Scotland's Out-of-Hospital Cardiac Arrest Report 2024-25

Contents

Preface

This report is published by the Scottish Ambulance Service on behalf of the Delivery Group for Scotland's Out-of-Hospital Cardiac Arrest Strategy and provides a summary of activity and outcomes after out-of-hospital cardiac arrest (OHCA) in Scotland from 1st April 2024 to 31st March 2025.

This document builds on the baseline data contained in Scotland's Out-of-Hospital Cardiac Arrest Report 2019-22 (Clegg et al., 2022) and should be read in conjunction with Scotland's Out-of-Hospital Cardiac Arrest Strategy 2021-2026 (Scottish Government, 2021) which provides details of our programmes of work to improve outcomes after OHCA.

Who is the intended audience of this report?

The public — one of the central recommendations of the Global Resuscitation Alliance's Ten Programmes is to develop accountability by publishing an annual report of OHCA outcomes (Global Resuscitation Alliance, 2021). This report seeks to do that.

Those interested in variations in healthcare across communities in Scotland — this report seeks to facilitate greater understanding of differences in the system of care for OHCA across the country and stimulate discussion about how we can do better.

Healthcare professionals — those wishing to ensure a data-driven approach to improving the delivery of realistic medical care, as well as those working on the 'front line' who want to understand the performance of the system to which they contribute.

Third sector organisations and policy makers — those who want a deeper understanding of the challenges facing communities across Scotland and how best to deploy resources to meet them.

The resuscitation community — others engaged in building systems to save lives after OHCA who seek to understand our approach to and benchmark against our outcomes. We present this report to be transparent about our challenges and our progress.

How to read this report

The report is structured to provide a background to the challenge of OHCA, Scotland's Out-of-Hospital Cardiac Arrest Strategy 2021-2026 and key metrics charting the progress of implementation of that strategy (Scottish Government, 2021).

Key clinical outcomes and process measures are given first including 30-day survival, ROSC, bystander CPR and PAD usage. These terms are defined in the appropriate sections. Each measure is shown as a geographic snapshot of the current state of affairs using a funnel plot of data from the last 12 months (April 1st 2024 - March 31st 2025). There are also charts showing the variation of each measure over time. Analysis is provided which highlights progress towards the delivery of the Strategy including examination of key dimensions of inequality and an update on the work of the Save a Life for Scotland Partnership.

Changes to the way we capture and report data

There have been some important changes in the way we have captured and presented the outcome data included in this report. This means that some of the historic figures included (in particular the percentage of 30 day survival) differ from those reported previously. For a fuller explanation see the Appendix at the end of the 2023/24 OHCA report (https://www.scottishambulance.com/media/10dn0df0/ohca-report-2022-23.pdf).

Timelines

Many of the line graphs in this report are presented as control charts in order to highlight how system elements are changing over time. In each case the average value (mean) is shown by a central dashed line, and upper and lower control limits (at two and three standard deviations) are shown as red dotted lines. In general, control lines can be used to highlight areas that may benefit from further investigation.

Funnel plots

A funnel plot is a scatter plot showing a cross-sectional 'snapshot' in time. We have used funnel plots to illustrate the variation in key OHCA measures across health board areas in Scotland while taking into account the number of arrests that occur within each board. We include two sets of upper and lower boundary lines on each plot, for 95% confidence intervals and 99.7% confidence intervals. These lines can be used to identify data points that may merit closer investigation as they lie outside of what might be expected due to normal variation in the figures.

Scottish Index of Multiple Deprivation (SIMD)

SIMD is the Scottish Government's standard tool for identifying areas in Scotland with concentrations of deprivation by incorporating census data from seven different domains (income, employment, education, housing, health, crime, and geographical access) into a single index (Scottish Government, 2020).

The SIMD is calculated for each of 6,976 data zones in Scotland using census data. Data zones are geographic areas in Scotland each containing a population of between 500 and 1,000 people. Where possible, they have been made to respect physical boundaries and natural communities, have a regular shape and contain similar households. Data zones are then ranked. In this report we have described SIMD using quintiles, with approximately 20% of the Scotland population in each quintile: quintile 1 (SIMD1) has the greatest deprivation while quintile 5 (SIMD5) has the least deprivation. The SIMD can be used to target policies and resources appropriately. It is important to remember that the SIMD is a geographically based measure and identifies deprived areas, not deprived individuals.

For the OHCA described in this report, SIMD is derived from the postcode of the OHCA incident location and uses lookup files from Public Health Scotland (Scottish Government, 2020). Because SIMD varies with each census and changes to data zone boundaries, we have used the date of each OHCA incident to ensure that the relevant SIMD is applied.

COVID-19 restrictions in Scotland

The longitudinal analyses in this report include the timeframe of the COVID-19 pandemic, including 'lockdown' measures enacted in Scotland and the eventual easing of such measures. Throughout the report, time series are marked to indicate the period where 'lockdown' measures were in place between 24th March 2020 and the move to level 3 restrictions on 20th April 2021.

Writing Group

This work includes the work of several individuals. We would like to publicly acknowledge the contribution of the following people in enabling the production of this report, whilst being mindful of the help of many others who are not listed here.

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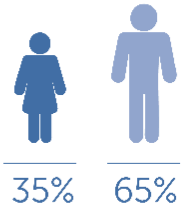
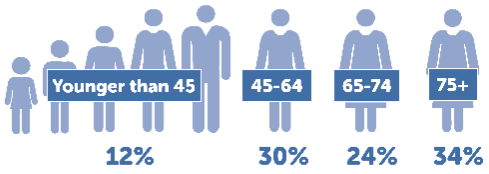
Improving Outcomes from OHCA*
Where we are 2024-2025

*Out-of-Hospital Cardiac Arrest

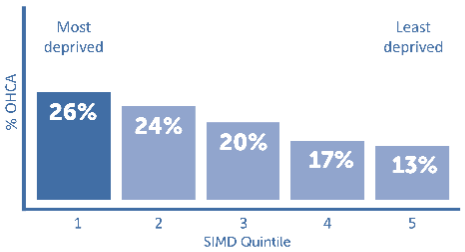
Average number of OHCA
3,741 per year



OHCA can affect anyone of any age at any time.



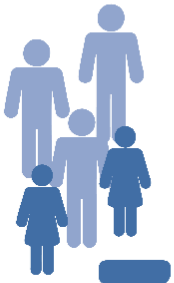
People in the most deprived areas are twice as likely to have an OHCA.



Before Strategy*

Annual number of survivors

225



Latest Statistics

Annual number of survivors

338

Public Access Defibrillator deployment before the arrival of the Ambulance Service rose from **2.5%** before the Strategy* to:

10%

1 in 10

Survived to leave hospital after OHCA.

*Baseline figures are from 2011-2015 prior to the launch of Scotland's Strategy for OHCA in March 2015.

Executive Summary 2024-25

- **Number of arrests:** From 1st April 2024 to 31st March 2025 there were 3,741 out-of-hospital cardiac arrests (OHCA) in Scotland where resuscitation was attempted. This represents a continued gradual increase in the number of worked arrests over the past decade, with a stable seasonal pattern and a winter peak.
- **Survival:** Overall, 30-day survival was 9.0% (Strategy aim 15%). The absolute number of survivors remains substantially higher than a decade ago, although the number of survivors per million of the population (60.9) was slightly lower than in 2023–24, reflecting year-to-year variation rather than a clear change in trajectory.
- **Shockable rhythms:** Among patients presenting with a shockable initial rhythm (Utstein comparator group), 30-day survival was 27.5% and ROSC was achieved in 52.3%. Although slightly lower than the peak seen in 2023–24, outcomes for this group remain markedly improved compared with earlier years and close to the highest levels recorded in Scotland.
- **CPR:** Bystander CPR was performed in 61.7% of worked arrests, remaining broadly unchanged from recent years and stable throughout the COVID-19 pandemic period. Variation between health boards is limited, suggesting a consistently high level of community response across Scotland.
- **PAD use:** Public Access Defibrillator (PAD) use by the public before ambulance arrival occurred in 9.8% of worked arrests. While this represents a sustained improvement compared with earlier years, progress has plateaued reinforcing that incremental gains will require targeted structural change rather than continuation of existing approaches. Marked variation persists between health boards, partly reflecting differences in PAD availability and accessibility.
- **Inequalities:** Socioeconomic inequalities remain a defining feature of OHCA in Scotland. People living in the most deprived communities (SIMD1) are twice as likely to experience OHCA and are less likely to survive compared with those in the least deprived areas (SIMD5). Bystander CPR rates are relatively consistent across deprivation quintiles, but disparities in PAD use are more pronounced and appear to be widening.

- **Innovation:** System development continues through national and local initiatives. Save a Life for Scotland (SALFS) remains central to improving community readiness, with continued growth in CPR training. The GoodSAM responder app is increasingly embedded within the system of care, although volunteer density remains insufficient in many areas to consistently mitigate ambulance response delays, particularly in more deprived and rural communities. Bystander aftercare provision, led by Chest Heart & Stroke Scotland, is an important recent addition to the system.
- **Looking Forward:** As Scotland enters the final phase of its OHCA Strategy 2021–2026, the system shows resilience and sustained improvement in several key areas. However, survival remains well below the national ambition, and persistent inequalities in incidence, early defibrillation, and outcomes continue to limit progress. The data reinforce the need for continued focus on community readiness, equitable access to PADs, local responder capacity, and whole-system approaches that recognise the constraints of geography and rising demand. Through coordinated action across emergency services, health, third sector partners and communities, Scotland can continue to strengthen its system of care and ensure that survival after OHCA is less dependent on postcode.

Introduction — the system of care

A successful response to out-of-hospital cardiac arrest (OHCA) depends on the coordinated action of many different people and organisations. This system of care begins in the community, with the recognition that someone has collapsed and the decision to call for help, and extends through bystander response, ambulance service care, hospital treatment, and recovery back into the community. At every stage, outcomes are shaped not only by individual actions, but by how well the system functions as a whole.

Traditionally, this system has been described using the “chain of survival” framework, which emphasises the importance of a sequence of time-critical steps: early recognition of cardiac arrest and activation of emergency services, early cardiopulmonary resuscitation (CPR), early defibrillation, advanced life support, and post-resuscitation care. This remains a helpful and widely recognised model, highlighting that delays or weaknesses at any point reduce the likelihood of survival.

Contemporary resuscitation guidance increasingly recognises that response to OHCA is not a simple linear process. Several elements of care occur in parallel, and outcomes are strongly influenced by the readiness of the community before an arrest occurs, as well as the quality of recovery and support after resuscitation. The effectiveness of early links in the chain depends on factors such as public awareness, access to defibrillators, emergency call handler recognition and instruction, and the availability of nearby responders. Later outcomes depend on coordinated hospital care, aftercare, and longer-term support for patients, families, and bystanders.

In recognition of this broader perspective, we have previously extended the traditional chain of survival to include two additional concepts: community readiness and aftercare. Community readiness reflects the extent to which people are trained, confident, equipped, and supported to act when a cardiac arrest occurs. Aftercare encompasses not only survival to hospital discharge, but neurological outcome, cardiac rehabilitation, psychological wellbeing, and the needs of families and bystanders affected by the event.

To better reflect this whole-system view, we now conceptualise the response to OHCA as a cycle rather than a simple chain, emphasising that effective care begins and ends in the community. Preparedness enables early action; early action enables survival; and recovery feeds back into preparedness through learning, engagement, and resilience.

Weaknesses at any point in this cycle can undermine outcomes, while improvements in one area often depend on progress in others.

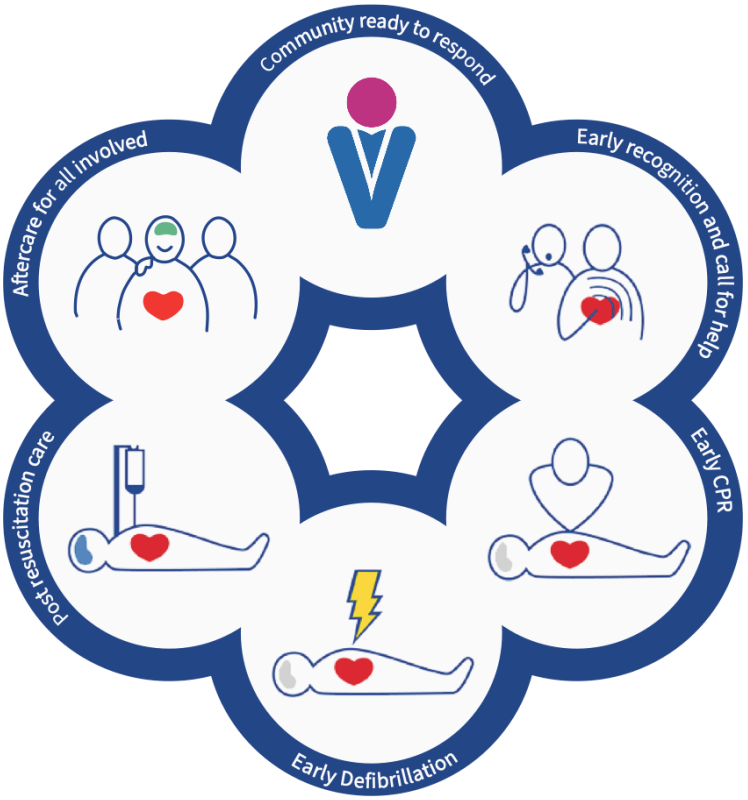


Figure 2 The 'Wheel of Recovery'
The Chain of Survival has been augmented with links for 'Community Readiness' and 'Aftercare', then joined to form a wheel emphasising that effective response to OHCA begins and ends in the community.

This report adopts that system-of-care perspective throughout. We present data on clinical outcomes and key process measures, examine how these vary across geography and deprivation, and explore how different components of the response pathway contribute to overall performance. By doing so, we aim not only to describe what is happening after OHCA in Scotland, but to identify where targeted, coordinated action across communities, services, and partners is most likely to save lives and reduce inequalities. Adopting a system-of-care perspective is not intended to dilute accountability; rather, it clarifies where responsibility for improvement sits at each stage of the pathway.

Setting the scene

Worked arrests

From April 1st 2024 to March 31st 2025, the Scottish Ambulance Service received 724,811 emergency calls, of which 1.8% were determined by call handlers to be possible out-of-hospital cardiac arrests. On arrival at the scene, the ambulance crew confirmed cardiac arrest in 9,714 cases and attempted resuscitation in 3,741 cases. Cases where resuscitation is attempted are referred to as 'worked arrests' (BOX 1). The number of worked arrests forms the denominator for all subsequent outcome calculations unless otherwise specified.

BOX 1: Worked arrests

'Worked arrests' are OHCA that have a cause which does not involve major physical trauma and where resuscitation was attempted by the Scottish Ambulance Service (SAS). There are a number of reasons why SAS may not initiate resuscitation including obvious death (i.e., the patient shows obvious signs of having been dead for some time) or the confirmation that resuscitation was not the patient's wish (e.g., by the presence of a 'do not attempt CPR' order as part of an anticipatory care plan).

Number of worked arrests

Figure 3 shows the number of worked out-of-hospital cardiac arrests (OHCA) in Scotland by year from 2011–12 to 2024–25. The number of worked arrests has increased gradually over the last decade, reflecting a combination of population change and an ageing demographic. This places a rising demand on emergency services. During the period covered by this report, there were 3,741 worked arrests.

Figure 4 shows the number of worked arrests by calendar month from April 2023 to March 2025. As in previous reports, a clear seasonal pattern is evident, with higher numbers of OHCA occurring during the winter months, particularly December and January. This winter peak has been consistently observed in Scotland and internationally

and is thought to reflect a combination of physiological, environmental, and behavioural factors (Bagai et al., 2013; El Sibai et al., 2021; Muller et al., 2020).

Although year-to-year variation is evident, the overall trend suggests a sustained and predictable burden of OHCA on the Scottish Ambulance Service. This has important implications for system planning, as incremental increases in incidence place pressure on all elements of the system of care, from ambulance availability to hospital capacity and post-resuscitation services.

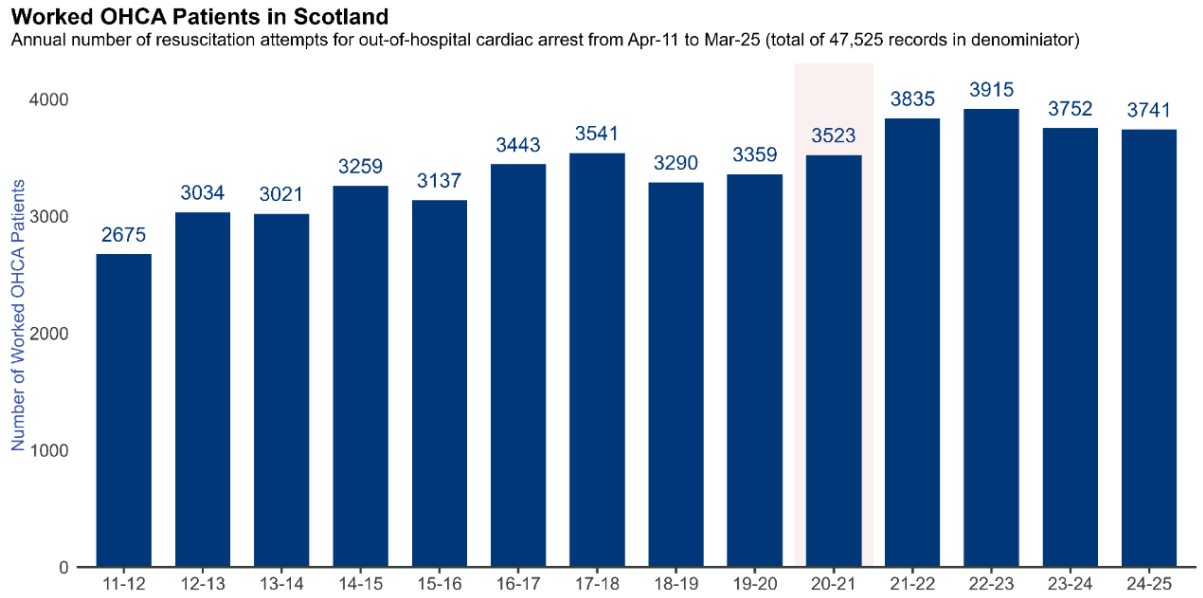


Figure 3 shows the number of worked OHCA in Scotland by year from 2011-12 to 2024-25.

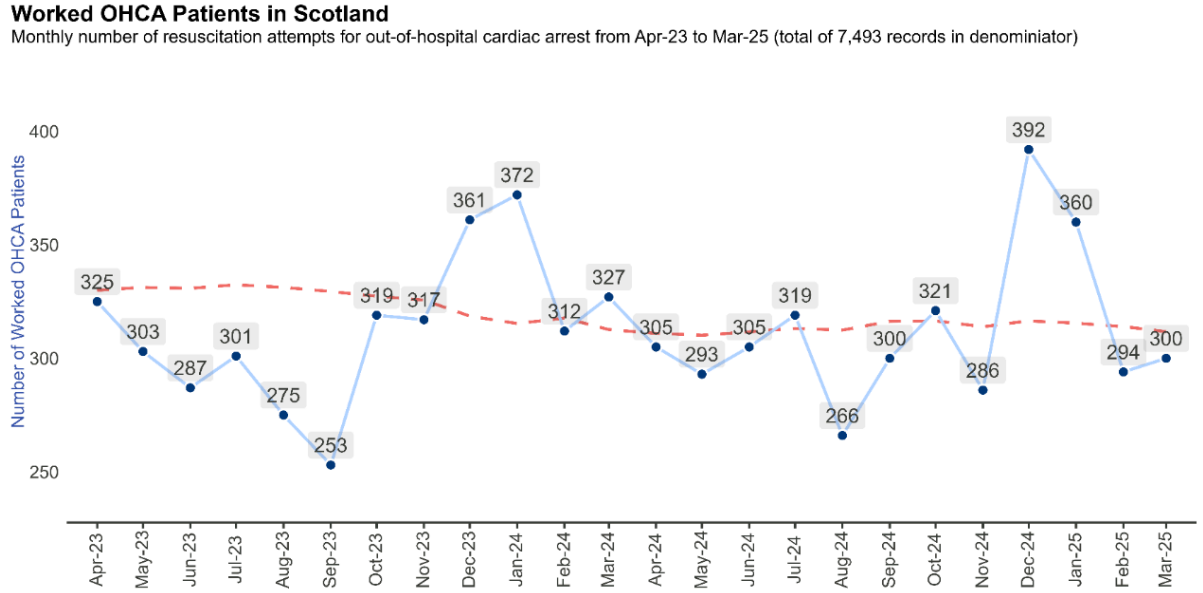


Figure 4 shows the number of worked OHCA in Scotland by month from April 2023 to March 2025. The red dotted line shows the 12-month rolling mean.

Proportion of arrests worked

The decision to initiate resuscitation is a critical component of care for out-of-hospital cardiac arrest (OHCA). While prompt action by the Scottish Ambulance Service (SAS) is essential to maximising survival, resuscitation attempts are not always clinically appropriate (BOX 1). The proportion of OHCA in which resuscitation is attempted therefore reflects both patient factors and professional judgement within the context of the wider system of care.

Previous studies have demonstrated substantial variation between emergency medical services in the proportion of arrests that are worked. For example, data from 129 North American EMS services participating in the Resuscitation Outcomes Consortium Epidemiologic Registry showed that resuscitation was attempted in 54.8% of OHCA overall, with wide variation between services (Brooks et al., 2017).

In Scotland, resuscitation was attempted in 26.1% of all confirmed OHCA in 2024–25 (Figure 5), representing a slight reduction from a peak of 27.0% in 2021–22. The proportion of arrests worked has remained relatively stable in recent years, with modest year-to-year variation. Figure 6 demonstrates some variation between territorial health boards, with Greater Glasgow and Clyde initiating resuscitation in a smaller proportion of patients found in cardiac arrest and Borders trending towards higher rates, although no health board lies outside the outer control limits.

Importantly, the stability of the proportion of arrests worked over time suggests that the observed increase in the absolute number of worked arrests is unlikely to be driven by a lowering of the threshold for initiating resuscitation, and more likely reflects a genuine increase in the burden of OHCA attended by SAS.

These findings indicate that, despite minor local variation, the overall approach to initiating resuscitation after OHCA in Scotland remains consistent over time and comparable across regions. The proportion of arrests worked therefore provides important context for interpretation of outcome measures in the remainder of this report.

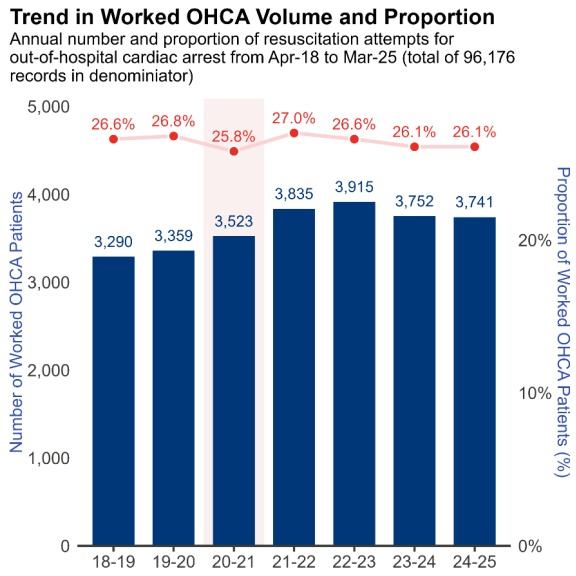


Figure 5 Shows the number of worked arrests by year from 2018-19 to 2024-25 (bar chart). The line graph above this shows what proportion of all confirmed arrests these bars represent.

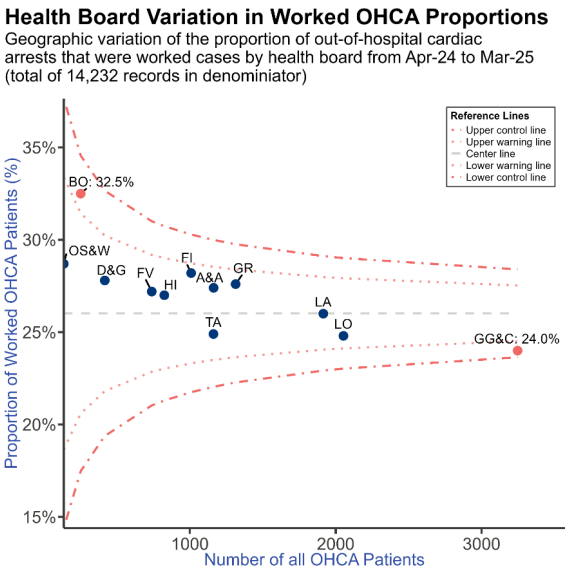


Figure 6 shows a funnel plot of the proportion of worked OHCA for each Health Board across Scotland during the single year 2024-25. The dashed central line shows the national mean, with the upper and lower 95% and 99.7% control limits shown as dotted red lines.

Denominator

It is important to note that the number of non-traumatic worked arrests attended in 2024-25 is used as the denominator for reporting the proportions shown in the rest of this report, unless otherwise explicitly stated. It can be argued that OHCA secondary to hanging or drowning could be considered as traumatic arrests. We have included these patients in our denominator this year and in previous reports, on the grounds that the system of care required to deliver advanced life support to these patients is similar to arrests due to other medical aetiologies.

Data Linkage

In order to report outcome data, cardiac arrest incidents are linked to in-hospital outcomes via the Unscheduled Care Datamart (UCD) as we have described previously (Clegg et al., 2022, 2020, 2019, 2018). Figure 7 shows the number and percentage of worked arrests that were successfully linked. The linkage rate is currently 97%, consistent with previous years. Incidents which could not be linked to outcome data were assumed to be deaths.

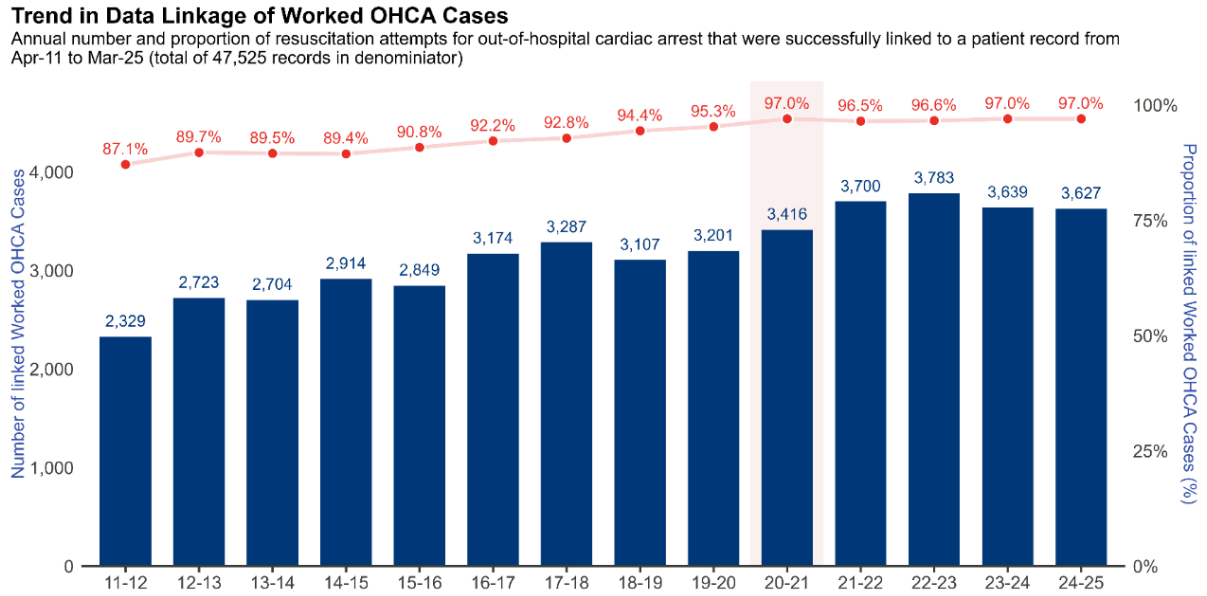


Figure 7 shows the number (bar graph) and percentage (line graph) of worked OHCA which were linked to outcome data via the Unscheduled Care Datamart by year from 2011-12 to 2023-24.

Patient characteristics

The characteristics of patients with worked OHCA have generally remained stable over the last decade (Appendix for data table). In 2024-25 the mean age was 64.8 years with males comprising 65.2% of patients. The percentage of patients having their OHCA at a location with the same postcode as their home address was 73.2%, while the percentage of patients presenting with a shockable initial heart rhythm (BOX 2) was 21.5%. The percentage of worked OHCA in each of the SIMD quintiles was essentially unchanged from previous years, with the most deprived quintile (SIMD1) having the most worked OHCAs and the least deprived quintile (SIMD5) having the least worked OHCAs. Figure 8 shows a visual representation of these data. See appendix (p52) for a comparison of patient characteristics from 2011-12 to 2024-25.

BOX 2: Initial heart rhythm

The initial heart rhythm recorded on the electrocardiogram (ECG) on arrival of SAS is important. A patient may have a **shockable rhythm** (i.e., ventricular fibrillation or ventricular tachycardia) which may be treatable by delivering an electric shock using a **defibrillator**, or **non-shockable rhythm** (i.e., asystole, pulseless ventricular activity, or bradycardia). The initial treatment and prognosis depends on the initial heart rhythm: survival is more likely for OHCA with a shockable initial rhythm. The outcomes for patients with a shockable initial rhythm are used as a benchmark for systems of OHCA care.

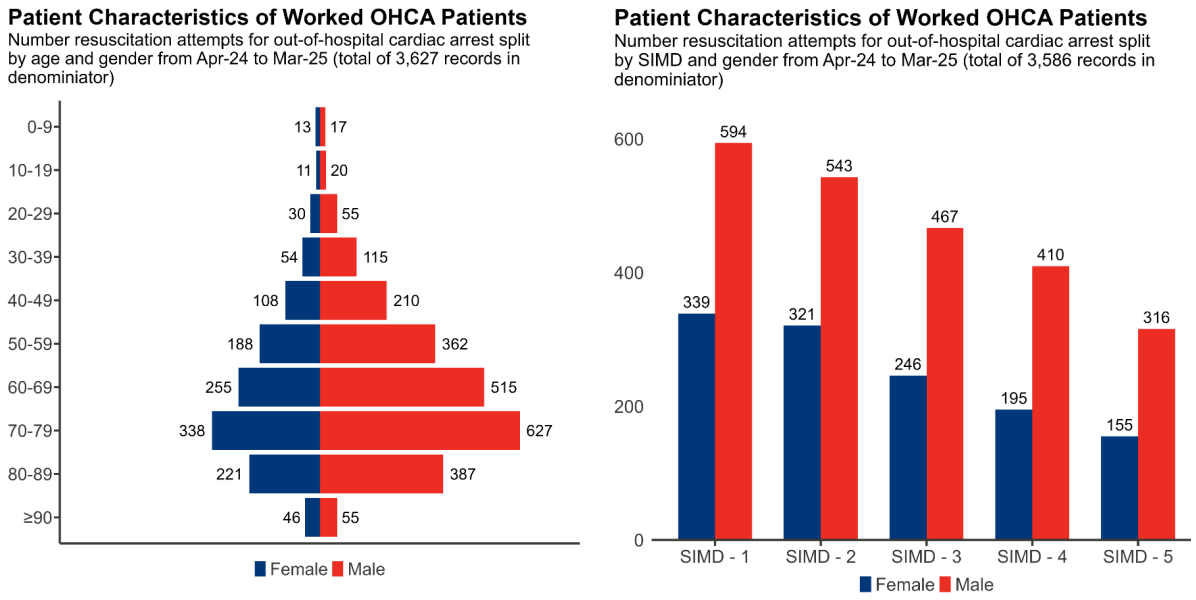


Figure 8 shows the distribution of worked OHCA by age (left panel) and SIMD quintile (right panel) in 2024-25. In both charts the male patient distribution is shown in red and the female distribution in blue.

Key outcome measures

30-day survival

Survival to 30 days after out-of-hospital cardiac arrest (OHCA) is commonly used as a proxy measure for longer-term, neurologically intact survival (BOX 3). Monitoring trends in 30-day survival provides an important summary measure of system performance over time, while recognising that survival is influenced by multiple interacting factors across the entire system of care.

Figure 9 shows the trend in mean 30-day survival for worked OHCA in Scotland from 2011–12 to 2024–25. Survival improved steadily over the pre-pandemic period, reaching

a peak of 10.9% in 2019, before falling sharply during the COVID-19 pandemic to a low of 6.8% in 2020–21. Since that time, there has been partial recovery, with 30-day survival of 9.6% in 2023–24 and 9.0% in 2024–25. Although this represents a small reduction compared with the previous year, survival remains substantially higher than a decade ago and within the range expected given normal year-to-year variation.

BOX 3: 30-day survival

The definition of 'survival' used in this report is survival to 30 days after the date of the OHCA. We have counted survival as the percentage of worked OHCA where patients were still alive at 30 days. Worked OHCA which were not linked to outcome data have been assumed to be deaths and included in the denominator when calculating survival rates.

Figure 10 presents a funnel plot of 30-day survival by territorial health board for 2024–25. No health board lies outside the 95% control limits, suggesting that the observed variation in survival across Scotland is consistent with expected statistical variation around the national mean rather than indicating marked differences in performance between regions. Tables showing 30-day survival data for individual health board areas can be found in the Appendix at the end of this report. Health board-level survival figures should be interpreted cautiously and in the context of case mix, geography, and random variation.

Taken together, these data indicate that while 30-day survival after OHCA in Scotland has not yet returned to its pre-pandemic peak, longer-term gains have largely been sustained. Continued improvement in survival will depend on strengthening all components of the system of care, particularly early community response and equitable access to timely defibrillation.

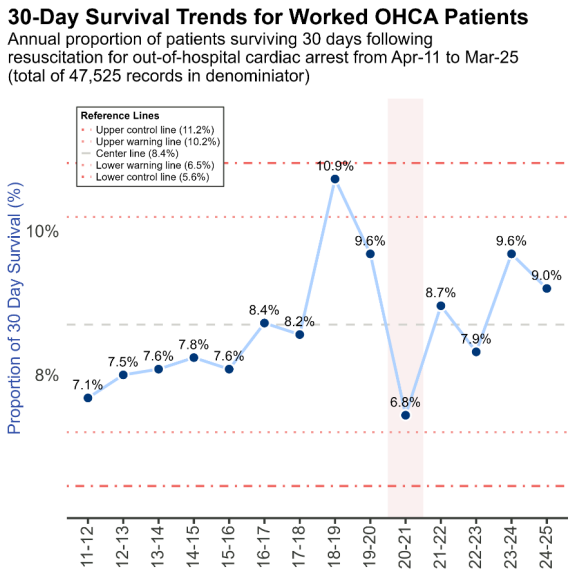


Figure 9 shows the percentage of survival at 30 days after OHCA for the whole of Scotland from 2011-12 to 2024-25. The shaded red area shows the COVID-19 'lockdown' time period. The dashed central line shows the national mean, with the upper and lower 95% and 99.7% control limits shown as dotted red lines.

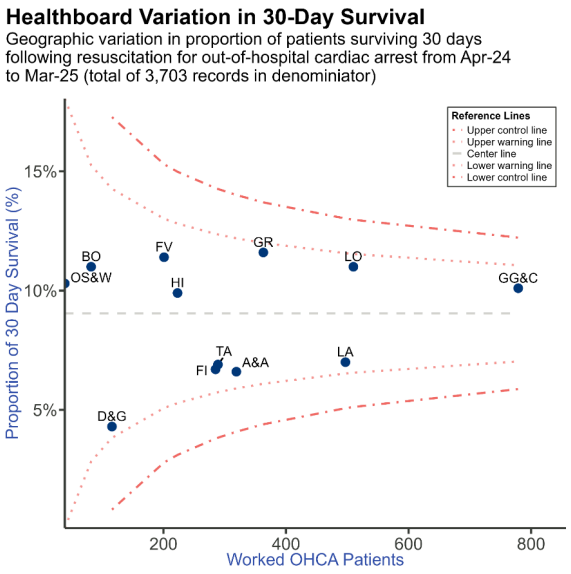


Figure 10 shows a funnel plot of 30-day survival vs the number of worked OHCA per Health Board during the single year 2024-25. The dashed central line shows the national mean, with the upper and lower 95% and 99.7% control limits shown as dotted red lines.

Number of 30-day survivors per million of the population

Reporting the number of patients who survive for 30 days after out-of-hospital cardiac arrest (OHCA) per million of the population provides a complementary measure to percentage survival (BOX 4). Unlike proportional survival, this metric is less sensitive to variation in the proportion of arrests in which resuscitation is attempted and offers a more stable indicator of the overall effectiveness of the system of care at a population level.

BOX 4: 30-day survivors per million

Reporting the number of 30-day survivors per million of the population is a useful measure which is not as dependent on rates of initiation of resuscitation. If we assume that the population of Scotland and the incidence of OHCA remain relatively stable, then monitoring the change in the absolute number of 30-day survivors per million is a more useful measure of the system of OHCA care than reporting changes in the proportion of patients who survive after resuscitation is attempted.

Figure 11 shows the number of 30-day survivors per million of the population in Scotland from 2011–12 to 2024–25. This measure is particularly relevant for national planning, as it reflects the total number of people returning to their communities after OHCA each year. This number has increased over the past decade, reflecting sustained improvements across the system of care, although a marked reduction occurred during the COVID-19 pandemic. In 2024–25, the number of 30-day survivors per million was 60.9, slightly lower than the 65.5 recorded in 2023–24.

While some year-to-year variation is evident, the longer-term trend suggests that the absolute number of people surviving OHCA in Scotland has increased compared with earlier years. Interpreted alongside proportional survival and incidence data, this measure reinforces the importance of population-level approaches to improving outcomes, particularly those that increase early recognition, bystander intervention, and access to defibrillation.

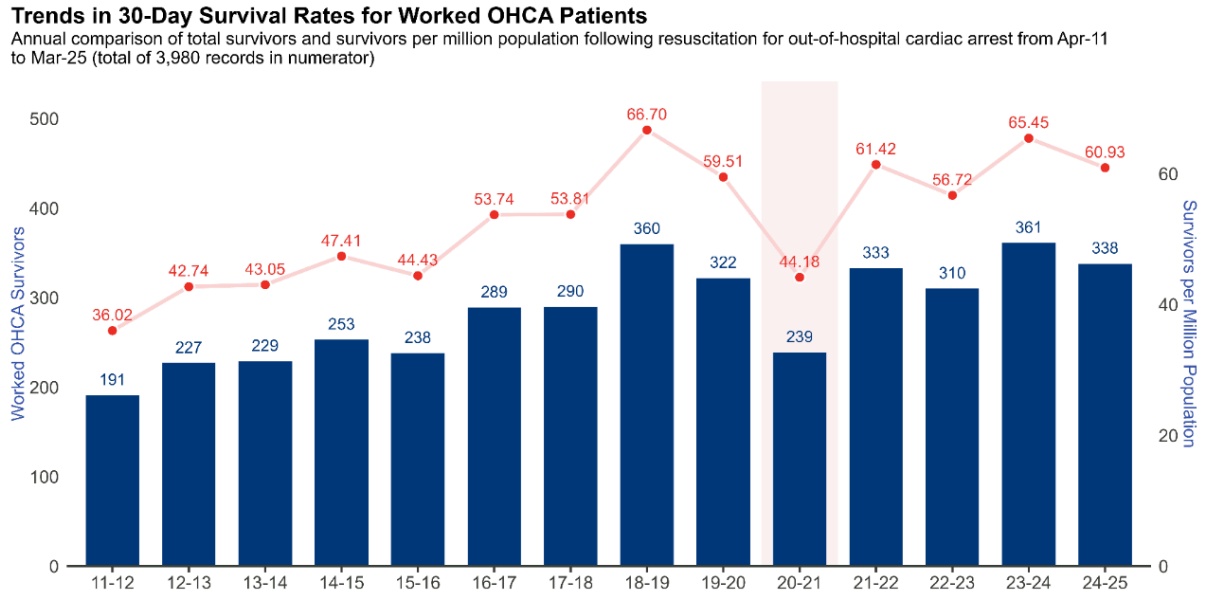


Figure 11 shows the number of patients alive at 30 days after worked OHCA for the whole of Scotland between the years 2011-12 to 2024-25 (blue bars) and the number of 30-day survivors per million of the population (red line).

30-day survival in patients with a shockable initial rhythm — the Utstein Comparator Group

Patients presenting with a shockable initial rhythm represent the group most likely to survive out-of-hospital cardiac arrest (OHCA). Outcomes for this subgroup are commonly used to benchmark systems of care, as they reduce heterogeneity related to arrest aetiology and allow more meaningful comparison of system performance over time (BOX 5).

BOX 5: the Utstein Comparator

The Utstein templates aim to provide uniformity to OHCA data definitions around the world. One element of this is the use of the 'Utstein Comparator group' (bystander-witnessed cardiac arrest with a shockable initial heart rhythm). We have referred to this group as **'patients with a shockable initial rhythm'** in this report.

The proportion of worked OHCA presenting with a shockable initial rhythm was 21.5% in 2024–25, consistent with recent years and with the longer-term trend towards a gradual reduction in the frequency of shockable rhythms observed internationally. Figure 12 shows the trend in 30-day survival for this group from 2011–12 to 2024–25. Survival has

improved substantially over the past decade, with nearly twice as many patients surviving to 30 days in 2024–25 compared with 2011–12.

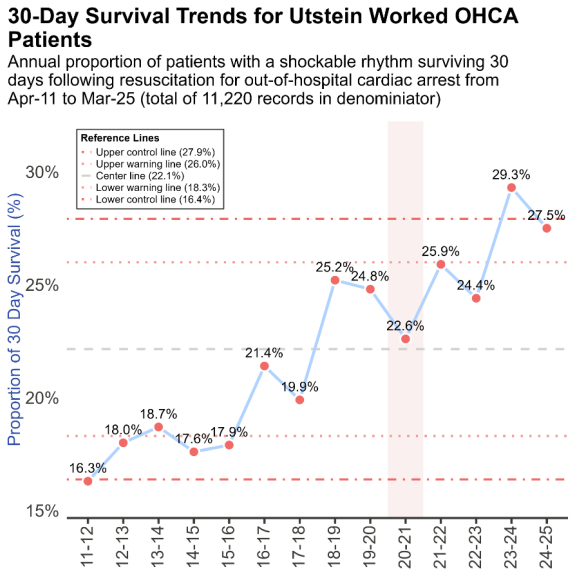


Figure 12 shows the percentage of survival at 30 days after OHCA for patients with an initial shockable rhythm from 2011-12 to 2024-25. The shaded red area shows the COVID-19 'lockdown' time period. The dashed central line shows the overall mean, with the upper and lower 95% and 99.7% control limits shown as dotted red lines.

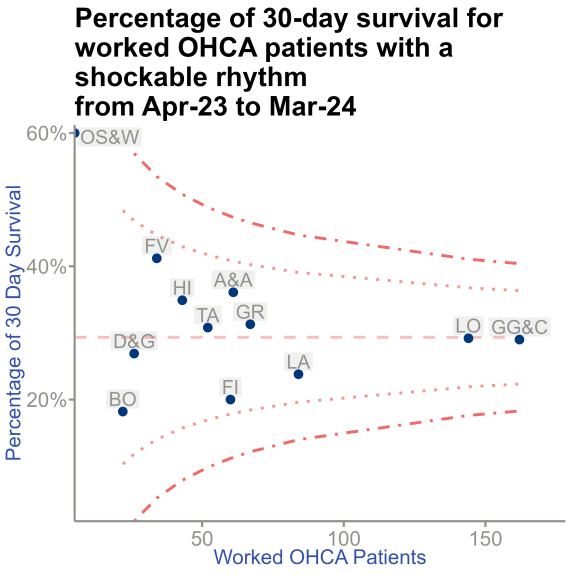


Figure 13 shows a funnel plot of 30-day survival vs number of worked OHCA for patients with an initial shockable rhythm per Health Board during the single year 2024-25. The dashed central line shows the national mean, with the upper and lower 95% and 99.7% control limits shown as dotted red lines.

In 2024–25, 30-day survival for patients with a shockable initial rhythm was 27.5%. This represents a slight reduction from the peak of 29.3% observed in 2023–24 but remains close to the highest levels recorded in Scotland and well above survival rates seen in earlier years. Year-to-year variation should therefore be interpreted cautiously and in the context of relatively small absolute numbers.

The funnel plot in Figure 13 shows 30-day survival for patients with a shockable initial rhythm by territorial health board in 2024–25. No health board lies outside the 95% control limits, indicating that observed variation is consistent with expected statistical variation rather than systematic differences in performance between regions.

Overall, outcomes in the Utstein comparator group suggest sustained improvement in the effectiveness of the Scottish system of care for OHCA over time. Continued gains in this group are likely to depend on further strengthening early recognition, bystander CPR, rapid defibrillation, and timely advanced life support, alongside optimisation of post-resuscitation care.

Return of spontaneous circulation (ROSC)

Return of spontaneous circulation (ROSC) is an important intermediate outcome following out-of-hospital cardiac arrest (OHCA) and represents successful initial resuscitation, defined in this report as the restoration of a palpable pulse sustained until arrival at the Emergency Department (BOX 6). Although ROSC does not equate to longer-term survival, it is a necessary precursor to survival and provides useful insight into the effectiveness of early and advanced resuscitative care.

BOX 6: Return of Spontaneous Circulation (ROSC)

Definitions for ROSC vary. The Scottish Ambulance Service records ROSC if a patient with OHCA regains a palpable pulse during resuscitation which is sustained until arrival at the Emergency Department. This includes those patients who are successfully resuscitated by members of the public using Public Access Defibrillators before the arrival of the ambulance service. The proportion of worked OHCA with ROSC is sometimes referred to as **'survival to hospital'** or **'number of hearts restarted'**. ROSC does not equate to 30-day survival.

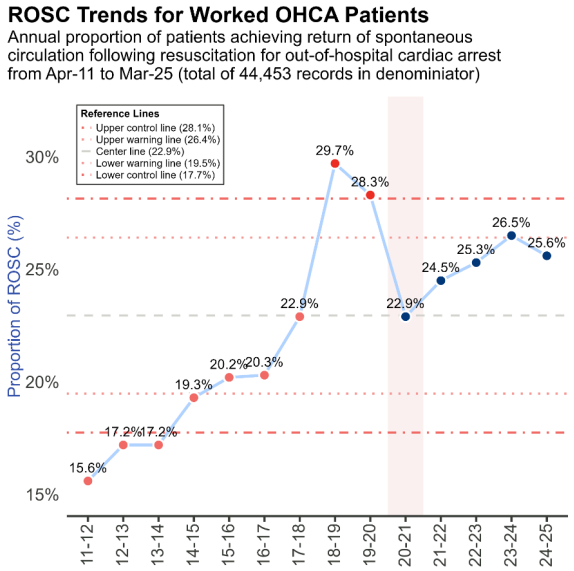


Figure 14 shows the percentage of worked arrests with attained ROSC per year from 2011-12 to 2024-25. The shaded red area shows the COVID-19 'lockdown' time period. The dashed central line shows the overall mean, with the upper and lower 95% and 99.7% control limits shown as dotted red lines.

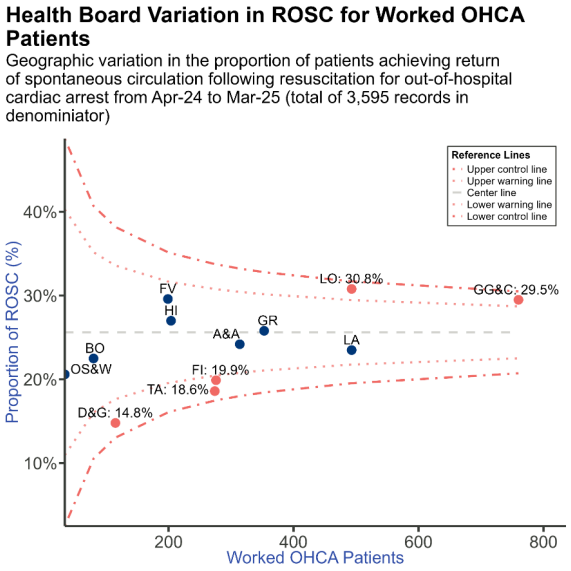


Figure 15 shows a funnel plot of worked OHCA with attained ROSC vs number of worked OHCA per Health Board during the single year 2024-25. The dashed central line shows the national mean, with the upper and lower 95% and 99.7% control limits shown as dotted red lines.

Figure 14 shows the trend in the proportion of worked OHCA in which ROSC was achieved from 2011–12 to 2024–25. ROSC rates improved over the pre-pandemic period, declined during the COVID-19 pandemic, and have since partially recovered. In 2024–25, ROSC was achieved in 25.6% of worked arrests, slightly lower than in the previous year.

Figure 15 presents a funnel plot of ROSC rates by territorial health board for 2024–25. Although the spread of ROSC rates is wider than in 2023–24, no health board lies outside the outer control limits, suggesting that observed variation is consistent with expected statistical variation rather than systematic differences in performance.

Taken together, these findings indicate that rates of initial resuscitation success in Scotland have remained broadly stable in recent years and substantially improved compared with earlier in the reporting period.

ROSC in patients with a shockable initial rhythm

Examining rates of return of spontaneous circulation (ROSC) among patients presenting with a shockable initial rhythm provides additional insight into the effectiveness of early and advanced resuscitative care in out-of-hospital cardiac arrest (OHCA). This subgroup represents patients with the greatest physiological potential for recovery and is commonly used for benchmarking system performance.

Figure 16 shows the trend in ROSC rates for patients with a shockable initial rhythm from 2011–12 to 2024–25. Over this period, the proportion of patients achieving ROSC has increased substantially compared with the early years of reporting, mirroring improvements seen in 30-day survival. In 2024–25, the national average ROSC rate for this group was 52.3%, slightly lower than in the previous year but remaining at a historically high level.

Figure 17 presents a funnel plot of ROSC rates in patients with a shockable initial rhythm by territorial health board for 2024–25. Although some variation between boards is evident, no health board lies outside the outer control limits, indicating that observed differences are consistent with expected statistical variation around the national mean. Lothian continues to trend towards higher ROSC rates in this group.

Overall, these data suggest sustained improvement in the delivery of effective resuscitative care for patients with shockable initial rhythms in Scotland.

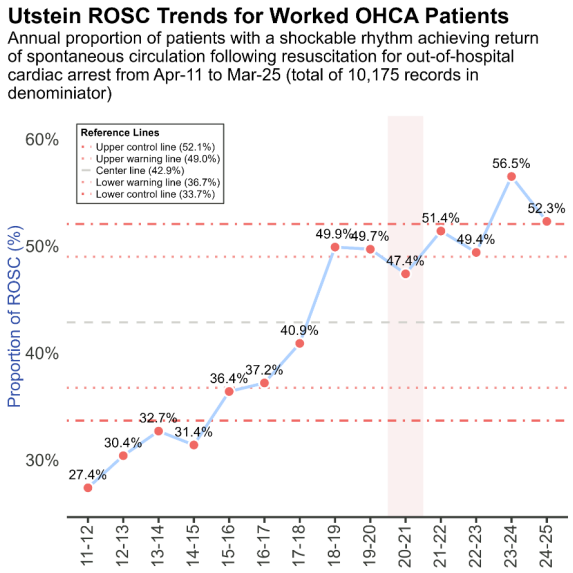


Figure 16 shows the percentage of worked OHCA with a shockable initial rhythm and where ROSC was attained per year from 2011-12 to 2024-25. The shaded red area shows the COVID-19 'lockdown' time period. The dashed central line shows the overall mean, with the upper and lower 95% and 99.7% control limits shown as dotted red lines.

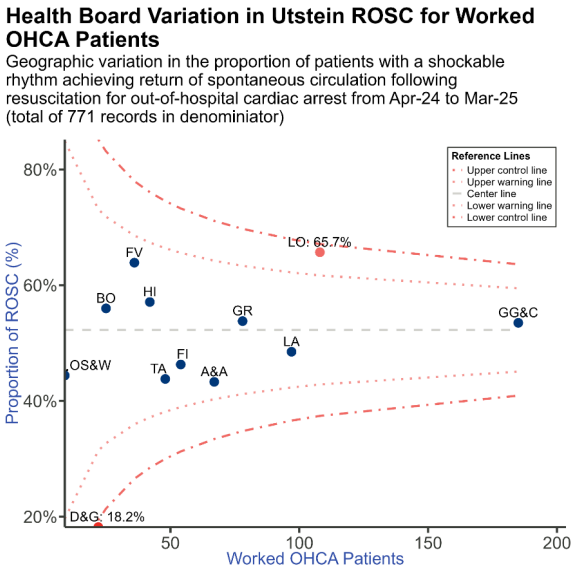


Figure 17 shows a funnel plot of the percentage of worked OHCA with shockable initial rhythm and where ROSC was attained vs the number of worked OHCA with a shockable initial rhythm per Health Board during the single year 2024-25 . The dashed central line shows the national mean, with the upper and lower 95% and 99.7% control limits shown as dotted red lines.

Key process measures

The following sections of the report examine key elements in the Wheel of Recovery. These are the processes which need to be in place for successful resuscitation to occur leading to ROSC and 30-day survival.

Bystander CPR

Bystander cardiopulmonary resuscitation (CPR) is one of the most effective interventions for improving survival after out-of-hospital cardiac arrest (OHCA) and is a critical early component of the system of care (BOX 7). In the absence of bystander CPR, the likelihood of survival is very low.

BOX 7: Bystander CPR

The bystander CPR rate is the proportion of worked OHCA where a member of the public ('bystander') is performing CPR when the ambulance crew arrive. Whilst CPR can include both chest compressions and rescue breaths, the definition of CPR as used in this report is whether any chest compressions were performed.

Figures 18 and 19 show the proportion of worked OHCA in which bystander CPR was ongoing on arrival of the Scottish Ambulance Service (SAS). In 2024–25, bystander CPR was performed in 61.7% of cases, remaining broadly unchanged from recent years. The time series demonstrates that bystander CPR rates in Scotland have been relatively stable over the past decade and did not decline during the COVID-19 pandemic, indicating a resilient level of community response.

The funnel plot in Figure 19 shows limited variation in bystander CPR rates between territorial health boards. While most boards cluster closely around the national mean, Tayside continues to sit below the lower 95% control limit for the second consecutive year, suggesting that this pattern may warrant further local investigation.

Overall, these findings indicate that Scotland has achieved and sustained comparatively high levels of bystander CPR. However, the time series suggests that progress has largely plateaued since 2020–21, implying that the system may be approaching the limits of what can be achieved through existing population-wide approaches alone. Further gains are therefore unlikely to come from doing more of the same, and will instead depend on strategies that deliberately renew and expand the pool of CPR-capable bystanders. This includes increasing the proportion of school-aged children who receive CPR training, embedding skills earlier in the life course, and strengthening mechanisms such as GoodSAM that convert CPR awareness into timely action by mobilising nearby responders. Alongside targeted efforts in communities where rates remain lower, these approaches will be central to further strengthening community readiness and sustaining improvement in OHCA outcomes.

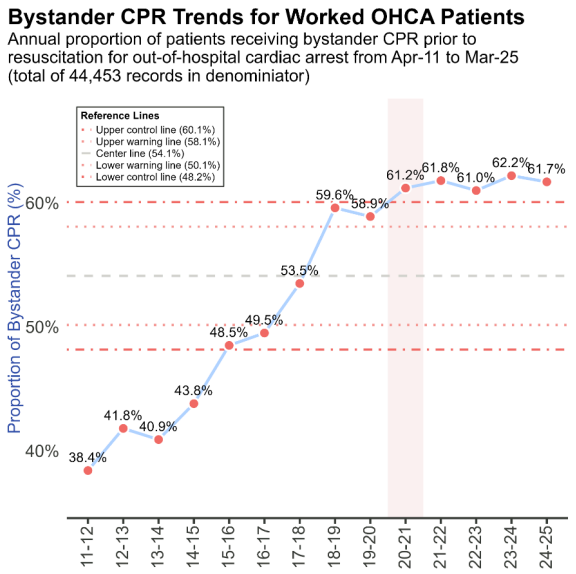


Figure 18 shows the percentage of worked OHCA with bystander CPR performed per year from 2011-12 to 2024-25. The shaded red area shows the COVID-19 'lockdown' time period. The dashed central line shows the overall mean, with the upper and lower 95% and 99.7% control limits shown as dotted red lines.

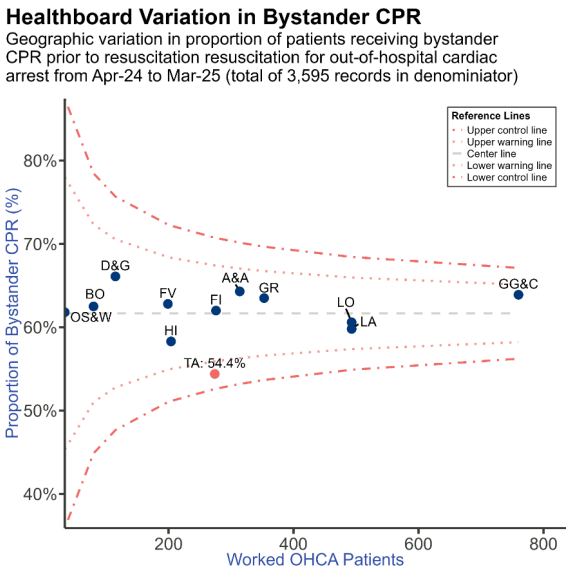


Figure 19 shows a funnel plot of the percentage of worked OHCA where bystander CPR was performed vs the number of worked OHCA per Health Board during the single year 2024-25. The dashed central line shows the national mean, with the upper and lower 95% and 99.7% control limits shown as dotted red lines.

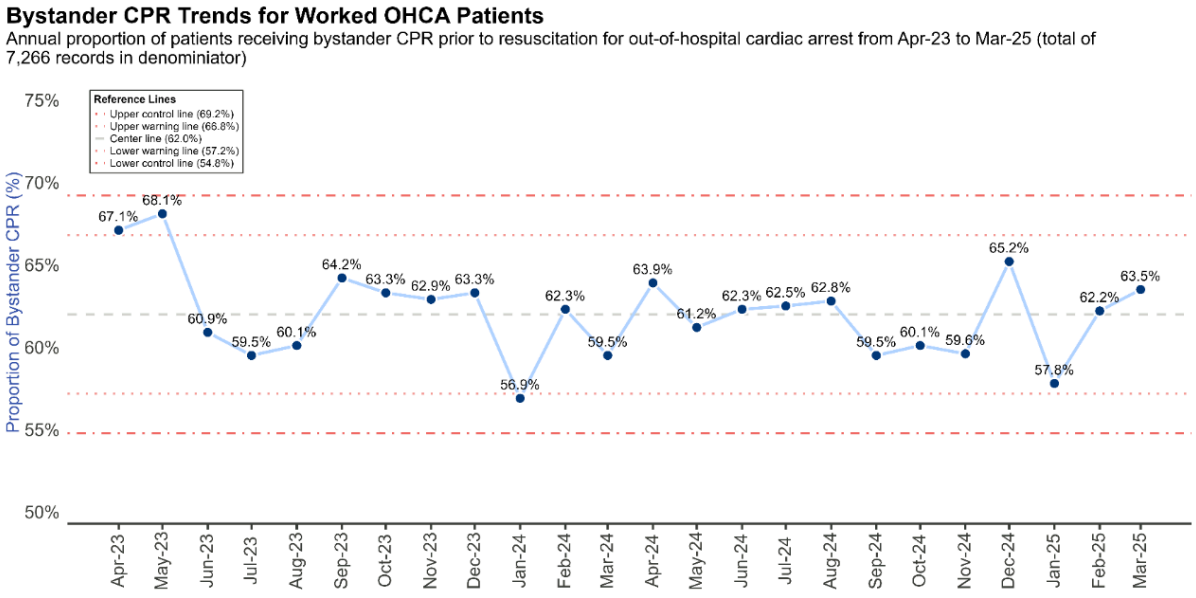


Figure 20 shows the percentage of worked OHCA with bystander CPR performed per month from April 2023 to March 2025. The dashed central line shows the overall mean, with the upper and lower 95% and 99.7% control limits shown as dotted red lines.

Public Access Defibrillator usage

Early defibrillation is a critical determinant of survival after out-of-hospital cardiac arrest (OHCA), particularly for patients presenting with a shockable initial rhythm (BOX 8). Public Access Defibrillators (PADs) allow defibrillation to occur before the arrival of the ambulance service and therefore have the potential to substantially improve outcomes.

Figure 21 shows the proportion of worked OHCA in which a PAD was applied by a member of the public prior to the arrival of the Scottish Ambulance Service (SAS). In 2024–25, PAD use occurred in 9.8% of worked arrests. While this represents a sustained improvement compared with earlier years, the rate of PAD use has remained similar to 2023-24 at just under 10%, suggesting that current approaches may be insufficient to overcome structural barriers such as placement, accessibility, and responder density.

The funnel plot in Figure 22 shows moderate variation in PAD use between territorial health boards, with less dispersion than in previous years. However, Lanarkshire continues to trend towards lower-than-expected PAD use at 5.7%. Figure 23 shows the number of PADs registered on the National Defibrillator Network (The Circuit) per 1,000 population by health board. These data suggest that lower PAD density and accessibility may contribute to reduced PAD use in some regions, including Lanarkshire and Greater Glasgow and Clyde.

Examined alongside bystander CPR rates, these findings highlight PAD availability and use as a key limiting factor in the early links of the system of care for OHCA. Improving outcomes will therefore require not only continued registration and maintenance of PADs, but also strategic placement, improved visibility and accessibility, and public confidence to use defibrillators when needed—particularly in communities at highest risk of cardiac arrest.

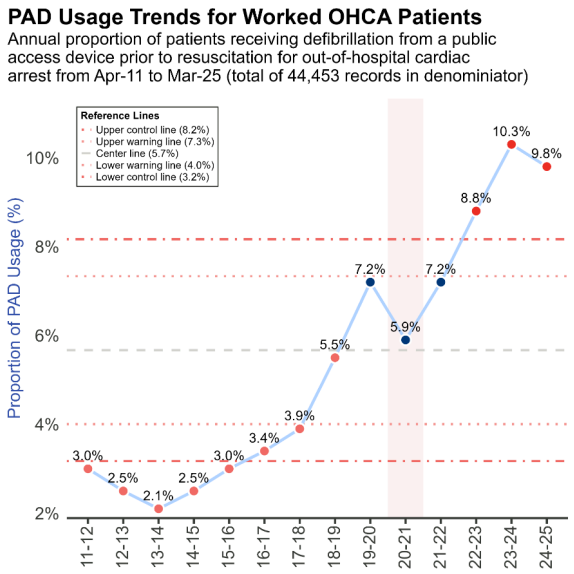


Figure 21 shows the percentage of worked OHCA where a PAD was applied before SAS arrival per year from 2011-12 to 2024-25. The shaded red area shows the COVID-19 'lockdown' period. The dashed central line shows the overall mean, with the upper and lower 95% and 99.7% control limits shown as dotted red lines.

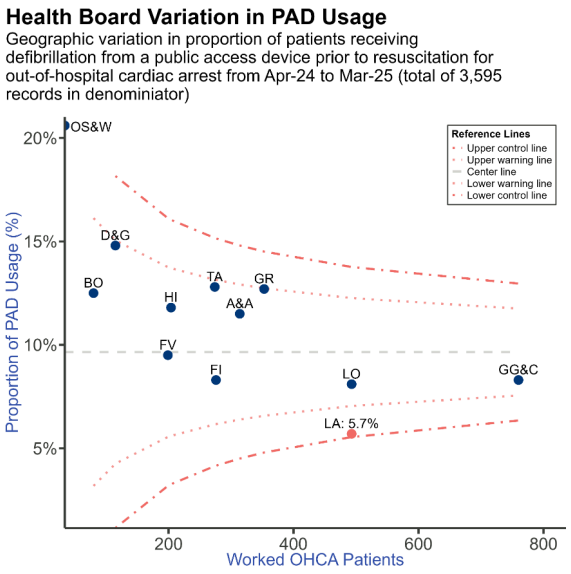


Figure 22 shows a funnel plot of the percentage of worked OHCA where a PAD was applied before SAS arrival vs the number of worked OHCA per Health Board during the year 2024-25. The dashed central line shows the national mean, with the upper and lower 95% and 99.7% control limits shown as dotted red lines.

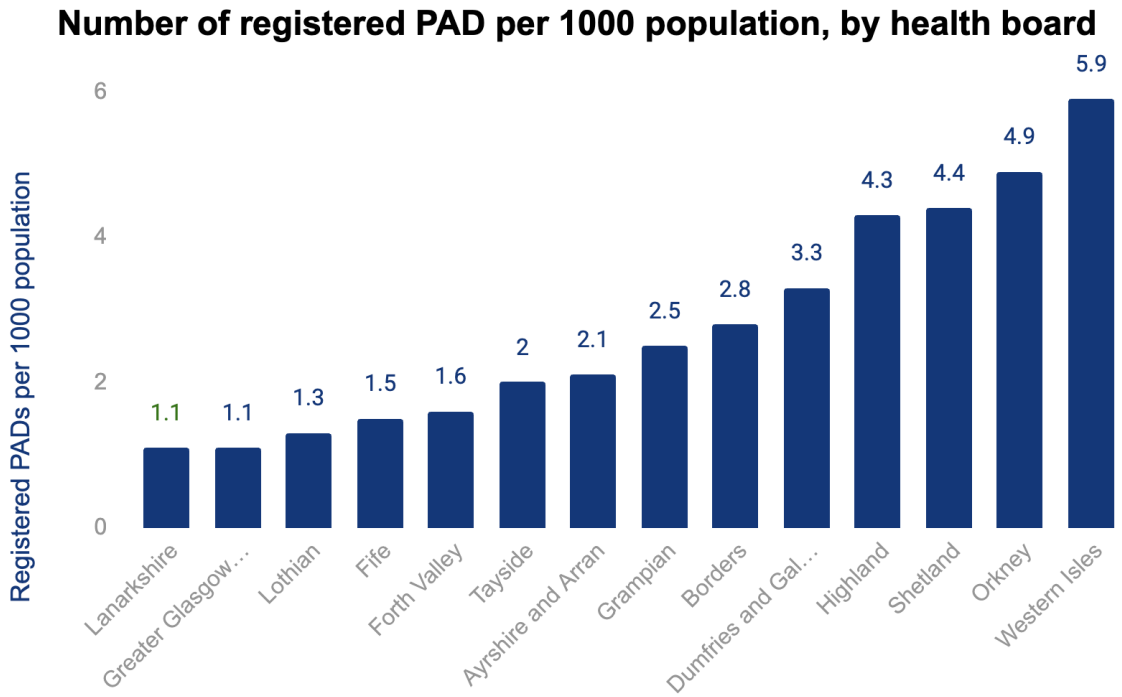


Figure 23 shows the number of Public Access Defibrillators registered on the National Defibrillator Network (the Circuit) per population for each of the health boards in Scotland in January 2026.

BOX 8: Public Access Defibrillator (PAD)

A PAD is an Automated External Defibrillator (AED) which is available for use by the general public in case of OHCA emergencies. AEDs are used to automatically detect an abnormal cardiac rhythm and deliver a lifesaving shock to reset and restart the heart. PAD should be located in areas where they are likely to be available to treat OHCA, well signposted and registered so that the SAS can direct a bystander to fetch one in an emergency.

Scottish Index of Multiple Deprivation and OHCA

Figures 24-27 illustrate the relationship between survival, bystander CPR, PAD use and SIMD (see the 'How to read this report' section for a description of SIMD).

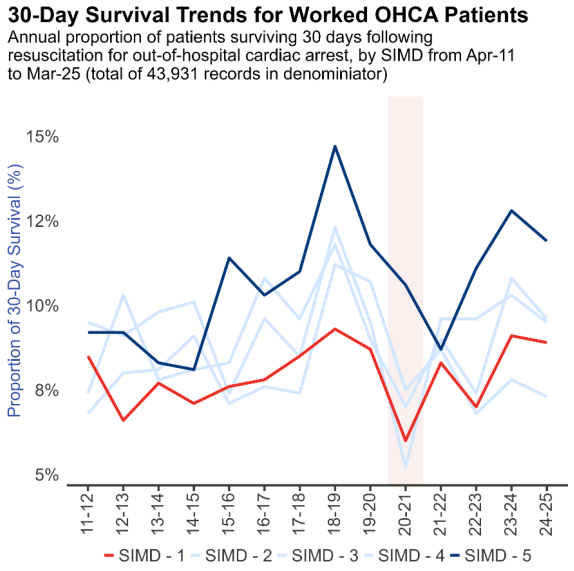


Figure 24 shows the mean annual 30 day survival for all patients with OHCA by SIMD. The shaded red area shows the COVID-19 'lockdown' period.

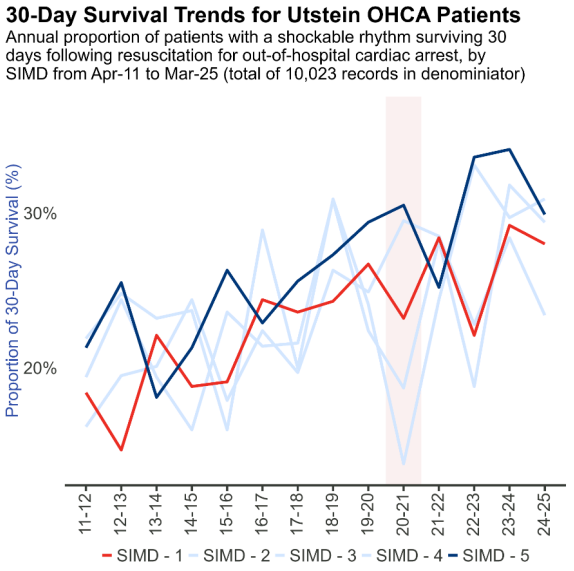


Figure 25 shows mean annual 30 day survival for patients with OHCA and a shockable rhythm by SIMD. The shaded red area shows the COVID-19 'lockdown' period.

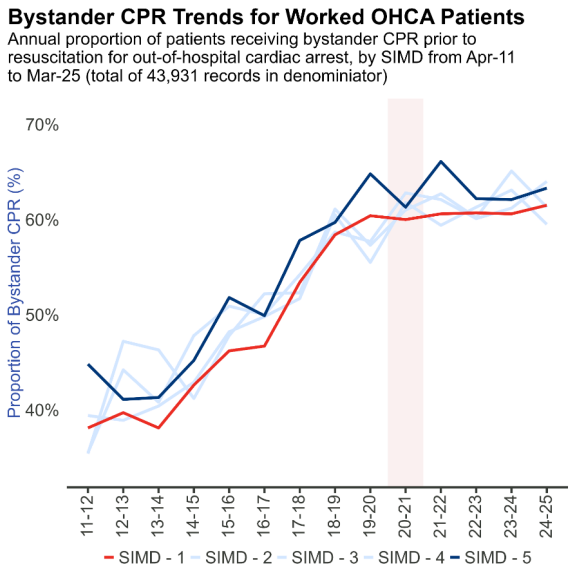


Figure 26 shows the proportion of patients with OHCA receiving bystander CPR, by SIMD. The shaded red area shows the COVID-19 'lockdown' period.

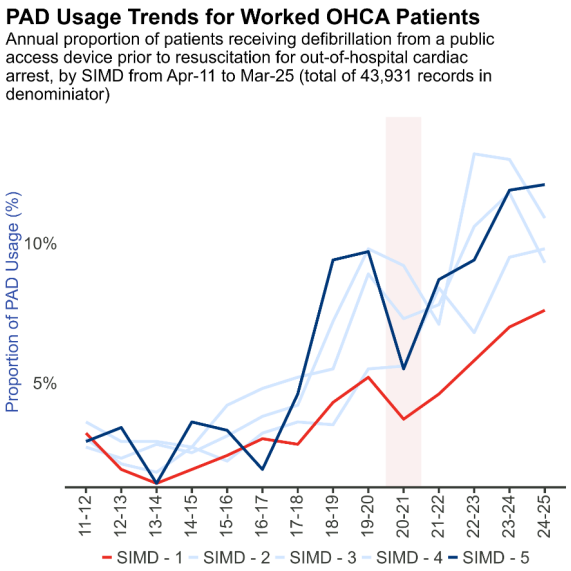


Figure 27 shows the proportion of patients with OHCA where a PAD was used before the arrival of SAS, by SIMD. The shaded red area shows the COVID-19 'lockdown' period.

Figures 24–27 illustrate the relationship between socioeconomic deprivation, measured using the Scottish Index of Multiple Deprivation (SIMD), and key outcomes and processes following out-of-hospital cardiac arrest (OHCA). SIMD provides a geographically based measure of deprivation and allows examination of inequalities in incidence, response, and outcomes across communities in Scotland.

Figures 24 and 25 show that patients living in the most deprived communities (SIMD1) consistently experience lower 30-day survival after OHCA than those living in the least deprived communities (SIMD5). This pattern is evident for all OHCA and for patients presenting with a shockable initial rhythm. These data are unadjusted; however, previous analyses in Scotland have demonstrated that, after adjustment for age, sex, and urban–rural classification, the relative odds of survival in SIMD1 fall further compared with SIMD5, indicating that deprivation itself is independently associated with poorer outcomes (Bijman et al 2023b, Bijman 2026).

Figures 26 and 27 examine key early process measures by SIMD. Bystander CPR rates are broadly similar across deprivation quintiles, suggesting that willingness to initiate CPR is relatively evenly distributed across communities. In contrast, the likelihood of PAD use before ambulance arrival shows a marked socioeconomic gradient, with substantially lower rates of PAD use in more deprived areas. This disparity appears to

be widening over time and represents a critical mechanism through which deprivation translates into worse survival outcomes.

Taken together, these findings highlight socioeconomic deprivation as a persistent and structural determinant of OHCA outcomes in Scotland. While progress has been made in improving bystander CPR across all communities, inequitable access to early defibrillation remains a major challenge. Addressing these inequalities will require targeted approaches to PAD placement, accessibility, and community engagement in areas of greatest need, alongside continued system-wide efforts to improve survival after OHCA.

Initiatives to improve the system of care

Save a Life for Scotland

Save a Life for Scotland (SALFS) is a national partnership bringing together the Scottish Ambulance Service, Scottish Fire and Rescue Service, Police Scotland, third sector organisations, the Scottish Government, and academic researchers to improve outcomes after out-of-hospital cardiac arrest (OHCA). Directed by the Resuscitation Research Group at the University of Edinburgh, the partnership aims to increase community readiness by equipping people across Scotland with the knowledge, confidence, and skills to respond effectively to cardiac arrest (see www.savealife.scot).

The central ambition of SALFS is to ensure that everyone in Scotland has the opportunity to learn cardiopulmonary resuscitation (CPR), understand how to use a public access defibrillator (PAD), and know how to act in the first critical minutes after a cardiac arrest. Since its formation in 2015, SALFS has focused on embedding CPR education in schools, workplaces, and communities, with particular emphasis on reaching young people and communities at highest risk of OHCA. The campaign aims to equip one million people with CPR skills by the end of 2026.

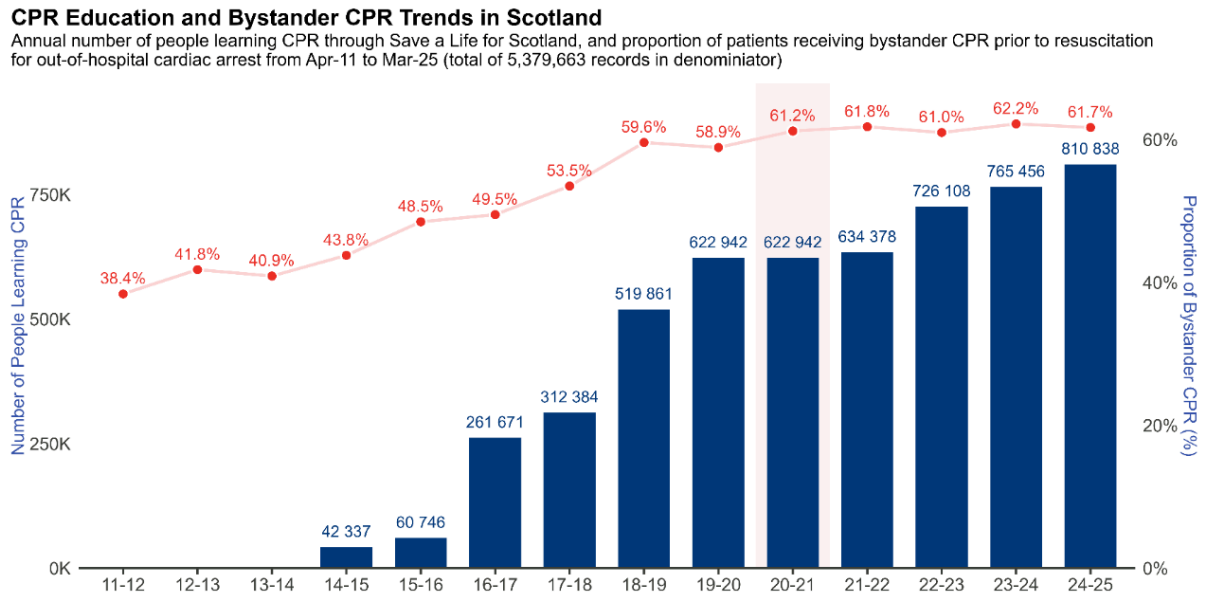


Figure 28 shows the number of people learning CPR alongside bystander CPR rates in Scotland from 2011–12 to 2024–25. As participation in CPR training has increased over time, bystander CPR rates have also risen, suggesting that sustained, population-level investment in community training and engagement can translate into meaningful improvements in early response to OHCA. While causality cannot be inferred from these ecological trends, the temporal association is consistent with international evidence that large-scale CPR training increases bystander response.

However, recent data indicate that bystander CPR rates have now stabilised at a comparatively high level. This suggests that while existing approaches have been successful in achieving widespread uptake, further gains are unlikely to come from continued expansion of traditional delivery models alone. In response, SALFS has increasingly complemented its training programmes with system-level interventions designed to normalise CPR knowledge and reach population groups not routinely engaged through conventional routes.

One such initiative has been collaboration with the Driver and Vehicle Standards Agency (DVSA) to embed CPR and defibrillator awareness within the official learning materials for the UK driving theory test. Introduced nationally in 2024, this intervention integrates lifesaving skills into a universal, non-healthcare educational touchpoint accessed by hundreds of thousands of learners each year. Early evaluation of the communications launch demonstrated substantial reach and engagement across the UK. While behavioural impact on bystander response cannot yet be quantified, this approach represents a structural mechanism for sustaining CPR awareness across successive

cohorts of new drivers, supporting long-term population readiness rather than one-off training effects.

Large-scale renewal and reinforcement of CPR skills has also been delivered through Restart a Heart Live (RSAH-Live), which continues to act as a focal point for coordinated national CPR education. RSAH-Live 2025 combined live-streamed instruction with supporting school and community activity, enabling over 130,000 participants across the UK to receive CPR and defibrillator familiarisation simultaneously. Beyond direct participation, RSAH-Live provides a national moment that refreshes confidence among those previously trained and offers a clear call to action for schools, families, and partner organisations.

Core SALFS activity continues to include oversight of the schools-based Heartstart programme, promotion of PAD registration and accessibility, and support for volunteer responder systems such as the GoodSAM responder app, and community cardiac responder schemes which enable CPR-aware volunteers to be alerted to nearby cardiac arrests and provide early assistance while ambulance resources are en route. Through its partnership model, SALFS enables alignment between national strategy and local delivery, helping to ensure that initiatives are complementary and focused on areas of greatest need.

These approaches illustrate how SALFS has progressed from a primary focus on training delivery towards a broader strategy that embeds CPR awareness into everyday systems and life transitions. This shift reflects an understanding that further gains in bystander CPR are likely to depend on maintaining visibility, normalisation, and repeated exposure to CPR concepts over time, alongside targeted local action in communities where uptake remains lower. The work of Save a Life for Scotland represents a core component of Scotland's system of care for OHCA, reinforcing the principle that effective response begins in the community and depends on sustained investment in readiness, confidence, and capability across the population.

GoodSAM

GoodSAM is a crowdsourcing platform used by most UK ambulance services. In Scotland we use the GoodSAM Responder smartphone app to alert registered volunteers to an OHCA near their location. A volunteer who chooses to attend can help perform CPR or fetch a defibrillator while an ambulance is en route. GoodSAM is an

effective mechanism for providing vital extra help in the crucial early minutes of a cardiac arrest. To support volunteers, welfare support is offered following the acceptance of an alert.

Figure 29 shows a wallet card advertising GoodSAM in Scotland. Scan the QR code for further information or to sign up. Requirements for volunteering are over 18 years old, photographic ID (e.g., drivers licence, passport), and either online or in-person CPR familiarisation.

In the reporting period from April 1st 2024 to March 31st 2025, 393 new users were registered on GoodSAM under the auspices of SAS; Figure 30 shows the cumulative number of sign-ups during this period. There are currently 2,805 users visible to SAS - this total includes those who signed up prior to April 2024. Additionally, there are a number of other volunteers who have registered directly with GoodSAM who may also be alerted to OHCA in Scotland.

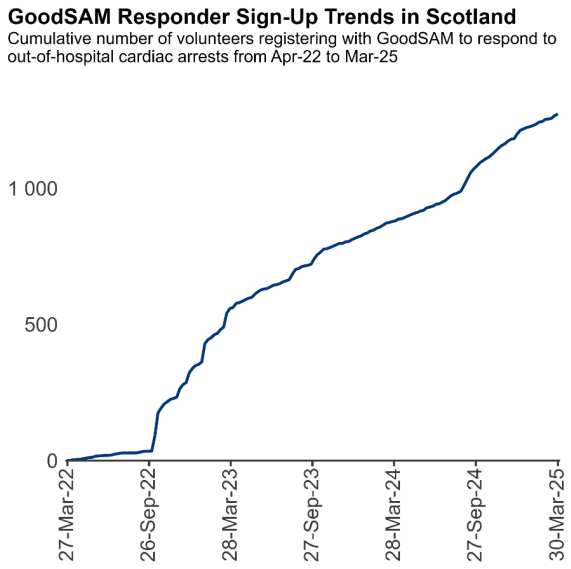


Figure 30 Shows the cumulative number of sign-ups to GoodSAM registered under the Scottish Ambulance Service from April 2022 to March 2025

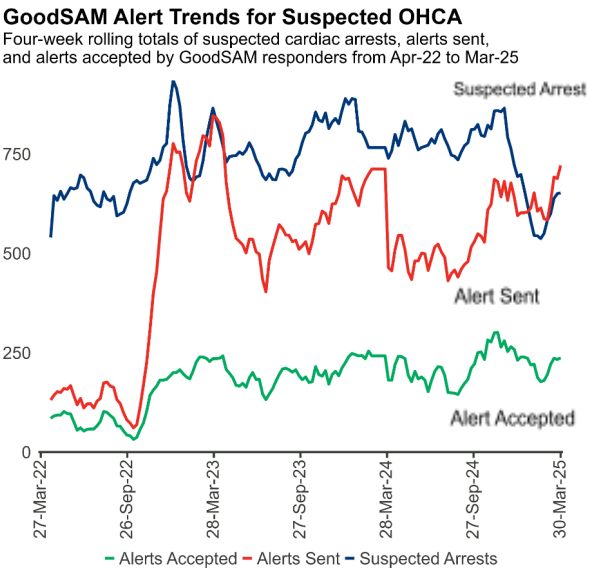


Figure 31 Shows the number of incidents initially coded as OHCA and the GoodSAM response. All lines are shown as a rolling 4 week average.

During 2024-25, 9,808 suspected OHCA calls triggered a GoodSAM alert with a total of 7,663 alerts being sent through the GoodSAM smartphone app (up to five responders per incident are alerted if they are within a radius of 500 metres). Of those alerts, 2,758 were accepted by a responder. Figure 31 shows the number of calls coded as suitable for GoodSAM by ambulance control (blue line). The number of volunteers on the system within 500 m of the incident who received an alert is shown by the red line (note, up to five alerts per incident may be sent if volunteers are available). The green line at the bottom of Figure 31 shows the number of volunteers who accepted the alert sent to their phone. It can be seen that as the number of volunteers registered on the system has increased (Figure 30) the likelihood of an available volunteer accepting an alert has risen modestly (Figure 31).

Crowdsourcing apps like GoodSAM are a great way to help communities to take care of each other, but their success is critically dependent on a high enough density of volunteers (Stieglis et al., 2020). Work continues to promote GoodSAM as a platform for alerting CPR-aware volunteers to a nearby OHCA.

Anyone who is CPR-aware can register through www.savealife.scot/goodsam or scan the QR code above in Figure 29. To learn how to do CPR see www.savealife.scot.

Bystander Aftercare

Every year in Scotland there are around 9,000 suspected OHCA in the community, and thousands of bystanders—most often family members, but also friends, or strangers—perform CPR before paramedics arrive. While this improves survival rates, bystanders can experience trauma, guilt or anxiety after the event. However, research shows that bystanders can benefit from support post event, including reassurance, debriefing, and information.

In November 2023, a pilot project funded by the Scottish Government was launched to provide telephone support to bystanders. This partnership between Chest Heart Stroke Scotland (CHSS), the Resuscitation Research Group at the University of Edinburgh, and the Scottish Ambulance Service involved CHSS advisors (trained healthcare professionals) providing telephone support as part of the CHSS standard advice line service. The service is promoted to bystanders by SAS handing out wallet cards at OHCA events.

In 2024, CHSS chose to continue to fund the service after the 6 month pilot ended. In 2025, an average of 15-20 calls were being received per month, with the majority of callers needing just the one phone call. Informal feedback from participants and CHSS advisors has been roundly positive and methods for further assessing the efficacy of the service are under development.

In May 2025, the Recovery After Cardiac Arrest meeting was held. Supported by CHSS, the meeting brought together the CHSS advisors, researchers, clinicians and third sector organisations to discuss bystander support in Scotland. In part to support the work of the CHSS line but also to identify future steps that may reduce the impact of participating in an OHCA on bystanders.

Conclusion

In 2024–25, 3,741 out-of-hospital cardiac arrests (OHCA) in Scotland received attempted resuscitation, continuing a gradual increase in the absolute number of worked arrests over the past decade. The proportion of arrests in which resuscitation was attempted has remained stable, indicating that this increase reflects a genuine rise in the burden of OHCA rather than a change in resuscitation thresholds.

Key outcome measures show sustained improvement compared with earlier years, although progress has plateaued in the period following the COVID-19 pandemic. Overall 30-day survival was 9.0%, remaining well above levels seen a decade ago but below the national ambition set out in Scotland's OHCA Strategy. Among patients presenting with a shockable initial rhythm, outcomes remain close to historic highs, with both survival and ROSC rates substantially improved compared with earlier reporting periods.

Process measures highlight both strengths and continuing constraints within the system of care. Bystander CPR rates remain consistently high and resilient, including through periods of significant system disruption. In contrast, public access defibrillator (PAD) use, while improved over time, remains inequitably distributed. Socioeconomic deprivation continues to exert a strong influence on both the incidence of OHCA and the likelihood of survival, with disparities in early defibrillation representing a key mechanism through which inequality is translated into poorer outcomes.

The data in this report underscore the central importance of early, community-based interventions in improving survival after OHCA. Continued progress will depend on strengthening community readiness, improving equitable access to defibrillation, expanding local responder capacity, and sustaining support for recovery and aftercare. As Scotland enters the final phase of its OHCA Strategy 2021–2026, coordinated action across emergency services, health, third sector partners, and communities remains essential to ensure that improvements in survival are both sustained and shared equitably across the population. The data also suggest that the next phase of improvement will be driven by interventions tailored to local need and context, rather than by applying the same solutions uniformly across Scotland.

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Appendix

Definitions of OHCA-related terminology

Term	How the term is used in this report
Worked arrests	'Worked arrests' are OHCA that have a cause which does not involve major physical trauma and where resuscitation was attempted by the Scottish Ambulance Service (SAS). This number forms the denominator for all subsequent outcome calculations unless otherwise specified. There are several reasons why SAS may not attempt resuscitation including obvious death (i.e., the patient shows obvious signs of having been dead for some time) or the confirmation that resuscitation was not the patient's wish (e.g., by the presence of a 'do not attempt CPR' order as part of an anticipatory care plan).
Initial heart rhythm	The initial heart rhythm recorded on the electrocardiogram (ECG) on arrival of SAS is important. A patient may have a shockable rhythm (i.e., ventricular fibrillation or ventricular tachycardia) which may be treatable by delivering an electric shock using a defibrillator, or non-shockable rhythm (i.e., asystole, pulseless ventricular activity, or bradycardia). The initial treatment and prognosis depend on the initial heart rhythm: survival is more likely for OHCA with a shockable initial rhythm.
30-day survival	The definition of 'survival' used in this report is survival to 30 days after the date of the OHCA. We have counted survival as the percentage of worked OHCA where patients were still alive at 30 days. Worked OHCA which were not linked to outcome data have been assumed to be deaths and included in the denominator when calculating survival rates.
30-day survivors per million	Reporting the number of 30-day survivors per million of the population is a useful measure which is not as dependent on rates of initiation of resuscitation. If we assume that the population of Scotland and the incidence of OHCA remain relatively stable, then monitoring the change in the absolute number of 30-day survivors per million is a more useful measure of the system of OHCA care than reporting changes in the

	proportion of patients who survive after resuscitation is attempted.
The Utstein Comparator	The Utstein templates aim to provide uniformity to OHCA data definitions. One element of this is the use of the 'Utstein Comparator group' (bystander-witnessed cardiac arrest with a shockable initial heart rhythm). We have referred to this group as 'patients with a shockable initial rhythm' in this report.
Return of Spontaneous Circulation (ROSC)	Definitions for ROSC vary. The Scottish Ambulance Service records ROSC if a patient with OHCA regains a palpable pulse during resuscitation which is sustained until arrival at the Emergency Department. This includes those patients who are successfully resuscitated by members of the public using Public Access Defibrillators before the arrival of the ambulance service. The proportion of worked OHCA with ROSC is sometimes referred to as 'survival to hospital' or 'number of hearts restarted'. ROSC does not equate to 30-day survival.
Bystander CPR	The bystander CPR rate is the proportion of worked OHCA where a member of the public ('bystander') is performing CPR when the ambulance crew arrive. Here the definition of CPR is whether any chest compressions were performed with or without rescue breaths.
Public Access Defibrillator (PAD)	A PAD is an Automated External Defibrillator (AED) which is available for use by the general public in case of OHCA emergencies. AEDs are used to automatically detect an abnormal cardiac rhythm and deliver a lifesaving shock to reset and restart the heart. PAD should be located in areas where they are likely to be available to treat OHCA, well signposted and registered so that the SAS can direct a bystander to fetch one in an emergency.
The Circuit - the National Defibrillator Network	The national defibrillator network also referred to as The Circuit, was developed by the British Heart Foundation and provides the NHS ambulance services with information about defibrillators across the UK so that after a cardiac arrest, they can be accessed quickly to help save lives. Registration on the Circuit makes PAD visible to the Scottish Ambulance Service and alerts emergency call handlers that there is a PAD near to an OHCA. To stay 'active' on the database the PAD must have a named individual ('guardian') responsible for regular checking to ensure the defibrillator is 'emergency ready' if needed.
System of care	The coordinated network of people, organisations, processes, and resources involved in prevention, recognition, response,

	treatment, recovery, and aftercare following out-of-hospital cardiac arrest.
Community readiness	The extent to which a community is prepared to respond effectively to out-of-hospital cardiac arrest, including public awareness, CPR skills, access to defibrillators, confidence to act, and availability of nearby responders.
Place-based approach	An approach that tailors interventions to local population need, geography, and context rather than applying identical measures uniformly across all areas.

Health Board Abbreviations

Abbreviation	Regional NHS Health Board
A&A	NHS Ayrshire & Arran
BO	NHS Borders
D&G	NHS Dumfries & Galloway
FI	NHS Fife
FV	NHS Forth Valley
GG&C	NHS Greater Glasgow & Clyde
GR	NHS Grampian
HI	NHS Highland
LA	NHS Lanarkshire
OR	NHS Orkney
LO	NHS Lothian
SH	NHS Shetland
TA	NHS Tayside
WI	NHS Western Isles

Glossary of Terms

ACC	Ambulance Control Centre
BHF	British Heart Foundation (www.bhf.org.uk)
Bystander	A lay person involved in assisting someone with OHCA
Cardiac arrest	A condition in which the heart suddenly stops pumping blood around the body
Chain of Survival	The sequence of events required for the best chance of survival after OHCA
CHI	Community Health Index (see https://www.nrscotland.gov.uk/glossary-of-terms)
COVID-19	Coronavirus disease (COVID-19): an infectious disease caused by the SARS-CoV-2 virus
CPR	Cardio-Pulmonary Resuscitation: chest compressions with or without rescue breaths delivered to a person who has suffered a cardiac arrest
Defibrillation	The administration of a controlled electric shock to the heart in order to reset a normal heart rhythm
ECG	An electrocardiogram (ECG) is a simple test used to check the heart's rhythm and electrical activity. Sensors attached to the skin detect the electrical signals produced by the heart each time it beats
GRA	Global Resuscitation Alliance (www.globalresuscitationalliance.org)
Health Board	Healthcare services in Scotland are the responsibility of 14 regional National Health Service (NHS) Boards that report to the Scottish Government. Health board areas are aligned with the area of each local authority that they serve.
Heart Attack	Damage caused by a clot in the arteries supplying blood to the heart muscle — requires emergency treatment in hospital
Non-shockable rhythm	Cardiac arrest may be accompanied by pulseless electrical activity or asystole — these are not treated with defibrillation
OHCA	Out-of-Hospital Cardiac Arrest
PAD	Public Access Defibrillators. AEDs (Automatic External Defibrillators) which are available in the community for use by the public before the arrival of the ambulance service.

Presenting Rhythm	The first ECG rhythm recorded at an OHCA.
ROSC	Return of Spontaneous Circulation. Here, we record ROSC if a patient with OHCA has a pulse on arrival in the Emergency Department.
RRG	Resuscitation Research Group at the Usher Institute in the University of Edinburgh (www.rrg.scot)
SAS	Scottish Ambulance Service (www.scottishambulance.com)
Save a Life for Scotland	SALFS is a campaign which brings together the work of a range of partners committed to saving lives by changing the way we think about OHCA in order to get Scotland CPR ready (www.savealife.scot)
Shockable heart rhythm	The heart rhythm in cardiac arrest may be Ventricular fibrillation or ventricular tachycardia — these are both treated by immediate delivery of an electric shock using a defibrillator
SIMD	Scottish Index of Multiple Deprivation. (https://www.nrscotland.gov.uk/glossary-of-terms#s)
SMR01	Standardised Mortality Ratio 01: a record of episodes of inpatient care
The Circuit	The National Defibrillator Network
UCD	Unscheduled Care Datamart
Utstein Template	Internationally recognised criteria for uniform reporting of cardiac arrest
Utstein Comparator	Bystander-witnessed cardiac arrests with a shockable initial heart rhythm
VF	Ventricular Fibrillation: a condition in which there is uncoordinated contraction of the heart muscle, which may be corrected by early defibrillation
Worked Arrests	'Worked arrests' are OHCA that have a cause which does not involve major physical trauma and where resuscitation was attempted by the Scottish Ambulance Service (SAS)

Data tables

Summary of worked OHCA by year

Measure	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
All Incidents	2675	3034	3021	3259	3137	3443	3541	3290	3359	3523	3835	3915	3752	3741
Incidents Matched	2329	2723	2704	2914	2849	3174	3287	3107	3201	3416	3700	3783	3639	3627
Data Linkage %	87.1%	89.7%	89.5%	89.4%	90.8%	92.2%	92.8%	94.4%	95.3%	97%	96.5%	96.6%	97%	97%
Bystander CPR	894	1139	1107	1276	1383	1570	1760	1853	1885	2091	2288	2306	2265	2239
Bystander CPR %	38.4%	41.8%	40.9%	43.8%	48.5%	49.5%	53.5%	59.6%	58.9%	61.2%	61.8%	61%	62.2%	61.7%
PAD Usage	70	67	56	74	86	107	128	171	231	202	267	332	375	354
PAD Usage %	3%	2.5%	2.1%	2.5%	3%	3.4%	3.9%	5.5%	7.2%	5.9%	7.2%	8.8%	10.3%	9.8%
ROSC	364	467	465	561	576	645	753	924	907	781	906	956	965	930
ROSC %	15.6%	17.2%	17.2%	19.3%	20.2%	20.3%	22.9%	29.7%	28.3%	22.9%	24.5%	25.3%	26.5%	25.6%
30 Day Survivors	191	227	229	253	238	289	290	360	322	239	333	310	361	338
30 Day Survival %	7.1%	7.5%	7.6%	7.8%	7.6%	8.4%	8.2%	10.9%	9.6%	6.8%	8.7%	7.9%	9.6%	9%

Patient Characteristics by year

Measure	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
Average Patient Age	66.3	66.6	65.6	66.6	66.4	65.4	65.8	64.9	64.6	63.8	64.9	65.2	64.1	64.8
Patient Age Standard Deviation	17.8	17.9	17.7	17.9	17.2	18.2	17.7	18	18.1	17.6	17	16.9	17.6	17.3
Shockable Rhythm %	26.9%	25.3%	25.9%	23%	24.1%	22.6%	23.5%	26.6%	24%	19.6%	20.6%	20.3%	20.4%	21.5%
Female %	37.2%	36.1%	36.6%	37.5%	37.3%	36.6%	35.8%	36.3%	37.2%	35.4%	34.3%	36.9%	35.2%	34.8%
Male %	62.8%	63.9%	63.4%	62.5%	62.7%	63.4%	64.2%	63.7%	62.8%	64.6%	65.7%	63.1%	64.8%	65.2%
Home Location %	68.5%	69.1%	69.5%	70.3%	71.5%	72.2%	73%	71.2%	73.6%	77.5%	73.7%	74.1%	71%	73.2%
SIMD - 1	26.3%	26.1%	27%	25.9%	26.7%	28%	27.3%	27.3%	28.8%	28%	27%	26.2%	25.8%	26%
SIMD - 2	25%	24.6%	22.8%	25.4%	24%	23%	22.9%	24.5%	24.2%	23.7%	24.2%	23%	22.9%	24.1%
SIMD - 3	18.4%	19.2%	19.6%	19.6%	18.9%	18.8%	20.2%	18.4%	18.9%	19%	19.5%	20.3%	20.4%	19.9%
SIMD - 4	16.4%	15.9%	17.4%	15.4%	16.3%	16.9%	16.1%	16.4%	14.4%	16%	15.6%	16.6%	16.2%	16.9%
SIMD - 5	13.8%	14.2%	13.1%	13.7%	14.1%	13.3%	13.4%	13.5%	13.7%	13.3%	13.7%	13.9%	14.7%	13.1%

30-day survival by health board, 2024-25

Health Board	Worked Arrests	30-day Survival	30-day Survival %	Survival per 100k
Ayrshire & Arran	319	21	6.6%	5.7
Borders	82	9	11%	7.7
Dumfries & Galloway	116	5	4.3%	3.4
Fife	285	19	6.7%	5.1
Forth Valley	201	23	11.4%	7.5
Grampian	363	42	11.6%	7.1
Greater Glasgow & Clyde	779	79	10.1%	6.5
Highland	223	22	9.9%	6.8
Lanarkshire	497	35	7%	5.2
Lothian	510	56	11%	6
Orkney, Shetland & Western Isles	39	4	10.3%	16.4
Tayside	289	20	6.9%	4.8

Proportion of worked arrests by SIMD

SIMD	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
SIMD - 1	26.3%	26.1%	27%	25.9%	26.7%	28%	27.3%	27.3%	28.8%	28%	27%	26.2%	25.8%	26%
SIMD - 2	25%	24.6%	22.8%	25.4%	24%	23%	22.9%	24.5%	24.2%	23.7%	24.2%	23%	22.9%	24.1%
SIMD - 3	18.4%	19.2%	19.6%	19.6%	18.9%	18.8%	20.2%	18.4%	18.9%	19%	19.5%	20.3%	20.4%	19.9%
SIMD - 4	16.4%	15.9%	17.4%	15.4%	16.3%	16.9%	16.1%	16.4%	14.4%	16%	15.6%	16.6%	16.2%	16.9%
SIMD - 5	13.8%	14.2%	13.1%	13.7%	14.1%	13.3%	13.4%	13.5%	13.7%	13.3%	13.7%	13.9%	14.7%	13.1%

30-day Survival by SIMD

SIMD	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
SIMD - 1	8.5%	6.6%	7.7%	7.1%	7.6%	7.8%	8.5%	9.3%	8.7%	6%	8.3%	7%	9.1%	8.9%
SIMD - 2	6.8%	8%	8.1%	9.1%	7.1%	7.6%	7.4%	11.2%	10.7%	7.5%	8.7%	6.8%	7.8%	7.3%
SIMD - 3	9.5%	9.1%	9.8%	10.1%	7.4%	9.6%	8.5%	12.3%	9.5%	5.2%	9.6%	9.6%	10.3%	9.5%
SIMD - 4	7.4%	10.3%	7.8%	8.1%	8.3%	10.8%	9.6%	11.8%	9%	7%	9%	7.4%	10.8%	9.6%
SIMD - 5	9.2%	9.2%	8.3%	8.1%	11.4%	10.3%	11%	14.7%	11.8%	10.6%	8.7%	11.1%	12.8%	11.9%

Bystander CPR by SIMD

SIMD	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
SIMD - 1	38.1%	39.7%	38.1%	42.6%	46.2%	46.7%	53.4%	58.4%	60.4%	60%	60.6%	60.7%	60.6%	61.5%
SIMD - 2	39.4%	38.9%	40.4%	42.9%	48.2%	49.8%	51.7%	60.5%	55.5%	61.8%	59.4%	61.3%	63.1%	59.5%
SIMD - 3	35.5%	44.2%	40.8%	47.8%	50.9%	50%	54.2%	58.7%	57.7%	62.8%	62.1%	60.1%	61.2%	64%
SIMD - 4	35.4%	47.2%	46.3%	41.2%	47.8%	52.2%	52.3%	61.1%	57.3%	61%	62.7%	60.2%	65.1%	61.3%
SIMD - 5	44.8%	41.1%	41.3%	45.2%	51.8%	49.9%	57.8%	59.7%	64.8%	61.3%	66.1%	62.2%	62.1%	63.3%

PAD Deployment by SIMD

SIMD	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
SIMD - 1	3.2%	1.9%	1.4%	1.9%	2.4%	3%	2.8%	4.3%	5.2%	3.7%	4.6%	5.8%	7%	7.6%
SIMD - 2	3%	2.1%	1.8%	2.7%	2.2%	3.2%	3.6%	3.5%	5.5%	5.6%	8.4%	6.8%	9.5%	9.8%
SIMD - 3	3.6%	2.9%	2.9%	2.7%	4.2%	4.8%	5.2%	5.5%	8.9%	7.3%	7.8%	10.6%	11.8%	9.3%
SIMD - 4	2.7%	2.3%	2.8%	2.5%	3.1%	3.8%	4.2%	7.2%	9.8%	9.2%	7.1%	13.2%	13%	10.9%
SIMD - 5	2.9%	3.4%	1.4%	3.6%	3.3%	1.9%	4.6%	9.4%	9.7%	5.5%	8.7%	9.4%	11.9%	12.1%

Number and Density of Registered PAD by Health Board

Health board	PAD number	Population (2021)	PAD/1000 pop[n]
Ayrshire and Arran	601	369,360	1.6
Borders	291	115,270	2.5
Dumfries and Galloway	415	148,860	2.8
Fife	472	373,550	1.3
Forth Valley	487	306,640	1.6
Grampian	1,313	586,150	2.2
Greater Glasgow and Clyde	1,125	1,063,960	1.1
Highland	1,211	238,190	5.1
Lanarkshire	660	661,900	1.0
Lothian	1,102	931,730	1.2
Orkney	96	22,390	4.3
Shetland	88	23,070	3.8
Tayside	723	417,470	1.7
Western Isles	139	26,330	5.3