Resuscitation Council UK

Epidemiology of cardiac arrest Guidelines

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Introduction

The European Resuscitation Council (ERC) Guidelines cover the epidemiology and outcomes of cardiac arrest across Europe. This section presents equivalent data drawn from UK studies of the epidemiology of cardiac arrest in the in-hospital and out-of-hospital settings.

Data sources

- Information on the epidemiology and outcomes of out-of-hospital cardiac arrest in England (up to 2024 at the time of writing) and Wales (2015-2021) is collected by the Out-of-Hospital Cardiac Arrest Outcomes (OHCAO) registry. The registry, which is funded by Resuscitation Council UK and the British Heart Foundation, works closely with the Association of Ambulance Chief Executives National Ambulance Medical Directors Group and National Ambulance Research Steering Group.
- Scottish Ambulance Service, on behalf of the Delivery Group for Scotland's Strategy for Out-of-Hospital Cardiac Arrest 2021-2026, produces an annual out-of-hospital cardiac arrest report.
- Representatives from Northern Ireland Ambulance Service have made data available for the chapter authors.
- The British Heart Foundation provided information about The Circuit.
- Information on the epidemiology and outcomes of in-hospital cardiac arrest are provided by the National Cardiac Arrest Audit. This is a joint initiative between Resuscitation Council UK and the Intensive Care National Audit and Research Centre (ICNARC). The National Cardiac Arrest Audit (NCAA) receives data from 186 hospitals across the UK, including from 22 paediatric centres (correct as of March 2024). Overall data for in-hospital cardiac arrest are presented for 2023-2024, and paediatric-specific data for in-hospital cardiac arrest are presented for 2019-2024.
- Data about Donation after Circulatory Death (DCD) were provided by NHS Blood and Transplant and the Organ Donation and Transplantation Activity Data report.
- Data about peri-operative cardiac arrests are provided by the Royal College of Anaesthetists National Audit Project 7 (NAP7) Report. Data were collected between June 2021 and June 2022.

Out-of-hospital cardiac arrest

Where available, we have reported data from all areas of the UK in the following date ranges (unless otherwise specified):

- England (2024)

- Wales (Oct 2015 – Mar 2021)
- Scotland (April 2023 – March 2024)
- Northern Ireland (Jan 2024 – March 2025)

Numbers

- There are approximately 115,000 out-of-hospital cardiac arrests reported to the ambulance services in the UK each year.
- NHS ambulance services attempt resuscitation in around 43,000 people each year in the UK.

Annual incidence

- England: 54 per 100,000 people
- Northern Ireland: 60 per 100,000 people
- Scotland: 68 per 100,000 people
- Wales: 92 per 100,000 people

Demographics

- Most (98%) of out-of-hospital cardiac arrests occur in adults
- 70-80% occur at home
- 60-65% occur in men
- 55-65% occur in those aged 65 or over
- Approximately 80% of out-of-hospital cardiac arrests are due to a cardiac cause.

Median ambulance response times

- England: 7.2 minutes
- Northern Ireland: 9.4 minutes
- Wales: 8.9 minutes

Initial rhythm shockable

- England: 21.7%
- Northern Ireland: 18.4%
- Scotland: 20.4%
- Wales: 15.5%

Bystander witnessed arrests

- England: 50.5%
- Wales: 45.7%

Bystander CPR rates

- England: 72.6%
- Northern Ireland: 41.5% (Jan-Mar 2025 data)
- Scotland: 62.6%
- Wales: 64.3%

Bystander AED use rates

- England: 9.0%
- Northern Ireland: 8.0% (Jan-Mar 2025 data)
- Scotland: 10.3%
- Wales: 8.4%

Return of spontaneous circulation – overall

- England: 27.0%
- Northern Ireland: 23.8%
- Scotland: 26.5%
- Wales: 13.2%

Return of spontaneous circulation – Utstein Comparator Group

- England: 50.3%
- Scotland: 56.5%
- Wales: 28.0%

30-day Survival – overall

- England: 9.5%
- Northern Ireland: 6.5%
- Scotland: 9.6%

30-day Survival – Utstein Comparator Group

- England: 29.0%
- Scotland: 29.6%

Longer-term and functional outcomes

- There is currently no routinely collected or reported information about neurological outcomes, long-term outcomes or other quality of life measures in survivors.

Measures of inequalities

In the UK, out-of-hospital cardiac arrest is not distributed evenly across the population, with marked social and regional inequalities. In England, out-of-hospital cardiac arrest ‘hot spots’, areas with incidence above 60.2 per 100,000 per year and bystander CPR rates below 78.7% (the national medians), are more likely to be urban, densely populated, and socioeconomically deprived. These neighbourhoods tend to have higher proportions of residents in routine occupations, fewer in managerial roles, more people from ethnic minority backgrounds, more born outside the UK, and overall higher levels of deprivation. Across ambulance service regions in England, the proportion of hot spots varies widely, ranging from 5.1% to 48.2%.

Similar patterns are seen in Scotland, where people living in the most deprived areas are almost twice as likely to experience an out-of-hospital cardiac arrest as those in the least deprived areas, yet are less likely to survive to 30 days. Access to public-access Automated External Defibrillators (AEDs) also shows inequalities: the density of registered AEDs varies from 1.0 to 5.3 per 1,000 people across health boards, and deployment rates of public-access AEDs decrease as deprivation increases, despite similar rates of bystander CPR.

These disparities highlight the impact of social determinants on cardiac arrest outcomes and the importance of targeted community interventions to improve equity in survival.

Paediatric out-of-hospital cardiac arrest

Paediatric cases make up a very small proportion of out-of-hospital cardiac arrests. Across the UK, there are approximately 750-800 out-of-hospital cardiac arrests where the ambulance service attempted resuscitation each year. Incidence was 5.0 per 100,000 children (0-18 years) in England, 6.0 per 100,000 children (0-18 years) in Wales, 5.6 per 100,000 children (0-18 years) in Northern Ireland and 6.6 per 100,000 people (0-19 years) in Scotland.

In England, 30-day survival was 13.2%.

The Circuit – the national Public-access AED registry

- The Circuit is the national registry of public-access AEDs and is available to 999 call handlers at the time of the emergency call.
- Members of the public can see circuit-registered AEDs at Defib Finder.
- By mid-June 2025, there were 108,584 AEDs registered, and there had been 218,493 deployments or attempted deployments of Circuit-registered AEDs.
- Information about whether or not these AEDs reached the scene of an out-of-hospital cardiac arrest or were used is not yet available.

In-hospital cardiac arrest

Incidence/numbers

- There were 0.9 cardiac arrests per 1,000 admissions
- There were 12,755 cardiac arrests overall (2023-2024), of which approximately 200 were in paediatric patients (1,016 in the 5-year period 2019-2024).

Demographics – overall

- 62.6% male
- 68.5 years mean age
- 16.1% in non-white ethnicities

Demographics – paediatrics

- 54.2% male
- 57.1% aged < 1 years
- 38.0% in non-white ethnicities

Arrest location – overall

- 20.6% on presentation to hospital
- 51.7% in a general in-hospital location
- 11.4% in a treatment area
- 16.3 % in critical care or coronary care

Arrest location – paediatrics

- 32.8% on presentation to hospital
- 31.9% in a general in-hospital location
- 7.2% in a treatment area
- 28.1% in critical care

Initial rhythm – overall

- VF/VT: 18.1%
- PEA: 52.0%
- Asystole: 19.9%
- (Other/unknown: 10.0%)

Initial rhythm – paediatrics

- VF/VT: 6.0%
- Bradycardia: 22.8%
- Asystole and PEA: 57.6%
- (Other/unknown: 13.7%)

Clinical outcomes – overall

- 52.1% had return of spontaneous circulation > 20 minutes: 75.8% if the initial rhythm was VF/VT, 49.2% if it was PEA, 30.7% if it was asystole.
- 25.8% survived to hospital discharge: 52.9% if the initial rhythm was VF/VT, 17.1% if it was PEA, 11.5% if it was asystole.
- There is currently no routinely collected or reported information about neurological outcomes, long-term outcomes or other quality of life measures in survivors.

Clinical outcomes – paediatrics

- 69.2% had return of spontaneous circulation > 20 minutes: 78.1% if the initial rhythm was VF/VT, 89.4% if it was a bradycardia, 56.7% if it was all other non-shockable rhythms.
- 54.2% survived to hospital discharge: 62.1% if the initial rhythm was VF/VT, 74.7% if it was a bradycardia, 38.0% if it was all other non-shockable rhythms
- There is currently no routinely collected or reported information about neurological outcomes, long-term outcomes or other quality of life measures in survivors.

Withdrawal of Life Sustaining Treatment (WLST)

Among 28,438 out-of-hospital cardiac arrest patients admitted to 204 UK ICUs during 2010–2017, 10,775 (37.9%) had WLST, and of these, 59.4% occurred within 72 h of ICU admission.

Organ donation after death

- Organ donation from deceased patients can be either by Donation after Brain Death (DBD) or by Donation after Circulatory Death (DCD). DCD can be controlled (i.e. after planned withdrawal of life-sustaining treatment) or uncontrolled (after unexpected cardiac arrest where resuscitation was not successful or not indicated).
- In 2024-25, there were 1404 deceased donors, of which 728 were DCD donors and 676 were DBD donors. The average number of transplantable organs retrieved is 2.9 from DCD and 3.6 from DBD. For comparison, there were 969 living donors.
- As of 31 March 2025, there were 8,085 people on the waiting list for an organ transplant, a figure that rose from 4,248 on 31 March 2021.

Peri-operative cardiac arrest

- Incidence of peri-operative cardiac arrest is approximately 1 in 3,000 anaesthetics. This was around 1 in 8,000 anaesthetics in ASA 1-2 patients, and 1 in 1,200 anaesthetics in older, frailer patients (defined as age > 65 years and clinical frailty score > 5).
- 88% of peri-operative cardiac arrests occurred in adults.
- 2.8% of perioperative cardiac arrests occurred in the Emergency Department.
- The most common causes of peri-operative cardiac arrest were major haemorrhage (17%), bradyarrhythmia (9.4%) and cardiac ischaemia (7.3%).
- 56% patients were male.
- Median age was 60.5 years
- The ethnicity of patients having a peri-operative cardiac arrest was similar overall and across age groups to the general population, with no differences noted in the care provided to white and non-white patients.
- 74% were ASA 3-5.
- 60% were having major or complex surgery.

- 82% of initial rhythms during peri-operative cardiac arrest were non-shockable – PEA was the most common rhythm.
- 75% of patients survived the event, and 44% left the hospital alive, of whom 88% had a favourable neurological outcome.

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