Out-of-Hospital Cardiac Arrest Register

OHCAR Ireland

At the heart of evidence

Annual Report 2019

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Pre-Hospital Emergency Care Council

NUI Galway
OÉ Gaillimh

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2019 Synopsis

2,564 cases of out-of-hospital cardiac arrest where resuscitation was attempted

***84%** had bystander CPR performed

67% Male, 33% Female
Median age – 68 years

22% initially shockable

25% defibrillation attempted pre EMS arrival

38% transported

24% ROSC pre-hospital

18% ROSC on arrival at hospital

190 patients were discharged alive

**Excludes EMS witnessed cases*

Image format used with the kind permission of the St. John New Zealand OHCA Registry
CPR – Cardio Pulmonary Resuscitation
EMS – Emergency Medical Services
ROSC – Return of Spontaneous Circulation

OHCAR Key Messages 2019

Patient and Event Characteristics

- 2,564 out-of-hospital cardiac arrest incidents recorded on OHCAR (54 per 100,000 population in 2019)
  - 69% Occurred in an urban area [a]
  - 67% Male
  - Median age 68 years (interquartile range 54 – 79)
  - 86% Presumed medical cause
  - 68% happened in the home
  - 84% Bystander CPR attempted
  - 50% Bystander witnessed

Defibrillation

- 22% Initial shockable rhythm
- 31% Defibrillator pads applied prior to arrival of the EMS
- 30% Defibrillation attempted
  - 25% had defibrillation attempted before arrival of the EMS
  - 49% Surviving patients had defibrillation attempted pre-EMS arrival

Patient Outcomes

- 24% had Return of Spontaneous Circulation (ROSC) pre-hospital
- 18% had ROSC on arrival at hospital
- 7.4% Discharged alive (190 patients)
  - 97% had good to moderate neurological function on discharge
- 15% of patients were in the Utstein Group [b] [4]
  - 48% ROSC pre-hospital
  - 41% ROSC on arrival at hospital
  - 28% Patients were discharged alive

[a]Definition 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 centre[10].

[b]The Utstein subgroup includes patients who are >17 years, with presumed medical aetiology, bystander witnessed event and an initial shockable rhythm.

Trends

- 17% increase in bystander CPR from 2012 – 2019
- 12% increase in bystander defibrillation from 2012 – 2019
- 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 176 in 2018 to 190 in 2019.**

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 2019, OHCAR is one of six 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 is funded by the National Ambulance Service (NAS). 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 sources 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: NAS have introduced electronic PCRs (ePCR), and during 2019 79% (n=1,740/2,190) of cases were identified directly by OHCAR via the electronic PCR system.

PCRs are also 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.

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].

[c]Cerebral 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 produces 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 26. 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

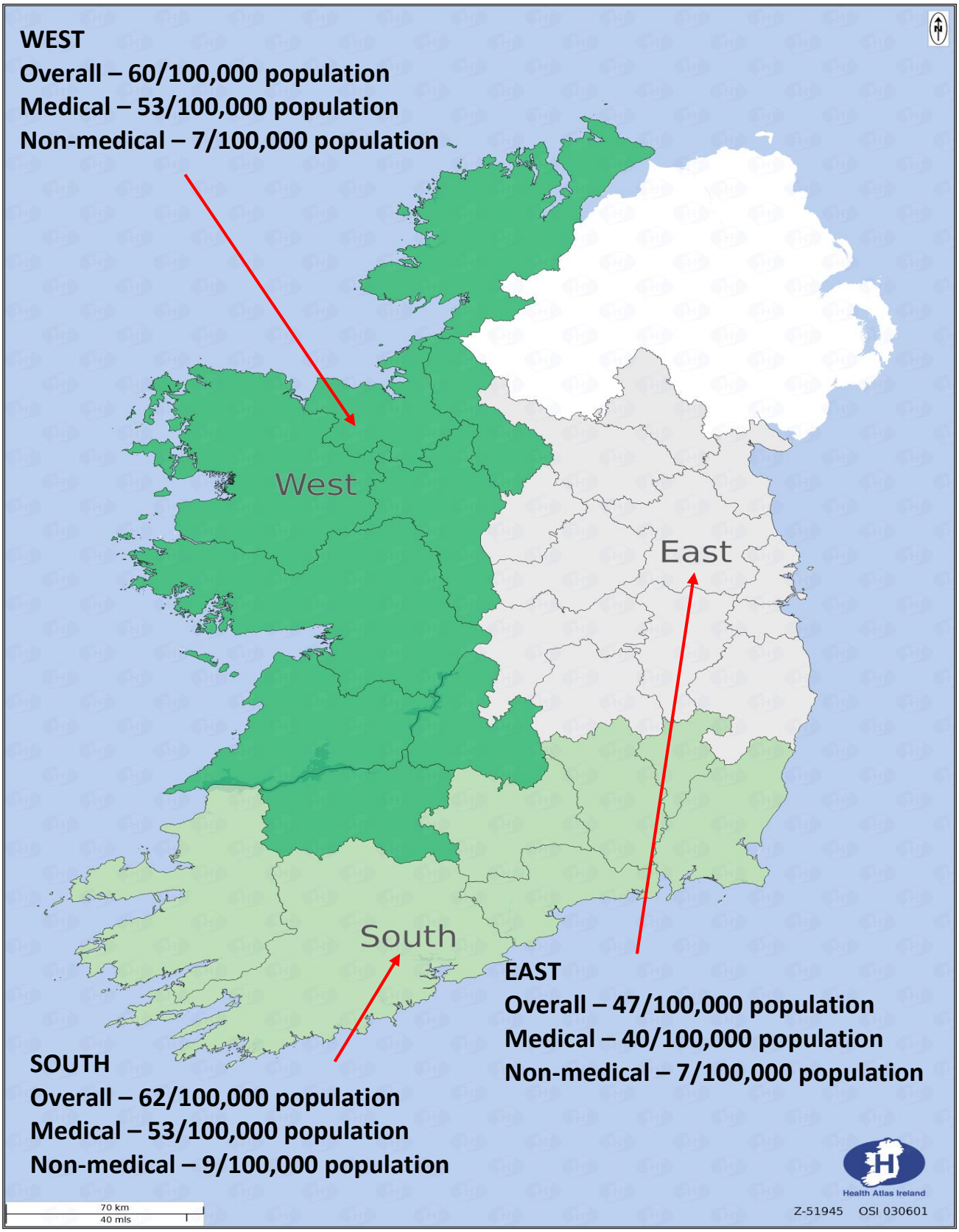
3.1 Incidence

In 2019, a total of **2,564** OHCA were attended where resuscitation was attempted by NAS, DFB, DAA or bystanders. Of these, 29% were reported directly to OHCAR, 68% were identified during examination of ePCRs and <1% were identified during missing case searches. This equates to 54 OHCA resuscitation attempts per 100,000 in 2019 [10]. In Europe, the estimated incidence of OHCA ranges between 27 and 91 per 100,000 per year [13].

In 2019, the majority of OHCA incidents were presumed to be of medical aetiology (46/100,000 persons) compared to a small proportion of cases of non-medical aetiology (trauma, asphyxial, drug overdose or submersion) (8/100,000 persons). The HSE South Area reported the highest incidence at 62/100,000 persons (Map 1) [d].

[d]Population data from Census of Population 2016 [10].

Map1: Incidence of OHCA with resuscitation attempts in 2019

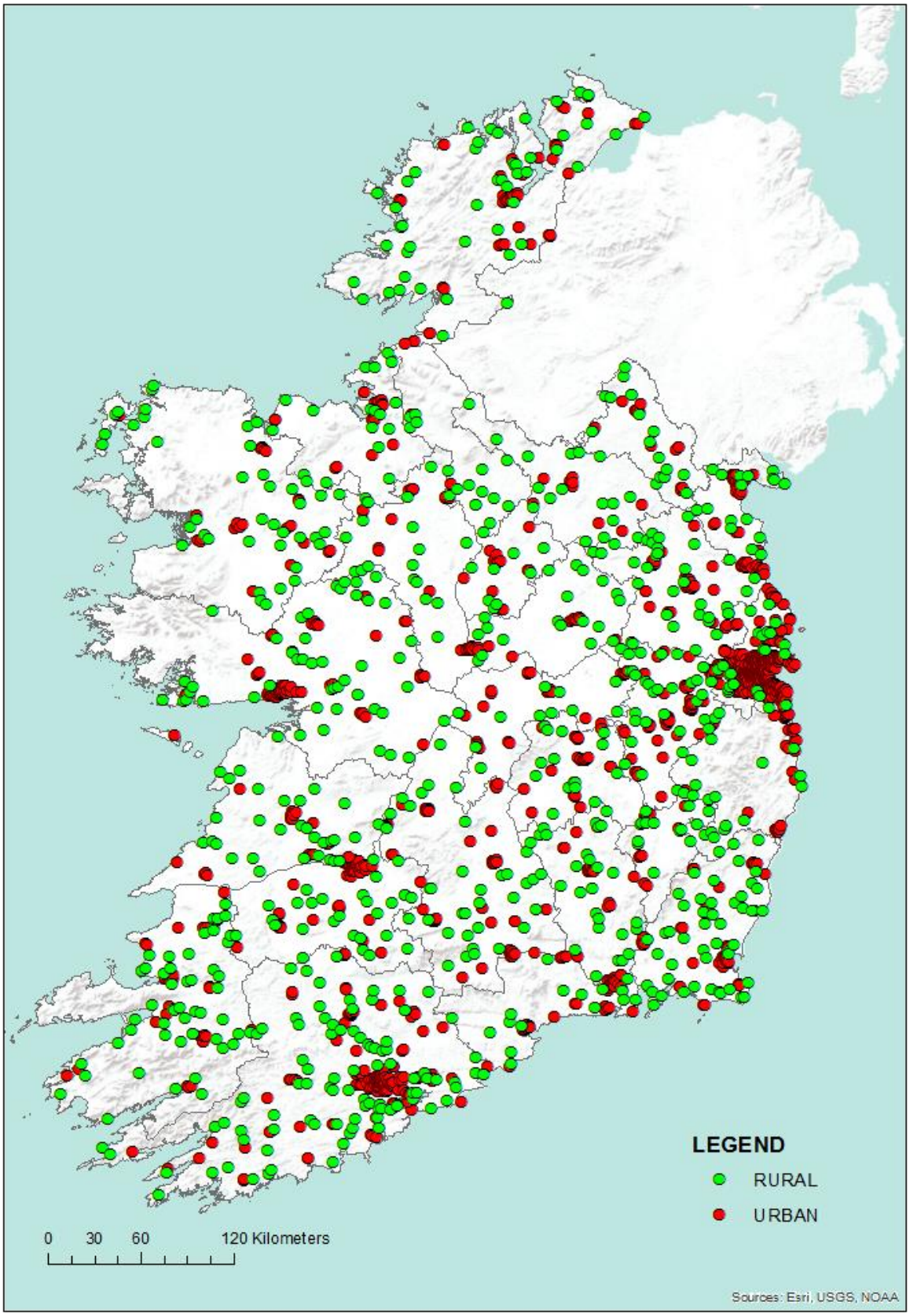


3.2 Geographical Distribution of Incidents

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 matches with the Central Statistics Office (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].

- 69% of cases occurred in an urban area (n=1,665/2,418); 148 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 53 per 100,000 population/year in rural areas.

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



3.3 Demographics

- 1,726 patients were male (67%)
- Patients ranged in age from less than one to 103 years old (median age 68 years, interquartile range (IQR) 54 – 79)
- Females were more likely to collapse in a private setting (homes or residential institutions) than males (n=710/831, 86% v 1,271/1,726, 74%), ($p<0.001$)
- Females were older than males (69 years (IQR 56 – 80) vs. 67 years (IQR 52 – 77) respectively).

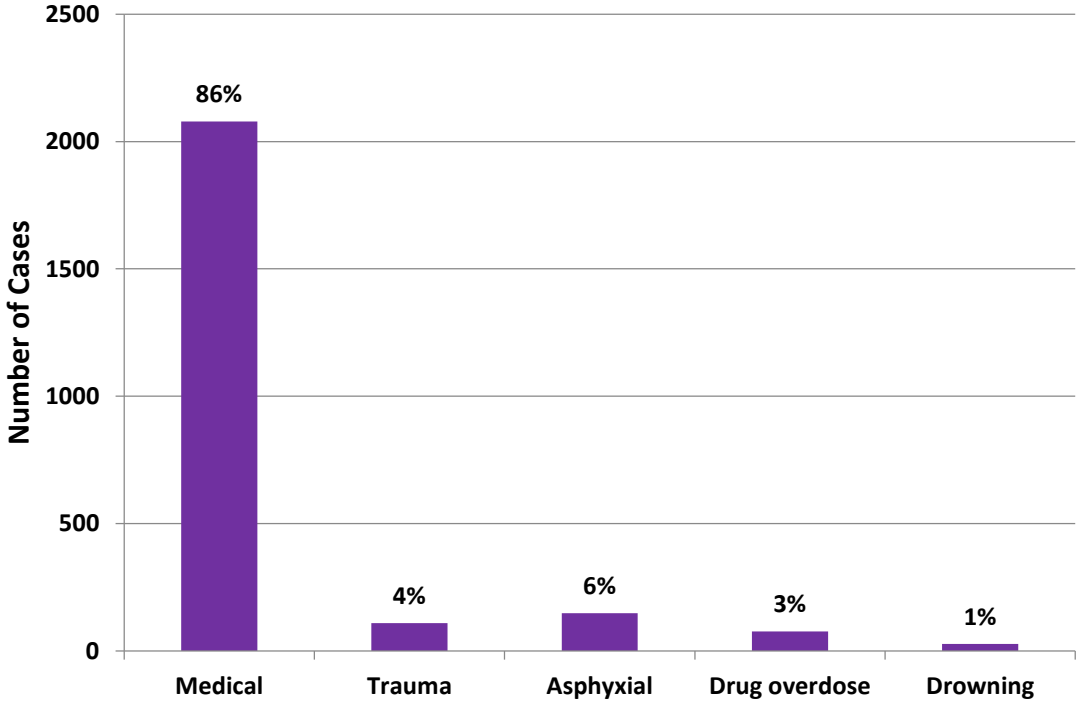
3.4 Community First Responders

In December 2019 there were 266 Community First Responder (CFR) groups linked with NAS and there was approximately 1,800 AEDs identified to National Emergency Operations Centre (NEOC). 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. Each county in Ireland have at least one CFR group.

3.5 Presumed Aetiology

- 86% of incidents were presumed to be of medical aetiology (n=2,199/2,564)
- Non-medical aetiologies included (Figure 1):
  - 4% trauma (n=106)
  - 6% asphyxia (n=147)
  - 3% drug overdose (n=84)
  - 1% submersion (n=28)
- 85% of male patients had a presumed medical aetiology (n=1,463/1,726) compared to 88% of female patients (n=729/831)
- Patients with a presumed medical aetiology were significantly older than all other aetiologies (**70 years vs. 42 years** respectively).

Figure 1: Presumed aetiology (n=2,564)



3.6 Call Response Interval

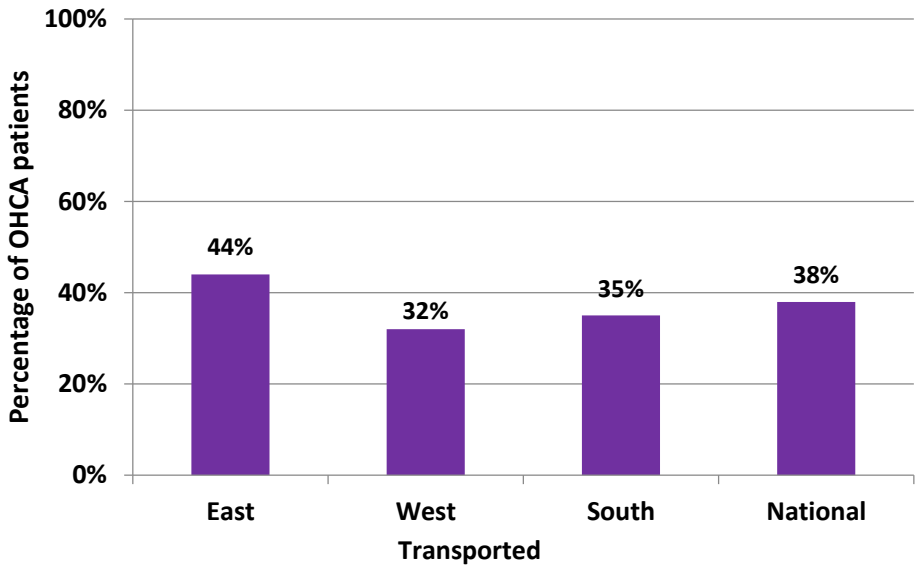
As per the Utstein definition [4], the call response interval (CRI) is the interval from the time the call received at the dispatch centre to arrival of EMS at the scene. Only the CRI for non-EMS witnessed cases are included in this analysis (n=2,319/2,536). As call response interval is not normally distributed, the median value for each category is given:

• All non EMS witnessed cases	12 minutes (IQR 8 - 20 minutes)
• Rural non EMS witnessed cases	18 minutes (IQR 12 – 24 minutes)
• Urban non EMS witnessed cases	10 minutes (IQR 7 – 16 minutes)
• Utstein comparator group	11 minutes (IQR 8 – 17 minutes)

3.7 Transported to Hospital

- 38% of patients were transported to either an Emergency Department or a cardiac catheterisation laboratory (cathlab) (n=989/2,564); 2% were transported to a mortuary (n=41/2,564) and 60% of patients remained at scene (n=1,534/2,564)
- The percentage of patients who were transported to hospital was 44% in the East, 32% in the West, and 35% in the South (Figure 2)
- Patients in urban areas were more likely to be transported than in rural areas (42% vs. 27%, p<0.001).

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



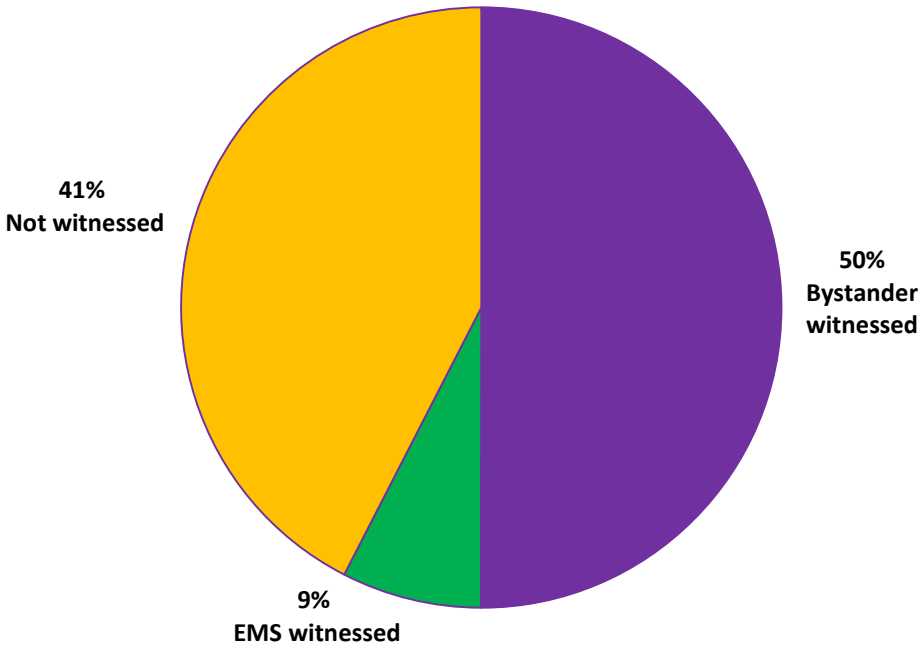
3.8 Event Location

- 68% of incidents occurred in the home (n=1,766/2,564)
- 77% of incidents occurred in a private setting (home, farm or residential institution (n=1,988/2,564)
- 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=576/2,564)
- In urban areas, a similar proportion of patients collapsed in a public place compared to rural areas (20% vs. 20%).

3.9 Witness Status

- 50% of cases were bystander witnessed (n=1,281/2,536), (Figure 3)
- 49% of urban cases were bystander witnessed (n=825/1,665) and 52% of rural cases were bystander witnessed (n=395/753).

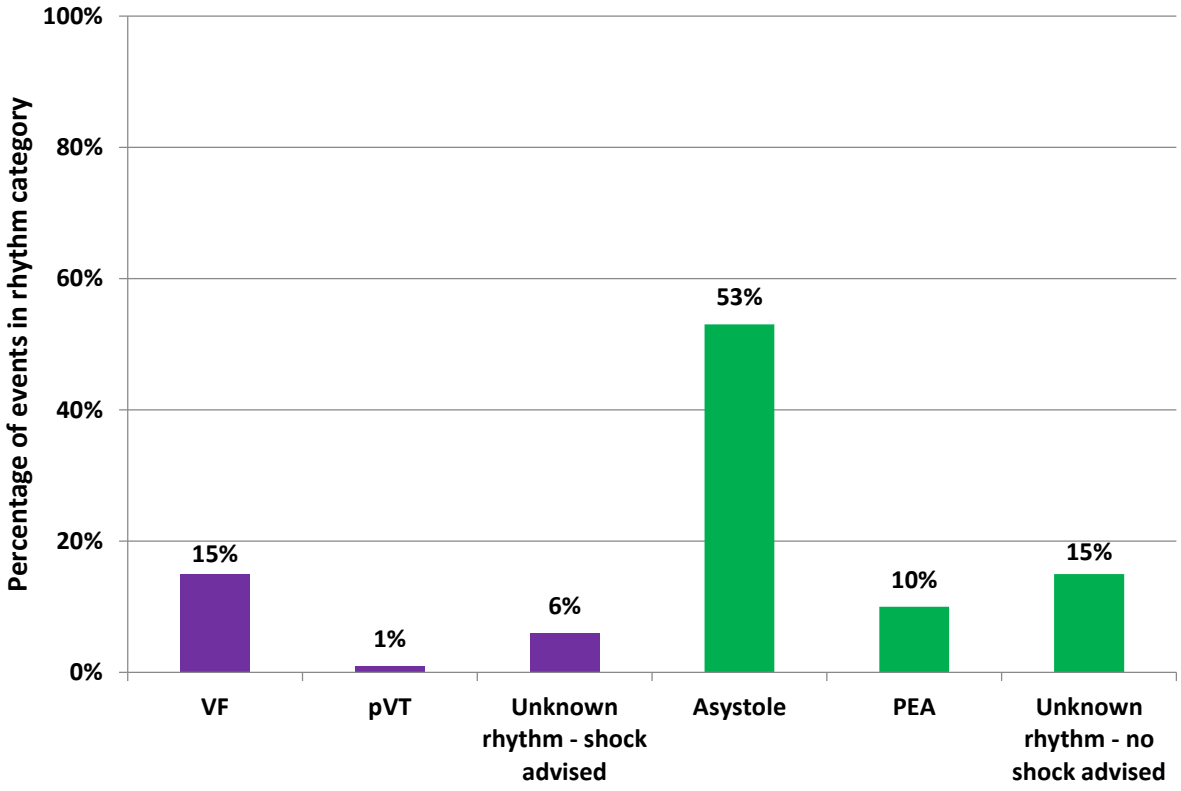
Figure 3: Witnessed status (n= 2,536)



3.10 First Monitored Rhythm

- 22% of cases were in a shockable rhythm at time of first rhythm analysis (n=557/2,562), (Figure 4)
- The initial rhythm was asystole in 53% of cases (n=1,322/2,494).

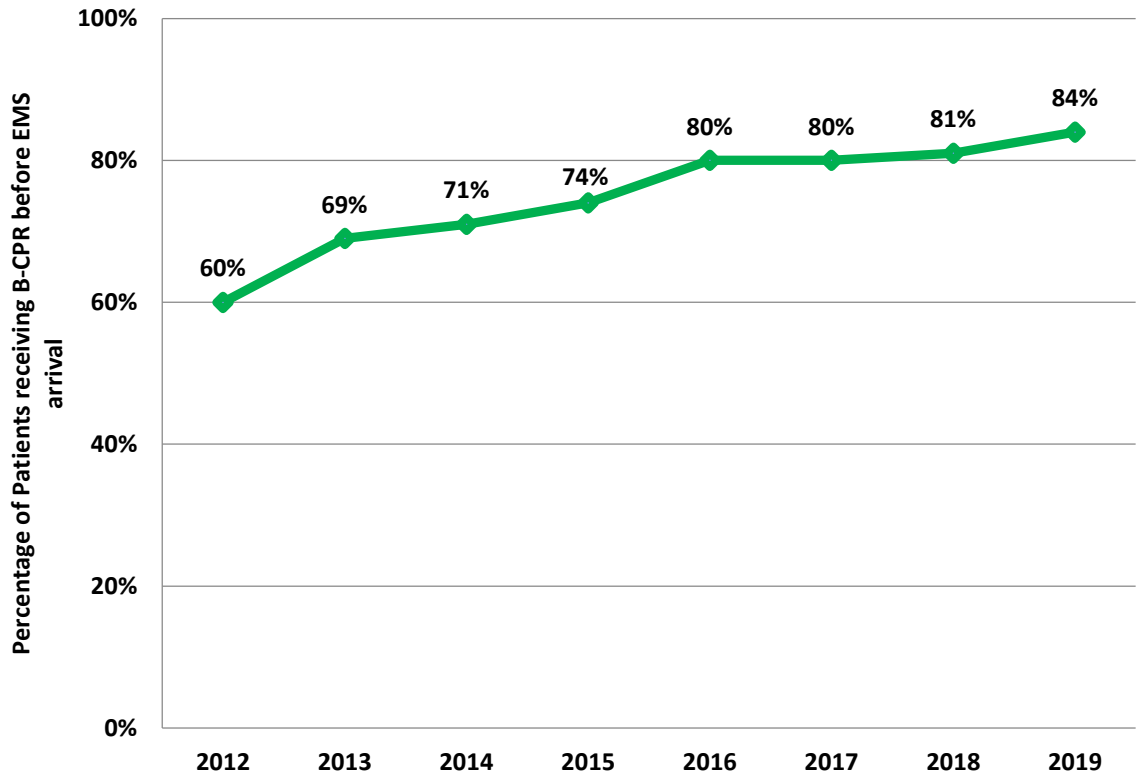
Figure 4: First monitored rhythm (n=2,494)



3.11 Bystander CPR

- Bystander CPR was attempted in 84% of cases (n=1,944/2,301).

Figure 5: Percentage of patients receiving B-CPR before EMS arrival, years 2012 – 2019

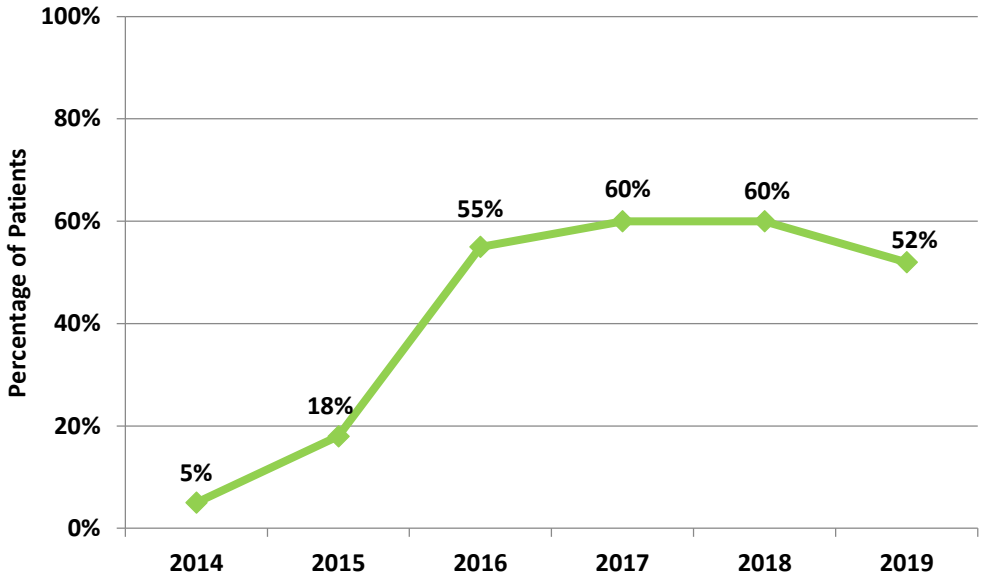


- In the subgroup of patients that had a bystander witnessed collapse (n=1,281) 87% (n=1,109) of patients had bystander CPR (B-CPR) attempted.
- A higher proportion of cases in a rural area received B-CPR (n=629/753) compared to an urban area (n=1,250/1,665) (83% vs. 75%; p<0.001).

3.12 Mechanical CPR

- 52% of cases involved the use of mechanical CPR (n=1,259/2,442) (Figure 6).

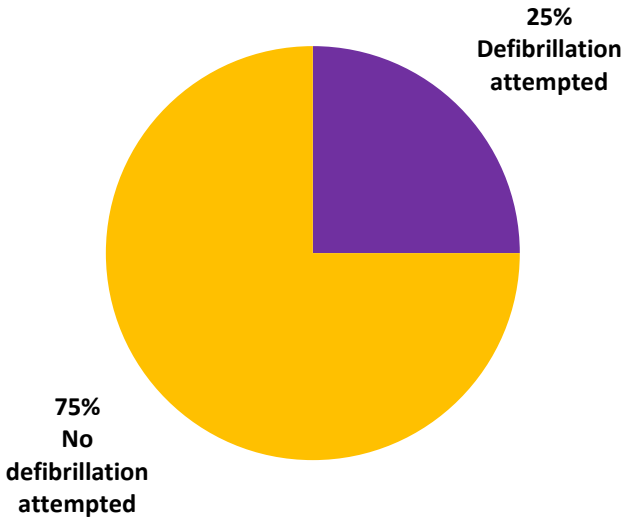
Figure 6 Percentage of patients receiving Mechanical CPR, years 2014 – 2019



3.13 Defibrillation

- 30% of cases had defibrillation attempted (n=758/2,557)
- Of the patients who had defibrillation attempted:
  - 31% had the pads applied pre-EMS arrival (n=237/758)
  - 25% had the first shock delivered pre-EMS arrival (n=187/756) (Figures 7 & 8).

Figure 7: Defibrillation attempted pre-EMS arrival



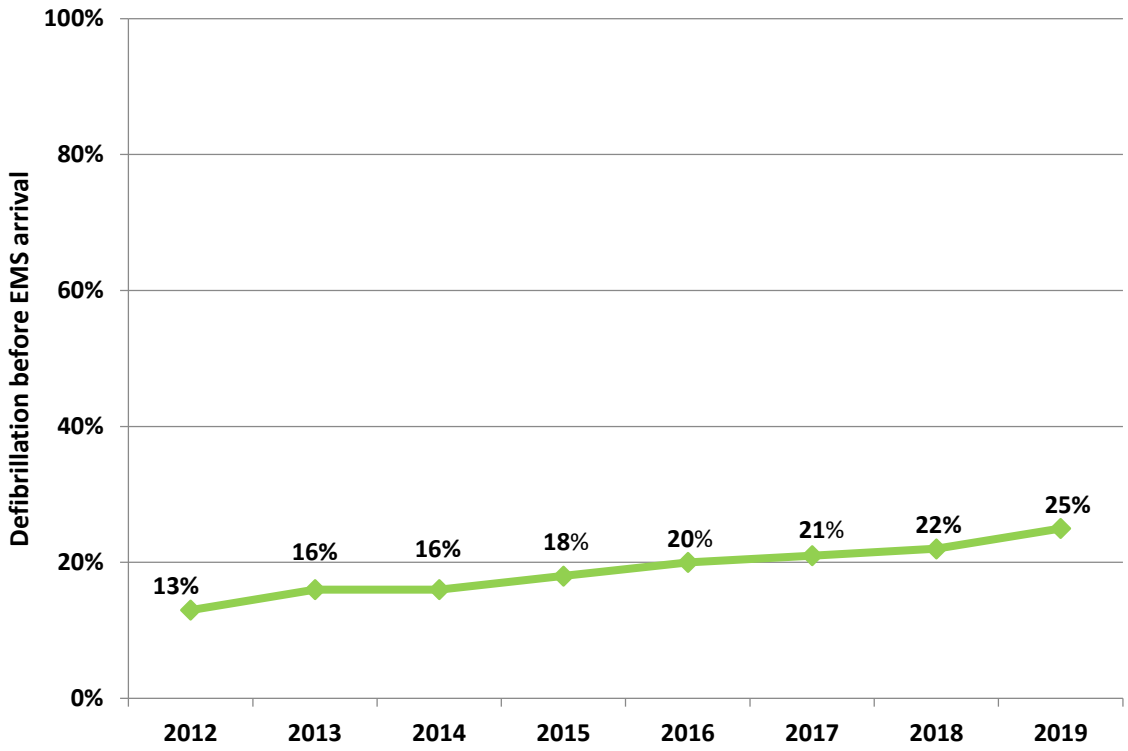
In the 187 cases where first shock was delivered before EMS arrival, the identity of the person who delivered the first shock was as follows:

- Members of the general public (23%, n=43)
- Doctors (18%, n=33)
- Basic Life Supporter (BLS) / Cardiac First Responder (CFR) trained (17%, n=32/187)
- Local Fire services (12%, n=22)
- Voluntary Services (12%, n=22)
- Nurses (11%, n=21)
- Others including Occupational First Aiders and members of An Garda Síochána (7%, n=14).

A total of 223 patients converted to a shockable rhythm during resuscitation. Of these:

- 60% were initially in asystole (n=135/223)
- 24% were initially in PEA (n=53/223, rhythm type not specified for the remainder.

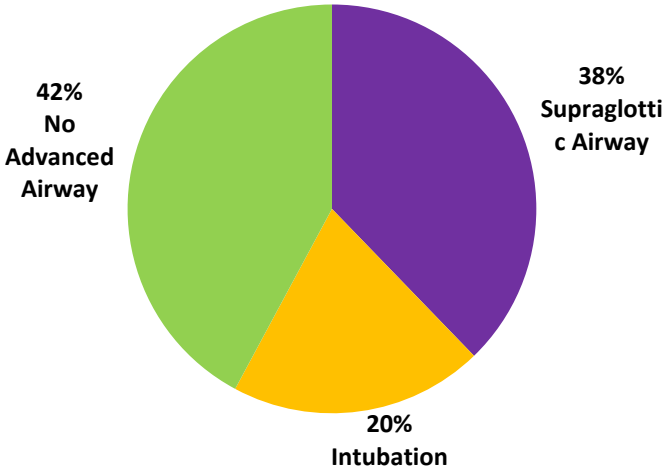
Figure 8: Defibrillation attempted before Ambulance service arrival 2012 – 2019



3.14 Advanced Airway Adjuncts

- In 58% of cases, advanced airway adjuncts were used, i.e. supraglottic airway device or intubation (n=1,440/2,489), (Figure 9).

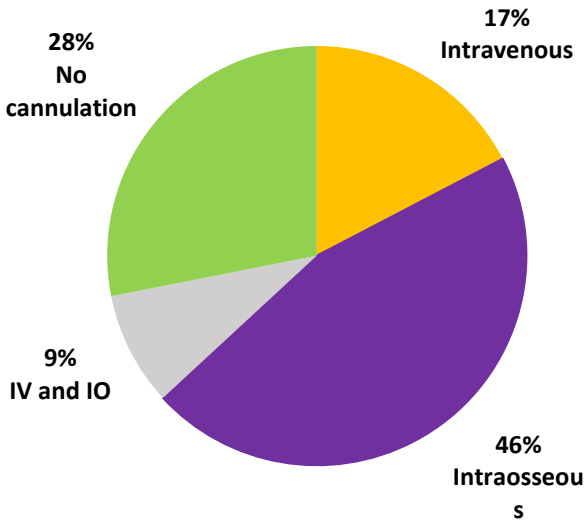
Figure 9: Adjunct airway management (n=2,489)



3.15 Cannulation

- 72% of cases had cannulation performed (n=1,852/2,564)
  - 46% of cases had intraosseous cannulation (n=1,158/2,530)
  - 17% had intravenous only cannulation (n=439/2,530)
  - 9% had a combination of both techniques (n=222/2,530)
  - 28% of cases were not cannulated (n=711/2,530) (Figure 10).

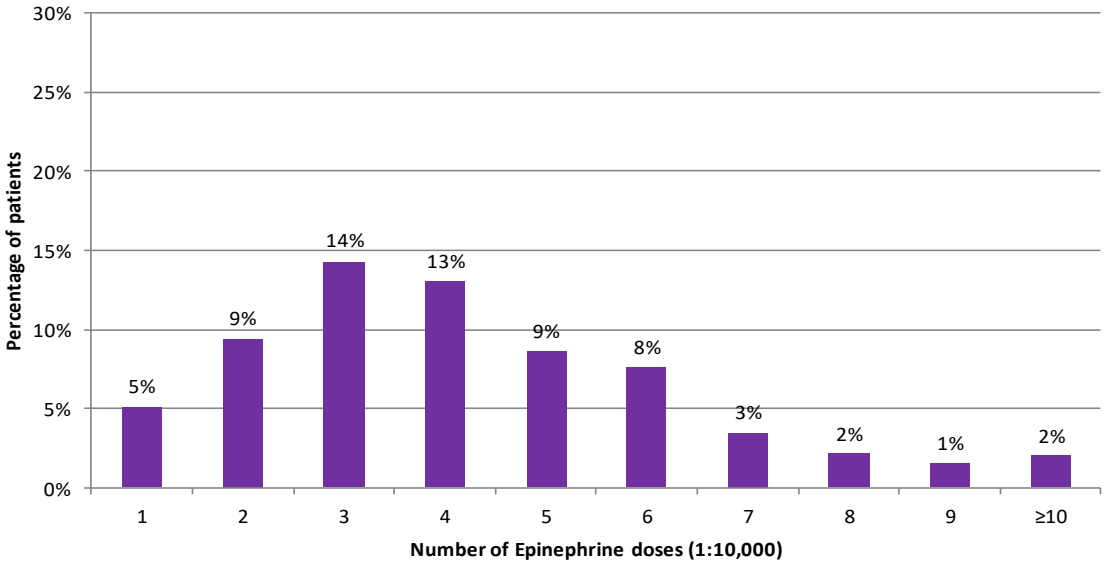
Figure 10: Cannulation method (n=2,530)



3.16 Cardiac Arrest Medication

- 67% of cases had epinephrine administered (n=1,715/2,564); the number of doses given ranged from 1 to 15 (Figure 11).

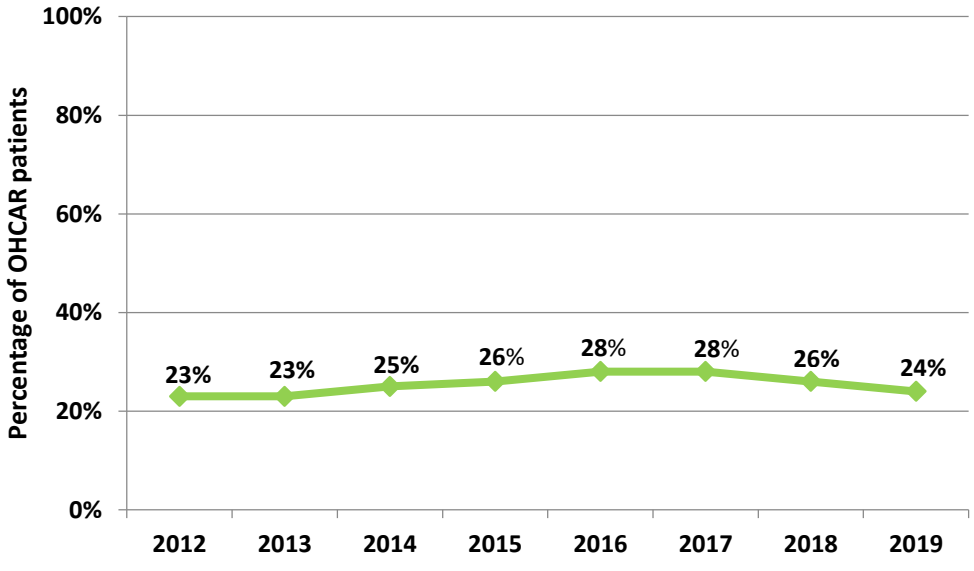
Figure 11: Percentage of Epinephrine doses (1:10,000) (n=1,715)



3.17 ROSC at any stage

- 24% of cases had ROSC before hospital arrival (n=628/2,563) (Figure 12). Data on ROSC was missing for one patient
- 27% of cases that occurred in an urban area achieved ROSC, compared with 18% in a rural area (n=450/1,665 vs. n=133/752, p<0.001).

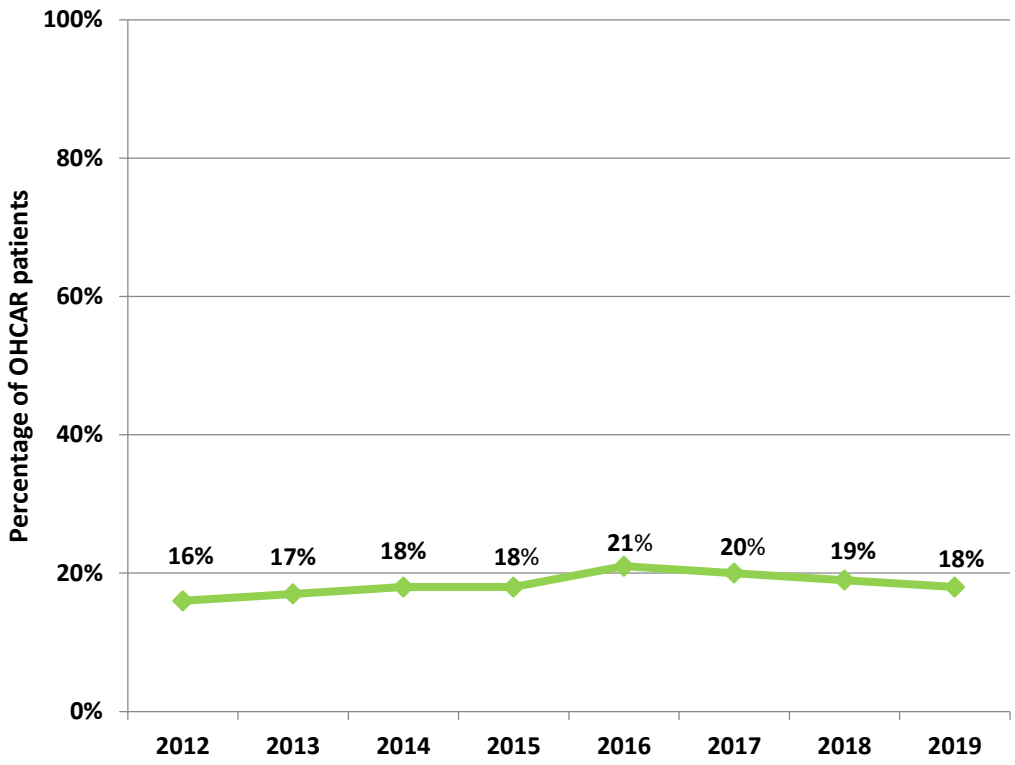
Figure 12: ROSC at any stage pre-hospital, all patients. Years 2012 – 2019 (n=5,074)



3.18 ROSC on Hospital arrival

- 18% of cases had ROSC on Hospital arrival (n=476/2,560) (Figure 13)
- ROSC on Hospital arrival was more likely to occur in an urban area compared to a rural area (20% vs. 13%; p<0.001).

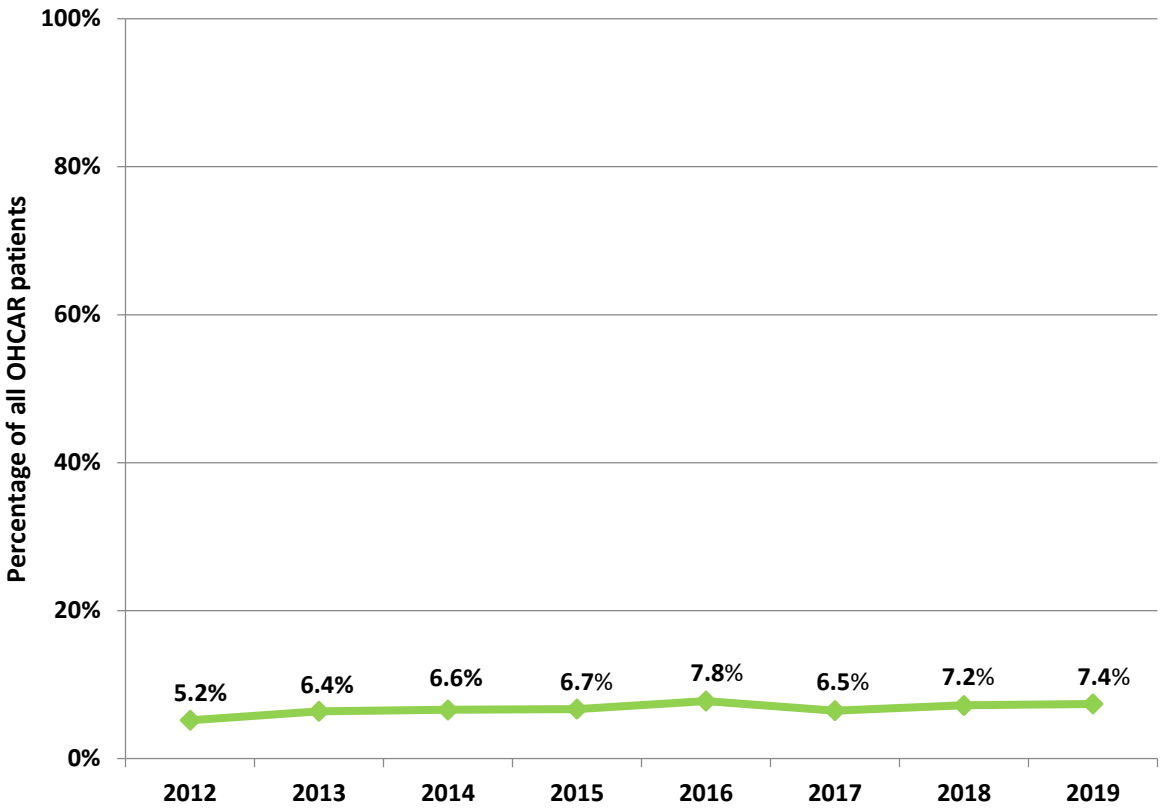
Figure 13: ROSC at Hospital arrival, all patients. Years 2012 – 2019 (n=4,218)



3.19 Discharged alive from Hospital

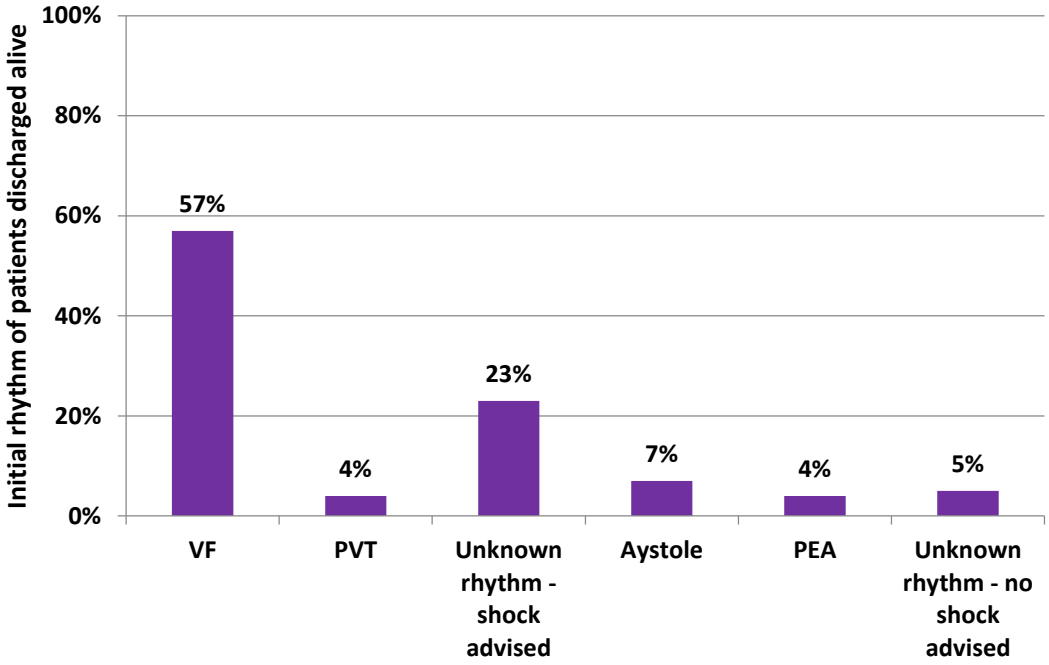
- A total of 190 patients were discharged alive from hospital (7.4%) (Figure 14). Data on 12 patients who were transported to hospital could not be obtained.

Figure 14: Percentage survival to discharge, all patients. Years 2012 – 2019 (n=1,193/17,632)



- Surviving patients were younger (median age 59 years, IQR 45 – 71) than non-surviving patients (median age 69 years, IQR 55 – 79 years, (p≤0.029))
- The presumed aetiology was medical for 92% of survivors
- Survival in the presumed medical aetiology group was 8% (n=174/2,189) compared with 4% (n=16/363) in the non-medical group (p=0.017)
- 18% of patients who collapsed in a public location survived (n=105/570), compared to 4% of patients that collapsed in a private location (n=85/1,982), (p≤0.001)
- 7.7% of patients who collapsed in an urban area survived (n=128/1,655), compared to 5.9% of patients that collapsed in a rural area (n=45/752), (p≤0.126)
- 84% of survivors had an initial shockable rhythm (n=159/190), (Figure 15)
- 16% of survivors had an initial non-shockable rhythm (n=31/190).

Figure 15: Percentage of survivors categorised by first analysed rhythm



- In the non-EMS witnessed group of survivors (n=147)
  - 85% had a witnessed arrest
  - 93% received bystander CPR
  - 50% (n=74), had defibrillator pads applied prior to EMS arrival
  - 40% (n=59) were shocked before EMS arrival
- In the EMS-witnessed group, 19% of patients survived (n=42/217)
- In the subgroup of EMS-witnessed patients that were adults, with presumed medical aetiology, with an initial shockable rhythm, 49% of patients survived (n=33/67).

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

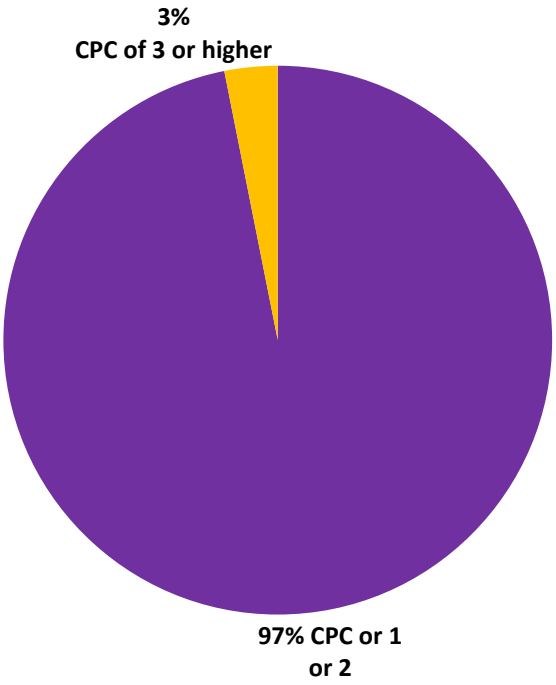
(4). Coma or vegetative state

(5). Brain death.

CPC score data was available for 160 surviving patients (Figure 16):

- 97% (n=155) had a score of 1 or 2
- 3% (n=5) had a score of 3 or higher

Figure 16: CPC score at discharge



3.21 OHCA in the under 35 age group

- 8% of cases were recorded as being <35 years of age (n=210/2,549)
    - 46% were of a presumed medical aetiology (n=97/210)
    - 12% were caused by trauma (road traffic accident, gunshot, stabbing, crush injuries or fall) (n=26/210)
    - 19% of cases resulted from a drug overdose (n=39/210)
    - 63% of cases were unwitnessed (n=132/208)
    - 11% were initially shockable (n=24/210)
    - 9.5% survived to Hospital discharge (n=20/210)

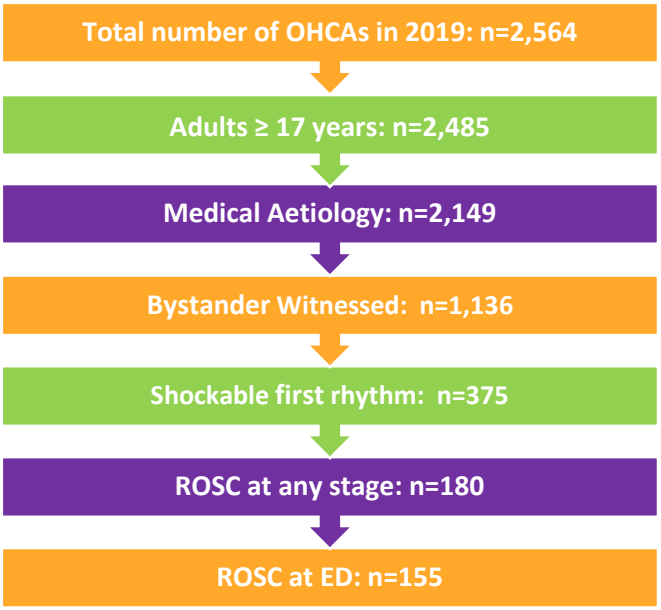
3.22 Utstein Comparator Subset

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 2019 Utstein comparator subset and ROSC outcomes

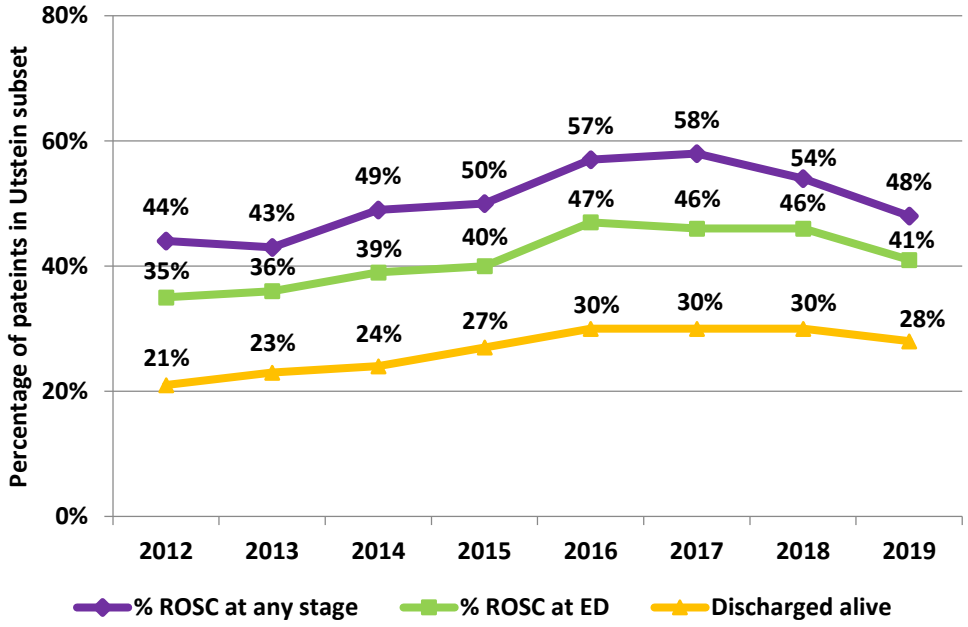


In 2019, the Utstein comparator subset included 375 patients and accounted for 15% of all OHCAR cases (375/2,564).

3.23 Utstein Comparator Subset Outcomes

- **48%** of patients (n=180/375) achieved ROSC at some stage before hospital arrival
- **41%** of patients (n=155/375) had ROSC on arrival at the ED
- **28%** of patients (n=104/375) were discharged alive from hospital (Figure 18)
- Of the survivors for whom CPC was available, **95%** had a CPC score of one or two (n=82/86).

Figure 18: Outcomes in the Utstein comparator subset, years 2012 – 2019



Case Characteristics

- Of those patients who collapsed in a public location, 42% survived (n=63/149) compared to 18% in a private location (n=41/222) (p=0.001)
- 95% of cases were recognised as cardiac arrest at the time of ambulance dispatch (n=353/372)
- Bystander CPR was performed on 92% of survivors
- 49% of the patients who survived had defibrillation attempted before ambulance service arrival (n=51/104). The estimated median time from 'time of collapse' to 'time of first shock administered' was 4 minutes (n=29/51, IQR 2 – 5).

Chapter 4

4.0 Discussion

4.1 OHCAR reporting to Service Providers

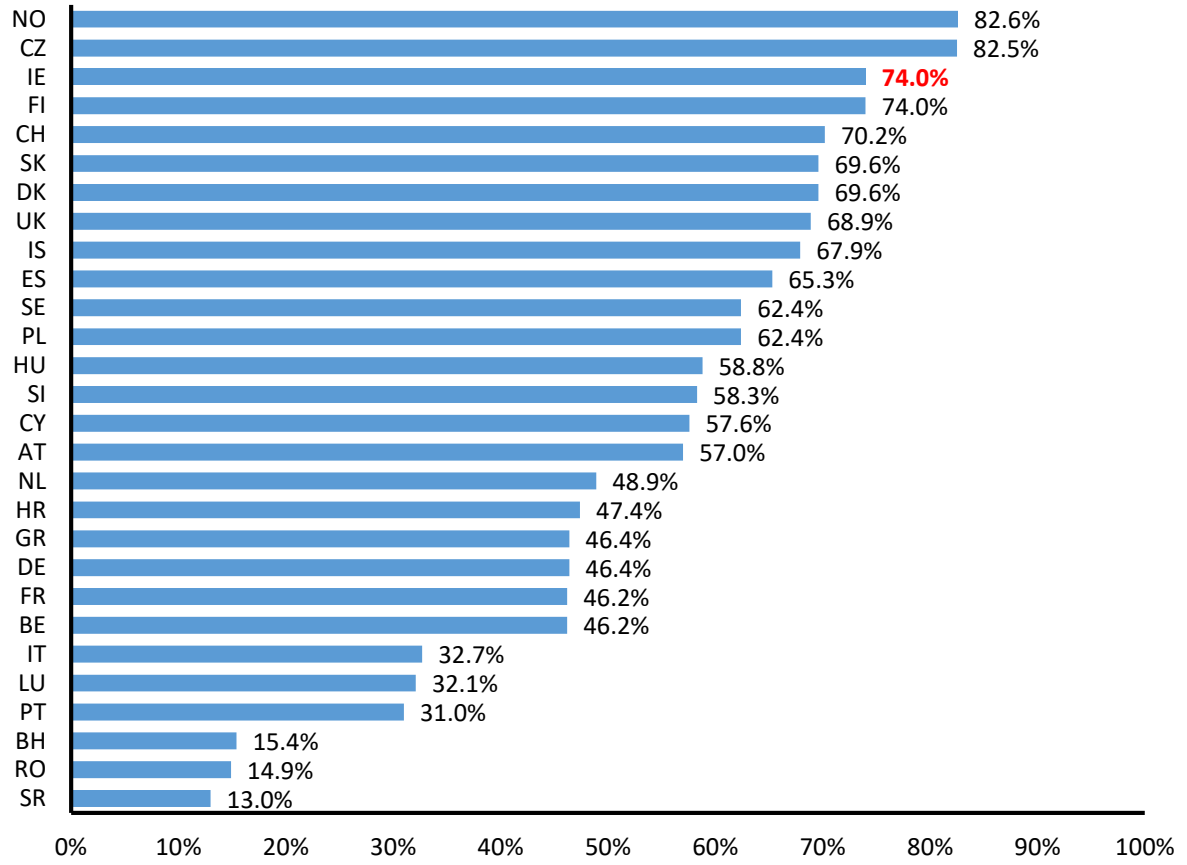
OHCAR is used to provide data for the 'ROSC at Hospital' monthly clinical Key Performance Indicator for NAS, and also to provide detailed regional quarterly reports. These include descriptive data elements and outcome variables at regional level and constitute the data source for reports circulated by NAS to stations for 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. 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 28 European countries with a population of almost 179 million people. Ireland was one of only four countries that contributed data for the entire country for the study period. Data collection commenced on the 1st of October 2017 until the 31st of December 2017. The EuReCa TWO study was published in 2020 [13].

The estimated rate of OHCA where B-CPR was attempted in EuReCa countries was 58% (Ireland 74%, figure 20). ROSC was achieved before hospital arrival in 33% of all EuReCa TWO cases (Ireland 25%). The overall EuReCa TWO proportion of patients that were discharged alive was 8% (Ireland 5.7%). Average survival to discharge in Utstein patients in collaborating countries was 31% (Ireland 26%). (For participating Country names see appendix 4).

Figure 19: EuReCa TWO study Bystander CPR rates



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.

4.3 Future developments in OHCAR

OHCAR has worked closely with NAS in implementing an electronic PCR system. This became fully operational in December 2019 and has facilitated a more efficient and streamlined transfer of data relating to an OHCA. Information is 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, there has been a 3% improvement in Bystander CPR to 84%. The use of mechanical CPR has gone from 60% to 52% of all OHCAR cases.

There has been a 3% improvement in attempted defibrillation before EMS arrival, from 22% to 25%. ROSC before hospital arrival was 24%, ROSC on arrival at hospital was 18% and discharge alive from hospital has remained unchanged at 7.4%.

In the Utstein group the ROSC prior to hospital arrival was 48%, ROSC at Hospital arrival was 41% and discharge alive was 28%. 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 2019 – July 2020:

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

Chapter 6

Acknowledgements

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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 and 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 2019 to July 2020.

The membership at June 2020 is:

- Dr. Peter Wright, Discipline of General Practice, NUI Galway (OHCAR Director 2019)
- A/Professor Conor Deasy, Consultant in Emergency Medicine, Cork University Hospital (OHCAR Chair)
- Professor Gerard Bury, UCD Centre for Emergency Medical Science
- Dr. John Dowling, North West Immediate Care Programme
- Mr. Brian Power, 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.

Appendix 2

OHCAR Meetings, Representations and Publications

- RESPOND "The Importance of CFRs in OHCAR", National Cardiac First Responder Conference, Mullingar, 6th April 2020.

Publications using OHCAR data or supported by OHCAR

Masterson S, Jensen M. Complying with Utstein guidelines: Comprehensive case identification in the Irish national out-of-hospital cardiac arrest register. Resuscitation. Jan 16 2016, https://doi:10.1016/j.resuscitation.2015.12.018.

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Appendix 3

OHCAR Utstein Comparator Subset 2019 – Regional Results

Figure 1: Number of OHCAR patients in the Utstein group by region (n=375)

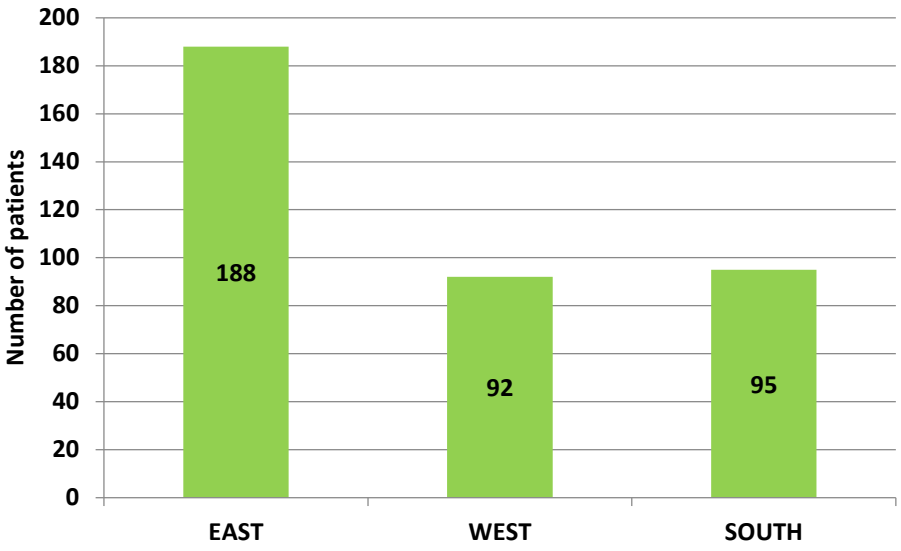


Figure 2: Dispatcher recognition of cardiac arrest at time of ambulance dispatch (Utstein), (n=372):

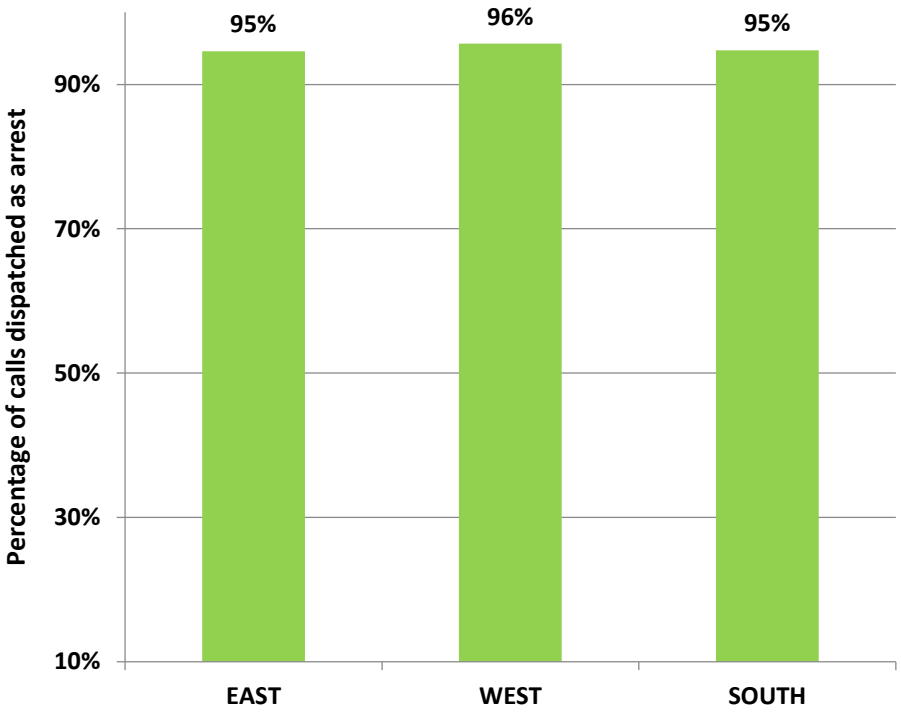
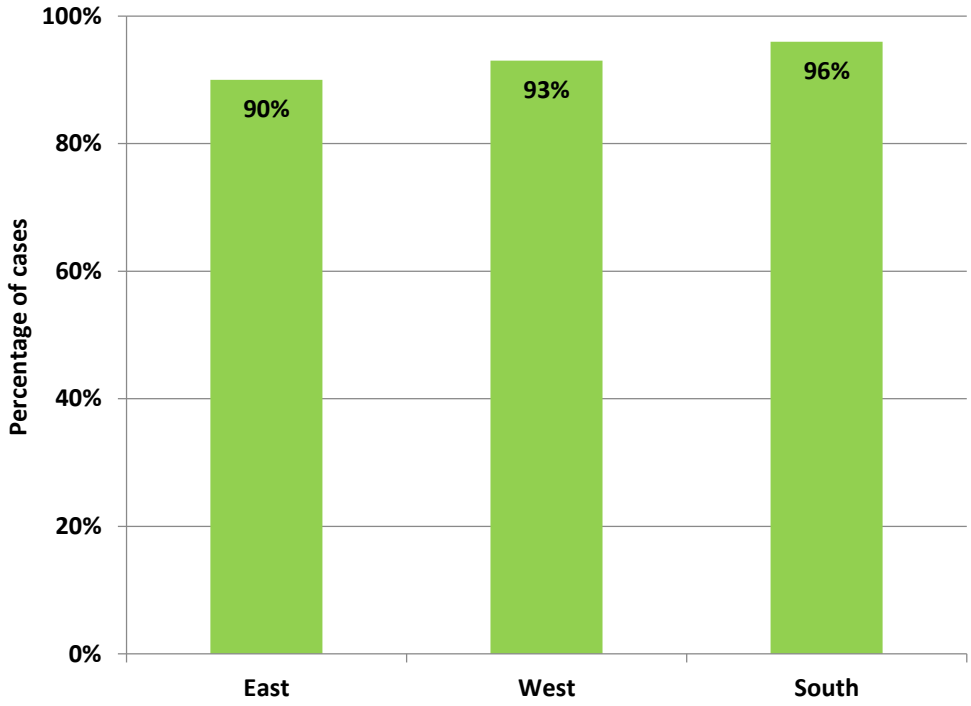


Figure 3: Percentage of Utstein cases with bystander CPR:



Appendix 4

EuReCa Two participating Country names

CZ	Czech Republic	NO	Norway
BE	Belgium	RO	Romania
HU	Hungary	CH	Switzerland
SK	Slovakia	SE	Sweden
PT	Portugal	NL	The Netherlands
DK	Denmark	SL	Slovenia
UK	United Kingdom	IS	Iceland
PO	Poland	AT	Austria
DE	Germany	HR	Croatia
IT	Italy	IE	Ireland
SR	Serbia	GR	Greece
FI	Finland	CY	Cyprus
LU	Luxembourg	ES	Spain
FR	France	BH	Bosnia & Herzegovina