Victorian Ambulance Cardiac Arrest Registry (VACAR)

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Manager Research and Evaluation

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Manager Operational Quality & Improvement
Value of an OHCA registry

- It has been advocated by the AHA that OHCA should be designated a reportable event to facilitate monitoring and improvement of cardiovascular health (Nichol et al Circulation 2008)
- There is a need for high quality evidence to describe the incidence of OHCA and its outcome in order to develop a fundamental understanding of the problem to outline a scientifically based approach to reduce its burden
- Even modest improvements in OHCA survival, given its incidence, can translate to many lives saved
- Sayre in a recent editorial, states measurement of survival to hospital discharge following OHCA should be expected of all EMS systems, that EMS should publically report their hospital discharge rates to their political leaders and the citizens they serve as well as treating clinicians (Sayre Resuscitation 2011)
### Table 4. Incidence and Outcome of EMS-Treated Out-of-Hospital Cardiac Arrest

<table>
<thead>
<tr>
<th></th>
<th>Alabama (n = 267)</th>
<th>Dallas (n = 1265)</th>
<th>Iowa (n = 565)</th>
<th>Milwaukee (n = 801)</th>
<th>Ottawa (n = 1836)</th>
<th>Pittsburgh (n = 575)</th>
<th>Portland (n = 793)</th>
<th>Seattle (n = 1170)</th>
<th>Toronto (n = 2992)</th>
<th>Vancouver (n = 1634)</th>
<th>Overall (n = 11,898)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted incidence rate per 100,000</td>
<td>40.3</td>
<td>82.9</td>
<td>51.3</td>
<td>66.7</td>
<td>45.1</td>
<td>51.1</td>
<td>47.0</td>
<td>74.4</td>
<td>57.0</td>
<td>52.6</td>
<td>56.0</td>
</tr>
<tr>
<td>Adjusted mortality rate per 100,000</td>
<td>36.9</td>
<td>77.2</td>
<td>44.4</td>
<td>78.0</td>
<td>42.3</td>
<td>47.1</td>
<td>41.0</td>
<td>62.3</td>
<td>53.6</td>
<td>46.9</td>
<td>50.9</td>
</tr>
<tr>
<td>Case-fatality rate, %</td>
<td>91.7</td>
<td>92.6</td>
<td>86.9</td>
<td>90.1</td>
<td>93.5</td>
<td>92.3</td>
<td>86.9</td>
<td>83.5</td>
<td>93.3</td>
<td>88.5</td>
<td>90.7</td>
</tr>
<tr>
<td>Survival to discharge, %</td>
<td>3.0</td>
<td>4.5</td>
<td>11.0</td>
<td>9.7</td>
<td>5.3</td>
<td>7.0</td>
<td>10.6</td>
<td>16.3</td>
<td>5.5</td>
<td>9.7</td>
<td>7.9</td>
</tr>
<tr>
<td>Vital status data missing, %</td>
<td>5.3</td>
<td>2.9</td>
<td>2.1</td>
<td>0.1</td>
<td>1.2</td>
<td>0.7</td>
<td>2.5</td>
<td>0.2</td>
<td>0.7</td>
<td>1.7</td>
<td>1.4</td>
</tr>
</tbody>
</table>

Abbreviation: EMS, emergency medical services.

*All rates were unequal across sites at *P* < .001.

### Table 5. Incidence and Outcome of Ventricular Fibrillation

<table>
<thead>
<tr>
<th></th>
<th>Alabama (n = 65)</th>
<th>Dallas (n = 195)</th>
<th>Iowa (n = 135)</th>
<th>Milwaukee (n = 165)</th>
<th>Ottawa (n = 429)</th>
<th>Pittsburgh (n = 102)</th>
<th>Portland (n = 249)</th>
<th>Seattle (n = 297)</th>
<th>Toronto (n = 614)</th>
<th>Vancouver (n = 478)</th>
<th>Overall (n = 2,729)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted incidence rate per 100,000</td>
<td>9.9</td>
<td>12.8</td>
<td>12.4</td>
<td>18.7</td>
<td>10.4</td>
<td>9.3</td>
<td>15.1</td>
<td>19.0</td>
<td>11.4</td>
<td>15.2</td>
<td>12.8</td>
</tr>
<tr>
<td>Adjusted mortality rate per 100,000</td>
<td>8.8</td>
<td>10.7</td>
<td>8.9</td>
<td>13.7</td>
<td>8.6</td>
<td>7.2</td>
<td>11.3</td>
<td>11.5</td>
<td>9.5</td>
<td>10.9</td>
<td>9.8</td>
</tr>
<tr>
<td>Case-fatality rate, %</td>
<td>80.2</td>
<td>82.7</td>
<td>72.0</td>
<td>74.0</td>
<td>83.1</td>
<td>77.5</td>
<td>73.9</td>
<td>50.8</td>
<td>83.0</td>
<td>71.7</td>
<td>76.5</td>
</tr>
<tr>
<td>Survival to discharge, %</td>
<td>7.7</td>
<td>9.5</td>
<td>22.7</td>
<td>26.0</td>
<td>14.8</td>
<td>21.5</td>
<td>22.5</td>
<td>39.9</td>
<td>15.7</td>
<td>25.0</td>
<td>21.0</td>
</tr>
<tr>
<td>Vital status data missing, %</td>
<td>3.1</td>
<td>7.9</td>
<td>4.4</td>
<td>0</td>
<td>2.1</td>
<td>1.0</td>
<td>3.6</td>
<td>0.3</td>
<td>1.3</td>
<td>3.0</td>
<td>2.5</td>
</tr>
</tbody>
</table>

*All rates were unequal across sites at *P* < .001.
Funded by Victorian Department of Health
Classified as Quality Assurance
Overseen by a multidisciplinary Steering Committee
Aims to collect data on all cardiac arrest patients attended by ambulance in Victoria
Data collection dates back to late 1999
Reporting includes – Steering Committee, Dept Health, AV Board, CAA, ROGS
VACAR Processes

Cases identified
- via data filter, manual PCR sort, Team Managers and clinical audits

Registry
- Based on Utstein template and definitions plus added fields
- Extracts clinical and operational data from PCRs (AV, Fire, CERTs) and operational databases
- Supplemented with hospital discharge data (date, direction, diagnosis)
  (Ethics approvals from > 100 participating hospitals)
- Data entry lags 2-3 weeks post event
- Some coroners data (aetiology) included for discrete projects
- QOL data collection started Jan 2011 (12-month follow-up for patients arresting from Jan 2010 onwards)
Incidence - paediatric

Frequency

Year

2002/03 2005/06 2008/09 2011/12

91 82 110 101
**Basic Epidemiology**

All arrests attended by AV over 2000-2011

<table>
<thead>
<tr>
<th>Item</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total patients</td>
<td>56,569 (Average 4,714 per year)</td>
</tr>
<tr>
<td>Presumed cardiac aetiology</td>
<td>72%</td>
</tr>
<tr>
<td>Witnessed</td>
<td></td>
</tr>
<tr>
<td>By public</td>
<td>29%</td>
</tr>
<tr>
<td>By paramedics</td>
<td>7%</td>
</tr>
<tr>
<td>Male Gender</td>
<td>66%</td>
</tr>
<tr>
<td>Adult arrests (&gt;15 years)</td>
<td>98%</td>
</tr>
<tr>
<td>Median age</td>
<td>70 years</td>
</tr>
<tr>
<td>Arrest at home</td>
<td>73%</td>
</tr>
<tr>
<td>Resuscitation initiated by EMS</td>
<td>44%</td>
</tr>
<tr>
<td>EMS response time (call to scene):</td>
<td></td>
</tr>
<tr>
<td>Median 90th percentile</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>
Precipitating event

Figure 5: Presumed precipitating events for adult OHCA

<table>
<thead>
<tr>
<th>Year</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>69%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>68%</td>
<td>65%</td>
<td>66%</td>
<td>64%</td>
</tr>
<tr>
<td>2010</td>
<td>71%</td>
<td></td>
<td>74%</td>
<td></td>
</tr>
</tbody>
</table>

Legend:
- Presumed Cardiac
- Trauma
- Respiratory
- Overdose/Poisoning
- Terminal Illness
- Hanging
- Other

1 Adult (>15 years). EMS witnessed events are not depicted in the figure.
Increased survival observed over the decade

A recent pooled analysis of 142,740 adult OHCA of presumed cardiac aetiology between 1984-2008 reported a pooled rate of survival to hospital of 24% (95%CI 21%-27%) and hospital discharge of 7.6% (95%CI 6.7%-8.4%). (Sasson et al. Circ Cardiovasc Qual Outcomes. 2010;3(1):63-81). Pooled survival to hospital discharge for 82,854 OHCA with VF as the presenting rhythm on arrival of EMS was 7.4%. No significant improvement in survival rates were observed over this period.
VF/VT survival drives most improvement

Figure 2: Statewide survival for adult VF/VT OHCA where EMS attempted resuscitation
Regional variation – VF/VT outcomes

Figure 2: Regional survival rates for VF/VT OHCA where EMS attempted resuscitation

Survival:
- Survival to Hospital (Metro)
- Survival to Hospital (Rural)
- Survival to Discharge (Metro)
- Survival to Discharge (Rural)
Response times

<table>
<thead>
<tr>
<th>Time (Minutes)</th>
<th>Rural</th>
<th>Metropolitan</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 5</td>
<td>50%</td>
<td>30%</td>
</tr>
<tr>
<td>6 to 10</td>
<td>30%</td>
<td>10%</td>
</tr>
<tr>
<td>11 to 15</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>16 to 20</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>21 to 25</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>26 to 30</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>31 to 35</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>&gt;35</td>
<td>5%</td>
<td></td>
</tr>
</tbody>
</table>
Variation persists after adjusting for key variables

Table 6: Adjusted odds ratios for survival from regional OHCA of presumed cardiac aetiology (VF/VT only) where EMS attempted resuscitation

<table>
<thead>
<tr>
<th>Year</th>
<th>Sample Size</th>
<th>Survival to Hospital</th>
<th>Survival to Discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>447</td>
<td>2.57 (1.49-4.42); p=0.001</td>
<td>2.77 (1.09-7.07); p=0.03</td>
</tr>
<tr>
<td>2004</td>
<td>524</td>
<td>3.47 (2.07-5.82); p&lt;0.001</td>
<td>4.34 (1.01-9.61); p&lt;0.001</td>
</tr>
<tr>
<td>2005</td>
<td>537</td>
<td>3.43 (2.06-5.72); p&lt;0.001</td>
<td>2.91 (1.43-5.94); p=0.003</td>
</tr>
<tr>
<td>2006</td>
<td>493</td>
<td>2.84 (1.66-4.86); p&lt;0.001</td>
<td>3.21 (1.49-7.12); p=0.004</td>
</tr>
<tr>
<td>2007</td>
<td>467</td>
<td>3.90 (2.37-6.41); p&lt;0.001</td>
<td>4.53 (1.96-10.42); p&lt;0.001</td>
</tr>
<tr>
<td>2008</td>
<td>500</td>
<td>3.46 (2.08-5.75); p&lt;0.001</td>
<td>2.68 (1.30-5.50); p=0.007</td>
</tr>
<tr>
<td>2009</td>
<td>494</td>
<td>3.32 (2.12-5.20); p&lt;0.001</td>
<td>4.20 (2.23-7.90); p&lt;0.001</td>
</tr>
<tr>
<td>2010</td>
<td>524</td>
<td>1.97 (1.29-3.01); p=0.002</td>
<td>1.45 (0.85-2.50); p=0.18</td>
</tr>
<tr>
<td>2011</td>
<td>552</td>
<td>1.57 (1.05-2.36); p=0.03</td>
<td>2.64 (1.50-4.62); p=0.001</td>
</tr>
</tbody>
</table>

- Adult patients aged >17 years, presumed cardiac aetiology, where EMS attempted resuscitation and the presenting rhythm was VF or VT. EMS denotes AV, and first responders (fire-fighters and community response teams). Excludes EMS witnessed events.
Significant increases in bystander CPR have been observed.
The VACAR Research
Some VACAR Research

Epidemiology
- All patients\(^1\)
- Traumatic \(^2\)
- Urban/rural \(^3\)
- Age cohorts (paediatric\(^4\), young adult (inc coroners findings), elderly\(^5\))
- Nursing homes, terminally ill
- EMS witnessed
- Paediatric hangings\(^6\)
- Asystolic cardiac arrests\(^7\)
- Gender\(^8\)

Clinical Trials
- Therapeutic hypothermia by paramedics following resuscitation from VF: RCT\(^9\)
- Autopulse in rural areas
- The Rinse Trial. The Rapid Infusion of Normal cold SalinE by paramedics during CPR. NHMRC $678k\(^{10}\)

Treatment / programs
- Dispatcher CPR\(^11\)
- 2005 guidelines\(^12\)
- Fire First Responders\(^13,14\)
- Sensitivity of AMPDS\(^15\)
- Impact of hospitals (PCI)\(^16\)
- Impact of post ROSC BP
- PAD program
- EMS witnessed
- Hyperoxia – linked data with ANZICS

Environmental / demography
- Impact of air pollution on OHCA incidence\(^{17}\)
- Impact of population density on OHCA outcome

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1. Fridman et al Resuscitation 2007
3. Jennings et al MJA 2006
4. Deasy et al Resuscitation 2010
5. Deasy et al Resuscitation 2011
8. Bray et al Resuscitation 2013
12. Deasy et al Resuscitation 2011
15. Flynn et al Prehosp Disaster Med 2006
16. Stub et al Heart 2011
17. Dennekamp et al Epidemiology 2010
Paediatric outcomes

- October 1999 to June 2007
- Melbourne
- 209 children in cardiac arrest on arrival of EMS
- 193 children who had attempted resuscitation
- 5 arrested at school (3/5 with VF)

*Deasy C, et al. Resuscitation 2010; 81:1095-100*
## Paediatric outcomes

### Metro

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Resus started</th>
<th>ROSC</th>
<th>Survived</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asystole</td>
<td>159</td>
<td>143</td>
<td>23</td>
<td>7 (5%)</td>
</tr>
<tr>
<td>PEA</td>
<td>36</td>
<td>36</td>
<td>15</td>
<td>2 (6%)</td>
</tr>
<tr>
<td>VF</td>
<td>14</td>
<td>14</td>
<td>8</td>
<td>5 (36%)</td>
</tr>
</tbody>
</table>

*Deasy C, et al. Resuscitation 2010; 81:1095-100*
The VACAR Research-retrospective

Older patient outcomes

– Between 2000 and 2009
– 33,178 adult OHCAs
– Study of age groups
  • 65-79
  • 80-89
  • 90-99
  • 100+


### Older patients

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Resus started</th>
<th>ROSC</th>
<th>Survived</th>
</tr>
</thead>
<tbody>
<tr>
<td>80-89</td>
<td>6430</td>
<td>2542</td>
<td>797</td>
<td>111 (4%)</td>
</tr>
<tr>
<td>90-99</td>
<td>1530</td>
<td>483</td>
<td>98</td>
<td>10 (2%)</td>
</tr>
<tr>
<td>100+</td>
<td>40 (2=VF)</td>
<td>7</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

*Deasy C, et al. Resuscitation 2011; 82:398-403*

Quality of Life (QOL) follow-up

30 min phone interview (performed by Monash Uni-contract)

(1) Eligible population
- Adult patients discharged from hospital, 12 months post-arrest

(2) Contact process
- Victorian Death Registry check prior to contact attempt
- Discharged patients sent a letter explaining intended follow-up
- Letter followed by phone call (4 attempts)

(3) Tools
- Residential and work status question
- Glasgow Outcome Scale-Extended (GOS-E)
- EuroQOL 5-Domain (EQ-5D)
- Short Form-12 (SF-12)
OHCA in Victoria (Jan 2010-Dec 2011)

All OHCA (n=10,210)
- Child 197 (2%)
- Adult 10,013 (98%)

47%
Attempted resus (n=4,758)
- Child 143 (3%)
- Adult 4,615 (97%)

35%
Survive to hospital (n=1,663)
- Child 39 (2%)
- Adult 1,624 (98%)

13%
Survive to discharge (n=609)
- Child 8 (1%)
- Adult 601 (99%)

12 months post arrest

DECEASED (n=39)

UNCONTACTABLE (n=84)
(incl 1 overseas)

REFUSED (n=6)

Other (n=13)

459 INTERVIEWED (84%)
- Patient (n=346, 76%)
- Proxy (n=113, 24%)

### Characteristics of contacted cases (n=459)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>At arrest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean (SD)</td>
<td>61 years (15)</td>
</tr>
<tr>
<td>Male gender</td>
<td>356 (78%)</td>
</tr>
<tr>
<td>Arrest witnessed by:</td>
<td></td>
</tr>
<tr>
<td>- Public</td>
<td>250 (55%)</td>
</tr>
<tr>
<td>- Paramedics</td>
<td>152 (33%)</td>
</tr>
<tr>
<td>Bystander CPR (excludes paramedic witness)</td>
<td>242 (79%)</td>
</tr>
<tr>
<td>Arrest location:</td>
<td></td>
</tr>
<tr>
<td>- PHYSICAL SETTING - Home</td>
<td>225 (49%)</td>
</tr>
<tr>
<td>- GEOGRAPHIC SETTING - Rural</td>
<td>82 (18%)</td>
</tr>
<tr>
<td>Shockable rhythm (VF/VT)</td>
<td>374 (81%)</td>
</tr>
<tr>
<td>Presumed cardiac aetiology</td>
<td>415 (90%)</td>
</tr>
<tr>
<td>Discharge direction:</td>
<td></td>
</tr>
<tr>
<td>- home</td>
<td>392 (85%)</td>
</tr>
<tr>
<td>- rehabilitation</td>
<td>55 (12%)</td>
</tr>
<tr>
<td>- nursing home</td>
<td>6 (1%)</td>
</tr>
<tr>
<td>Working</td>
<td>217 (47%)</td>
</tr>
<tr>
<td>At 12-months</td>
<td>73%</td>
</tr>
<tr>
<td></td>
<td>(81% same role, 85% same org)</td>
</tr>
</tbody>
</table>

GOS-E (n=458) – Measure of functionality

Severe disability
- Vegetative state: 1%
- Severe: 11%
  - Lower: 11%
  - Upper: 4%
- Moderate: 18%
  - Lower: 12%
  - Upper: 7%
- Good: 34%
  - Lower: 19%
  - Upper: 12%
  - Vegetative state: 4%

Majority self-rate as having good recovery

Patient rated: 70%
GOS-E: 70%
EQ-5D (N=455) – Health status

For each health domain, the majority report no problem
• 34% report no problem in any health domain
**EQ-5D: Summary score and VAS**

- **Mean EQ-5D Index score (95% CI) (n=457)**
  - 0.77 (0.75-0.80)

- **EQ-5D visual analogue scale (VAS)**
  - Prior (n=413): “… your health prior to your cardiac arrest?”
  - Current (n=421): “… your state of health today?”

Median VAS score, with 25th and 75th percentile error bars

59% rated their current health as worse than before their arrest
SF-12- PCS & MCS (n=320)

Physical Component Score (PCS)

Mental Component Score (MCS)

18-44 yrs  | 45-74 yrs  | 75+ yrs

Mean score, with upper and lower 95% CI for mean

VACAR  | Australian norms

HOSPITAL CHARACTERISTICS ARE ASSOCIATED WITH PATIENT OUTCOMES FOLLOWING OUT-OF-HOSPITAL CARDIAC ARREST

Dr Dion Stub
Interventional Cardiac Research Fellow
Alfred Hospital & Baker IDI Heart Diabetes Research Institute Melbourne

Nichol et al Circulation 2010

“....patients resuscitated from out-of-hospital VF or from OHCA with STEMI should be transported as soon as it is feasible to a facility that is capable of performing these procedures”

“Field providers treating such patients should bypass referral hospitals and go directly to a cardiac resuscitation receiving hospital so that these patients can receive angiography within 90 minutes.“
Methods

- Data were analysed from the Victorian Ambulance Cardiac Arrest Registry from January 2003 to March 2010.
- Hospital characteristics were defined by the Australian Institute of Health and Welfare and the Victorian Department of Health.
- Cardiac centre was defined as a hospital providing 24-h, 7-day/week emergency cardiac catheterisation facilities.
- Hospitals were categorised as large (>400 beds), medium (250-400 beds) and small (<250 beds).
# Outcomes by hospital bed size

Adjusted for age, witnessed collapse, VF/VT, time to return of spontaneous circulation

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.957</td>
<td>0.90 - 0.96</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>EMS arrival to ROSC</td>
<td>0.998</td>
<td>0.89 - 0.92</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Initial rhythm VF/VT</td>
<td>4.31</td>
<td>3.41 - 5.45</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Witnessed arrest</td>
<td>1.50</td>
<td>1.16 - 1.93</td>
<td>0.002</td>
</tr>
<tr>
<td>Transport to a cardiac centre</td>
<td>1.40</td>
<td>1.12 - 1.74</td>
<td>0.003</td>
</tr>
<tr>
<td>Admission in hours (08:00 - 17:00)</td>
<td>1.34</td>
<td>1.10 - 1.64</td>
<td>0.004</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hospital Bed Number</th>
<th>No. of Hospitals (No. events)</th>
<th>Survival to discharge</th>
<th>Adjusted odds of survival (95%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;250</td>
<td>55 (363)</td>
<td>28.4 %</td>
<td>Baseline</td>
<td>NA</td>
</tr>
<tr>
<td>250-400</td>
<td>7 (816)</td>
<td>26.1 %</td>
<td>0.86 (0.66 - 1.20)</td>
<td>0.37</td>
</tr>
<tr>
<td>&gt; 400</td>
<td>8 (1527)</td>
<td>34.7 %</td>
<td>1.20 (0.89 – 1.63)</td>
<td>0.23</td>
</tr>
</tbody>
</table>
Survival to discharge based on hospital characteristics
Adjusted for age, initial rhythm, witnessed cardiac arrest, time until return of circulation

<table>
<thead>
<tr>
<th>Hospital Type</th>
<th>Adjusted probability Survival %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non Cardiac Centre (n = 890)</td>
<td>29.0%</td>
</tr>
<tr>
<td>Rural Cardiac Centre (n = 88)</td>
<td>32.2%</td>
</tr>
<tr>
<td>Metropolitan Cardiac Centre (n=1188)</td>
<td>35.4%</td>
</tr>
<tr>
<td>Metropolitan Cardiac Major Trauma Centre (n=540)</td>
<td>42.1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Point Estimate</th>
<th>95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>29.0%</td>
<td>(24-35)</td>
<td>0.592</td>
</tr>
<tr>
<td>32.2%</td>
<td>(22-40)</td>
<td>0.009</td>
</tr>
<tr>
<td>35.4%</td>
<td>(31-41)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>42.1%</td>
<td>(36-49)</td>
<td></td>
</tr>
</tbody>
</table>
Conclusions

- Survival to hospital discharge was significantly increased in patients transported to hospitals with 24-h interventional cardiology facilities during working hours.

- Further research into the individual components of post-resuscitative care is required to determine those factors within hospitals that improve outcomes.

- Data would support the development of Australian systems of care for patients with OHCA
The VACAR Research-prospective

- **The RINSE trial**
  - RCT
  - NHMRC funded
  - Compares bolus 30mL/kg ice-cold IV fluid during CPR with standard care
  - 2520 patients from 3 states
  - All Victorian data collection and outcomes from VACAR
  - 751 recruited to date
The VACAR Research-prospective

The CHEER trial

– Pilot observational trial
– Post-VF arrest
– <65 years
– No ROSC at 30 minutes
  • CPR to ED
  • Hypothermia
  • ECMO
  • Emergency
  • Reperfusion
The VACAR Research-prospective

The CHEER trial

- Only 4 patients in 1.5 years from 3 ambulance units
- Data from VACAR for Melbourne/ 12months/ age < 65 and VF arrest

- 222 patients
- 68 no ROSC
- 149 ROSC (13 to Alfred)
- 5 transport with CPR (3 to Alfred)
Acknowledgements

VACAR Team
- Marijana Lijovic
- Ziad Nehme
- Marian Lodder
- Davina Vaughan
- Resmi Nair
- Vanessa Barnes

DH

OHCA survivors

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Questions?

Clinical Paper

Resuscitation of out-of-hospital cardiac arrests in residential aged care facilities in Melbourne, Australia

C. Deasy, J.E. Bray, K. Smith, L.R. Harriss, S.A. Bernard, P.M. Davidson, P. Cameron

Induction of Therapeutic Hypothermia by Paramedics After Resuscitation From Out-of-Hospital Ventricular Fibrillation Cardiac Arrest: A Randomized Controlled Trial


Outdoor Air Pollution as a Trigger for Out-of-hospital Cardiac Arrests

Martine Denauchamps, Muhammad Akram, Michael John Abramson, Andrew Tonkin, Malcolm Ross Sim, Masha Fridman, and Burcan Erbas

Functional outcomes and quality of life of young adults who survive out-of-hospital cardiac arrest

Conor Deasy, Janet Bray, Karen Smith, L.R. Harriss, Stephan Bernard, Peter Cameron, on behalf of the VACAR Steering Committee

Survival in patients with myocardial infarction complicated by out-of-hospital cardiac arrest undergoing emergency percutaneous coronary intervention