OUT-OF-HOSPITAL CARDIAC ARREST REGISTRY

Summary Report
2024/25

WELLINGTON FREE AMBULANCE
kia ora te tangata

CONTENTS

Quality Improvement and Innovation
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BARRY'S STORY OF SURVIVAL

Barry and his wife had just returned to Wellington after visiting family in Christchurch. As they walked through the airport terminal, Barry suddenly collapsed. His wife called out for help and a bystander immediately dialled 111.

Air New Zealand crew quickly grabbed the nearby defibrillator while airport operations staff started CPR right away. Paramedics arrived at the scene within minutes. The team delivered multiple electric shocks, around 28 in total, to try and restart Barry's heart.

A critical care paramedic then arrived with a LUCAS CPR machine, which took over chest compressions so the team could focus on advanced treatment. Barry was intubated and put into a coma to stabilise his heart rhythm. Even in the ambulance, Barry suffered another cardiac arrest, requiring further shocks.

The paramedics worked tirelessly for about two hours on scene before transporting him to hospital, setting up privacy screens and continuing treatment during the journey. Barry credits their skill and quick action with saving his life.

LLOYD MORRISON FOUNDATION HEARTBEAT COMMUNITY CPR TRAINING

When Barry woke up in hospital, he remembers one of the paramedics standing beside his bed, keen to see how he was doing. "They had invested so much in getting me back, and their ongoing care was incredible," Barry says.

In hospital, Barry spent several weeks recovering and underwent a quadruple bypass surgery. Since then, he has met the paramedics who cared for him, finding it healing to learn exactly what happened.

Barry and his family have since completed CPR training. "I encourage everyone to learn CPR and AED use, these skills and the paramedics' response made all the difference for me," he says.

ABOUT THIS REPORT

Cardiac arrest remains a considerable public health issue, with ischaemic heart disease being the second most prevalent cause of death in New Zealand.

Internationally, survival rates following out-of-hospital cardiac arrest (OHCA) are highly variable and can range from less than 6% to greater than 50%. Benchmarking survival from OHCA is a key measure of the clinical quality of an Emergency Ambulance Service (EAS) and is fundamental to making improvements in OHCA survival. Knowledge of New Zealand OHCA outcomes is a key driver to help identify and address areas for improvement in clinical care.

The data presented in this report is for all OHCA attended by Wellington Free Ambulance EAS in the period from 1 July 2024 to 30 June 2025.

The data presented in this report primarily relates to events that were either 'attended' or where there was a 'resuscitation attempted' by EAS personnel. 'Attended' refers to all OHCA where EAS personnel arrived at the scene regardless of whether or not a resuscitation attempt was made. 'Resuscitation attempted' refers only to those events where an attempt at resuscitation was made by EAS personnel or successful defibrillation occurred prior to EAS arrival.

Unless otherwise stated, all analyses exclude cardiac arrests witnessed by EAS personnel.

Unless otherwise stated, survival refers to survival to 30 days post cardiac arrest.

EXECUTIVE SUMMARY

274 PEOPLE

were treated for an out-of-hospital cardiac arrest by Wellington Free Ambulance

Median age (years)

- **58** Pacific peoples
- **61** Māori
- **68** Non-Māori/ Non-Pacific peoples

67% male

69% of cardiac arrests occurred at home

82% of witnessed OHCA received bystander CPR (73% when unwitnessed OHCA included)

7% received defibrillation by a Community Responder prior to ambulance arrival

48% of incidents accepted by at least one GoodSAM responder

The median time in which a dispatched responder reached a patient was **8 minutes** in urban communities and **8 minutes** in rural and remote communities[A]

95% of events were co-responded to and attended by Fire and Emergency New Zealand

27% of patients survived the event (had a pulse on arrival at hospital)

15% of patients survived to 30 days (39% survival in the Utstein comparator group)

All events, adult, resuscitation attempted: includes adults (≥ 15 years old), all-cause, resuscitation attempted. Excludes children, and EAS personnel witnessed events.

A A dispatched responder includes EAS ambulance and FENZ.

BENCHMARKING EXECUTIVE SUMMARY

Key figures for all-cause events

Table 1: Key figures for all-cause events [A]

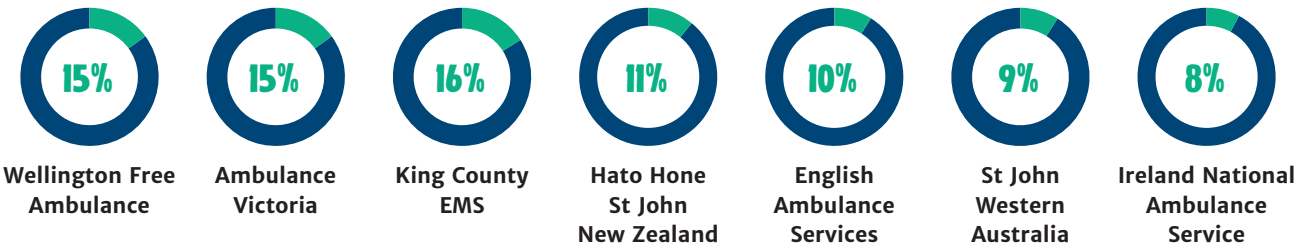
Year	Total number events	% Bystander CPR	% Community Responder AED use	Urban median response time	Rural & remote median response time	% Attended by Fire & Emergency New Zealand	% ROSC on handover	% Survival
2019/20	209	77	6	9	14	94	32	16
2020/21	217	71	4	8	14	97	28	10
2021/22	234	77	7	8	10	97	26	10
2022/23	258	78	7	9	10	93	27	14
2023/24	244	76	9	8	9	95	26	15
2024/25	274	73	7	8	8	95	27	15

Benchmarking (all-cause events)

The outcomes of OHCA for international benchmarking compare rates of ROSC sustained to hospital handover and survival. This group requires that the following criteria be met: includes adults (≥ 15 years old), all-cause, resuscitation attempted. Excludes children, and EAS personnel witnessed events.

Table 2: Benchmarking survival outcomes for all-cause events[A,B,C,D,E]

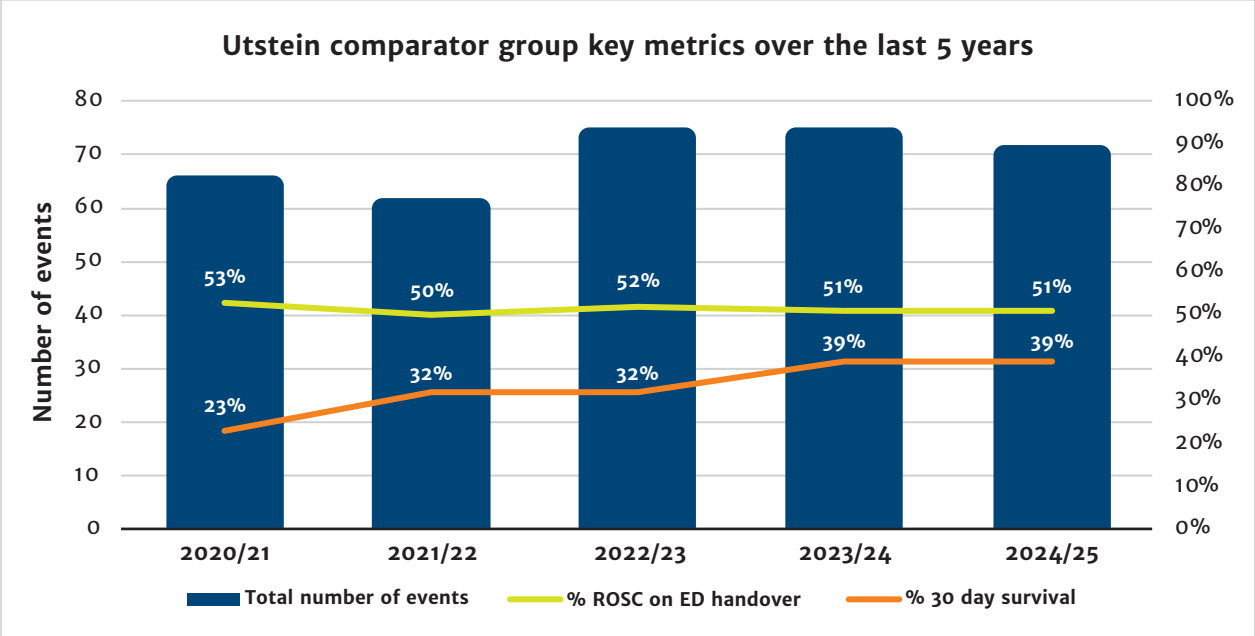
Ambulance Service	Collection period	Total number events	% ROSC on handover	% Survival[B]
King County EMS	1 July 2024 to 30 June 2025	973	45%	16%
Wellington Free Ambulance	1 July 2024 to 30 June 2025	274	27%	15%
Ambulance Victoria	1 July 2024 to 30 June 2025	2,192	33%	15%
Hato Hone St John New Zealand	1 July 2024 to 30 June 2025	2,192	23%	11%
English Ambulance Services	1 January 2024 to 31 December 2024	29,241	27%	10%
St John Western Australia	1 July 2024 to 30 June 2025	1,130	20%	9%
Ireland National Ambulance Service	1 January 2024 to 31 December 2024	2,885	18%	8%



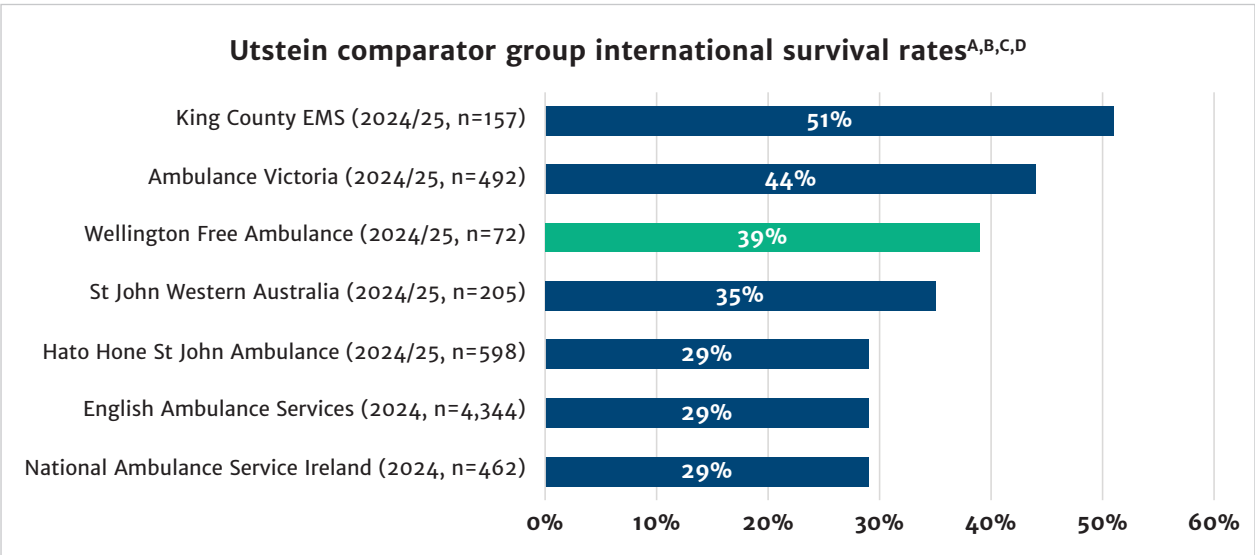
A **All events, adult, resuscitation attempted:** includes adults (≥ 15 years old), all-cause, resuscitation attempted. Excludes children, and EAS personnel witnessed events.
B Wellington Free Ambulance, Hato Hone St John New Zealand, English Ambulance Services and St John Western Australia report on survival to 30-days, all other services report survival to hospital discharge.
C Ireland National Ambulance Service and English Ambulance Services report on all ages.
D Ireland National Ambulance Service and English Ambulance Services include EAS witnessed events.

Utstein Comparator Group[A]

One important international comparison uses a carefully standardised subgroup of patients known as the 'Utstein Comparator Group'. This subgroup requires that the following criteria be met: includes adults (≥15 years old), all-cause, resuscitation attempted, shockable presenting rhythm and bystander witnessed. Excludes children, EAS witnessed and no resuscitation attempt.



The chart below compares the Wellington Free Ambulance Utstein comparator group survival rate with that of other ambulance services.



A **Utstein Comparator Group:** includes adults (≥ 15 years old), all-cause, resuscitation attempted, shockable presenting rhythm and bystander witnessed. Excludes children, EAS witnessed and no resuscitation attempt.
B Wellington Free Ambulance, Hato Hone St John New Zealand, English Ambulance Services, and St John Western Australia report on survival to 30-days, all other services report survival to hospital discharge.
C Ireland National Ambulance Service reports patients ≥17 years old. English Ambulance Services report on all ages.
D King County EMS exclude cardiac arrests with penetrating or blunt trauma mechanisms.

APPENDICES

THE OUT-OF-HOSPITAL CARDIAC ARREST REGISTRY

In 2019, the Hato Hone St John and Wellington Free OHCA Registries were merged to create a National OHCA Registry. In 2022, the National OHCA Registry was further integrated into the Aotearoa New Zealand Paramedic Care Collection (ANZPaCC) database. ANZPaCC includes all routinely collected clinical data from the electronic Patient Report Form (ePRF) for patients attended by road emergency medical services. It is co-governed by Hato Hone St John and Wellington Free Ambulance.

Analysis is conducted in collaboration with Wellington Free Ambulance by Hato Hone St John Clinical Evaluation, Research, and Insights investigators Heather Hutchinson and Sarah Maessen, along with Auckland University of Technology's ANZPaCC Principal Investigator Bridget Dicker.

Eligibility

Wellington Free Ambulance captures data on all OHCA events attended by the EAS. A cardiac arrest is defined as a patient who is unconscious and pulseless with either agonal breathing or no breathing.

Inclusion and exclusion criteria are described in Table A1 and Table A2.

Data capture

The data is collated in the registry using a reporting template based on international definitions outlined in the Utstein style of reporting and the variables developed by the Australasian Resuscitation Outcomes Consortium (Aus-ROC).

In the data collection process there are three separate points where data is acquired:

- Computer Aided Dispatch (CAD) and supporting systems.
- On scene by the EAS personnel in attendance.
- Mortality data from the New Zealand National Health Index (NHI) records.

Computer aided dispatch

Patient and event details are collected by the Ambulance Communications Centre when a 111 call is received and an ambulance is dispatched, with data being entered into the CAD system. Data specifically related to cardiac arrest is obtained from the CAD system and transferred into the OHCA Registry.

Table A1: Inclusion criteria (all of the following).

1	Patients of all ages who suffer a documented cardiac arrest
2	Occurs in New Zealand where Wellington Free Ambulance or one of its participating co-responders is the primary treatment provider
3	• Patients of all ages who on arrival of the EAS are unconscious and pulseless with either agonal breathing or no breathing or • Patients of all ages who become unconscious and pulseless with either agonal breathing or no breathing in the presence of EAS personnel or • Patients who have a pulse on arrival of EAS personnel following successful bystander defibrillation.

Table A2: Exclusion criteria (any of the following).

1	Patients who suffer a cardiac arrest in a hospital facility where EAS may be in attendance but are not the primary treatment providers
2	Patients who suffer a cardiac arrest during an inter-hospital transfer where EAS may be providing transport but are not the primary treatment providers
3	Bystander suspected cardiac arrest where the patient is not in cardiac arrest on arrival of the EAS personnel, and where defibrillation did not occur prior to ambulance arrival or no other evidence verifying a cardiac arrest state is present
4	Patients who suffer a cardiac arrest where Hato Hone St John is the primary treatment provider

On scene collection

Ambulance officers on scene attending a patient in cardiac arrest are required to record specific data. This is recorded on an electronic Patient Report Form (ePRF) and submitted electronically to a secure server.

NHI patient outcome data

The patient's NHI is collected by EAS personnel on scene or at hospital handover. If the NHI was not available at the time of the event then the NHI is determined by cross-reference of the patient's date of birth and name to the NHI database.

The date of death is updated by the Manatū Hauora Ministry of Health identity data management team after matching NHI identity with the official death registrations on a monthly basis.

Data quality

The registry undergoes continuous quality-assurance processes, including systematic auditing and the revision of existing records when new, corrected, or previously unavailable information becomes accessible. As a consequence of these ongoing data-validation activities, annual datasets may demonstrate variance attributable to methodological updates rather than genuine changes in clinical or operational performance. Accordingly, figures presented in this report may differ from those published in prior years, reflecting enhancements in data completeness and accuracy rather than substantive shifts in outcomes.

Ethical review

The OHCA Registry has been approved by the New Zealand Health and Disability Ethics Committee (Aotearoa New Zealand. Paramedic Care Collection (ANZPaCC), 13415).

The registry is also subject to EAS internal research governance processes that include a locality review and locality authorisation as per the Standard Operating Procedures for Health and Disability Ethics Committees.

The OHCA Registry is held on a secure server which requires active directory permissions. At no stage is data that could identify individual patients or individual hospitals publicly released from this registry.

OHCA flowchart for system effectiveness (attempted resuscitation, all ages, includes EAS witnessed)[A]

Population served	
546,300	
Cardiac arrest attended	**Cardiac arrest not treated**
644	**DNAR** 61
	Futile 255
Cardiac arrest treated	
328	

Patient characteristics	
Male sex	214 (1 unknown)
Initial shockable rhythm	106 (5 unknown)
Medical aetiology	292
Witnessed by bystander	149
Witnessed by EAS	48
Bystander CPR	205
Public location	75

Patient outcomes	
Any ROSC	140
Survived event	97
Survival to 30 days	56 (2 unknown)

OHCA flowchart for system effectiveness (Utstein comparator, includes all ages)[A]

Population served	
546,300	
Cardiac arrest attended	**Cardiac arrest not treated**
644	**DNAR** 61
	Futile 255
Cardiac arrest treated	
328	
Bystander witnessed	**Other witness**
149	**Not witnessed** 131
	EAS witnessed 48
Initial shockable rhythm	**Initial non-shockable rhythms**
72	**Asystole** 47
	PEA 23
	Non shockable 6
	Unknown 1

Patient outcomes	
Any ROSC	46
Survived event	37
Survival to 30 days	27 (2 unknown)

A Flowchart template reference: Grasner et al, 2024.

ABBREVIATIONS

AED	Automated external defibrillator	**EMS**	Emergency medical services
CAD	Computer aided dispatch	**FENZ**	Fire and Emergency New Zealand
CPR	Cardiopulmonary resuscitation	**GoodSAM**	Good Smartphone Activated Medics
DNAR	Do not attempt resuscitation order	**OHCA**	Out-of-hospital cardiac arrest
EAS	Emergency ambulance service	**ROSC**	Return of spontaneous circulation

GLOSSARY OF TERMS

Adult	Patients aged 15 years or older.
Children	Patients aged less than 15 years.
Community responder	A member of the community who is not part of the EAS service who provides assistance at an OHCA event. For example, a member of the public, or an off duty ambulance officer or an off duty doctor or nurse.
EAS attended	This is the population of all patients following cardiac arrest where EAS personnel attended regardless of whether emergency treatment was provided.
EAS personnel	Emergency ambulance crews dispatched to a medical emergency.
Presumed cardiac aetiology	An OHCA is presumed to be of cardiac aetiology, unless it is known or likely to have been caused by trauma, drowning, poisoning or any other non-cardiac cause.
Resuscitation attempted	Performance of chest compressions (or other emergency care for cardiac arrests secondary to trauma) by responding EAS personnel, or the delivery of a shock at any time (including before ambulance arrival).
Return of spontaneous circulation	The patient shows clear signs of life in the absence of chest compressions for more than 30 seconds. Signs of life include any of the following: normal breathing, palpable pulse, increasing end tidal CO_2 or active movement.
Rural and remote service area	Assigned according to the Geographic Classification for Health. Rural includes: R1, R2 and R3.
Shockable rhythm	Ventricular fibrillation, ventricular tachycardia or unknown shockable (AED).
Specific rates	Rates for specific segments/groups of the population (e.g. sex, age, ethnicity).

Survival to 30-days	The patient is alive at 30-days post-OHCA event.
Survived event	The patient has sustained ROSC to handover at hospital.
Urban area	Assigned according to the Geographic Classification for Health. Urban includes: U1 and U2.
Witnessed event	A witnessed cardiac arrest is one that is seen or heard by another person.

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