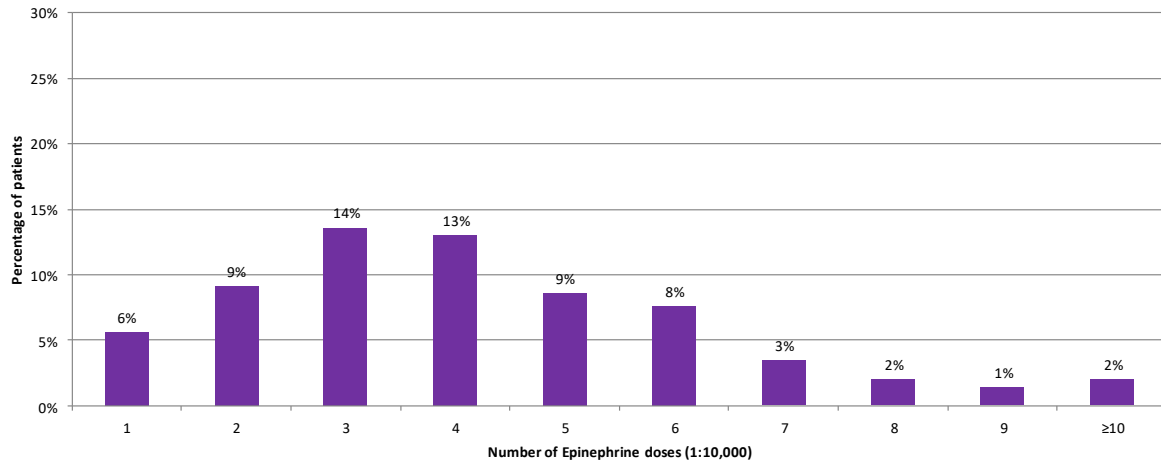
Figure 10: Cannulation method (n=2,410)



3.16 Cardiac Arrest Medication

- 67% of cases had epinephrine administered (n=1,627/2,442); the number of doses given ranged from 1 to 18 (Figure 11).

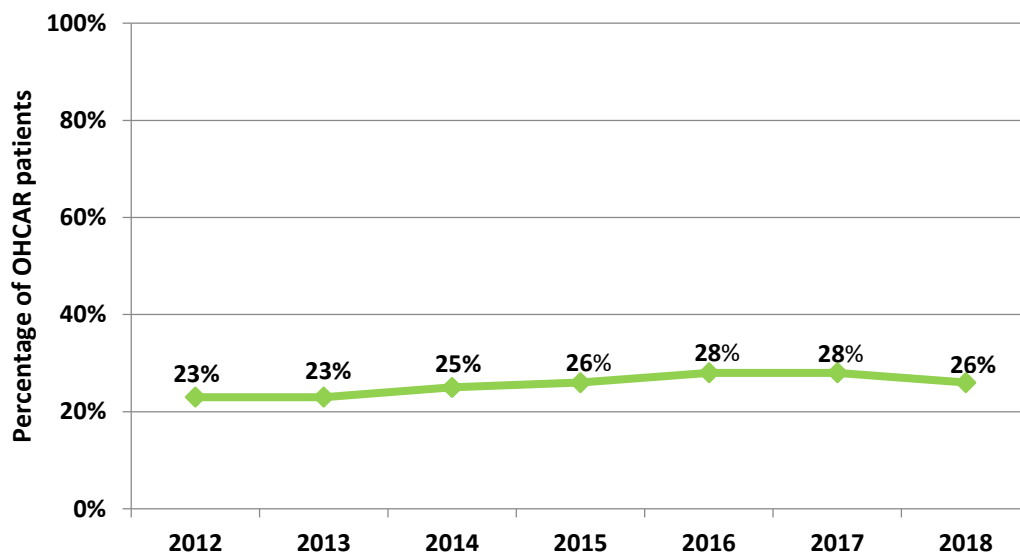
Figure 11: Percentage of Epinephrine doses (1:10,000) (n=1,627)



3.17 ROSC at any stage

- 26% of cases had ROSC before hospital arrival (n=625/2,436) (Figure 12). Data on ROSC was missing for six patients
- 27% of cases that occurred in an urban area achieved ROSC, compared with 19% in a rural area (n=453/1,651 vs. n=128/677, p<0.001).

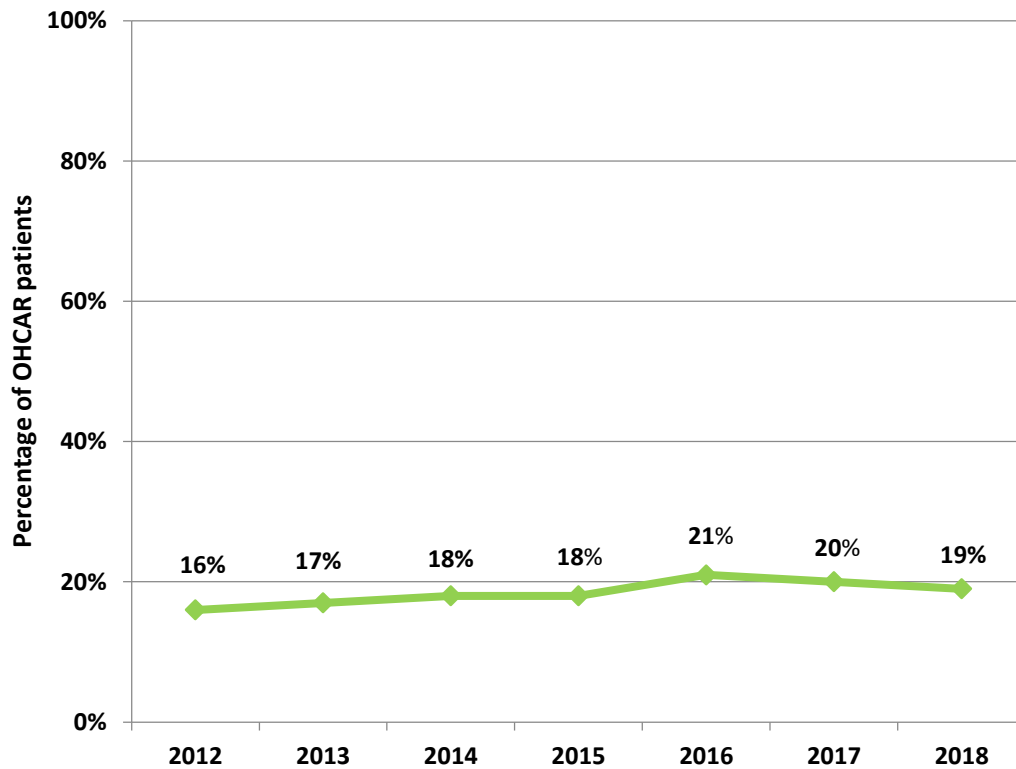
Figure 12: ROSC at any stage pre-hospital, all patients. Years 2012 – 2018 (n=4,446)



3.18 ROSC on Hospital arrival

- 19% of cases had ROSC on Hospital arrival (n=458/2,428) (Figure 13)
- ROSC on Hospital arrival was more likely to occur in an urban area compared to a rural area (20% vs. 12%; p<0.001).

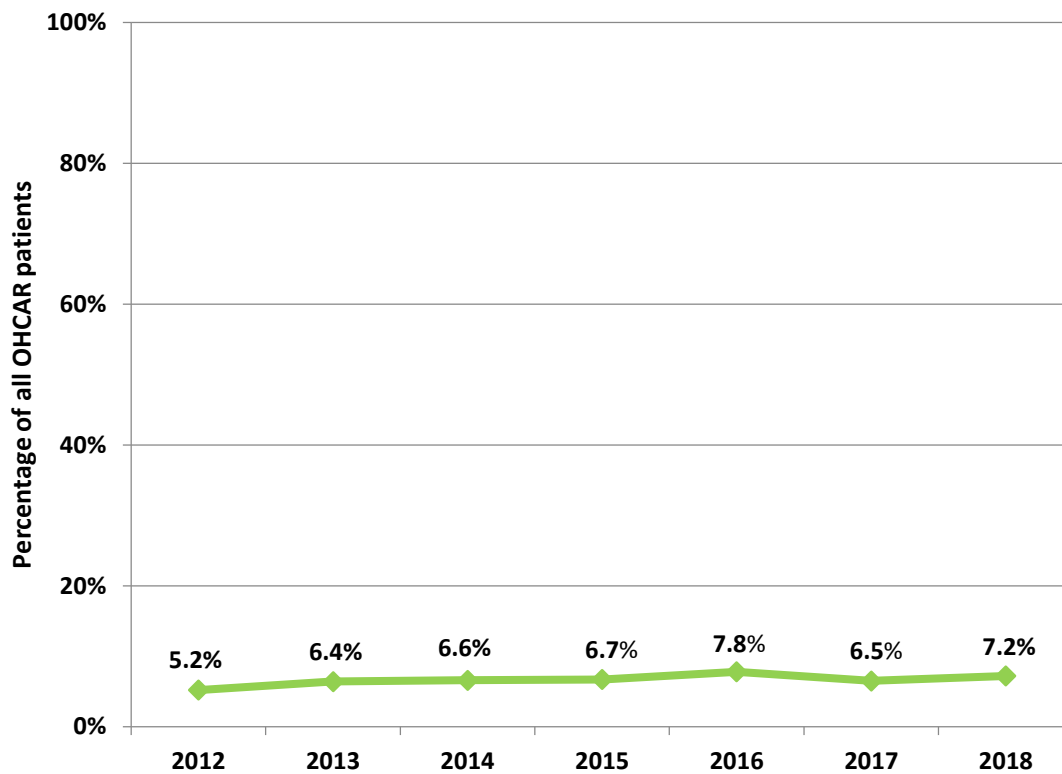
Figure 13: ROSC at Hospital arrival, all patients. Years 2012 – 2018 (n=3,712)



3.19 Discharged alive from Hospital

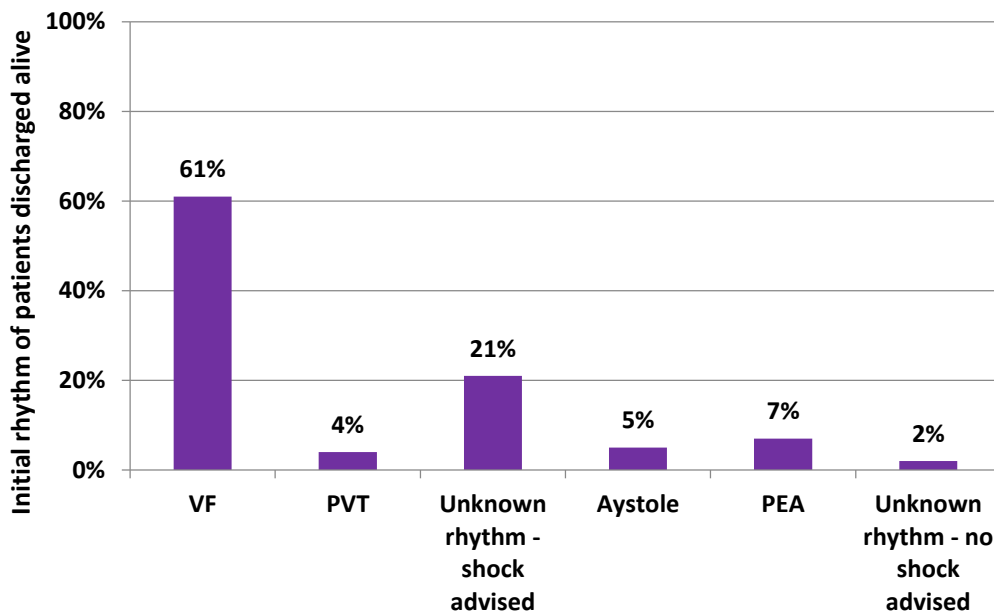
- A total of 176 patients were discharged alive from hospital (7.2%) (Figure 14). Data on eight patients who were transported to hospital could not be obtained.

Figure 14: Percentage survival to discharge, all patients. Years 2012 – 2018 (n=1,003/15,068)



- Surviving patients were younger (median age 61 years, IQR 52 – 71) than non-surviving patients (median age 68 years, IQR 53 – 79 years, ($p \leq 0.001$))
- The presumed aetiology was medical for 90% of survivors
- Survival in the presumed medical aetiology group was 8% ($n=159/2,079$) compared with 5% ($n=17/363$) in the non-medical group ($p=0.027$)
- 19% of patients who collapsed in a public location survived ($n=105/545$), compared to 4% of patients that collapsed in a private location ($n=71/1,896$), ($p \leq 0.001$)
- 7.8% of patients who collapsed in an urban area ($n=129/1,656$), compared to 3.5% of patients that collapsed in a rural area ($n=24/677$), ($p \leq 0.001$)
- 85% of survivors had an initial shockable rhythm ($n=147/173$), (Figure 15)
- 15% of survivors had an initial non-shockable rhythm ($n=26/173$).

Figure 15: Percentage of survivors categorised by first analysed rhythm



- In the non-EMS witnessed group of survivors (n=136)
 - 93% had a witnessed arrest
 - 89% received bystander CPR
 - 44% (n=60), had defibrillator pads applied prior to EMS arrival
 - 37% (n=50) were shocked before EMS arrival
- In the EMS-witnessed group, 21% of patients survived (n=37/179)
- In the subgroup of EMS-witnessed patients that were adults, with presumed medical aetiology, with an initial shockable rhythm, 52% of patients survived (n=31/60).

3.20 Neurological function at discharge

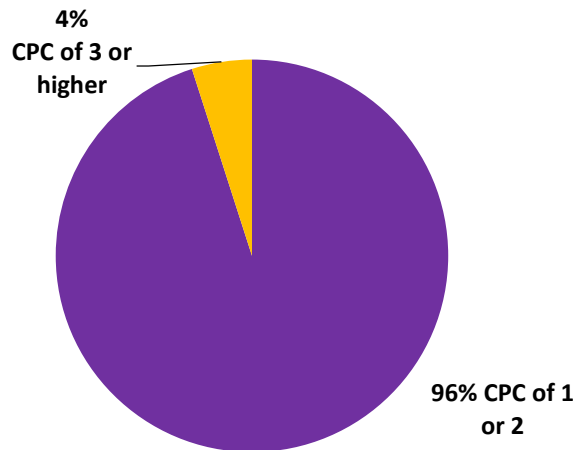
The CPC ⁵ Score is an instrument developed to assess both traumatic and anoxic cerebral injuries. It is classified as a core Utstein data element for recording of cardiac arrest patients. The CPC score has five categories:

- (1). Good cerebral performance
- (2). Moderate disability: conscious, sufficient cerebral function for independent living
- (3). Severe disability: dependent on others for daily support
- (4). Coma or vegetative state
- (5). Brain death.

CPC score data was available for 157 surviving patients (Figure 16):

- 96% (n=151) had a score of 1 or 2
- 2% (n=4) had a score of 3 or higher

Figure 16: CPC score at discharge



3.21 OHCA in the under 35 age group

- 9% of cases were recorded as <35 years of age (n=209/2,431)
 - 45% were of a presumed medical aetiology (n=94/209)
 - 11% were caused by trauma (road traffic accident, gunshot, stabbing, crush injuries or fall) (n=23/209)
 - 18% of cases resulted from a drug overdose (n=38/209)
 - 65% of cases were unwitnessed (n=133/203)
 - 11% were initially shockable (n=24/208)
 - 5% survived to Hospital discharge (n=11/208)

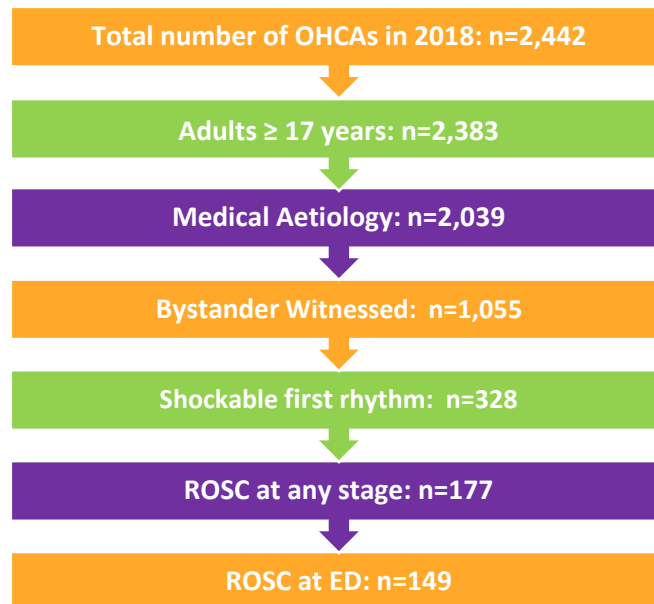
3.22 Utstein Comparator Subset

The Utstein comparator subset includes the following subgroup of patients

- Adult (i.e. older than seventeen years)
- Presumed medical aetiology
- Bystander witnessed arrest
- First monitored rhythm shockable.

There is wide variation of circumstances around a cardiac arrest and patient characteristics. Using the Utstein comparator subset allows for a more standardised comparison of patient outcomes between systems and time periods (Figure 17).

Figure 17: Flowchart of the 2018 Utstein comparator subset and ROSC outcomes

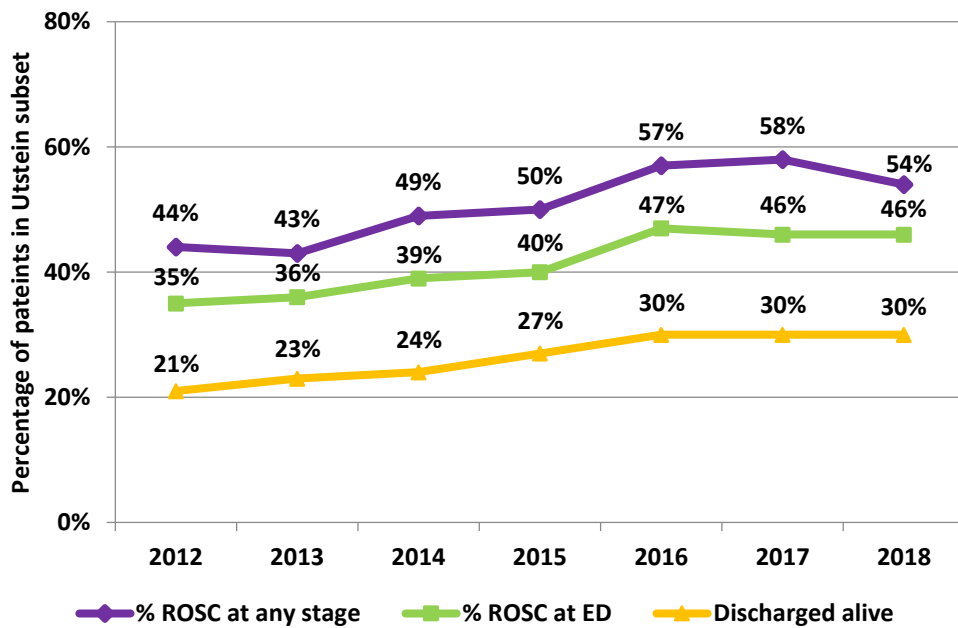


In 2018, the Utstein comparator subset included 328 patients and accounted for 13% of all OHCA cases (328/2,442).

3.23 Utstein Comparator Subset Outcomes

- **54%** of patients (n=177/328) achieved ROSC at some stage before hospital arrival
- **46%** of patients (n=149/324) had ROSC on arrival at the ED
- **30%** of patients (n=99/326) were discharged alive from hospital (Figure 18)
- Of the survivors for whom CPC was available, **96%** had a CPC score of one or two (n=88/92).

Figure 18: Outcomes in the Utstein comparator subset, years 2012 – 2018



Case Characteristics

- Of those patients who collapsed in a public location, 47% survived (n=62/131) compared to 19% in a private location (n=37/195) (p=0.001)
- 87% of cases were recognised as cardiac arrest at the time of ambulance dispatch (n=282/325)
- Bystander CPR was performed on 92% of survivors
- 45% of the patients who survived had defibrillation attempted before ambulance service arrival (n=44/97). The estimated median time from ‘time of collapse’ to ‘time of first shock administered’ was 6 minutes (n=23/44, IQR 3 – 10).

Chapter 4

4.0 Discussion

4.1 OHCAR reporting to Service Providers

OHCAR is used to provide data for the 'ROSC at Hospital' monthly clinical Key Performance Indicator for NAS, and also provides detailed regional quarterly reports. These include descriptive data elements and outcome variables at regional level and constitute the data source for reports circulated by NAS to stations via the ONELIFE initiative, which is a NAS run quality improvement programme. A quarterly report is provided to DFB with outcome data and descriptive information. OHCAR Annual reporting is undertaken on the geographical regions of West, South and combines the DFB with the Eastern NAS region.

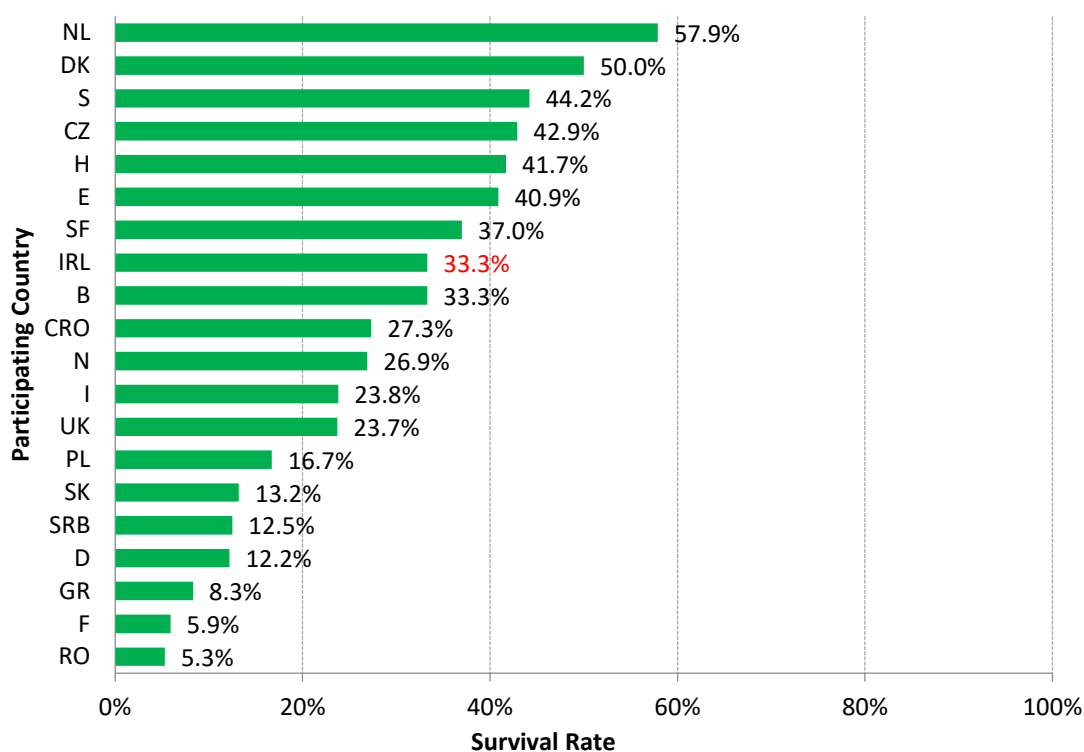
4.2 Ireland and the EuReCa Studies

In October 2014, Ireland participated in the EuReCa ONE study – a one month survey of OHCA cases in 27 countries across Europe^{11, 12}. Ireland was one of only seven countries that contributed data for the entire country for the study period. The estimated rate of OHCA where resuscitation was attempted per 100,000 population per year in EuReCa countries was 44 (Ireland 49). ROSC was achieved before hospital arrival in 29% of all EuReCa ONE cases (Ireland 26%, figure 19). The overall EuReCa ONE proportion of ROSC at arrival to hospital was 25% (Ireland 16%) and discharged alive was 10.3% (Ireland 5.9%, figure 21). (For participating Country names see appendix 4).

Utstein Subgroup

ROSC in the EuReCa ONE Utstein subgroup was 57% (Ireland 58%). Average survival to discharge in Utstein patients in collaborating countries was 30% (Ireland 33%, figure 19).

Figure 19: EuReCa ONE study survival rate in the Utstein comparator group



4.3 Research Awards

European Registry of Cardiac Arrest Study ONE (EuReCa ONE)

The study received the Ian G. Jacobs Award for International Group Collaboration to Advanced Resuscitation Science, by the American Heart Association and the Resuscitation Science Symposium Planning Committee for best international collaboration. The award was presented in November 2017.

Following on from the success of EuReCa ONE ⁶, EuReCa TWO was launched in Reykjavik, Iceland in September 2016. OHCAR has provided National OHCA data for incidents in Ireland to the EuReCa TWO study, which covered 29 European countries with a population of over 175 million people. Data collection commenced on the 1st of October 2017 until the 31st of December 2017. Publication of the EuReCa TWO study is expected in late 2019.

Dr. Peter Wright is the EuReCa Two National Coordinator for Ireland and Dr. Siobhán Masterson is part of the EuReCa TWO Study Management Team. OHCAR representatives regularly attend EuReCa meetings with the other National Coordinators and the Study Management Team.

4.4 OHCAR and the Health Research Board

Dr. Siobhán Masterson completed a three-year Health Research Board (HRB) Research Training Fellowship in January 2018 entitled '*A geographic model for improving out-of-hospital cardiac arrest survival in Ireland*'.

Research Consortium

The OHCAR Research Consortium is a forum established by the OHCAR Steering Group. The aim of the consortium is to foster and support researchers and research in OHCA. The group has met twice since its inception, and has made two funding applications to the HRB.

4.5 Future developments in OHCAR

OHCAR is working closely with NAS in implementing an electronic PCR system. Once operational, this will facilitate a more efficient and streamlined transfer data relating to an OHCA. Information will be available to OHCAR immediately, aiding data processing and the generation of reports to service users in a short timeframe. OHCAR is in the process of updating its database which will be aligned with the electronic PCR system.

Chapter 5

5.0 Conclusion

Since the last OHCAR Annual Report, Bystander CPR has increased to 81%. The use of mechanical CPR has stabilised at 60% of all OHCAR cases.

Attempted defibrillation before EMS arrival has increased from 21% to 22%. ROSC before hospital arrival has decreased to 26%. ROSC on arrival at hospital has decreased from 20% to 19%. Discharge alive from hospital has increased from 6.5% to 7.2%.

In the Utstein group the ROSC prior to hospital arrival has decreased from 58% to 54%, and ROSC at Hospital arrival has stabilised at 46%. Discharge alive has stabilised at 30%. In line with previous years, surviving patients were more likely to be younger, have a presumed medical aetiology, have collapsed in a public, urban location, have a witnessed arrest, present in a shockable rhythm, and received bystander CPR.

5.1 OHCAR Research

Research projects approved by OHCAR Steering Group July 2018 – July 2019:

Principal Investigator	Title
Prof. Gerard Bury	Medical Emergency Responder Integration and Training Three (MERIT3). Utilisation of a novel Ambulance Service alerting system to prompt GP first responders to nearby cardiac arrests
Dr. Richard Tanner	Out-of-Hospital Cardiac Arrests in the Young Population; A Five Year Review of The Irish National Out-of-Hospital Cardiac Arrest Register

Chapter 6

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NAS - Emergency Medical Technicians, Paramedics, Advanced Paramedics, Aero-Medical Crews, National Emergency Operations Centre, NAS Clinical Information Manager, NAS Clinical Development Manager, NAS National Director, NAS Medical Director

DFB - Emergency First Responders, Emergency Medical Technicians, Paramedics, Advanced Paramedics, East Region Communications Centre, District Officer EMS Support, Assistant Chief Fire Officer EMS Operations, DFB Medical Director

First Responders - All CFR Group Members, First Aid Responders, Irish Coast Guard, Members of An Garda Síochána, Order of Malta, St. John Ambulance, Red Cross, Private Ambulance Crews, Voluntary First Responders, Bystanders, Doctors, Nurses, Local Fire Services, and Civil Defence

Hospitals - Resuscitation Training Officers, Emergency Department Consultants / Registrars, Clinical Nurse Managers, Emergency Department Staff / Secretaries, Audit Nurses

DAA - Information Officer, Responders

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Appendix 1

OHCAR Steering Group

The OHCAR Steering Group is responsible for ensuring that the aims of OHCAR are fulfilled and for advising on its organisation and direction. The Steering Group includes representatives from all four supporting organisations, and met three times between July 2018 to July 2019.

The membership at June 2019 is:

- Professor Gerard Bury, UCD Centre for Emergency Medical Science
- A/Professor Conor Deasy, Consultant in Emergency Medicine, Cork University Hospital (OHCAR Chair)
- Dr. John Dowling, North West Immediate Care Programme
- Ms. Jacqueline Egan, Programme Development Officer, PHECC
- Mr. Joe Fahy, Resuscitation Officer, Portiuncula University Hospital
- Dr. Joseph Galvin, Consultant Cardiologist, Mater Hospital
- Mr. David Hennelly, Clinical Development Manager, National Ambulance Service, HSE
- Dr. Siobhán Masterson, National Project Manager, Out-of-Hospital Cardiac Arrest Strategy, National Ambulance Service & HRB Research Fellow, Discipline of General Practice, NUI Galway
- Dr. David Menzies, CFR Ireland & Consultant in Emergency Medicine, St Vincent's University Hospital & Clinical Lead, Emergency Medical Science, UCD, Centre for Emergency Medical Science
- Professor Andrew Murphy, Discipline of General Practice, NUI Galway
- Professor Cathal O'Donnell, Medical Director, National Ambulance Service
- Mr. Martin O'Reilly, District Officer, EMS Support Officer, DFB
- Mr. Martin Quinn, OHCAR Manager, Discipline of General Practice, NUI Galway
- Dr. Peter Wright, OHCAR Director, Discipline of General Practice, NUI Galway.

Appendix 2

OH CAR Meetings, Representations and Publications

- RESPOND “The Importance of CFRs in OH CAR”, National Cardiac First Responder Conference, Mullingar, 21st April 2018
- EuReCa Two Meeting: Bologna September 2018
- European Resuscitation Council (ERC) congress: Bologna, September 2018
- British Heart Foundation Conference, Belfast, October 2018.

Publications

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Appendix 3

OHCAR Utstein Comparator Subset 2018 – Regional Results

Figure 1: Number of OHCAR patients in the Utstein group by region (n=328)

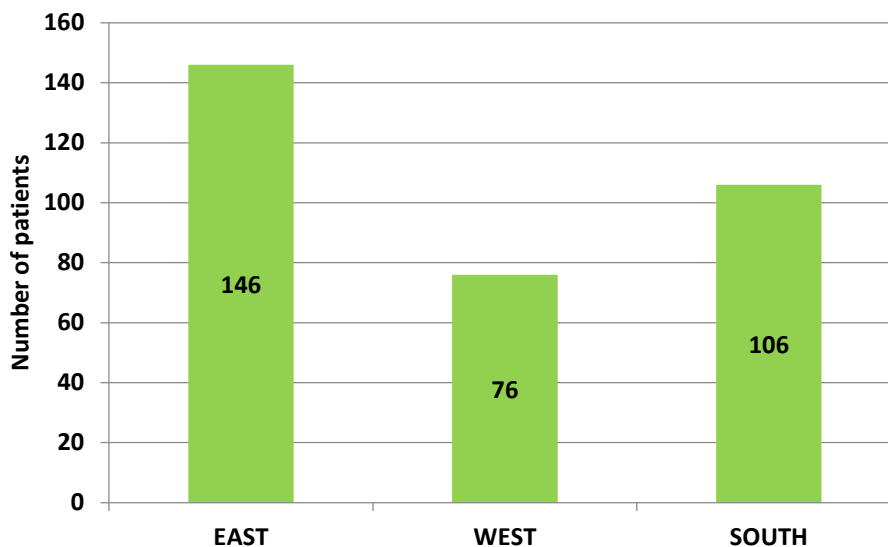


Figure 2: Dispatcher recognition of cardiac arrest at time of ambulance dispatch (Utstein), (n=328):

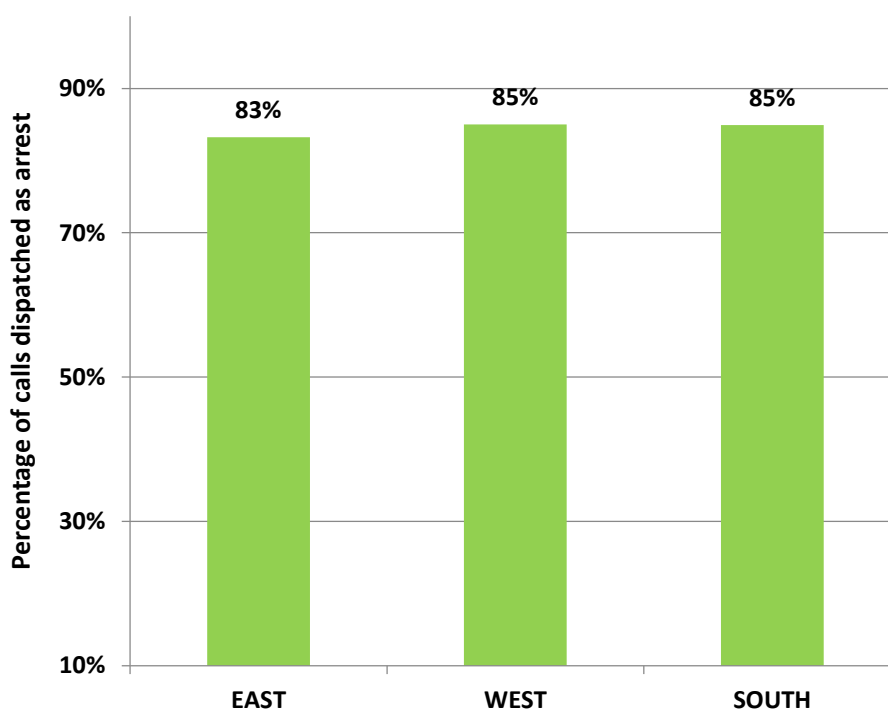
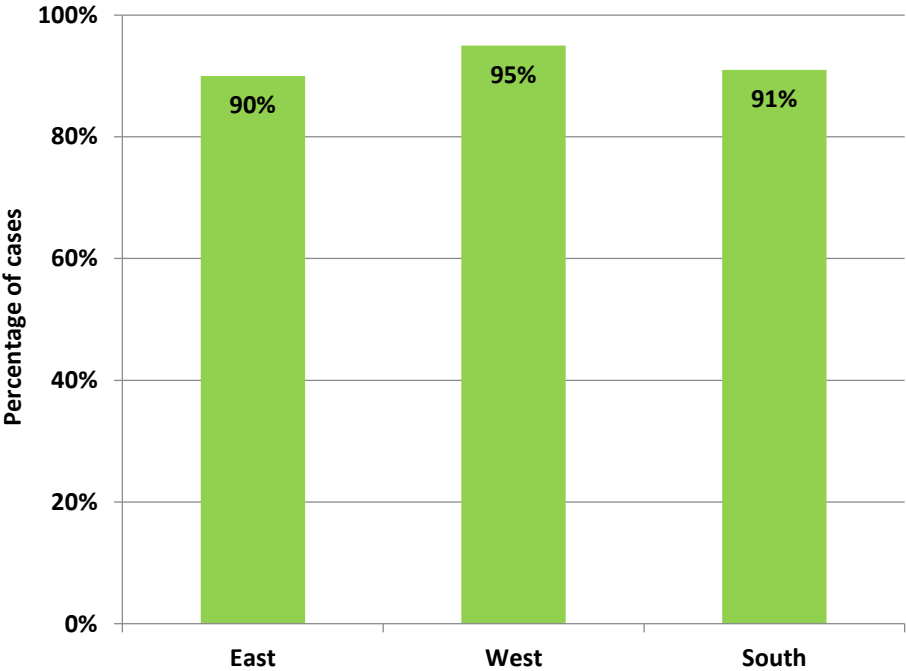


Figure 3: Percentage of Utstein cases with bystander CPR:



Appendix 4

EuReCa ONE participating Country names

CZ	Czech Republic	N	Norway
B	Belgium	RO	Romania
H	Hungary	CH	Switzerland
SK	Slovakia	S	Sweden
P	Portugal	NL	The Netherlands
DK	Denmark	SLO	Slovenia
UK	United Kingdom	ICE	Iceland
PL	Poland	A	Austria
D	Germany	CRO	Croatia
I	Italy	IRL	Ireland
SRB	Serbia	GR	Greece
SF	Finland	CYP	Cyprus
LUX	Luxembourg	E	Spain
F	France		