Quality of Life and Functional Outcomes 12 Months After Out-of-Hospital Cardiac Arrest

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Background——Out-of-hospital cardiac arrest (OHCA) is a significant global health problem. There has been considerable investment in improving the emergency medical response to OHCA, with associated improvements in survival. However, concern remains that survivors have a poor quality of life. This study describes the quality of life of OHCA survivors at 1-year postarrest in Victoria, Australia.

Methods and Results——Adult OHCA patients who arrested between 2010 and 2012 were identified from the Victorian Ambulance Cardiac Arrest Registry. Paramedics attended 15,113 OHCA patients of which 46.3% received an attempted resuscitation. Nine hundred and twenty-seven (13.2%) survived to hospital discharge of which 76 (8.2%) died within 12 months. Interviews were conducted with 697 (80.7%) patients or proxies, who were followed-up via telephone interview, including the Glasgow Outcome Scale—Extended, the 12-item short form health survey, and the EuroQol. The majority (55.6%) of respondents had a good recovery via the Glasgow Outcome Scale—Extended≥7 (41.1% if patients who died postdischarge were included and nonrespondents were assumed to have poor recovery). The mean EuroQol index score for respondents was 0.82 (standard deviation, 0.19), which compared favorably with an adjusted population norm of 0.81 (standard deviation, 0.34). The mean 12-item short form Mental Component Summary score for patients was 53.0 (standard deviation, 10.2), whereas the mean Physical Component Summary score was 46.1 (standard deviation, 11.2).

Conclusions——This is the largest published study assessing the quality of life of OHCA survivors. It provides good evidence that many survivors have an acceptable quality of life 12 months postarrest, particularly in comparison with population norms. (Circulation. 2015;131:174-181. DOI: 10.1161/CIRCULATIONAHA.114.011200.)

Key Words: follow-up studies ▪ heart arrest ▪ prognosis ▪ registries ▪ resuscitation

Out-of-hospital cardiac arrest (OHCA) is a significant global health problem that claims hundreds of thousands of lives worldwide each year.1 Overall survival remains low with a recent systematic review reporting a pooled survival to hospital discharge rate for all cardiac rhythms of 7.6% (95% confidence interval [CI], 6.7–8.4).2 A number of reports have demonstrated recent improvements in short-term survival.3-5 For example, in Victoria, Australia, the adjusted odds of survival to hospital discharge from a shockable rhythm is more than double that seen a decade ago.6 Despite this finding, there are concerns that many survivors are substantially disabled with poor long-term quality of life.7,8 Given that there is significant investment in improving the emergency response to OHCA patients9,10 and reported improvements in short-term survival outcomes, the long-term neurological state and quality of life of survivors is of growing significance.11

Health-related quality of life (HRQoL) is defined by the World Health Organization as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.” It contains 3 fundamental domains, namely biological functioning, psychological functioning, and social functioning.12 The measurement of these may be influenced by factors such as a person’s beliefs, experiences, and perceptions.13 However, some quality-of-life measurement tools have been validated in the critical care patient population.13-15 The collection of long-term OHCA morbidity data is important for the appropriate evaluation of emergency medical service (EMS) systems and treatment approaches.16 A number of studies have reported the HRQoL for OHCA survivors, but these have generally been limited by a lack of validated assessment tools, small sample sizes, and incomplete patient follow-up.17 A recent systematic review on patient-centered outcomes after cardiac arrest survival noted a lack of prospective, population-based studies, and marked heterogeneity in

Received May 19, 2014; accepted October 10, 2014.
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The online-only Data Supplement is available with this article at http://circ.ahajournals.org/lookup/suppl/doi:10.1161/CIRCULATIONAHA.114.011200/-/DC1.
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© 2014 American Heart Association, Inc.
Circulation is available at http://circ.ahajournals.org DOI: 10.1161/CIRCULATIONAHA.114.011200
the methodology among studies.13 The majority of studies in the review concluded that quality of life after cardiac arrest is acceptable to good, but the ability to extrapolate these results to a broader population remains compromised by the inherent methodological weaknesses of many of the studies.

The current study describes the quality of life of adult OHCA survivors at 1-year postarrest across the state of Victoria, Australia by using 3 years of data from the Victorian Ambulance Cardiac Arrest Registry (VACAR).

**Methods**

**Design and Setting**

We conducted a prospective study using population-based data from Victoria, Australia obtained from the VACAR.13 According to the Australian Bureau of Statistics, the estimated resident population of Victoria in 2013 was 5.7 million, with 76% of the population located in the state’s capital city of Melbourne. Thirteen percent of the population were aged >65 years.18

Ambulance Victoria is the sole provider of emergency ambulance services across the state. Emergency call taking is performed by using the commercial medical priority dispatch system, with advanced life support and intensive care paramedics dispatched to the majority of suspected cardiac arrests. Fire fighter first responders and volunteer community emergency response teams also co-respond across parts of the state. Paramedics operate under guidelines aligned to Australian Resuscitation Council protocols.19

Ambulance Victoria maintains the VACAR, which captures all OHCA attended by the EMS in the state. OHCA patients are eligible if they are pulseless at any stage during EMS attendance or are defibrilated before EMS arrival.17 Data variables are collected according to the Uiststein guidelines20 and include patient demographics, arrest features, EMS variables, resuscitation care, and hospital discharge outcome. The cause of cases is presumed to be of cardiac origin when no other cause is apparent.20 Case ascertainment and data entry are subject to extensive quality control, and the registry has passed 2 external audits.

**Ethics**

VACAR data collection is classified as a quality assurance activity by the Victorian Government Department of Health Ethics Committee. Approval from Institutional Ethics Committees has also been received for hospital data collection.

**Patient Population and Follow-Up Process**

Since January 2010, adult OHCA patients (aged ≥18 years) who survived to hospital discharge have undergone quality-of-life interviews via telephone follow-up 12 months after arrest. Adult patients who had an OHCA between January 1, 2010 and December 31, 2012 were eligible for inclusion in the study. The Victorian Registry of Births, Deaths and Marriages is initially searched for death information. Patients identified as alive at 12 months are sent a letter indicating they will receive a telephone call regarding their health and requesting verification of current contact information. Patients are then contacted by a dedicated researcher experienced in the administration of the study instruments. Where necessary and applicable, a proxy is interviewed in place of the patient. At least 5 attempts are made to contact patients at different time points, including after hours. An algorithm for dealing with the distressed participant is available. Interviews are performed from a central location.

**Outcome Measures**

The VACAR patient interview includes measurement of the following:

- Twelve-item short form (SF-12) health survey.22 The SF-12 is a generic HRQoL instrument that allows for measurement of physical and mental health status. Its use has been widely published, it is fast to administer, and it has been shown to correlate highly with its more detailed counterpart, the Short Form 36.23 Scores of ≥50 represent no disability, scores of 40 to 49 represent mild disability, scores of 30 to 39 represent moderate disability; and scores <30 represent severe disability. The SF-12 is not considered appropriate for proxy response.
- The EuroQol (EQ-5D).24 The EQ-5D has been validated to measure HRQoL, and can be used to calculate quality-adjusted life-years. The tool assesses 5 domains: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. The EuroQol visual analogue scale records a person’s self-rated health on a vertical scale, with the end points worst imaginable health state and best imaginable health state (0–100). The feasibility of obtaining EQ-5D scores via proxy has been examined in Victorian major trauma patients, with differences between patient and proxy scores due to random variability rather than systematic bias.25
- Work-related factors. Return to work is recorded, with additional questions regarding same employer and same role if the patient has returned to work.
- Living status factors. Residential status of the patient at the time of interview is recorded. If the patient has returned home, they are asked about the use of additional support services.

**Data Analysis**

Continuous variables are reported as means and standard deviations (SDs), or medians and interquartile ranges, with comparisons between groups performed by using the t test or Mann-Whitney U test, respectively. Categorical data are reported as counts and percentages, with comparisons between groups assessed by using the χ2 test. The EQ-5D health status was converted to a single index score by weighting each of the dimensions against United Kingdom (UK) norms to produce a score ranging from –0.594 (worse than death) to 1 (full health).26 Age- and sex-adjusted comparisons with the UK EQ-5D norms were calculated by standardizing the UK population EQ-5D data to the OHCA responder population distribution.27 SF-12 patient scores were compared with Australian norms by standardizing the Australian population SF-12 scores to the OHCA responder population distribution.27 The standardized mean difference (SMD) for SF-12 scores was calculated by subtracting the mean score of the corresponding Australian age and sex category from the OHCA responder’s score and dividing by the SD of the appropriate age/sex category.27 The SMD provides a method of showing the degree of deviation of SF-12 scores from the population norm by standardizing individual scores by sex and age. The size of the SMD represents the magnitude of the difference between SF-12 scores of the Australian population and cardiac arrest survivors, with values >0.8 considered large.28 Hot Deck imputation was used to impute missing EQ-5D and SF-12 values for patients who were lost to follow-up at 12 months. Donor variables included patient age, sex, and shockable cardiac arrest rhythm.29

Correlates of good outcome at 12 months postarrest were analyzed via multiple logistic regression, with backward elimination of nonsignificant variables. Patients were included if they either died after hospital discharge or responded to the survey (n=633). Outcome was considered to be good if respondents scored ≥2 on GOS-E (ie, moderate disability or good recovery). Variables considered in the model included age, sex, working status before arrest, HRQoL before arrest, shockable rhythm on arrest or EMS arrival, bystander cardiopulmonary resuscitation, public location, population size, presumed cardiac cause, and witness status.

Analyses were conducted by using SPSS version 20 (IBM SPSS Inc, Armonk, NY), and P values of <0.05 were regarded as significant.

**Results**

**Patient Profile**

During the 3-year study period, Ambulance Victoria attended 15 113 adult patients with cardiac arrest of which 6999 (46.3%) received an attempted resuscitation by EMS. Of these, 927 (13.2%) survived to hospital discharge and 851 (12.2%) were
considered likely to be alive at 12 months postarrest. Interviews were conducted with 530 patients and 157 proxies, producing a response rate of 80.7%. Very few patients refused to participate (<2%), with the majority of nonresponders lost to follow-up (Figure 1). When proxies were interviewed, the majority of respondents included the patient’s spouse (45.2%), child (21.7%), or parent (11.5%). There were 4 patients in whom a language barrier prevented the interview. The mean time between the patient’s cardiac arrest and follow-up was 54.6 weeks (SD, 4.9).

Table 1 displays demographic and arrest details of responders versus nonresponders. The mean age of responders was 59.1 years (SD, 14.9) and the majority were male (78.2%). Responders were more likely than nonresponders to have an arrest due to presumed cardiac cause (91.3% versus 84.1%, \( P = 0.007 \)), present to EMS in ventricular fibrillation or ventricular tachycardia (85.9% versus 74.2%, \( P < 0.001 \)), and be transported to a hospital with percutaneous coronary intervention facilities (88.6% versus 79.9%, \( P = 0.003 \)). Table 2 compares the characteristics of patient and proxy responders. When a proxy was interviewed, the patient was less likely to have been discharged to home (80.0% versus 89.4%, \( P = 0.002 \)) and less likely to have experienced a ventricular fibrillation or ventricular tachycardia arrest (75.6% versus 89.0%, \( P < 0.001 \)).

### Patient Outcomes at 12 Months for Survey Respondents

#### Functional Outcome

At 12 months postarrest, the majority of survivors who responded to our survey were living at home without care (72.7%), with

![Figure 1](image-url)  
**Figure 1.** Outcomes of adult (≥18 years) out-of-hospital cardiac arrest in Victoria between January 1, 2010 and December 31, 2012. Patients receiving an attempted resuscitation form the denominator of all proportions. (1) Lost to follow-up includes patients who were unable to be contacted or living overseas. (2) Other includes patients who were inappropriate to contact including terminally ill or psychiatric patients (n=12); discharged from a hospital without VACAR QOL ethics approval at the time (n=8); experienced a language barrier with the caller (n=4); EMS indicates Emergency Medical Service; OHCA, out-of-hospital cardiac arrest; QOL, quality of life; and VACAR, Victorian Ambulance Cardiac Arrest Registry.

only 3.8% reported to be in supported accommodation. Half (50.3%) of the survivors reported working before their arrest and, of these, 74.2% had returned to work, with 62.2% returning...
to the same role. Based on the GOS-E, the majority of responders at 12 months had a good recovery (n=381, 55.6%); however, this reduced to 41.1% when patients who died postdischarge (GOS-E=1) were included and nonresponders were assumed to have poor recovery. A total of 575 (83.9%) responders scored a GOS-E≥5 (92.8% of patients versus 53.8% proxies, P=0.001). Only 3 patients were reported to be in a vegetative state, all of whom presented to EMS in a nonshockable rhythm (Figure 2).

Survivors at 12 months who responded to our survey and were categorized as having poor recovery according to GOS-E (score <5) were older (mean age, 63.8 versus 58.3, P=0.002), less likely to have arrested because of presumed cardiac causes (86.4% versus 92.3%, P=0.040), less likely to arrest in a public place (21.1% versus 38.3%, P=0.010), less likely to have presented to EMS in a shockable rhythm (66.1% versus 89.8%, P<0.001). These patients also less frequently reported working before their cardiac arrest (26.4% versus 55.1%, P=0.001).

Similarly, in comparison with our 12-month responders, patients who died within 12 months of discharge were older (mean age, 68.3 versus 59.1, P<0.001), less likely to have arrested in a public place (21.1% versus 38.3%, P=0.003), less likely to receive bystander cardiopulmonary resuscitation (60.9% versus 80.9%, P=0.001), and less commonly presented to EMS in a shockable rhythm (49.3% versus 85.8%, P<0.001). Discharge home from the hospital was also less common (57.9% versus 86.5%, P<0.001), with the remainder going to rehabilitation (22.4%) or a nursing home (14.5%).

Quality of Life Measured Via EQ-5D
Over one-third of responders reported no problem in all 5 domains assessed via the EQ-5D (37.7%). The vast majority had no problems with self-care (87.6%), pain (71.7%), daily activity (67.8%), mobility (66.4%), or anxiety (66.3%; Figure 3). The mean EQ-5D index score for responders was 0.82 (SD, 0.19), which compares favorably with an age- and sex-adjusted UK
norm of 0.81 (SD, 0.34). This score did not change when imputation was used to calculate the missing values of non-responders (mean, 0.82; SD, 0.17). Imputation and sensitivity analyses are provided in the online-only Data Supplement.

Most (60.6%) respondents generated an EQ-5D index score of ≥0.81 (Figure 4), and this remained at 60.3% when missing values were imputed for patients who were lost to follow-up. According to the EQ-5D visual analogue scale (0–100), survivors generally rated their prearrest health as higher (median score, 85; first quartile through third quartile, 70–95) in comparison with their health at 12 months postarrest (median score, 75; first quartile through third quartile, 65–85), P<0.001.

Although most respondents reported a decrease in HRQoL postarrest via the visual analogue scale (55.7%), almost half either reported no change or an increased quality of life (24.5% and 19.8%, respectively).

Quality of Life Measured Via SF-12
The mean SF-12 Mental Component Summary (MCS) score for all patients (excluding proxies) was 53.0 (SD, 10.2), which is not significantly different from the age- and sex-adjusted Australian population mean of 53.1 (SD, 21.8).28 Similarly, the mean Physical Component Summary (PCS) score of patients did not differ significantly from the adjusted Australian population norm (mean, 46.1; SD, 11.2 versus mean, 46.8; SD, 19.2).28 Imputation of missing values for nonresponders made very little difference to the mean summary scores for MCS and PCS.

Figure 5 displays the SMD for patients, broken down by sex and age. Overall, patients reported a slightly lower PCS Score than the comparable Australian population (SMD, –0.114; 95% CI, –0.206 to –0.022), but a similar MCS Score (SMD, –0.016; 95% CI, –0.120 to 0.087). Female patients reported significantly lower PCS Scores (SMD, –0.356; 95% CI, –0.567 to –0.148), and younger patients (18–44 years) were also more likely to score significantly lower than the Australian population (SMD for MCS, –0.409; 95% CI, –0.675 to –0.114 and SMD for PCS, –0.431; 95% CI, –0.696 to –0.167).28 Sensitivity analyses regarding missing data are available in the online-only Data Supplement.

Discussion
This is the largest published study assessing the quality of life of OHCA survivors. It is prospective and population based, covering an entire state in Australia. Three generic outcome assessment tools were used to assess patients within our population, increasing the external validity of these findings. We achieved a good follow-up rate, and the response from patients who were contacted was overwhelmingly positive, with very few refusals (<2%).

The majority of patients who were discharged from the hospital were alive at 12 months postarrest (91.8%). However, it is possible that some of the patients lost to follow-up may have...
died following hospital discharge. The reported long-term survival rate could be as low as 78.3% if all nonresponders were assumed to have died within the 12-month period. Overall, the quality of life of respondents was good with only 16% of respondents reporting severe disability according to the GOS-E. However, this figure could be doubled if all nonresponders are assumed to have severe disability. The HRQoL summary scores obtained via both the EQ-5D and the SF-12 support good quality of life in survivors who responded in comparison with age- and sex-adjusted population norms. Importantly the EQ-5D index score, which included proxy responses, was available for 685 of 687 respondents and was not significantly different from the age- and sex-adjusted UK norm, even when imputation was used to calculate missing values for nonresponders.

Our findings are similar to previous studies that assessed the quality of life of OHCA survivors. However, the small sample sizes of previous studies has hindered the ability to detect significant differences from population norms and to extrapolate findings to other EMS settings. For example, a recent study from Sweden examined the HRQoL of patients with cardiac arrest treated with therapeutic hypothermia at hospital discharge, 1 and 6 months after cardiac arrest. At 6 months, survivors had a mean EQ-5D index score of 0.76 (SD, 0.2), which is lower than the mean of 0.82 (SD, 0.19) observed in our cohort. The Swedish study was small (n=26) and excluded >50% of patients because of missing data from each time point. Nevertheless, the study demonstrates an improvement in mean HRQoL scores at 6 months (EQ-5D index score, 0.76) in comparison with baseline (EQ-5D index score, 0.49), and suggests that the assessment of HRQoL outcomes too early could significantly underestimate the possible full range of functional recovery in survivors.

Larger, prospective evaluations of the quality of life of OHCA survivors include the Ontario Prehospital Advanced Life Support Study (OPALS). Investigators contacted survivors via telephone at 1 year postarrest and administered the Health Utilities Index Mark III, which describes health utility as a score from 0 (dead) to 1 (perfect health). The median Health Utilities Index Mark III for survivors (n=268) was 0.80 (interquartile range, 0.47), which was similar to the median Health Utilities Index Mark III for an age-adjusted population norm (0.83). Similarly, a study enrolling consecutive OHCA patients from Amsterdam (n=174) reported only a mild to moderate reduction in the quality of life of survivors at 6 months postarrest in comparison with population norms.

Our results suggest that most patients retain their independence after cardiac arrest. The majority of patients were discharged from the hospital to their home, and, at the time of follow-up, 72.7% of respondents were living at home without care and 87.6% reported no problems with self-care. Additionally, of those working before their arrest, the majority (74.2%) had returned to work. This finding is higher than previous reports (13%–56%); however, these studies included small numbers of patients (n≤50) and may not be representative of the wider OHCA survivor population.

We identified a cohort of survivors who did not regain an acceptable quality of life postarrest. These patients were generally older, with many presenting to EMS in a nonshockable rhythm. It is possible that HRQoL assessment during the rehabilitation phase may benefit these patients (and others), particularly if there was an option of early intervention. Such interventions could be targeted to domains identified as particularly poor according to assessment tools (eg, mobility) and to factors demonstrated to be predictive of poor HRQoL. Elements such as fatigue, performance of instrumental daily activities, and cognitive concerns have been demonstrated to correlate with physical HRQoL, whereas elements such as anxiety and depression have been correlated with mental HRQoL.

Our data also suggest that the strongest correlate of good outcome at 12 months postarrest was a shockable rhythm on EMS arrival or arrest (odds ratio, 4.52; 95% CI, 2.55–8.00). This highlights the need for practical guidelines for EMS attempting resuscitation when patients are found in nonshockable rhythms. A recent review of OHCA patients presenting in asystole or pulseless electric activity based on data from VACAR showed low survival rates with no improvement over a 10-year period.

Our study has a number of limitations. Fifteen per cent of patients were lost to follow-up, and a very small number were excluded owing to language barriers. Some of our interviews were conducted with proxies rather than patients, but this could also be seen as a strength given that severely disabled patients were not specifically excluded. We assessed HRQoL but did not specifically explore anxiety or depression, both of which have been reported in OHCA survivors. Finally, we only contacted patients at a single time point postdischarge, so we are unable to demonstrate changes in HRQoL over time or assess ideal follow-up periods. A recent study from the Netherlands on OHCA patients suggests that cerebral performance category scores at discharge overestimate functional outcome in comparison with neurological function at 6 to 12 months postarrest.

There is a real need for a comprehensive, prospective study assessing recovery at multiple time points to be conducted in the OHCA survival population. Interestingly, although most respondents in our study rated their postarrest quality of life as lower than before the arrest, ≈20% suggested they had an improved quality of life. This highlights the dynamic nature
of patient’s perceptions of this concept over time. In conclusion, this study provides good evidence that the majority of survivors of OHCA maintain their independence and have a good quality of life 12 months postarrest, particularly in comparison with standardized population norms.

Acknowledgments
We thank Emma Masango (Monash University) and the VACAR Team; Vanessa Barnes, Marian Lodder, Resmi Nair, Davina Vaughan, and Kerri Anastasopoulos.

Sources of Funding
The Victorian Ambulance Cardiac Arrest Registry was funded by the Victorian Department of Health.

Disclosures
None.

References

CLINICAL PERSPECTIVE
This article describes the quality of life of survivors of out-of-hospital cardiac arrest at 12 months postarrest in a large, statewide prospective study. It demonstrates that the majority of patients who were discharged from the hospital were alive at 1 year, and that most respondents had made a good recovery according to the Glasgow Outcome Scale–Extended (41.1%–55.6%). Over one-third of survivors who responded via the EuroQol reported no problem in all 5 domains (self-care, daily activity, mobility, anxiety, and pain). In particular, 87.6% reported no problems with self-care. The quality-of-life scores obtained via the EuroQol visual analogue scale show that just over half of the respondents (55.7%) rated their postarrest quality of life as lower than that before their arrest. However, comparisons with age- and sex-adjusted population norms suggest that cardiac arrest survivors who responded at 12 months report quality-of-life outcomes similar to their population counterparts. Results from this study can be used to guide discussions regarding prognosis and likely recovery after out-of-hospital cardiac arrest for patients in similar populations. Quality-of-life assessment during the rehabilitation phase may benefit cardiac arrest survivors, particularly if there was an option of early intervention. Such interventions could be targeted to domains identified as particularly poor according to assessment tools (eg, mobility). However, the trajectory of recovery from out-of-hospital cardiac arrest over time has yet to be properly examined, and there is a real need for a comprehensive, prospective study assessing recovery at multiple time points to be conducted in the out-of-hospital cardiac arrest population.
Table 1. Sensitivity analysis of EQ-5D Index Scores

<table>
<thead>
<tr>
<th>EQ-5D Index Score</th>
<th>Unadjusted Analysis (in manuscript) (n=685)</th>
<th>Sensitivity Analysis* (n=851)</th>
<th>Hot Deck Imputation^ (n=826)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 0.2, no (%)</td>
<td>6 (0.9)</td>
<td>6 (0.7)</td>
<td>6 (0.7)</td>
</tr>
<tr>
<td>0.21 - 0.4, no (%)</td>
<td>19 (2.8)</td>
<td>19 (2.2)</td>
<td>21 (2.5)</td>
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<tr>
<td>0.41 - 0.6, no (%)</td>
<td>55 (8.0)</td>
<td>221 (26.0)</td>
<td>66 (8.0)</td>
</tr>
<tr>
<td>0.61 - 0.8, no (%)</td>
<td>190 (27.7)</td>
<td>190 (22.3)</td>
<td>235 (28.5)</td>
</tr>
<tr>
<td>≥ 0.81, no (%)</td>
<td>415 (60.6)</td>
<td>415 (48.8)</td>
<td>498 (60.3)</td>
</tr>
<tr>
<td>Mean (95% CI)†</td>
<td>0.82 (0.81 - 0.84)</td>
<td>0.77 (0.76 - 0.79)</td>
<td>0.82 (0.81 – 0.83)</td>
</tr>
</tbody>
</table>

*Non-responders were allocated a value of 0.58 which corresponds to the 10th percentile Index Score. ^Hot Deck imputation utilised three donor variables including Age, Gender and Shockable Arrest Rhythm. Total possible patients=851. †Age / gender weighted UK mean (95% CI): 0.81 (0.79 – 0.84).

Table 2. Sensitivity analysis of SF-12 scores

<table>
<thead>
<tr>
<th>SF-12 Domain</th>
<th>Mean (95% CI)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCS</td>
<td>53.0 (52.1 – 53.8)</td>
<td>509</td>
</tr>
<tr>
<td>MCS – Sensitivity*</td>
<td>49.2 (48.4 – 50.0)</td>
<td>694</td>
</tr>
<tr>
<td>MCS - Hot Deck Imputation^</td>
<td>53.2 (52.4 – 53.9)</td>
<td>651</td>
</tr>
<tr>
<td>PCS</td>
<td>46.1 (45.1 – 47.1)</td>
<td>509</td>
</tr>
<tr>
<td>PCS – Sensitivity*</td>
<td>41.5 (40.6 – 42.4)</td>
<td>694</td>
</tr>
<tr>
<td>PCS – Hot Deck Imputation^</td>
<td>46.2 (45.3 – 47.0)</td>
<td>650</td>
</tr>
</tbody>
</table>

*Non-responders were allocated a value of 29 for the PCS which corresponds to the 10th percentile, and a value of 39 for the MCS. ^Hot Deck Imputation used Age, Gender and Shockable Arrest Rhythm as donor variables. All analyses exclude proxy responses, total possible population = 694. Abbreviation: CI, confidence interval; MCS, Mental Component Summary; PCS, Physical Component Summary.
Table 3. Sensitivity analysis of SMD for SF-12 scores

<table>
<thead>
<tr>
<th>SF-12 Domain</th>
<th>Mean (95% CI)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCS</td>
<td>-0.016 (-0.12 – 0.087)</td>
<td>509</td>
</tr>
<tr>
<td>MCS – Sensitivity*</td>
<td>-0.4586 (-0.5529 – -0.3644)</td>
<td>694</td>
</tr>
<tr>
<td>MCS - Hot Deck Imputation^</td>
<td>0.0062 (-0.0836 – 0.0960)</td>
<td>651</td>
</tr>
<tr>
<td>PCS</td>
<td>-0.1138 (-0.2058 – -0.0218)</td>
<td>509</td>
</tr>
<tr>
<td>PCS – Sensitivity*</td>
<td>-0.5707 (-0.6636 – -0.4778)</td>
<td>694</td>
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<tr>
<td>PCS - Hot Deck Imputation^</td>
<td>-0.0930 (-0.1719 – -0.0140)</td>
<td>650</td>
</tr>
</tbody>
</table>

*Non-responders were allocated a value of 29 for the PCS which corresponds to the 10th percentile, and a value of 39 for the MCS. ^Hot Deck Imputation used Age, Gender and Shockable Arrest Rhythm as donor variables. All analyses exclude proxy responses, total possible population = 694.

Abbreviation: CI, confidence interval; MCS, Mental Component Summary; PCS, Physical Component Summary