PRIVATE AND CONFIDENTIAL

OHCAR

National Out-of-Hospital Cardiac Arrest Register

FIFTH ANNUAL REPORT

NOVEMBER 2013
<table>
<thead>
<tr>
<th>CONTENTS</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>OHCAR Overview...</td>
<td>2</td>
</tr>
<tr>
<td>The National Out-of-Hospital Cardiac Arrest Register...</td>
<td>3</td>
</tr>
<tr>
<td>Aim of OHCAR...</td>
<td>3</td>
</tr>
<tr>
<td>OHCAR Governance and Organisation...</td>
<td>4</td>
</tr>
<tr>
<td>Scope of Patients included in OHCAR...</td>
<td>5</td>
</tr>
<tr>
<td>Data Collection...</td>
<td>6</td>
</tr>
<tr>
<td>Quality Control...</td>
<td>7</td>
</tr>
<tr>
<td>OHCAR and the National Ambulance Service...</td>
<td>8</td>
</tr>
<tr>
<td>OHCAR Data Collection...</td>
<td>8</td>
</tr>
<tr>
<td>Research...</td>
<td>9</td>
</tr>
<tr>
<td>OHCAR and EuReCa...</td>
<td>10</td>
</tr>
<tr>
<td>OHCAR Meetings...</td>
<td>11</td>
</tr>
<tr>
<td>OHCAR 2012 Results – All Cases...</td>
<td>12</td>
</tr>
<tr>
<td>OHCAR 2012 Comparator Subset...</td>
<td>23</td>
</tr>
<tr>
<td>OHCAR 2012 Key Messages...</td>
<td>28</td>
</tr>
<tr>
<td>OHCAR in the Future...</td>
<td>30</td>
</tr>
<tr>
<td>References</td>
<td>33</td>
</tr>
<tr>
<td>APPENDIX ONE: OHCAR 2012 Comparator Subset by National Ambulance Service Area...</td>
<td>35</td>
</tr>
<tr>
<td>APPENDIX TWO: OHCAR 2012 All Cases by Former Ambulance Divisions...</td>
<td>39</td>
</tr>
</tbody>
</table>
OHCAR OVERVIEW
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\(^1\). Since inception, OHCAR has grown from a regional register in the North West to being one of only three nationwide OHCA registers in Europe, achieving full national coverage in January 2012.

The need for OHCAR has been reinforced in the policy document “Changing Cardiovascular Health”\(^2\) and the Emergency Medicine Programme Strategy (2012)\(^3\). Most significantly for OHCAR, the National Ambulance Service (NAS) have undertaken to integrate OHCAR into NAS. OHCAR will be used to facilitate reporting of OHCA resuscitation incidence, management and outcomes and will be 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
- Despite universal understanding of and agreement on the need for the ‘Chain of Survival’ to be enacted in a timely manner\(^4\), international research has shown a wide variation in the pattern of survival both within and between countries\(^5,6\).
- Research on OHCA in Ireland has been carried out for over forty years, with the documentation of OHCA survival with the world’s first cardiac ambulances staffed solely by paramedic personnel in Dublin\(^7\).
- It is essential that the tradition of OHCA research is continued and expanded if Irish practice is to be based on Irish evidence
- In order to learn from Irish experience of OHCA, a systematic and ongoing data collection & analysis mechanism is required. This is the role of OHCAR.
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. 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
- Ms. Jacqueline Egan, Programme Development Officer, PHECC
- Dr. Joseph Galvin, Cardiologist, Mater Hospital
- Dr. Geoff King, Director, PHECC
- 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)

The Steering Group met four times from October 2012 to October 2013.

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. 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. This includes support in statistical analysis, website development and access to an academic network and appropriate training courses.

Since June 2013 administrative support is provided to OHCAR by the NAS. The OHCAR Administrator is based in NAS Headquarters in Ballyshannon, Co. Donegal. The OHCAR Administrator has enabled additional data validation measures and missing data searching to be accommodated and has greatly enhanced the comprehensiveness and quality of the OHCAR database.
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”.

- At present, the primary source of OHCAR data is the statutory ambulance services i.e. the NAS and the Dublin Fire Brigade. The current data collection model relies primarily on statutory ambulance services attending the scene at some stage. Increasingly however, first aid support at many sporting and entertainment events is provided by voluntary and auxiliary organisations and in some cases, OHCA patients may be dealt with or transported to hospital without statutory ambulance involvement. This may also be the case when patients require aeromedical transport and when the transporting organisation is other than the NAS. OHCAR has data sharing agreements with some of these organisations, but improvements in data collection methodologies and extension of data sharing agreements are required to ensure such cases are included on the OHCAR database.

- 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 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.
- The OHCAR data collection continuum stretches from receipt of the emergency call in Ambulance Control to discharge of surviving patients from hospital.

Ambulance Services

- The method used for collecting data varies across the NAS Ambulance Area:

<table>
<thead>
<tr>
<th>NAS AREA</th>
<th>PCR Electronic</th>
<th>Control Electronic</th>
<th>PCR Photocopy</th>
<th>Control Photocopy</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAS West</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Former North West Division</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Former Western Division</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Former Mid-West Division</td>
<td>✔️</td>
<td></td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>NAS South</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Former Southern Division</td>
<td>✔️</td>
<td></td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Former South Eastern Division</td>
<td>✔️</td>
<td></td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>NAS North Leinster</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Former Eastern Division</td>
<td>✔️</td>
<td></td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Former North-East Division</td>
<td>✔️</td>
<td></td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Former Midlands Division</td>
<td>✔️</td>
<td></td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Dublin Fire Brigade</td>
<td>✔️</td>
<td></td>
<td>✔️</td>
<td></td>
</tr>
</tbody>
</table>

Hospital Services

OHCAR now has a data sharing agreement with the following hospitals nationwide:

- Bantry General Hospital
- Beaumont Hospital
- Connolly Hospital Blanchardstown
- Ennis Hospital: UL Hospitals
- Kerry General Hospital
- Louth County Hospital, Dundalk
- Mater Misericordiae University Hospital
- Mercy University Hospital, Cork
- Midland Regional Hospital Portlaoise
- Naas General Hospital
- Our Lady Of Lourdes Hospital, Drogheda
- Portiuncula Hospital, Ballinasloe
- Sligo General Hospital
- St Colmcille’s Hospital, Loughlinstown
- St John's Hospital Limerick
- St Michael's, Dun Laoghaire
- Tallaght Hospital
- Waterford Regional Hospital
- Cavan Monaghan Hospital
- Children’s University Hospital, Temple Street
- Cork University Hospital
- Galway University Hospitals
- Letterkenny General Hospital
- Mallow General Hospital
- Mayo General Hospital
- Midland Regional Hospital Mullingar
- Midland Regional Hospital Tullamore
- Nenagh Hospital: UL Hospitals
- Our Lady's Hospital, Navan
- Roscommon County Hospital
- South Tipperary General Hospital
- St James's Hospital
- St Luke's General Hospital Carlow / Kilkenny
- St Vincent's University Hospital, Elm Park
- University Hospital Limerick
- Wexford General Hospital
Quality Control

- Since the establishment of OHCAR, ways to ensure the quality of data have been developed and constant improvements in quality control mechanisms have been sought.
- The database is regularly checked for invalid and conflicting variables and data from control is sought in electronic format where possible to minimise transcription errors. Additionally, dispatch-related data is accepted only from control rather than taken from the PCR to ensure reliability of the dispatch data source.
- The national use of the PHECC PCR as the primary data collection tool also increases reliability of data collected by practitioners.
- Since the OHCAR Administrator joined in June 2013, it has been possible to carry out data validation. Each case is entered on a temporary file by the OHCAR Administrator and then checked against the original source by the OHCAR Manager before being added to the OHCAR database.
- Improved missing case identification has also been possible since June 2012. Lists of control data for all DELTA and ECHO emergency calls for the former South East, West, Midlands and Mid West divisions was requested and received by OHCAR. Known OHCAR cases were eliminated from these lists and the PCRs for the remaining cases were viewed on the PCR archive system (IMSCAN). An additional 225 OHCAR cases were found using this search system.
- The increased volume of cases has led to an increase in the amount of data requested from receiving hospitals. Additionally, as some cases were identified during the missing data collection process, considerable time may have elapsed since the event, making data retrieval in hospitals more difficult. This has impacted on the quantity of data that can be obtained from hospitals.
OHCAR AND THE NATIONAL AMBULANCE SERVICE

- During 2013, the NAS increased its contribution to OHCAR funding to 80%.
- The original OHCAR organisational structure has remained but the OHCAR Manager has participated in the Ambulance Service Quality Improvement Programme (AQuIP) and has participated in the ongoing process to develop pre-hospital Key Performance Indicators (KPIs)
- Outcome from OHCA is to be a Clinical KPI for the ambulance service and it is planned that OHCAR will be the data source for this KPI. Ways to streamline and expedite OHCAR data collection and processing are currently being investigated to facilitate OHCAR data reporting for this KPI.

OHCAR DATA COLLECTION

- Achieving nationwide coverage has increased the volume of data collected, processed and reported on by OHCAR and the plan to use OHCAR to report on OHCA outcomes for NAS means that the current data collection process needs to be modified
- A standardised data collection methodology should streamline OHCAR data reporting and processing and should also facilitate more standardised approaches to data collection from hospitals
- OHCAR has data collection agreements with the Red Cross, Order of Malta and the Civil Defence, but there is also the need to improve OHCAR data collection from all non-statutory organisations so that all OHCA resuscitation attempts are captured, not just those with statutory ambulance involvement
- A proposal for an OHCAR ‘Datahub’ which would facilitate standardised data collection by all pre-hospital practitioners via a web-based platform was made via the NAS Medical Director to the HSE ICT Directorate. A Project Business Case for the Datahub was prepared and is currently being considered by the ICT Directorate. If acceptable, the Business Case will be presented by the Directorate to CMOD in the Department of Finance. If approved, the procurement process for an OHCAR Datahub can be commenced.
RESEARCH

Since the last Annual Report, OHCAR involvement in research has included academic journal article submissions, presentation and attendance at national and international conferences and submission of an ethics approval application:

Articles for Submission to Academic Journals


Study Submission

- Research Proposal for the following study prepared “Does the use of CPR feedback software improve CPR quality in the Irish pre-hospital setting?” Hennelly D, Kenna L, Cummins N, Masterson S, O’Donnell C. Ethical approval obtained from Mid-Western Regional Hospital Ethics Committee July 2013.

Oral and Poster Presentations


OHCAR AND EURECA

OHCAR has submitted data for 2012 to EuReCa – the European Cardiac Arrest Registry – and is one of only three countries in Europe with full national register coverage.

The EuReCa experience has shown that there are marked differences in how OHCA registers are structured across Europe and that the amount and type of data collected also varies across countries. EuReCa’s primary focus is now to establish a minimum dataset (based on the Utstein dataset) which participating countries must be able to provide in order to contribute to EuReCa.

The strategy to facilitate participating countries to achieve a minimum dataset will be discussed at a EuReCa meeting in early 2014.

OHCAR representatives have attended two EuReCa meetings since during 2012 and 2013.

OHCAR MEETINGS

Meetings

- EuReCa meetings October 2012 and October 2013
- Public Health Research and Health Research Alliance meetings, NUI Galway 2012 & 2013
- NAS “9ECHO01” project meetings. April 2013 and September 2013
- Paramedic Supervisors, Ballyshannon April 2013
- GP training, Letterkenny June 2013
- KPI Development Conference October 2013.
OHCAR RESULTS 2012
ALL CASES
INCIDENCE
In 2012, a total of 1798 OHCA resuscitation attempts attended by National Ambulance Services were either reported directly to OHCAR or identified during missing case searches. Nationally, this equates to 39 OHCA resuscitation attempts per 100,000 persons during 2012. The majority of incidents were presumed to be of cardiac origin (34/100,000 persons) compared to a small proportion of cases of non-cardiac origin (5/100,000 persons). There was little variation in incidence between the three National Ambulance Service operational areas.

Figure One: Incidence of OHCA resuscitation attempts per 100,000 Population during 2012 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 1749 cases (97%).

- Over one third of events occurred in rural areas (n=603; 35%). This equates to a higher incidence of events in urban areas (40 events/ 100,000 persons) compared to rural areas (35 events/ 100,000 persons).
TRANSPORT TO AN EMERGENCY DEPARTMENT

- The majority of patients were transported to hospital (n=1038; 58%)
- The percentage of patients transported to hospital varied across the three NAS areas ranging from 39% in the West to 73% in North Leinster.

Was the Patient Transported to the ED?

- Of the total 1038 patients transported to the Emergency Department, 335 adult patients (32%) who presented in a non-shockable rhythm with a presumed cardiac aetiology were transported to ED with no record of return of spontaneous circulation (ROSC) at any stage pre-hospital.
- Patients in urban areas were more likely to be transported than patients in rural areas (70% vs. 35%; p<=0.001). PHECC Clinical Practice Guidelines allow for patients to be transported to an Emergency Department if an Advanced Paramedic is not at scene and ROSC is not achieved after 20 minutes. As urban locations are more likely to be in the vicinity of an ED, transport to hospital is more likely to occur. Additionally, in rural areas, general practitioners are more often available during the resuscitation attempt, meaning that when resuscitation does not result in ROSC, death may be pronounced at scene.
PATIENT DEMOGRAPHY

- There were 1211 male patients and 586 female patients (gender of one patient not specified)
- Patients ranged in age from less than one to 99 years old (median age 67 years)
- Female patients tended on average to be significantly younger than male patients (65 years vs. 71 years (p<=0.001)).

PRESUMED AETIOLOGY

- The vast majority of incidents were presumed to be of cardiac aetiology (n=1562; 87%)
- Non-cardiac causes included trauma (n=123); respiratory (n=12), submersion (n=17) and other non-cardiac causes including choking, drug/alcohol overdose, haemorrhage.

- Of all OHCAR cases, 86% 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 69 years compared to 37 years for the non-cardiac group (p<=0.001).
EVENT LOCATION

- Of the 1787 cases for which data was available, two-thirds of incidents occurred at home (n=1190; 66.5%)

- The next most common location was a residential institution (n=180). Almost one in twelve incidents occurred on the street or road (n=145). Other locations included public buildings (n=85), recreation or sporting facilities (n=53), in an ambulance (n=29), in a GP surgery (n=17), at an industrial place or premises (n=17) and on a farm (n=13). “Other” locations included at an airport (n=9) in water and in a car.

- There was no significant difference between the likelihood of collapse in a public place in urban or rural areas (22% vs. 19%).
WITNESS STATUS

- Of the 1730 events for which data was available, 954 incidents were witnessed by a bystander and 102 events were witnessed by Ambulance Service personnel. A total of 674 incidents were not witnessed. Data was missing for 68 incidents.
- The percentage of patients who had a bystander-witnessed arrest was similar for urban and rural settings (55% vs. 56%).

PRESENTING RHYTHM

- Of the 1764 cases for which data was available 388 patients (22%) were in a shockable rhythm at time of first rhythm analysis.
- Patients with a presumed cardiac aetiology were more likely to present in a shockable rhythm than patients with a non-cardiac aetiology (24% vs. 9%, p<=0.001).
- There was little difference in the percentage of patients presenting in a shockable rhythm according to urban or rural setting (21% vs. 23%).
Bystander CPR
- Of the 1628 cases that were not EMS-witnessed, data on bystander CPR was available for 1599 cases. Bystander CPR was attempted in 60% of these cases.
- Patients in a rural setting were more likely than patients in urban areas to receive bystander CPR (66% vs. 51% p <=0.001).

Mechanical CPR
- A mechanical CPR device was used in 64 cases only (3.6%).

Defibrillation
- Of the 1765 patients for whom data was available, 613 had defibrillation attempted (35%).
- In the 610 cases for which data was available, the first shock was delivered before ambulance services arrived in 82 cases.
- Patients in rural areas were more likely than patients in urban areas to have defibrillation attempted before the arrival of the Ambulance Services (6.4% vs. 3.7; p<=0.001).

Use of Advanced Airway Adjunct
- Of the 1658 cases for which data was available, advanced airway techniques were used in 1033 cases (62%).
CANNULATION
• Of the 1781 cases for which data was available, cannulation was performed in 1169 cases (66%)

EPINEPHRINE ADMINISTRATION
• Of the 1775 cases for which data was available, epinephrine was administered in 1091 cases.

• The number of epinephrine doses given to each patient ranged from one to fourteen
ROSC AT ANY STAGE

- Of the 1727 cases for which data was available, 396 patients had return of spontaneous circulation (ROSC) at some stage pre-hospital. Data on ROSC was missing for 71 patients.

  *Was ROSC achieved at any Stage Pre-Hospital?*

  ![Pie chart showing ROSC at any stage pre-hospital]

  - No 77%
  - Yes 23%

- 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. 17% p<=0.03)
- 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 1689 patients for whom data was available, 273 had ROSC on arrival at the Emergency Department. Data was missing for 109 patients.

  *ROSC on arrival at the ED?*

  ![Pie chart showing ROSC on arrival at the ED]

  - No 84%
  - Yes 16%

- Patients with a presumed cardiac aetiology tended to be more likely to have ROSC on arrival in ED than patients with a non-cardiac aetiology but this difference was not significant (16% vs. 14%)
- Patients in an urban setting were significantly more likely to have ROSC on arrival at ED compared to patients in a rural setting (19% vs. 11%; p<=0.001).
DISCHARGED ALIVE FROM HOSPITAL

- Of the 1773 patients for whom data was available, 93 patients were discharged alive from hospital. Data on 25 patients who were transported to the Emergency Department could not be obtained. The reasons for this included:
  - No or insufficient patient identifiers available to Ambulance Services at the time of transport to ED
  - No record of the patient found at the ED
  - Limited resources available in hospital for record search.

  ![Percentage of Patients Discharged Alive](image)

- Surviving patients were:
  - Younger on average than non-surviving patients (63 years vs. 67 years (p<=0.01))
  - More likely to have a presumed cardiac aetiology – survival in the presumed cardiac group was 5.5% (n=85) compared with 3.4% (n=8) in the non-cardiac group. This difference was not significant
  - More likely to collapse in a public place than in a private location (15% vs. 2.5% p<=0.0001)
  - More likely to collapse in an urban than a rural setting (6.2% vs. 3.2% p<=0.006)
  - More likely to suffer a witnessed than an unwitnessed arrest (7.6% vs. 1.6% (p<=0.001))
  - More likely to present in a shockable than a non-shockable rhythm (21% vs. 12% p<=0.001)

- In the non-EMS witnessed group, 82% of survivors received bystander CPR.
- In the non-EMS witnessed group, nineteen survivors had defibrillation attempted before arrival of Ambulance Services.
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.

- CPC score data was available for 67 patients only. Of the patients for whom data was available, 79% of patients had a CPC score of one.

**Cerebral Performance Category Score for Surviving patients (n=67)**

- As OHCAR has grown, it has become increasingly difficult to collect the CPC score for surviving patients. Some of the reasons for increasing difficulty include:
  - Patients may be transferred to several different hospitals before their episode of care is complete.
  - It may be several months after discharge before OHCAR requests data on patients who were transported to ED. This may be because of delays in data receipt or because cases are identified as a result of missing data search. In such cases, the search for hospital data may be more laborious due to patient record archiving processes in different hospitals, and the required resources to carry out the search may not be available.
OHCAR 2012
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.

In 2012, this subset accounted for 15% of all OHCAR patients (n=268). If the proportion of patients who present in a shockable rhythm can be increased in future years then the proportion of all OHCAR patients who can potentially survive will also be increased. Ways to increase the proportion of patients in this subset include:

- Improved cardiac arrest recognition
- Shorter call-response times
- Early, good quality CPR
- Early defibrillation.
CARDIAC ARREST RECOGNITION

- Of the 252 cases for which data was available, 137 cases were recognised as cardiac arrest at the time of ambulance dispatch

Was Cardiac Arrest recognised at time of ambulance dispatch?

- YES: 54%
- NO: 46%

AMBULANCE CALL-RESPONSE INTERVAL

*Overall*
- The median ambulance call-response interval (CRI) was eleven minutes (range: less than one minute to 1 hour 39 minutes)
- The proportion of incidents responded to in five minutes or less was 16%
- The proportion of incidents responded to in eight minutes was 37%

Percentage of Events in Each Time Interval Category

- >8 mins: 63%
- 6-8 mins: 21%
- 5 mins or less: 16%

*Urban vs. Rural Setting*
- Almost two thirds of cases (66%) occurred in an urban setting. The median CRI in an urban setting was nine minutes (range: less than one minute to 52 minutes) compared with eighteen minutes in a rural setting (less than one minute to 1 hour 39 minutes)
- The proportion of incidents responded to in five minutes or less was 19% in urban areas compared to 7% in rural areas
- The proportion of incidents responded to in eight minutes or less was 46% in urban areas compared to 15% in rural areas.
EARLY, GOOD QUALITY CPR

- Of the 264 cases for which data was available, 78% of patients in the subset had bystander CPR performed.

**Was Bystander CPR Performed?**

- 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

- A total of 56 patients (21%) had defibrillator pads applied before Ambulance Service arrival. All of these patients had defibrillation attempted before Ambulance Service arrival.

**Was a Shock Delivered before Ambulance Service Arrival?**
OUTCOMES

- Of the 261 cases for which data was available, 115 patients achieved ROSC at some stage pre-hospital (44%)
- Of the 246 cases for which data was available, 85 patients had ROSC on arrival at the Emergency Department (35%)
- Of the 261 cases for which data was available, 54 patients were discharged alive from hospital (21%)
- Of the 42 patients for whom CPC score was available, 32 patients had a CPC score of one (76%).

Surviving patients:
- Had a shorter median CRI (8 minutes (range: 2-48 minutes) vs. 12 minutes (<1 minute to 1 hour 39 minutes)
- Were more likely to collapse in an urban setting (81%)
- Had bystander CPR performed in the vast majority of cases (94%)
- Had defibrillation attempted before Ambulance Service arrival in 31% of cases
- Were less likely to be administered epinephrine than non-surviving patients (11% vs. 37%)
- Were less likely to be intubated than non-surviving patients (9% vs. 24%).
OHCAR 2012

KEY MESSAGES FROM THE RESULTS
KEY MESSAGES

All OHCAR Patients
- There were 1798 OHCAR cases recorded during 2012
- Percentage survival for all OHCAR cases was 5.2%
- Surviving patients were more likely to:
  - By 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)
- Nineteen survivors had defibrillation attempted before arrival of Ambulance Services.

OHCAR Comparator Subset
- The OHCAR comparator subset includes patients most likely to benefit from improvements in pre-hospital resuscitation
- In 2012 there were 268 patients in the Comparator Subset. Percentage survival in the Subset was 21%
- When compared to non-surviving patients, 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
- Almost one third of survivors in the Comparator Subset had defibrillation attempted before Ambulance Service arrival.
OHCAR IN THE FUTURE
OHCAR IN THE FUTURE

In the last Annual Report, key themes for OHCAR improvement were highlighted. It is planned to build on these themes so that the quality and usefulness of OHCAR can be enhanced.

Theme 1. Data Collection and Data Quality

OHCAR Datahub
While an electronic PCR system (ePCR) is not yet available, a Business Case for the OHCAR datahub has been developed. The proposed datahub would have the facility to interface with a future ePCR system and would have the added advantage or allowing data collection from non-statutory pre-hospital agencies and from participating hospitals.

Standardisation of Data Requests from Control
At present control data is requested by OHCAR from different control centres in different formats. Control Officers nationally have agreed that OHCAR can request control data on a monthly basis to provide control data in a standardised electronic format.

Missing Case Identification
It is planned that missing case searching will be extended to all NAS former divisions so that the comprehensiveness of OHCAR can be further enhanced. Ways to improve data collection from non-statutory services will also be investigated.
Theme 2. **Research**

**Mapping OHCAR cases**
One full year of OHCAR data has now been mapped. It is planned to build on this process on an annual basis so that sufficient data can be amassed to allow investigation of geographical patterns of OHCA incidence and outcome.

**EuReCa involvement**
It is intended that Ireland remain a member of EuReCa to ensure that Irish data is compatible and comparable with that of other European countries. By ensuring this, inter-country comparison of OHCA outcome will be possible and opportunities for inter-country research in Europe can be developed. It is the intention of OHCAR that Ireland should be part of such developments.

**Identification of confirmed OHCAs**
Most EuReCa participants currently are able to report the total number of “confirmed OHCAs” as part of their results. At present, OHCAR reports only confirmed OHCA resuscitation attempts. The feasibility of using control data to identify all confirmed OHCAs will be investigated by OHCAR.

Theme 3. **OHCAR and Improved Outcomes**

**Development of Monthly Reporting**
- OHCAR can now report national data. In order to ensure that data is as comprehensive and reliable as possible however, it is currently only possible to report national data on an annual basis.
- If OHCAR is to support reporting of OHCA outcomes as a clinical KPI for the NAS, it will be necessary to move to monthly data reporting. This will require extensive streamlining of data collection, validation and reporting processes both with the NAS and within OHCA.
REFERENCES


APPENDIX ONE

OHCAR 2012

COMPARATOR SUBSET

RESULTS BY NAS AREA
INCIDENCE, SETTING AND RESPONSE

Proportion of Comparator Subset Cases in each NAS Area

Percentage of Cases that Occurred in an Urban Setting

Ambulance Call Response Interval in each NAS Area

Median Call-Response Interval:
• NAS West – 13 minutes
• NAS South – 13 minutes
• NAS North Leinster – 10 minutes
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

- NAS West: 38%
- NAS South: 45%
- NAS North Leinster: 47%

Percentage of Cases with ROSC on arrival at the ED

- NAS West: 28%
- NAS South: 37%
- NAS North Leinster: 37%

Percentage of Cases with Survival to Hospital Discharge

- NAS West: 18%
- NAS South: 21%
- NAS North Leinster: 22%
APPENDIX TWO

OHCAR 2012

ALL DATA

RESULTS BY FORMER AMBULANCE DIVISION
Percentage of Total OHCAR cases in Each Division

OHCAR Incidence/ 100,000 population 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
Incidence of Mechanical CPR Device Usage in Each Division

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

Proportion of Airway Adjunct Types Used 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 Administered in Each Division