

Out-of-Hospital Cardiac Arrest Registry

2024



NSW Ambulance





NSW Ambulance acknowledges that Aboriginal and Torres Strait Islander people are the First People and Traditional Custodians of Australia, and the oldest continuing culture in human history.

We pay respect to Elders past, present and emerging and commit to respecting the lands we walk on, and the communities we walk with.

We celebrate the deep and enduring connection of Aboriginal and Torres Strait Islander people to Country and acknowledge their continuing custodianship of the land, seas, and sky.

We acknowledge the ongoing stewardship of Aboriginal and Torres Strait Islander people, and the important contribution they make to our communities and economies.

We reflect on the continuing impact of government policies and practices and recognise our responsibility to work together with and for Aboriginal and Torres Strait Islander people, families, and communities, towards improved health, economic, social, and cultural outcomes.

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The NSW Ambulance Out-of-Hospital Cardiac Arrest Registry represents a rich and valuable resource to inform understanding of cardiac arrest in NSW. Researchers interesting in working with NSW Ambulance should approach the Research Office in the first instance.

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This report from the NSW Ambulance Cardiac Arrest Registry is a quality assurance activity designed to assist NSW Ambulance in improving clinical outcomes for an important group of acutely ill patients.



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Introduction



Clare Beech ASM
*Interim Chief Executive,
NSW Ambulance*

The New South Wales Ambulance Out-of-Hospital Cardiac Arrest (OHCA) Report for 2024 tells a story of improving survival across our communities, increasing action by community members to give CPR for neighbours and people nearby, and increased delivery of early defibrillation by members of the public.

OHCA remains a significant public health problem, one which this report illustrates disproportionately affects people in rural and regional areas. However, in 2024, of 3,514 arrests where NSW Ambulance clinicians attempted resuscitation or the patient achieved ROSC prior to NSW Ambulance arrival, the 30-day survival rate was 13.1%, representing 458 people returning to their family and community. This is the highest recorded survival rate since our registry commenced in 2017.

Our experience continues to support the view that early CPR and defibrillation are the most important factors in enabling people who could survive to do so, while we also continue our work to improve every aspect of Cardiac Arrest care. In 2024 more than 3,600 people provided CPR for a person in need. Overall, 180 people received defibrillation from a public access defibrillator – 13 more people than in 2023. Of these patients nearly half (45%) survived.

2024 was the first full year of our GoodSAM Cardiac Responder program, and by the end of 2024 more than 9,000 people had signed up to give CPR to a person nearby. Of the 458 people who

survived, 40 of them received CPR or defibrillation from a neighbour alerted by GoodSAM. Minister for Health, the Hon Ryan Park said “Signing up as a GoodSAM volunteer will lead to more lives being saved, as with more volunteers we can increase the odds that someone near can perform simple chest compressions in the first few minutes while paramedics arrive and help save a life.”

There is more work for us to do to increase the number of people who provide CPR or defibrillation for a neighbour, and in this report, we identify important differences in CPR rates between regions, and between men and women.

Throughout 2024, paramedics continued to focus on High Performance CPR during training, additional Intensive Care Paramedics with advanced skills were added to our workforce across NSW, and we completed rollout of our new enhanced monitor-defibrillators to all NSW Ambulances.

We also continued our work to contribute to wider resuscitation science with the EVIDENCE randomised controlled study of expedited hospital care vs standard care completing recruitment during 2024, and the PRECARE study publishing important work regarding the feasibility of pre-hospital Extracorporeal Life Support.

Our organisation remains committed to the mission of improving survival from Cardiac Arrest, continuing to seek every opportunity to give anyone who could survive the best chance to do so.



2024 characteristics and outcomes



3,514

resuscitations attempted
an average of 10 EMS
resuscitation attempts per day



10 mins

median response time
state-wide
(Bystander-witnessed OHCA)



458

patients alive 30 days after
the event (13.1% of total
resuscitation attempts +
ROSC before arrival)

10,625

cardiac arrest patients
attended across NSW.
Highest number of all
Australian States and
Territories



35%

Female
median age 75



65%

Male
median age 68



92.9%

of EMS-attempted
resuscitations
received the highest
response category (1A)



99.3%

received a lights and
sirens response



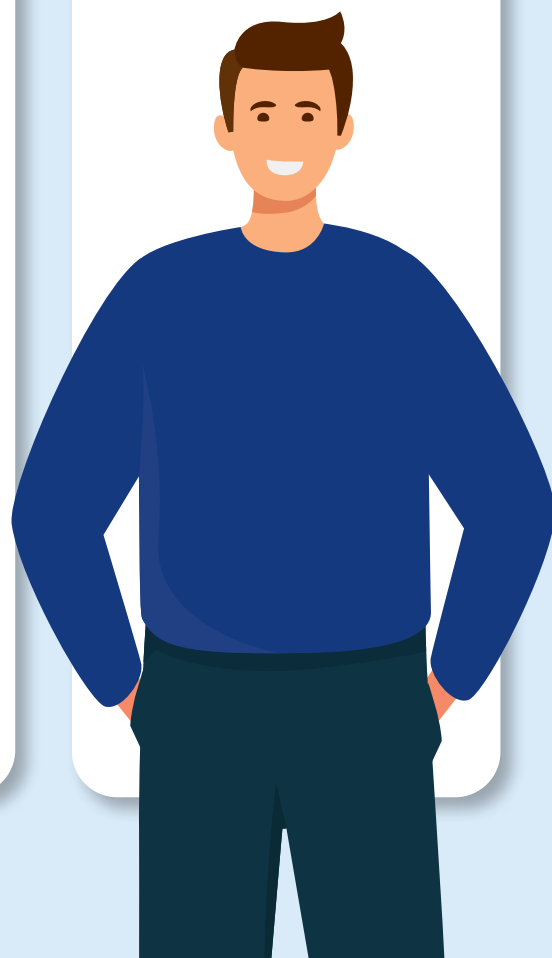
3 mins

median time from arrival at
patient to delivery of first
shock (excl. paramedic
witnessed arrests)

31.2%

of the Utstein patient
subgroup were alive 30 days
after the event

*Utstein subgroup: EMS-treated,
bystander-witnessed arrest,
shockable initial rhythm, of
presumed cardiac aetiology.





57.7%

Bystander-witnessed cardiac arrests who received bystander CPR*

180

Patients defibrillated by a bystander using an AED*

84.6%

Bystander-witnessed EMS-treated arrests who received **bystander CPR** (excl. paramedic-witnessed arrests)**

25.5%

Patients who received **bystander CPR** had an initial shockable rhythm (excl. paramedic-witnessed arrests)**



13.0%

Patients with **no bystander CPR** had an initial shockable rhythm (excl. paramedic-witnessed arrests)**

Survival was significantly higher when first shocked with an AED prior to paramedic arrival (36.2% shocked vs 6.4% not shocked) (excl. paramedic-witnessed)*

45.0%

Patients survived when **first shocked by an AED*** prior to paramedic arrival*

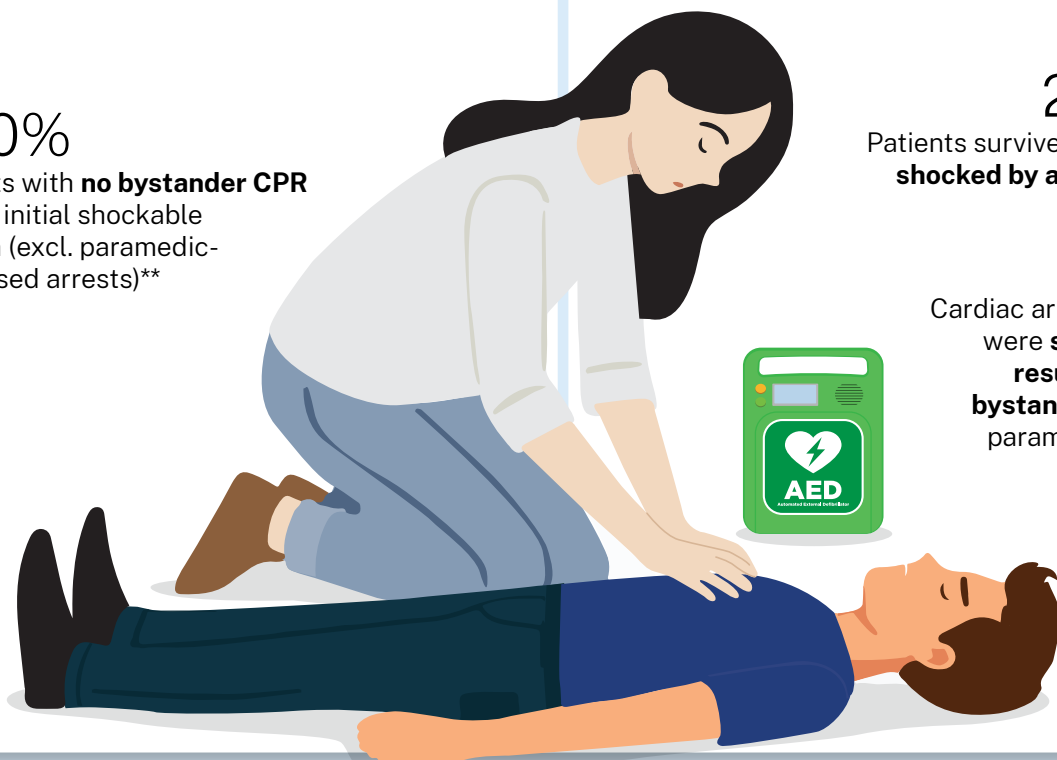


24.4%

Patients survived when **first shocked by a paramedic***

73

Cardiac arrest patients were **successfully resuscitated by bystanders** prior to paramedic arrival*



*All cardiac arrest patients attended across NSW. ** EMS-resuscitation attempted.

Executive summary

NSW Ambulance attended 10,625 OHCA events in the period 1 January 2024 to 31 December 2024, with 98.7% involving adults. Our mobile health service treated 3,514 OHCA events, averaging approximately 9.6 patient resuscitations per day (33.1% of all OHCA events). The crude incidence of OHCA was considerably lower in metropolitan NSW when compared to non-metropolitan NSW (102 and 158 per 100,000 population, respectively). The age-adjusted state-wide incidence of OHCA was 99 events per 100,000 population.

Patient demographics in 2024 were similar to previous years. Males accounted for 65.1% of OHCA cases and were generally younger than female patients (68 years and 75 years, respectively). Most OHCA events occurred in private residences (77.9%). OHCA events due to a presumed medical cause accounted for 87.0% of all adult EMS-attended patients, and 63.5% in children.

The rate of bystander CPR in bystander-witnessed OHCA events receiving EMS resuscitation was 84.6%, a 2.4% increase of that observed in 2023. Community members applied a public Automated External Defibrillator (AED) to the patient in 392 cases (3.7% of all OHCA patients), with 180 patients receiving an AED shock.

The median state-wide response time* to bystander witnessed OHCA was 10 minutes. The median response time to bystander witnessed OHCA in Greater Sydney & Central Coast (SA4 regions) was 9 minutes, and for the Rest of NSW (SA4 regions) the median response time was 12 minutes.

For the 3,587 OHCA that were EMS-treated or achieved Return of Spontaneous Circulation (ROSC) before NSW Ambulance arrival, the 30-day survival rate was 13.1%. Males had a higher 30-day survival rate (14.8%) when compared to females (9.5%). Patients in this cohort presenting in a shockable initial rhythm had a 30-day survival rate of 37.1%, whereas patients presenting in non-shockable rhythms had the poorest survival outcomes (pulseless electrical activity 7.6%; asystole 1.4%).

The highest 30-day survival rates were observed in patients whom, due to the life-saving actions of community members, achieved ROSC before NSW Ambulance arrival (87.3%). For the Utstein comparator group, the 30-day survival rate was 31.2%, up 2.4% from that observed in 2023, and continuing the positive trend of the last few years.



*NSW Ambulance response times were previously reported per the EMS-treated (excluding paramedic-witnessed) cohort/denominator. From 2022, the bystander-witnessed cohort/denominator was used. As a result, all median response times are notably higher than that reported in years prior to 2022.



About this report

The data presented in this report are for all OHCA attended by NSW Ambulance in the period from 1 January 2024 to 31 December 2024. This report comprises line level incidence, prognostic and treatment data from the NSW Ambulance Out-of-Hospital Cardiac Arrest Clinical Quality Registry and patient outcomes data.

Survival to 30-day outcomes for OHCA are obtained through data linkage (NSW Population and Health Service Research Ethics Committee; 2019/ETH00229) of registry data to the NSW Health Emergency Department Data Collection (EDDC) and the Admitted Patient Data Collection (APDC) in order to overcome Register of Births Deaths and Marriages (RBDM) linkage limitations owing to missing patient identifiers. Reporting survival to 30 days, rather than survival to discharge, allows for assessment of the effectiveness of acute interventions and treatments, accounting for potential complications or rehospitalisations that may occur after discharge. Unless otherwise stated, data analysis excludes EMS witnessed cardiac arrests; survival refers to 30-day survival after the cardiac arrest; and percentages in commentary are rounded to one decimal place, with missing cases excluded from calculations.

Analyses in this report are based on 4 patient cohorts:

1. **EMS resuscitations:** NSW Ambulance clinicians initiate or continue resuscitation efforts with the aim of reversing cardiac arrest.
2. **ROSC before NSW Ambulance arrival:** Patients who were successfully resuscitated by bystanders before arrival of NSW Ambulance clinicians.
3. **EMS-witnessed cardiac arrests:** NSW Ambulance clinicians have witnessed the cardiac arrest.
4. **All OHCA attended:** All OHCA patients attended by NSW Ambulance, including those deemed not to be viable for resuscitation. This group is used primarily only for demographic description of the cardiac arrest population.

Population data is derived utilising Statistical Area Level 4 (SA4), which are geographical areas built from whole Statistical Areas Level 3 (SA3s). The SA4 regions are the largest sub-State regions in the Main Structure of the Australian Statistical Geography Standard (ASGS) and have been designed for the output of a variety of regional data¹. In this report, “Metropolitan NSW” is determined as Greater Sydney and Central Coast SA4 regions, while “Non-metropolitan NSW” is all other SA4 regions (referred to as Rest of NSW).

The 2024 linked data supplied by the NSW Centre for Health Record Linkage was enhanced by inclusion of private hospital admission data. Inclusion of this data allowed positive matching of more admitted patients and resulted in a 13.5% reduction in unknown outcomes for 30-day survival.



Community heroes saving lives

When every second counts

November 26 started off as just another normal morning at Terminal 1 in Sydney Airport's international departure area.

Ferdinand Diocales, his wife and son were at the airport on their way home to the Philippines. They had been visiting his brother Ronald and his wife Quyen who had brought them to the airport.

The morning took an unexpected turn when, before checking in, Ferdinand went to find a toilet. By the time the family realised he hadn't returned and went looking for him, Ferdinand had gone into cardiac arrest nearby.

Dane Henderson, who works for the Australian Federal Police at Sydney Airport, was on duty when he got a GoodSAM notification on his phone. He'd recently joined the program.

"I found out about the GoodSAM app when NSW Ambulance was promoting it in Martin Place. I downloaded it and got approved," Dane said.

"I was with my colleagues in the AFP station, which is just across the road from Terminal 1. My colleague and I ran over to the terminal and found the patient, who was in cardiac arrest, in front of one of the cafes."

"One of the café staff and a customer had already started CPR and defib, using an airport defib, which was located near the café.

"My colleague and I jumped in and took over the CPR. Around the fifth shock the emergency crew from Aviation Rescue Fire Fighting Service (ARFF) arrived and took over CPR. The sixth shock knocked out the AED, so I grabbed the ARFF's one so we could continue," Dane said.

Shortly afterwards, the NSW Ambulance paramedics from Kogarah arrived on the scene and took over.

"By the time we arrived, the patient had already regained a pulse, but wasn't conscious," said Paramedic Jodie Anderson.

"The early CPR and defibrillation were the key. Without that, he wouldn't have survived.

"It was also a really good example of multiple groups of people, who don't normally work with each other, coming together," Jodie said.

By the time the Diocoles family discovered what was going on, screens had been erected around the incident, making things even more stressful.

Dane said that at some point during the procedures he realised that the patient's relatives were at the scene but the screens that had been erected around them blocked them from seeing what was going on.



Left:
Dane Henderson
Below:
Ferdinand Diocales



Young cardiac arrest survivor thanks paramedics

Sixteen year old Zufi Abdul had been out to the movies with friends and was heading to Central Train Station on his way home, when he collapsed and suffered a cardiac arrest.

Luckily, a bystander performed CPR before police and paramedics arrived in the pouring rain during peak hour.

The paramedics who arrived on the scene were Jeremy Beck, Alysoun Puz, Chris Bolli and Samuel Byrne.

“When we arrived, there were probably hundreds of people surrounding him in the pouring rain, and we needed to get him into the ambulance so that we could do what we needed to do, so the defibrillator could work.

Being as young as Zufi is and having such a life ahead of him, it’s fantastic to have him reach out to us” Paramedic Jeremy Beck said.

The paramedics worked on Zufi for about 10 minutes before achieving a return of spontaneous circulation.

Now fully recovered, Zufi wanted to make a special visit to meet his paramedics and say a big thank you.



“Finally, meeting these guys today and just saying thank you. And even though knowing the word thank you is just so short for me and for them, it meant the whole world,” said Zufi.

“It must have been a frightening situation for them,” he said.

Thanks to the rapid response and great teamwork, Ferdinand survived and was cleared to return home to the Philippines.

He and his family have nothing but praise for the entire response and care Ferdinand received.

“The whole thing came as a shock,” Ferdinand said. “We weren’t expecting anything, it was the end of our stay.”

“When I woke up in the hospital, the staff said I was really lucky that someone had been there to help.

“Dane did a fantastic job. I can’t thank him enough.

“GoodSAM is a very good program. We don’t know when emergencies will come for those in need,” Ferdinand said.

Quyen Diocolos, who is a theatre nurse at Canterbury Hospital, is even more aware of how fortunate Ferdinand

was to have had such a rapid, great response.

“We were lucky it happened there and that the responder was so good.

“We’d love to meet Dane sometime and thank him personally. I know how exhausting doing CPR can be.”

Ferdinand’s experience illustrates the importance of the GoodSAM program.

“Everything is critical when you go into cardiac arrest,” Dane said.

“I’ve been involved in a number of CPR cases, including three others at Sydney Airport, and in other situations. This is only my second successful case.”

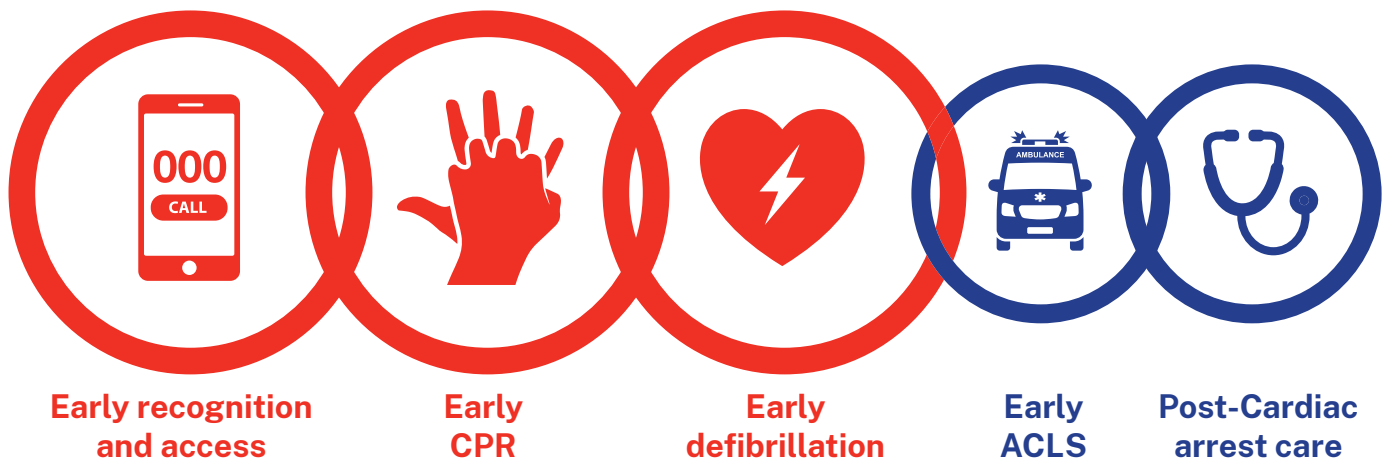
Quyen wasn’t aware of the GoodSAM program at the time, but she’s now a big fan.

“It’s a fantastic program. After what happened to my brother-in-law, I’m interested in volunteering. We need to spread the word.”



Cardiac arrest in the community

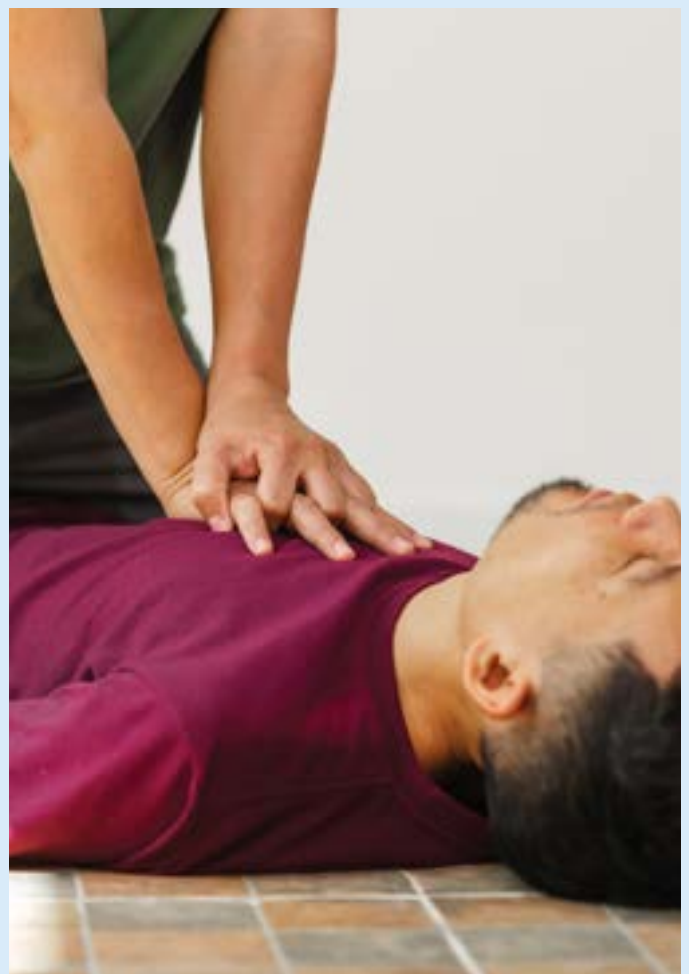
Completed by community members (bystanders)



Chain of Survival

The Chain of Survival concept was first introduced by Mary Newman, co-founder and President/CEO of the Sudden Cardiac Arrest (SCA) Foundation (Pennsylvania) in the late 1980s². The model received more widespread recognition when adopted by the American Heart Foundation in 1991 and today remains a universal framework for the general public, emergency services, and health care professionals in treating sudden cardiac arrest.

The Chain of Survival is comprised of five interdependent links, or series of critical actions, which when undertaken in rapid succession can maximise the chances of survival from OHCA. The links are: (1) early recognition and access, (2) early CPR, (3) early defibrillation, (4) Early Advanced Cardiac Life Support (ACLS), and (5) integrated post-cardiac arrest care. The first three links are opportunities for community members to positively impact the likelihood of survival, while the last two links refer to a comprehensive, multidisciplinary system of health care including pre-hospital paramedic responders and medical teams.



Community actions save lives

The actions of community members (bystanders) are critically important in the minutes that follow an OHCA. When bystanders performed CPR prior to NSW Ambulance paramedic arrival, event survival and 30-day survival increased (17.9% and 8.3%, respectively) when compared to no bystander CPR (1.9% and 0.5%, respectively) (Figure 1).

Similarly, when community defibrillation (AED shocks delivered) occurred prior to NSW Ambulance arrival, both event survival and 30-day survival increased (58.3% and 45.0%, respectively) when compared to no AED shocks delivered (6.8% and 2.6%, respectively) (Figure 2).

Bystander CPR and AED use significantly improves survival outcomes from OHCA

Figure 1: Impact of bystander CPR on survival outcomes in NSW, 2024 (All OHCA excluding paramedic-witnessed)

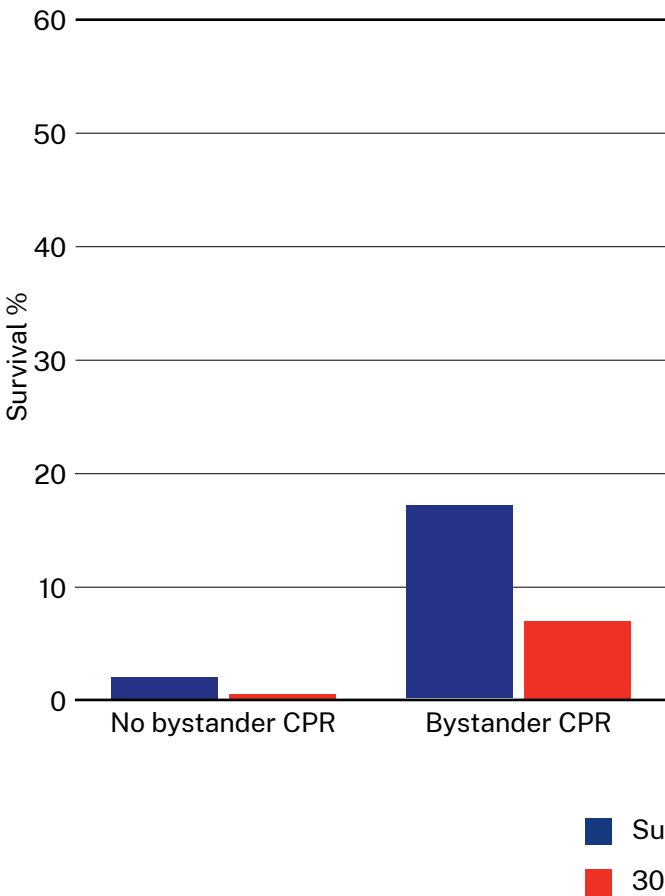
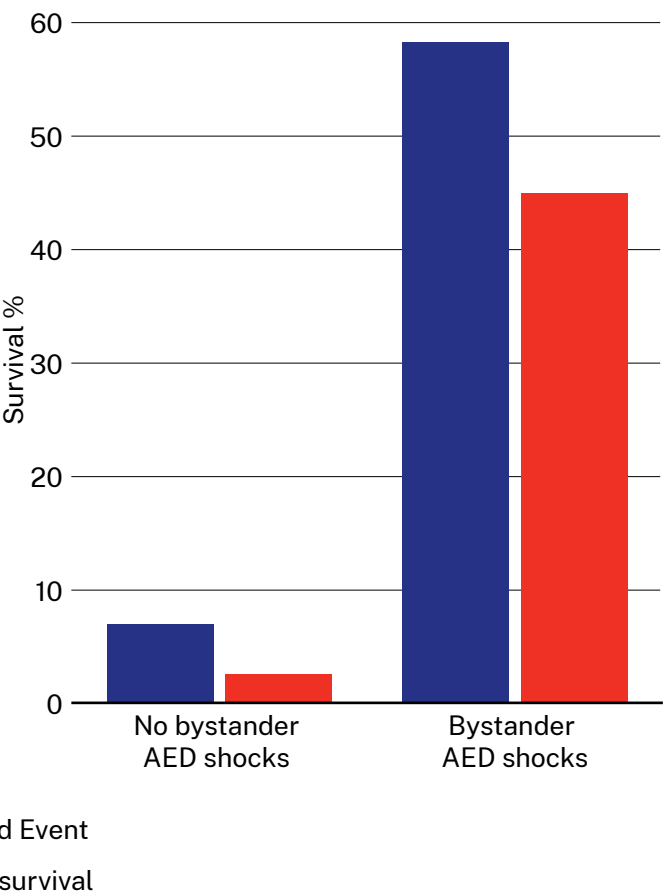


Figure 2: Impact of bystander AED shocks on survival outcomes in NSW, 2024 (All OHCA excluding paramedic-witnessed)



CPR in the community

Cardiac arrest treatment is a community issue requiring a wide range of people to be prepared to act, including bystanders, family members, first responders, emergency medical personnel, and other healthcare providers³. Early CPR is a vital link in the Chain of Survival and is the first hands-on intervention community members can provide to OHCA patients.

In 2024, incidence of bystander CPR varied widely across NSW (Figure 3a and 3b), with rates ranging from 27.9% in Coffs Harbour–Grafton to 48.4% in Blacktown. Overall, Greater Sydney and the Central Coast recorded a higher average rate (39.4%) than the Rest of NSW (33.2%), although both declined modestly from 2023 (40.8% and 34.6%, respectively). Within Greater Sydney, Western

Suburbs such as Blacktown (48.4%) and Parramatta (45.5%) continued to outperform other areas, while some districts experienced marked year to year fluctuations, including a drop in the Northern Beaches from 44.5% to 34.1% and a substantial increase in Sutherland from 32.7% to 42.3%. Regional NSW rates were generally more stable and clustered in the low to mid 30s, with Illawarra (39.3%) plus Southern Highlands and Shoalhaven (39.5%) standing out as comparatively high performers

Using bystander-witnessed cases identified as OHCA during call-taking and assigned an emergency response, the crude rate of bystander CPR was 86.5% in male patients and 80.2% in female patients. After stratifying by 5-year age groups, the age-standardised rate in female patients was 80.6%.



**For every
minute without
CPR, survival
decreases by
7–10%**

Are you ready to save a life?

Early intervention is vitally important in the Chain of Survival for OHCA. Community members have the potential to significantly improve the chances of survival, while enhancing the effectiveness of subsequent medical interventions, treatment, and post-cardiac arrest rehabilitation.

In 2024, almost 1,800 relatives provided bystander CPR and/or applied an AED to their family member prior to paramedic arrival, while another 868 community members took the same life-saving actions for patients to whom they were not related (Table 1).

**Every NSW community member
can make a difference in the Chain
of Survival.**

Table 1: Types of bystanders providing CPR upon EMS arrival, and/or applying an AED in NSW, 2024.
(All OHCA with bystander CPR and/or AED use)

Bystander Type	Number	%
Relative	1790	48.8%
Community member	868	23.7%
Police	248	6.8%
GoodSAM	222	6.0%
Other health worker	197	5.4%
Nurse	168	4.6%
Doctor	54	1.5%
Fire and Rescue	44	1.2%
Surf Life Saving/Lifeguard	26	0.7%
Off-duty Paramedic	23	0.6%
NSW Ambulance Clinical Volunteer/ Community First Responder	13	0.4%
Security Guard	13	0.4%
SES/St John	4	0.1%
Total	3670	100.0%



Figure 3a: Bystander CPR incidence for non-metropolitan NSW, 2024
(All OHCA excluding paramedic-witnessed)

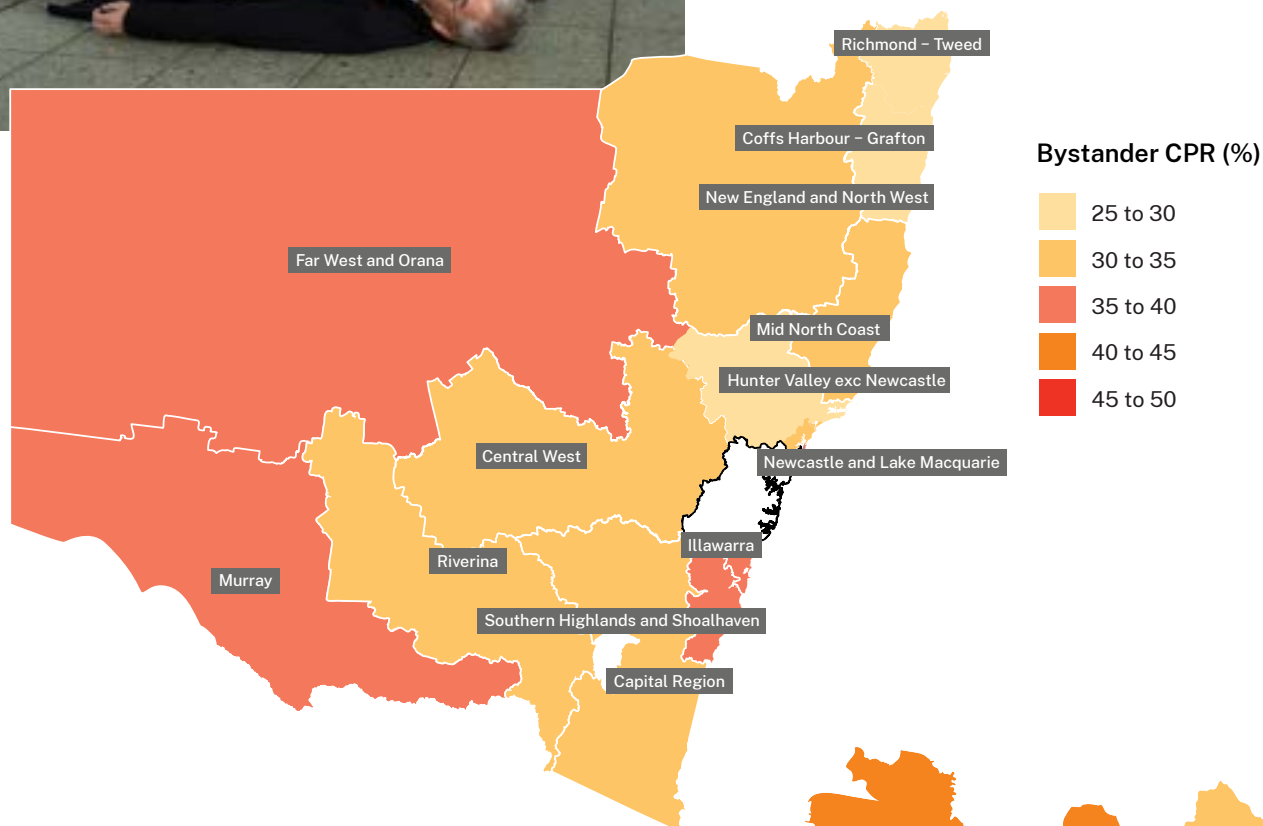
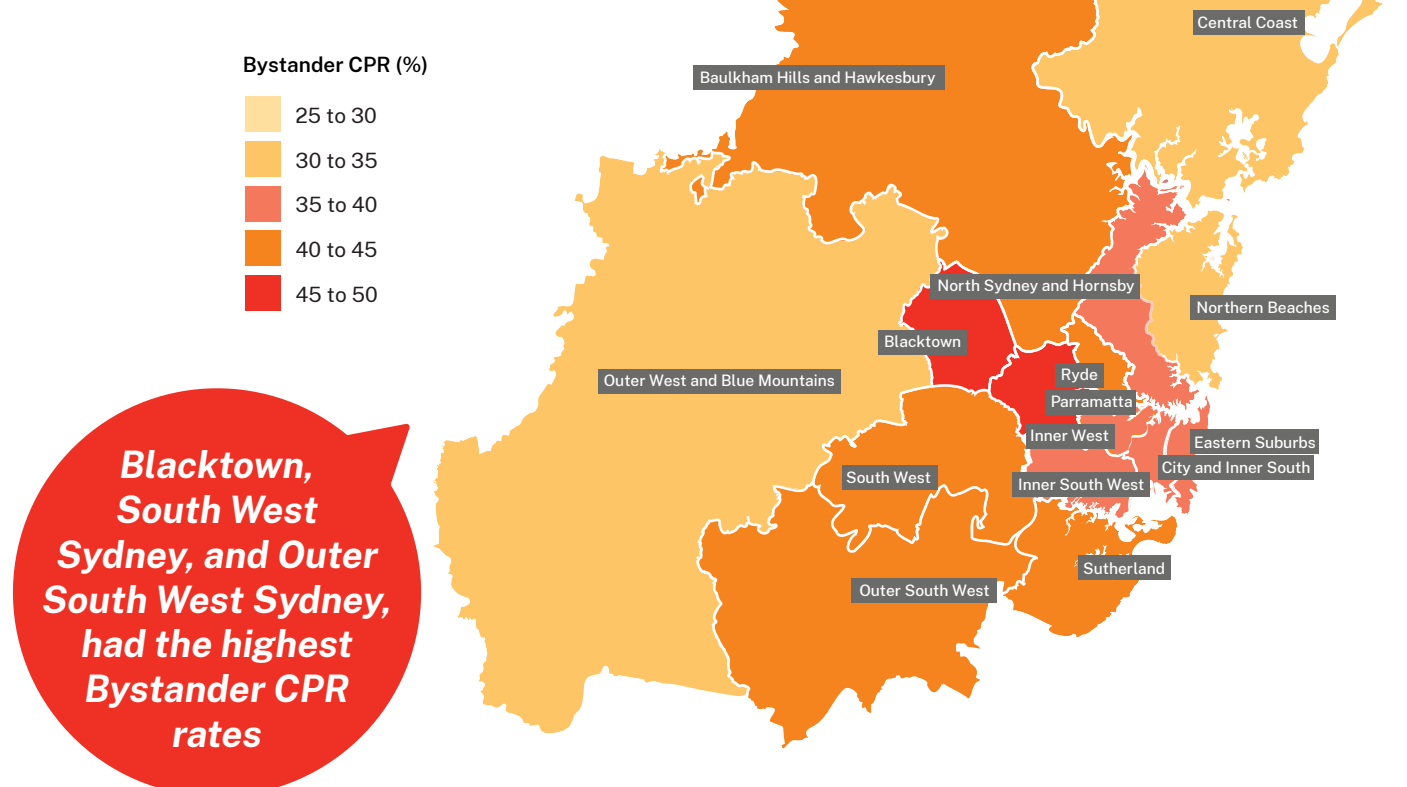


Figure 3b: Bystander CPR incidence for metropolitan NSW, 2024
(All OHCA excluding paramedic-witnessed)





GoodSAM responder program

Since launching in late 2023, the integration of GoodSAM with the NSW Ambulance triple zero dispatch system has proven an invaluable tool connecting responders to patients in the critical first few minutes of a cardiac arrest.

2024 marked the first full year of GoodSAM in NSW. During this time, 5,027 volunteers registered to provide CPR until paramedic arrival bringing the total number of registered GoodSAM responders to 9,145. With this growing responder network, the average distance a GoodSAM responder was from a cardiac arrest was 707 meters and arrived to the scene in an average of 4 minutes.

This link in the chain of survival saw 222 people provided CPR and/or an AED applied by GoodSAM responders during 2024, with 40 of those surviving to 30 days post cardiac arrest.



Sign up to GoodSAM



GoodSAM
Instant.Help



Incidence

In 2024 the crude and age-standardised incidence of OHCA across NSW was 121 and 99 per 100,000 persons, respectively, which was similar to that observed in 2023 (120 and 98, respectively). The incidence of OHCA was considerably higher in non-metropolitan NSW (158 crude; 124 age-standardised per 100,000 persons) when compared to metropolitan NSW (102 crude; 86 age-standardised per 100,000 persons) (Figure 4).

Incidence of OHCA varied markedly across NSW. The largest absolute increase in age-standardised OHCA incidence was observed in Sydney - Inner West (+16.9%), followed by Illawarra (+16.7%) and Southern Highlands and Shoalhaven (+15.3%). The Riverina region, Sydney - Ryde and Sydney - Blacktown areas showed significant reductions in age-standardised OHCA incidence (-15.1%, -12.9% and -12.5%, respectively) when compared to 2023.

OHCA incidence and OHCA events for metropolitan NSW and non-metropolitan NSW, are shown in Figure 5 (a and b) and Figure 6 (a and b), respectively.



Figure 4: OHCA crude incidence per 100,000 population in NSW, 2017 – 2024 inclusive. (All OHCA)

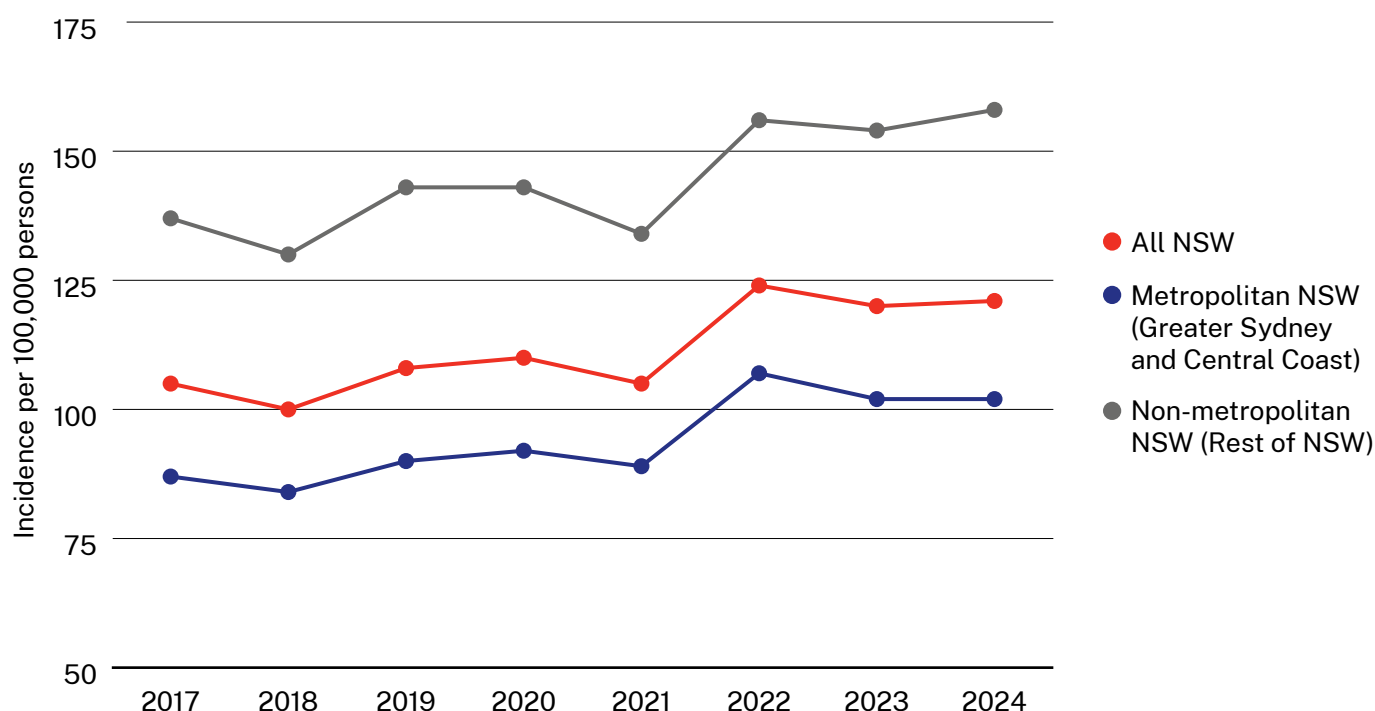




Figure 5a: OHCA incidence for non-metropolitan NSW, 2024 (per 100,000 population)
(All OHCA)

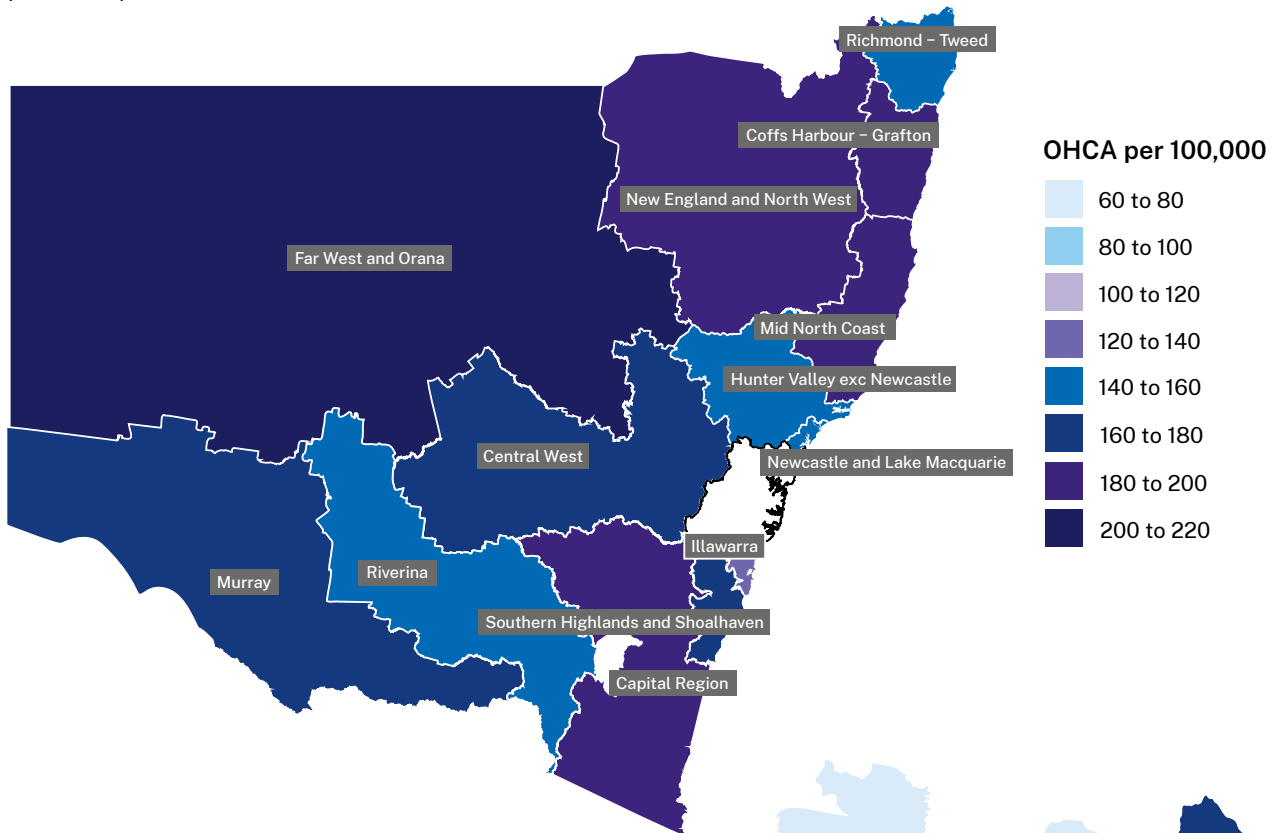


Figure 5b: OHCA incidence for metropolitan NSW, 2024 (per 100,000 population)
(All OHCA)

OHCA per 100,000

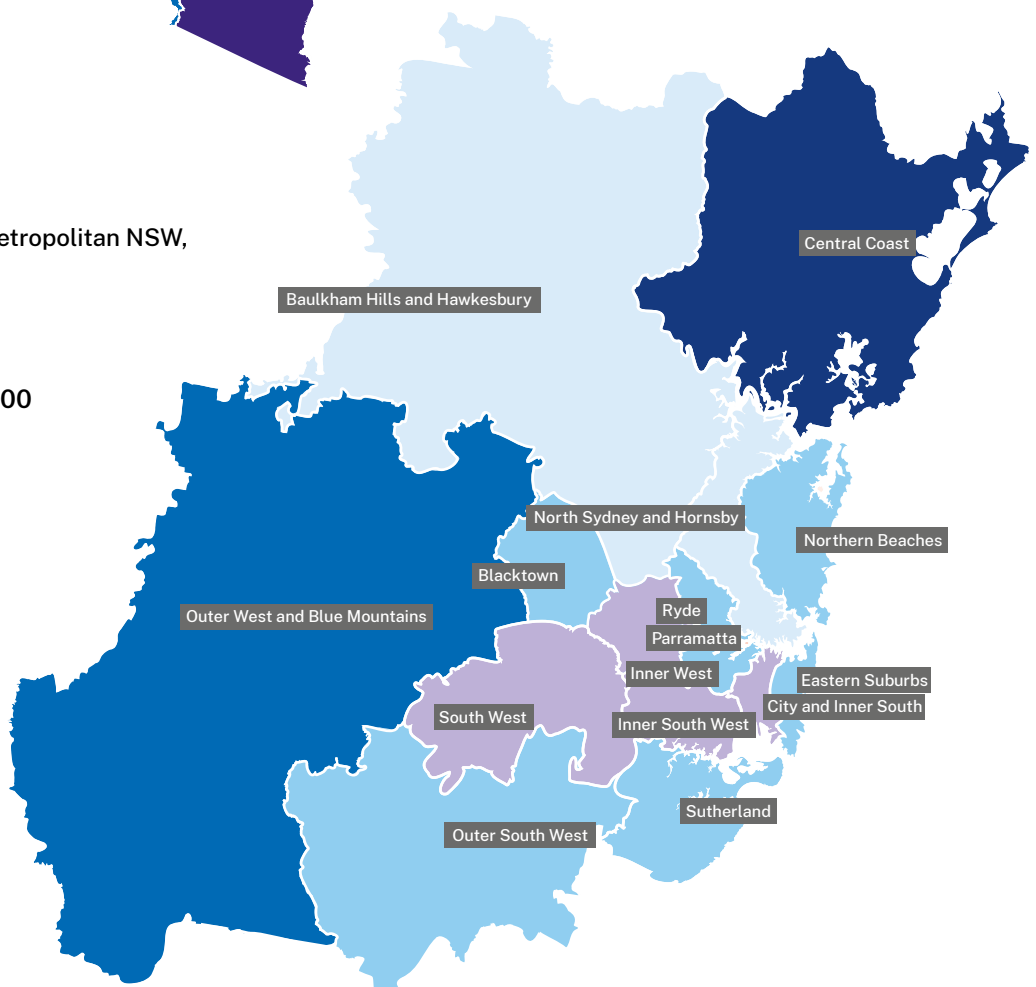
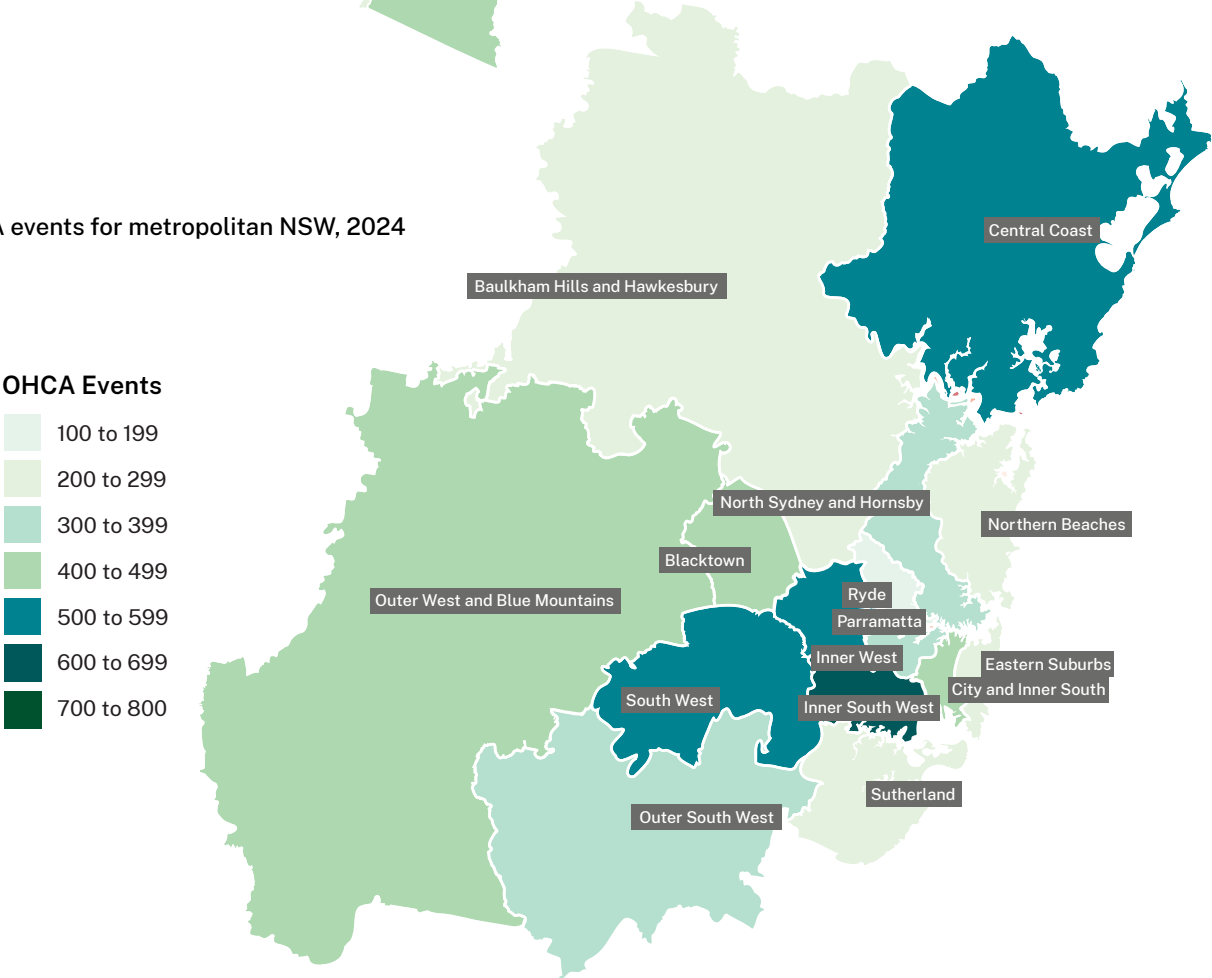


Figure 6a: OHCA events for non-metropolitan NSW, 2024
(All OHCA)



Figure 6b: OHCA events for metropolitan NSW, 2024
(All OHCA)



Demographics

In 2024, NSW Ambulance clinicians attended a total of 10,625 OHCA's including 10,552 patients in cardiac arrest and 73 patients who regained ROSC prior to NSW Ambulance arrival (Table 2).

Arrests occurred most frequently in private residences (77.9%), followed by public places (12.6%) and residential aged care facilities (8.9%).

NSW Ambulance clinicians attempted to resuscitate 3,514 patients (33.1% of OHCA's). An initial shockable rhythm (ventricular fibrillation or ventricular tachycardia, VF/VT) was observed in 23.3% of these patients, and bystander CPR had been performed on 71.7%.

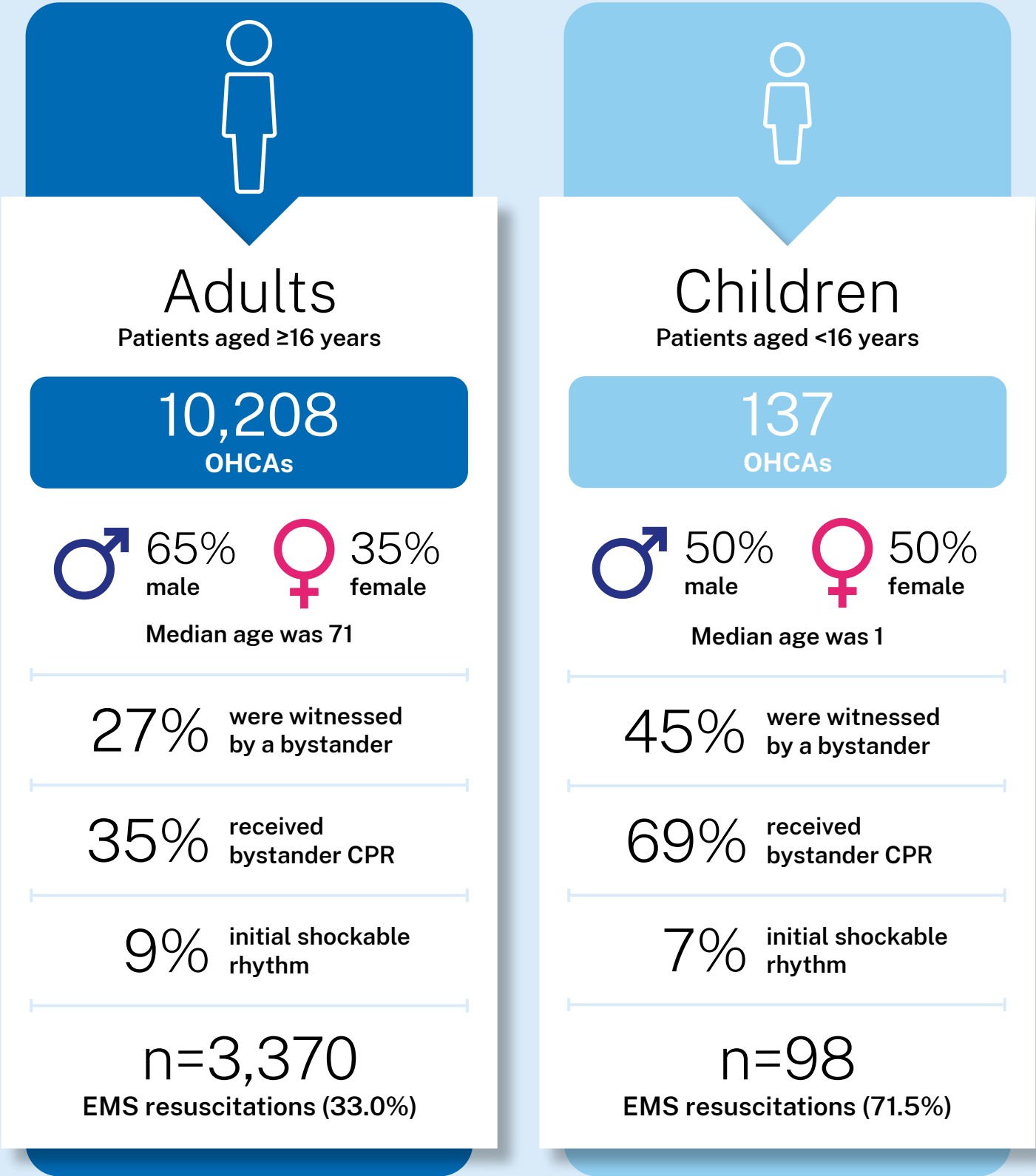
Of all resuscitation attempts excluding paramedic-witnessed (n=2,996), 22.8% of patients were found in a shockable rhythm, and an initial shockable rhythm was more likely in patients who had received bystander CPR (25.5%) than those who did not receive bystander CPR (13.0%). Across all OHCA's, 85.6% were presumed to be of medical aetiology (cause).

Table 2: Patient Characteristics in NSW, 2024

Variable	All OHCA attended		EMS-treated		ROSC prior to arrival	
Age (years)						
Median (Q1-Q3)^	70 (57-82)		66 (52-78)		56 (34.5-68)	
Sex						
Female	3691	34.7%	1116	31.8%	14	19.2%
Male	6882	64.8%	2395	68.2%	59	80.8%
Not specified/unknown	52	0.5%	3	0.1%	0	0%
Location of arrest						
Public place	1335	12.6%	761	21.7%	57	78.1%
Private residences	8279	77.9%	2524	71.8%	7	9.6%
Residential aged care facilities	949	8.9%	180	5.1%	2	2.7%
Medical facility	62	0.6%	49	1.4%	7	9.6%
Initial rhythm						
Shockable	884	8.3%	818	23.3%	46	63.0%
Non-shockable	9571	90.1%	2634	75.0%	16	21.9%
Unknown	170	1.6%	62	1.8%	11	15.1%
Bystander CPR						
Yes	3670	34.5%	2518	71.7%	73	100%
No	6954	65.4%	995	28.3%	0	0%
Unknown	1	0%	1	0%	0	0%
Witnessed arrest						
Bystander-witnessed	2912	27.4%	1670	47.5%	62	84.9%
Not witnessed	6958	65.5%	1320	37.6%	10	13.7%
Paramedic-witnessed	745	7.0%	518	14.7%	0	0%
Unknown	8	0.1%	5	0.1%	1	1.4%
Presumed aetiology						
Medical	9092	85.6%	2959	84.2%	59	80.8%
Non-medical (incl. trauma)	1533	14.4%	555	15.8%	14	19.2%
Unknown						
Survival						
Survived event	969	9.1%	896	25.5%	72	98.6%
Survived 30 days	458	4.3%	403	11.8%	55	87.3%
Total	10625		3514		73	

[^] Q1 = quartile 1 (25th percentile); Q3 = quartile 3 (75th percentile) | All denominators adjusted to account for missing data

Figure 7: Adult and paediatric demographics in NSW, 2024 (All OHCA)



*Age was unknown for 280 cases where ambulance records indicated the patient was transported. Denominators have been adjusted accordingly.

Aetiology of cardiac arrest in NSW

The aetiology of OHCA can vary between adults and children due to differences in underlying health conditions and pathology. In accordance with Utstein guidelines, OHCA aetiology is presumed to be cardiac, unless specified otherwise on the patient health care record.

In 2024, most instances of OHCA in both adults and children were presumed to be of cardiac origin (68.6%

and 40.9%, respectively). Terminal illnesses were more prevalent among adults (13.1%), while trauma was more common in children (15.3%). Among children, 5.1% of OHCA was attributed to hanging, 7.3% to asphyxia, and 7.3% to drowning. Sudden Unexpected Death in Infancy (SUDI) accounted for 10.2% of OHCA in children (included in 'other medical' aetiology) (Figure 8 and Figure 9).

Figure 8: Aetiology of OHCA in adult patients in NSW, 2024
(All OHCA, ≥16 years)

Adults

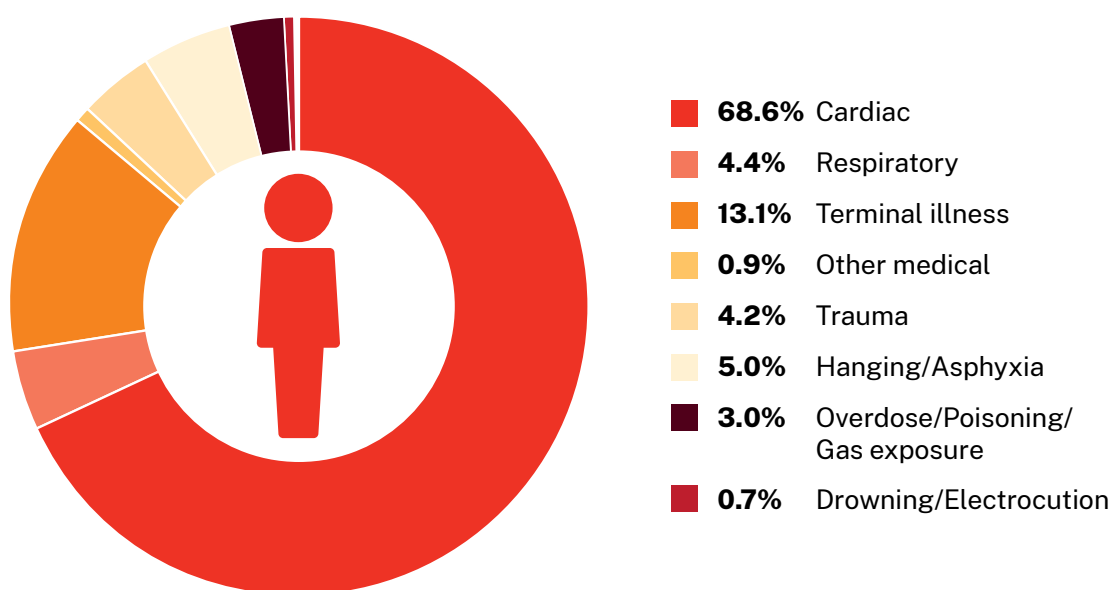
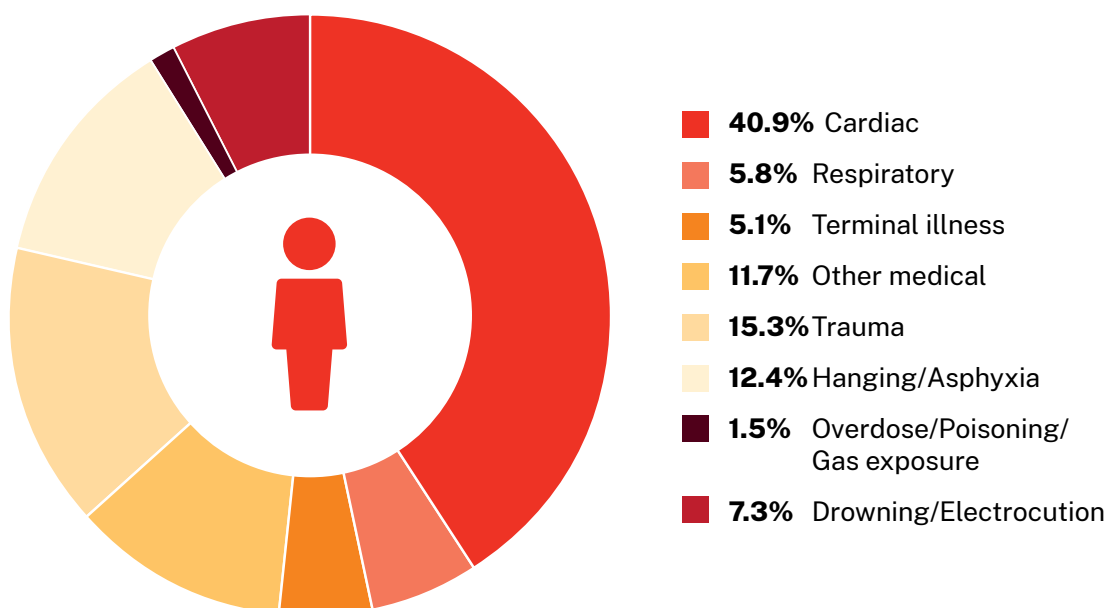


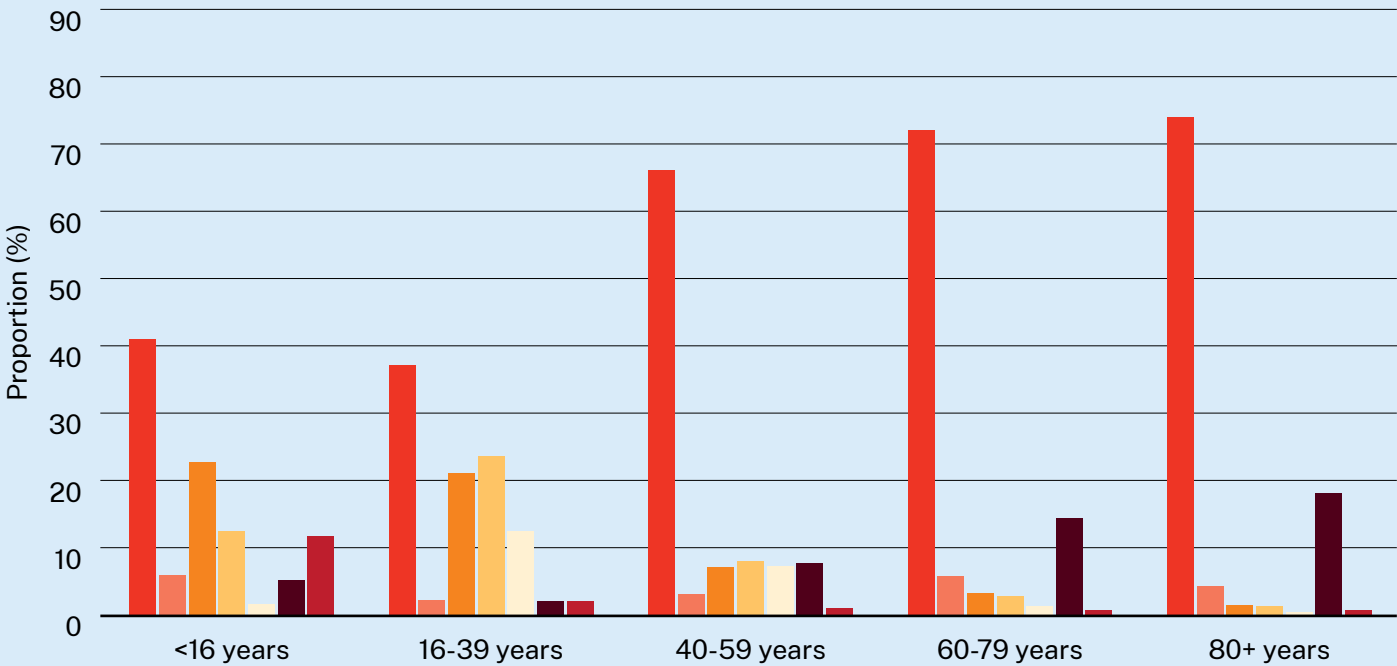
Figure 9: Aetiology of OHCA in paediatric patients in NSW, 2024
(All OHCA, <16 years)

Children



Across all adult age groups, the proportion of cardiac aetiology increased with age. Excluding cardiac, the most prevalent aetiology for patients aged 16-39 years was hanging/asphyxia (23.0% hanging; 0.5% asphyxia) followed by trauma (21.1%). High proportions of trauma, hanging and asphyxia were also observed in the <16 years age group (22.6%, 5.1% and 7.3%, respectively) (Figure 10).

Figure 10: Aetiology of OHCA per age group in NSW, 2024 (All OHCA)



*Trauma includes drowning and electrocution.

**Hanging/asphyxia includes strangulation and foreign body.

- Cardiac
- Respiratory
- Trauma*
- Hanging/asphyxia**
- Overdose/Poisoning
- Terminal Illness
- Other

Location of cardiac arrest in NSW

Across all OHCA in 2024 (adults and children), arrests occurred most frequently in private residences (77.9%), followed by public places (12.6%) and residential aged care facilities (8.9%) (Table 2). Children arrested more often in public places (19.7%) when compared to adults (11.1%), the difference largely accounting for adult OHCA occurring in residential aged care facilities (9.2%) (Figure 11 and 12).

Figure 11: Location of OHCA in adult patients, in NSW, 2024
(All OHCA, ≥16 years)

Adults

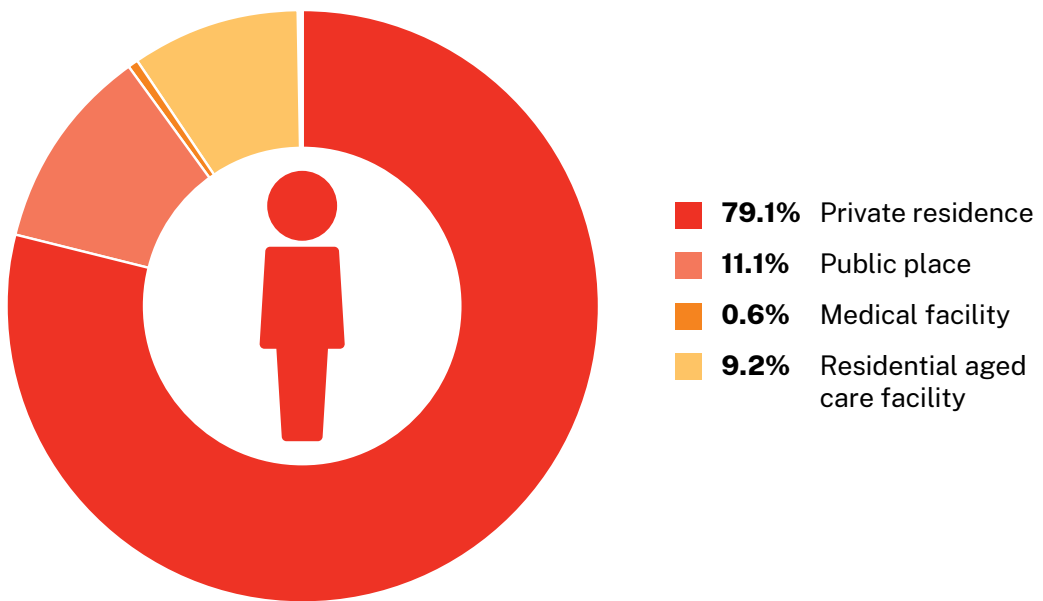
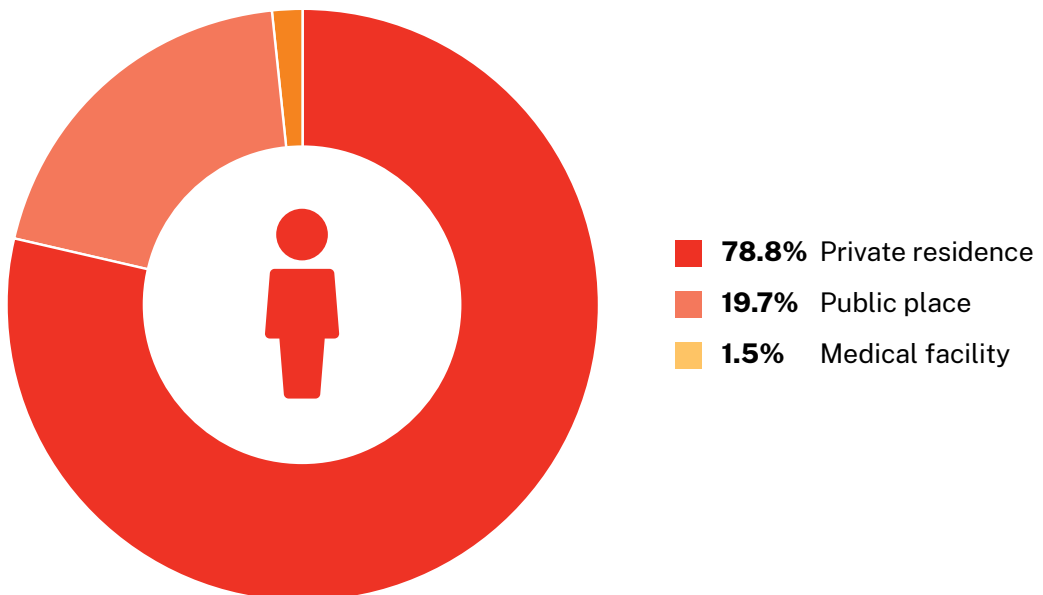


Figure 12: Location of OHCA in paediatric patients, in NSW, 2024
(All OHCA, <16 years)

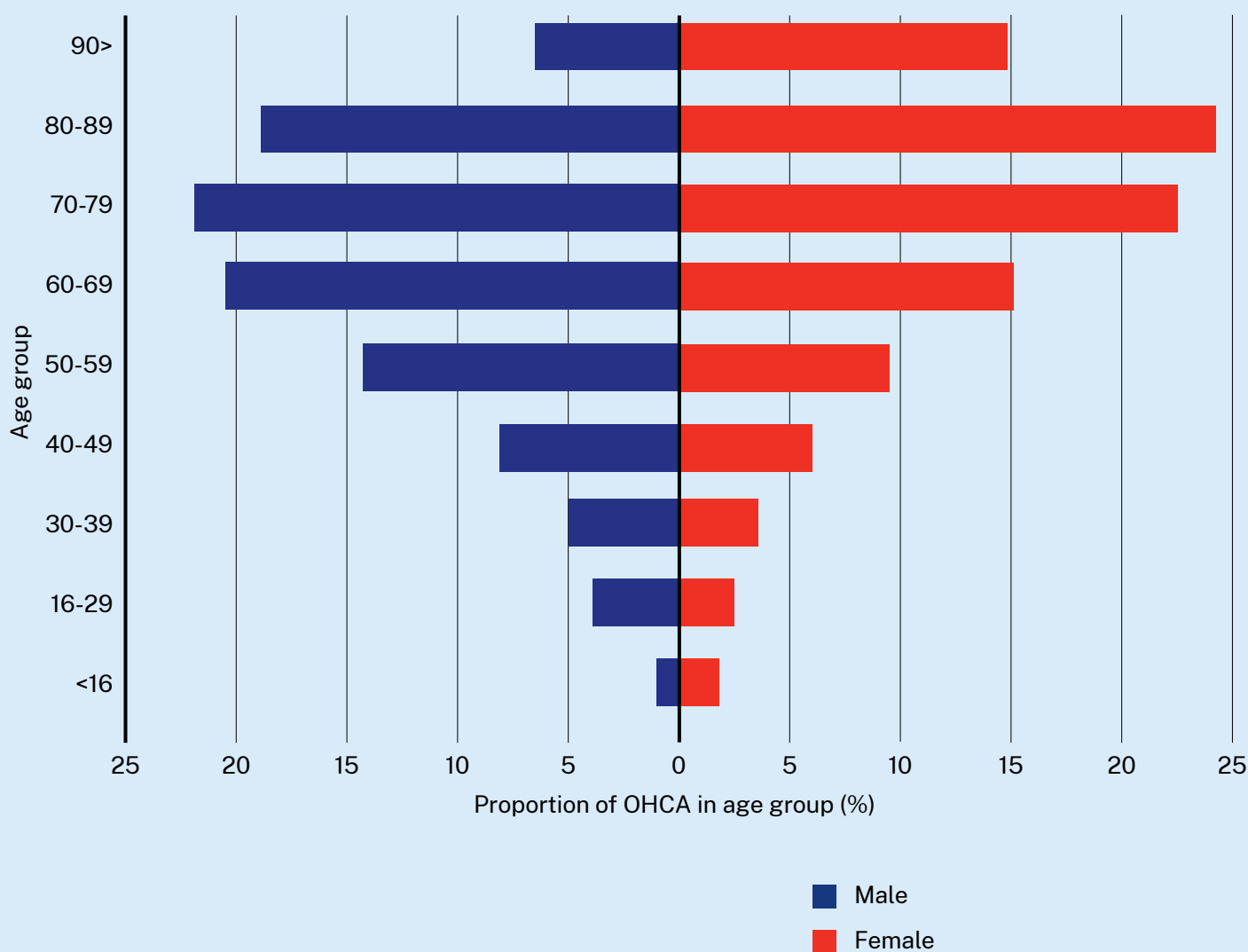
Children



Age and sex distribution of cardiac arrest in NSW

In 2024, most patients were male (64.8%). The median age for all OHCA was 70 (IQR: 57-82) years (Table 2), and female patients had a higher median age at arrest than males (75 versus 68 years). Case distribution by age and sex (Figure 13) was similar to previous years. Adults (16 years or older) accounted for 99% of cases.

Figure 13: OHCA incidence per age and sex in NSW, 2024.
(All OHCA)



*Age was unknown for 280 cases and sex was unknown for 52 cases. Denominators have been adjusted accordingly.

Factors associated with survival

Patient characteristics

Of the 3,587 arrests where NSW Ambulance clinicians attempted resuscitation or the patient achieved ROSC prior to NSW Ambulance arrival, event survival and 30-day survival were 27.0% and 13.1%, respectively (Table 3). Males had a higher survival rate when compared to females (14.8% versus 9.5% 30-day survival). Survival was highest where patients presented in a shockable rhythm or where their arrest had been witnessed, particularly by a paramedic.

Table 3: Survival per patient characteristics in NSW, 2024
(EMS-treated OHCA or ROSC before NSW Ambulance arrival)

Characteristic	Survived Event (n=968)		30-day Survival*** (n=458)		Total count
Age in years, Mean (Range)	64 (52-76)		61 (50-71)		
Sex*					
Female	293	25.9%	105	9.5%	1,130
Male	675	27.5%	353	14.8%	2,454
Location of arrest					
Public place	289	35.3%	179	23.4%	818
Residential home	624	24.7%	251	10.1%	2,531
Nursing home	24	13.2%	9	4.9%	182
Medical facility	31	55.4%	19	35.8%	56
Initial rhythm**					
Shockable	444	51.4%	305	37.1%	864
Non-shockable	483	18.2%	125	4.8%	2,650
Witnessed status					
Bystander-witnessed	537	31.0%	257	15.4%	1,732
Not witnessed	228	17.1%	73	5.6%	1,330
Paramedic-witnessed	201	38.7%	128	25.3%	518
Aetiology					
Medical	825	27.3%	399	13.6%	3,018
Non-medical (incl trauma)	143	25.1%	59	10.6%	569
Response time^ (min)	8 (5-12)		8 (5-13)		

^Median (interquartile range)

*Sex was unknown for 1 case

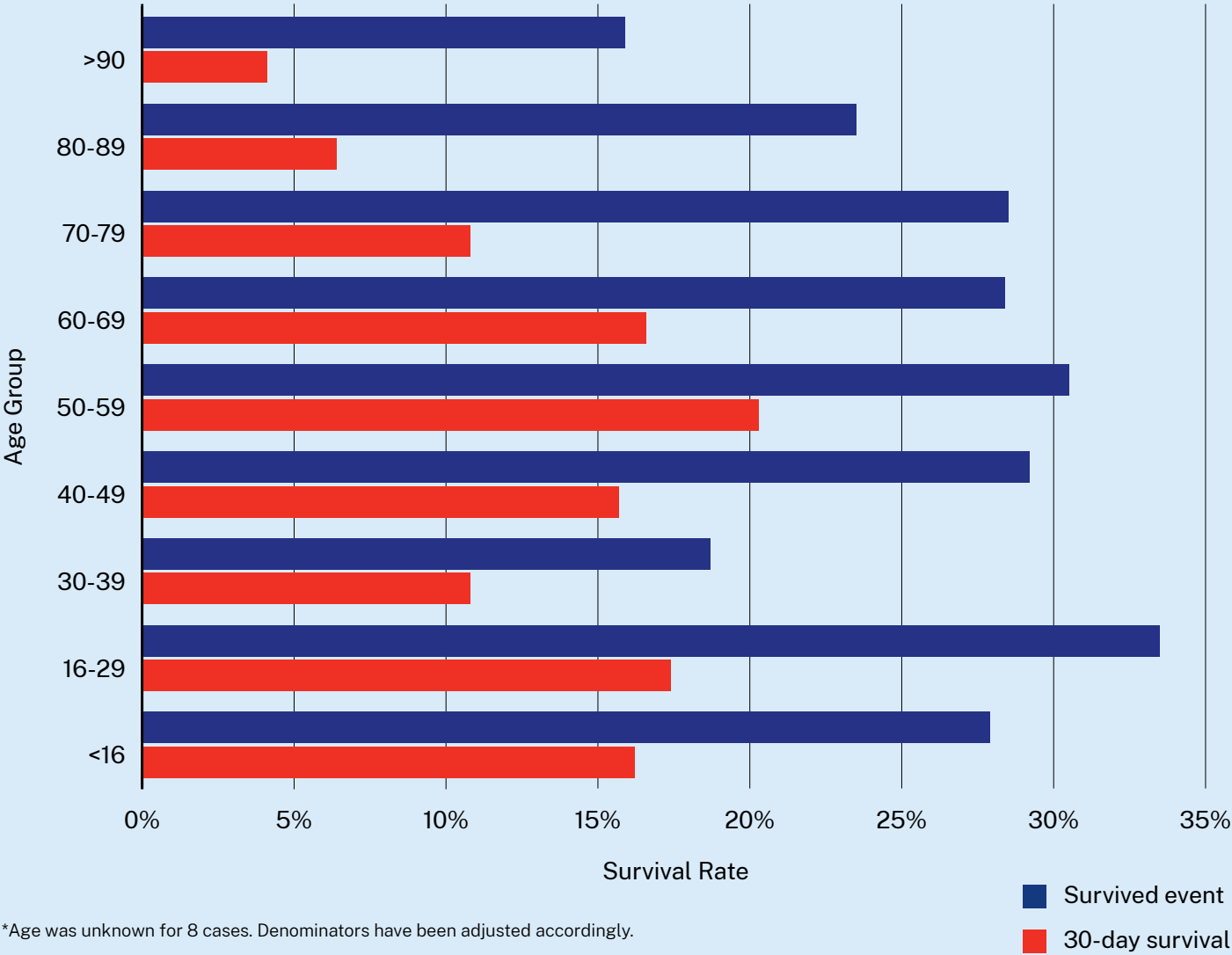
**Initial rhythm was unknown for 41 cases

***Survival to 30 days was unknown for 96 cases where ambulance records indicated the patient was transported but there was no corresponding linked EDDC or APDC record. Denominators have been adjusted accordingly.

The highest event survival rates were observed in the 16-29 year age group (33.5%), followed by the 50-59 year age group (30.5%) and 40-49 year age group (29.2%). The highest 30-day survival rate was observed in the 50-59 year age group (20.3%), followed by the 16-29 year age group (17.4%). The lowest survival rates were observed in the 90 year and over age group (Figure 14). Across all age groups, the 30-day survival rate for EMS-treated OHCA or patients achieving ROSC before NSW Ambulance arrival was 13.1%.

**Patients
50-59 years
of age had the
highest 30-day
survival rates**

Figure 14: Survival per age group in NSW, 2024.
(EMS-treated OHCA or ROSC before NSW Ambulance arrival)





Initial rhythm

Shockable rhythms (ventricular fibrillation/tachycardia; VF/VT) are known to deteriorate to a non-shockable rhythm (asystole or pulseless electrical activity; PEA) over time⁴. In 2024, 75.4% of OHCA patients presented with an initial non-shockable rhythm (PEA, asystole, or other non-shockable rhythm), while only 24.6% presented with an initial shockable rhythm (VF, VT, or other shockable rhythm) (Figure 15).

OHCA patients presenting with a shockable rhythm had significantly higher 30-day survival rates (37.1%) when compared to patients presenting in a non-shockable rhythm (4.8%) (Table 3). Both event survival and 30-day survival were highest in patients presenting in a shockable rhythm (Figure 16).

Initial shockable rhythm is associated with a better survival rate and neurological outcome

Figure 15: Initial rhythm in NSW, 2024.
(EMS-treated OHCA or ROSC before NSW Ambulance arrival)

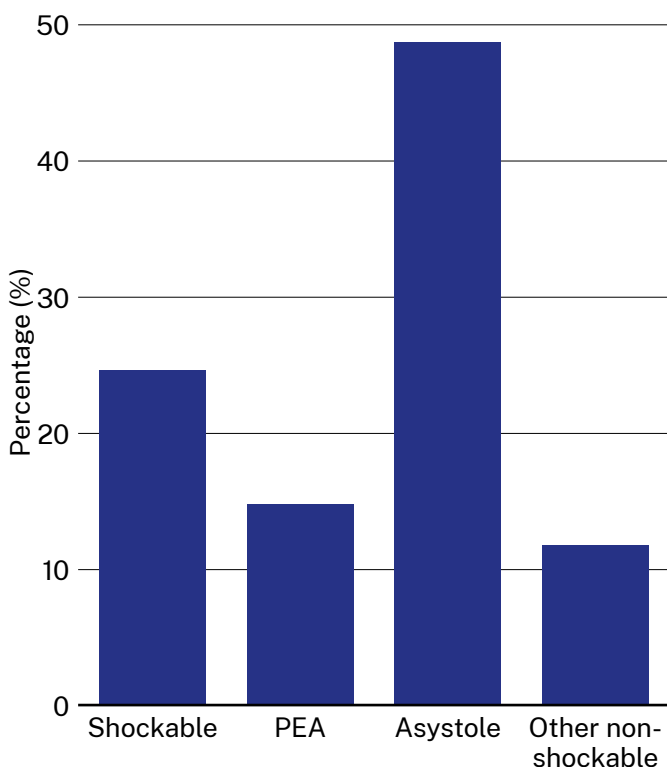
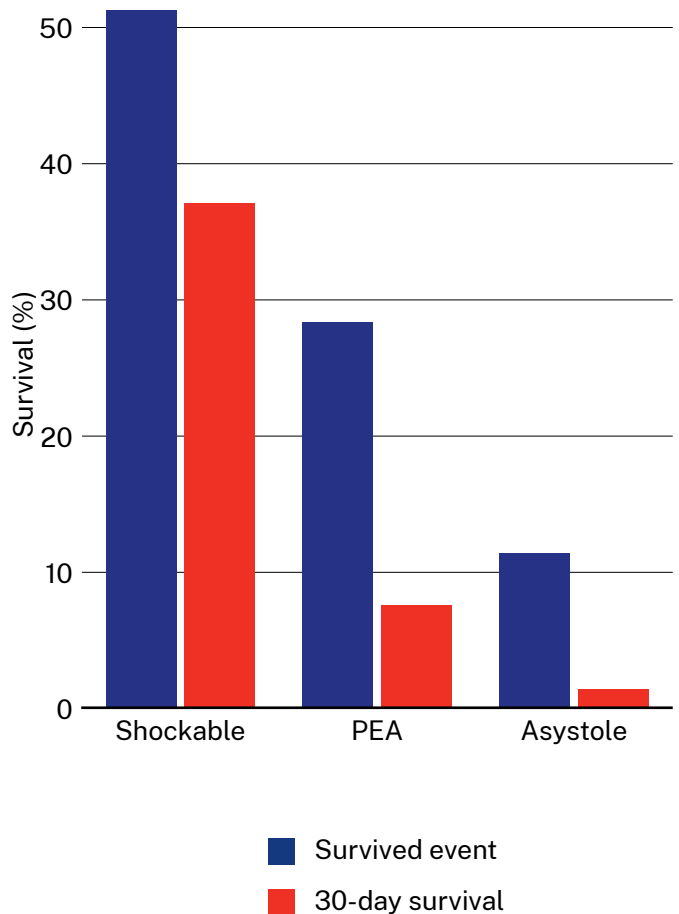


Figure 16: Survival per initial rhythm in NSW, 2024
(EMS-treated OHCA or ROSC before NSW Ambulance arrival)



*Rhythm was unknown for 41 cases.
Denominators have been adjusted accordingly.

Bystander CPR and AED use

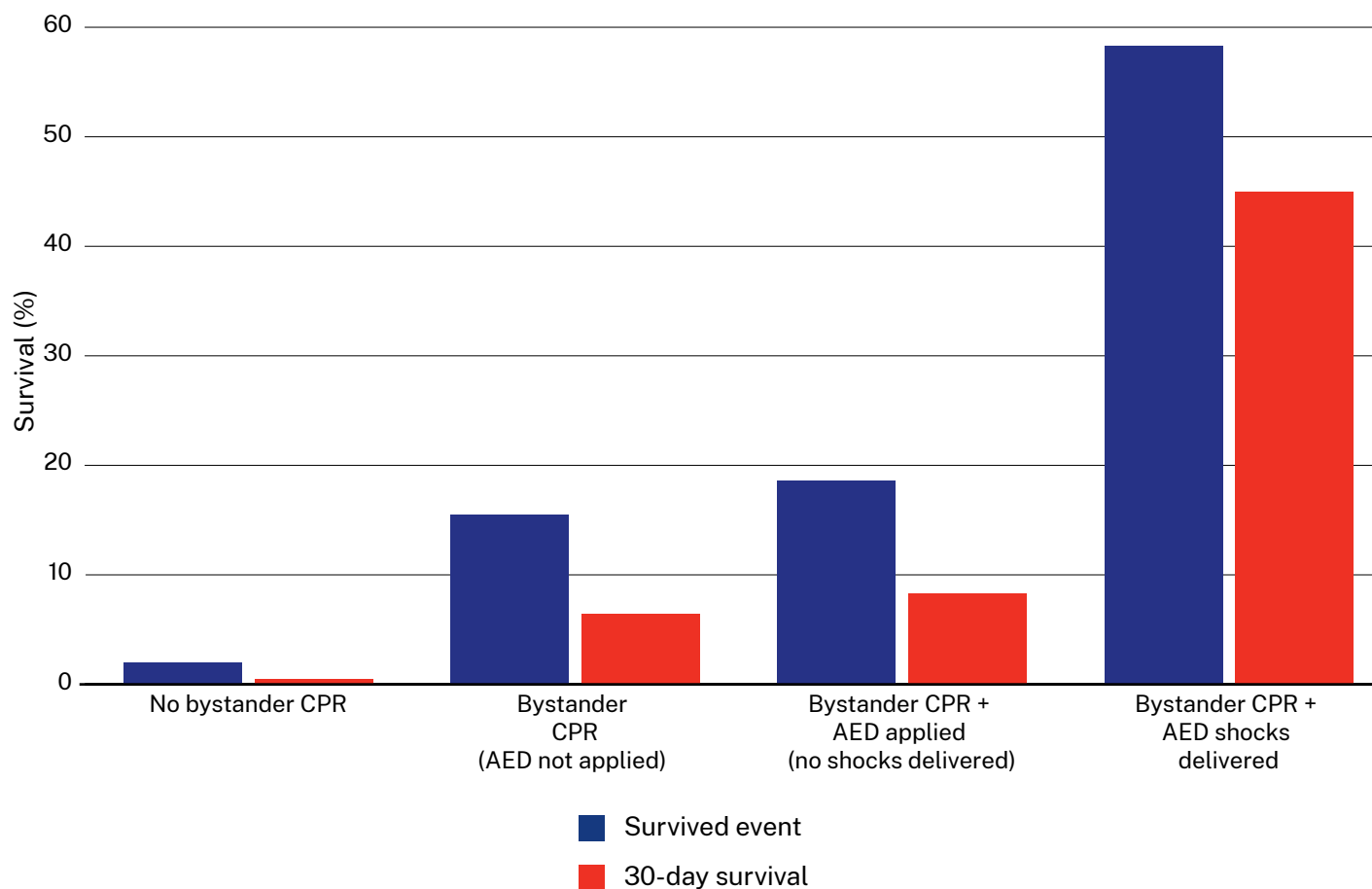
Survival rates significantly increase with early cardiopulmonary resuscitation (CPR) and defibrillation with bystander use of automated external defibrillators⁵.

For all OHCA in 2024, the 30-day survival rate was higher for patients who received bystander CPR (6.4%), compared to patients who did not receive bystander CPR (0.5%) (Figure 17).

An AED was applied to the patient in 392 cases, and a shock was delivered in 180 of these cases. The 30-day survival rate was highest for patients who received bystander CPR and received an AED shock (45.0%). This is an absolute increase of 16 additional survivors, or 8.0% compared to 2023.

Patients who received bystander CPR and AED shocks had the greatest chance of survival

Figure 17: Survival per bystander intervention in NSW, 2024 (All OHCA excluding paramedic-witnessed)





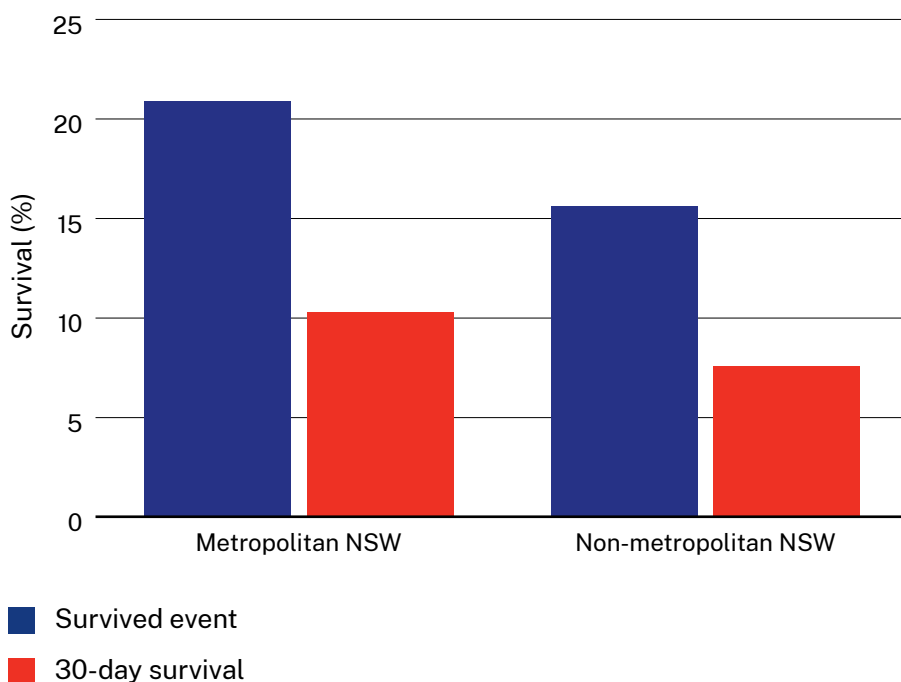
Metropolitan versus regional locations

For the purpose of assessing survival rates across metropolitan and regional NSW, analyses were conducted on the bystander-witnessed OHCA cohort.

In 2024, event survival was higher in metropolitan NSW when compared to regional NSW (20.7% and 15.8%, respectively). Similarly, 30-day survival was also higher in metropolitan NSW (9.2%) when compared to non-metropolitan NSW (7.2%) (Figure 18).

The 30-day survival rates in bystander-witnessed cases in 2024 across metropolitan NSW and non-metropolitan NSW were the same as the 2023 rates (10.3% and 7.6%, respectively).

Figure 18: Survival per rurality in NSW, 2024
(Bystander-witnessed OHCA)





ROSC before NSW Ambulance arrival

In 2024, NSW Ambulance attended 73 cardiac arrest patients who were successfully resuscitated (achieving Return of Spontaneous Circulation; ROSC) by bystanders prior to the arrival of NSW Ambulance clinicians.

When compared to EMS-treated OHCA patients, these patients had higher rates of cardiac aetiology (78.1%), were more often male (80.8%) and more frequently arrested in a public place (78.1%). These cardiac arrests were more often witnessed by a bystander (86.1%) and presented with an initial shockable rhythm (74.2%) (Table 4, Figure 19).

All of these patients received bystander CPR. Overall, both event survival and 30-day survival were highest in patients who achieved ROSC before NSW Ambulance arrival (98.6% and 87.3%, respectively).

Table 4: Characteristics of patients achieving ROSC before NSW Ambulance arrival in NSW, 2024.
(ROSC before NSW Ambulance arrival)

Characteristic	ROSC before NSW Ambulance arrival (n = 73)	
Age (years, median Q1-Q3)	56 (34.5-68)	
Sex		
Male	59	80.8%
Female	14	19.2%
Initial rhythm*		
Shockable	46	74.2%
Non-shockable	16	25.8%
Witnessed status**		
Bystander-witnessed	62	86.1%
Not witnessed	10	13.9%
Survival***		
Survived event	72	98.6%
30-day survival	55	87.3%

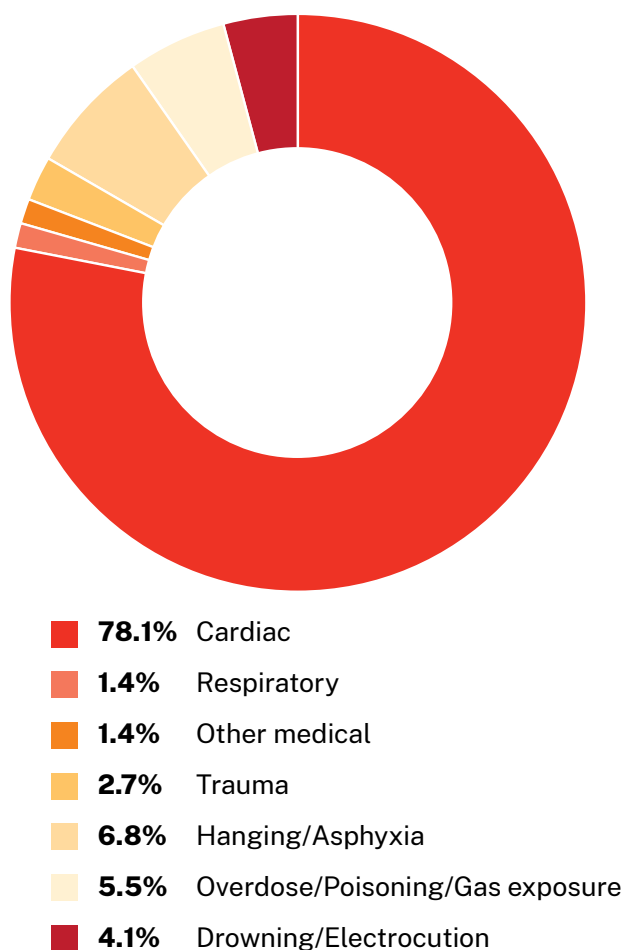
*Initial rhythm was unknown in 11 cases

** Witnessed status was unknown for 1 case

***30-day survival was missing in 10 cases.

Denominators have been adjusted accordingly.

Figure 19: Aetiology of patients achieving ROSC before NSW Ambulance arrival in NSW, 2024
(ROSC before NSW Ambulance arrival)



Of all OHCA, patients who achieved ROSC before NSW Ambulance arrival had the highest survival rates

Paramedic-witnessed cardiac arrests

In 2024, of paramedic-witnessed cardiac arrests, 15.6% (n=745) occurred in residential aged care facilities. However, for the purpose of these analyses, only EMS-treated paramedic-witnessed OHCA (n=518) were examined (which predominantly excludes terminal patients; patients with not-for-resuscitation orders in place; and patients within RACFs).

When compared to all EMS-treated OHCA patients, paramedic-witnessed OHCA patients had higher rates of cardiac aetiology (77.0%) and a higher median age (70 years). However, this cohort were comparable in sex (63.2% male) and initial rhythm (28.9% shockable) (Table 5, Figure 20).

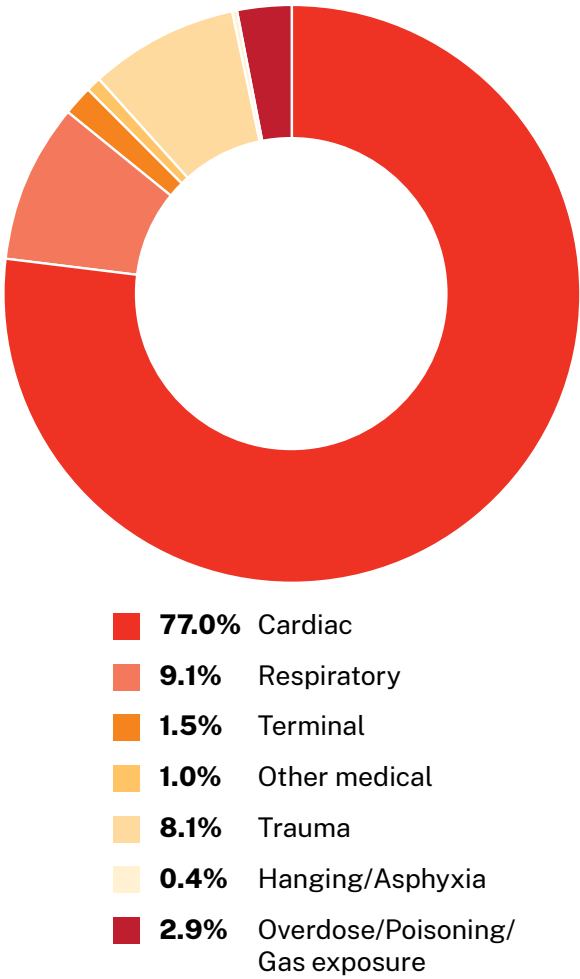
Event survival and 30-day survival for EMS-treated paramedic-witnessed cardiac arrests were notably higher than that observed in all EMS-treated OHCA (38.6% and 25.3%, respectively).

Table 5: Characteristics of patients experiencing paramedic-witnessed OHCA in NSW, 2024
(EMS-treated, Paramedic-witnessed cardiac arrests, excluding terminal/NFR/RACF patients)

Characteristic	EMS-treated, Paramedic-witnessed OHCA (n = 518)	
Age (years, median Q1-Q3)	70 (55-79)	
Sex		
Female	190	36.7%
Male	327	63.1%
Initial rhythm*		
Shockable	146	28.9%
Non-shockable	359	71.1%
Survival**		
Survived event	200	38.6%
30-day survival	128	25.3%

* Initial rhythm was unknown in 13 cases
**30-day survival was missing in 12 cases
Denominators have been adjusted accordingly.

Figure 20: Aetiology of patients experiencing paramedic-witnessed OHCA in NSW, 2024
(EMS-treated, Paramedic-witnessed cardiac arrests, excluding terminal/NFR/RACF patients)



Performance

Benchmarking survival outcomes: Utstein comparator group

The Utstein comparator group is a standardised way of comparing data about cardiac arrests across different regions, hospitals, or emergency health services. Endorsed by the international resuscitation community, the comparator group can be likened to a common set of guidelines or a checklist that ensures everyone is measuring and reporting information about cardiac arrests in the same way (comparing like with like)⁶.

Comparison of survival rates in a standardised population assists health care providers and researchers to better understand which treatments and interventions are most effective in saving lives. Consistent data collection, analysis and benchmarking enables a cycle of continuous improvement, where evidence informs practice to

ultimately improve patient outcomes. The Utstein comparator group is defined as:

- Cardiac arrest is witnessed by a bystander (not paramedic-witnessed)
- Patient presents with an initial shockable rhythm
- EMS-treated resuscitation
- Presumed cardiac aetiology

In 2024, there were 491 (14.0% of all EMS-treated OHCA) patients that met the Utstein criteria, of which 31.2% survived to 30 days. The latest available figures from national and international ambulance services on survival rates for patients meeting Utstein criteria are below (Table 6).

Table 6: Benchmarking OHCA survival rates, Utstein comparator group

Organisation	Utstein Definition Variations ^{A, B}	Time period	Survived event (%)	30-day Survival or Survived to hospital discharge (%)
NSW Ambulance	All age Presumed cardiac aetiology	1 Jan 24 – 31 Dec 24	47.0%	31.2% ^C
Queensland Ambulance Service ⁷	All age All aetiology	1 Jul 21 – 30 Jun 22	43.8%	27.5% ^C
Aotearoa New Zealand ⁸	≥15 years All aetiology	1 Jul 23 – 30 Jun 24	48.0%	33.0% ^C
St John Ambulance WA ⁹	All age All aetiology	1 Jan 24 – 31 Dec 24	50.6%	35.9% ^C
Ambulance Victoria ¹⁰	All age All aetiology	1 Jul 23 – 30 Jun 24	-	41.0% ^D
English Ambulance Services ¹¹	All age Presumed cardiac aetiology	1 Jul 23 – 30 Jun 24	51.1%	28.6% ^C
Ireland National Ambulance Service ¹²	≥17 years Medical aetiology only	1 Jan 24 – 31 Dec 24	40.0%	29.0% ^D
Scottish Ambulance Service ¹³	Initial shockable rhythm	1 Apr 23 – 31 Mar 24	56.5%	29.3% ^C
King County EMS ¹⁴	All age Non-traumatic aetiology only	1 Jan 23 – 31 Dec 23	-	51.0% ^D

A-All jurisdictions' definitions include bystander-witnessed, initial shockable rhythm, and EMS-treated cardiac arrests, excluding Scotland shockable rhythm)

B-Definitions can vary across jurisdictions according to age and aetiology, as such caution is advised when making comparisons between ambulance service providers.

C-Reports 30-day survival

D-Reports survival to hospital discharge

NSW Ambulance response times

Ambulance response time is defined as the time that elapses between receipt of the Triple Zero (000) call on the dispatch board and the arrival of EMS at the scene. This is a key prognostic factor for OHCA, and numerous studies have shown that shorter response times are associated with higher 30-day survival rates and favourable neurological outcomes.

To minimise potential bias, ambulance response times are analysed on the bystander-witnessed cohort. In years previous to 2022, NSW Ambulance response times were analysed on the EMS-treated (excluding paramedic-witnessed) cohort. The limitations of using EMS-treated (excluding paramedic-witnessed) cohort have been recognised, particularly in reference to OHCA patients where the decision not to resuscitate the patient was possibly influenced by an extended response time.

The decision to analyse response times on the bystander-witnessed cohort was taken to ensure best reflection of response times in the patient group that were most suitable for resuscitation. As a result, all reported median response times are higher than those reported in years prior to 2022.

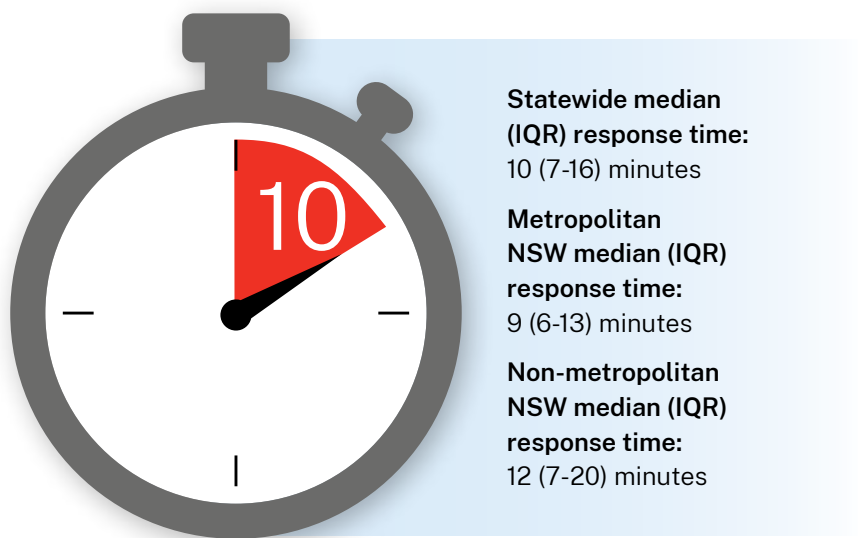
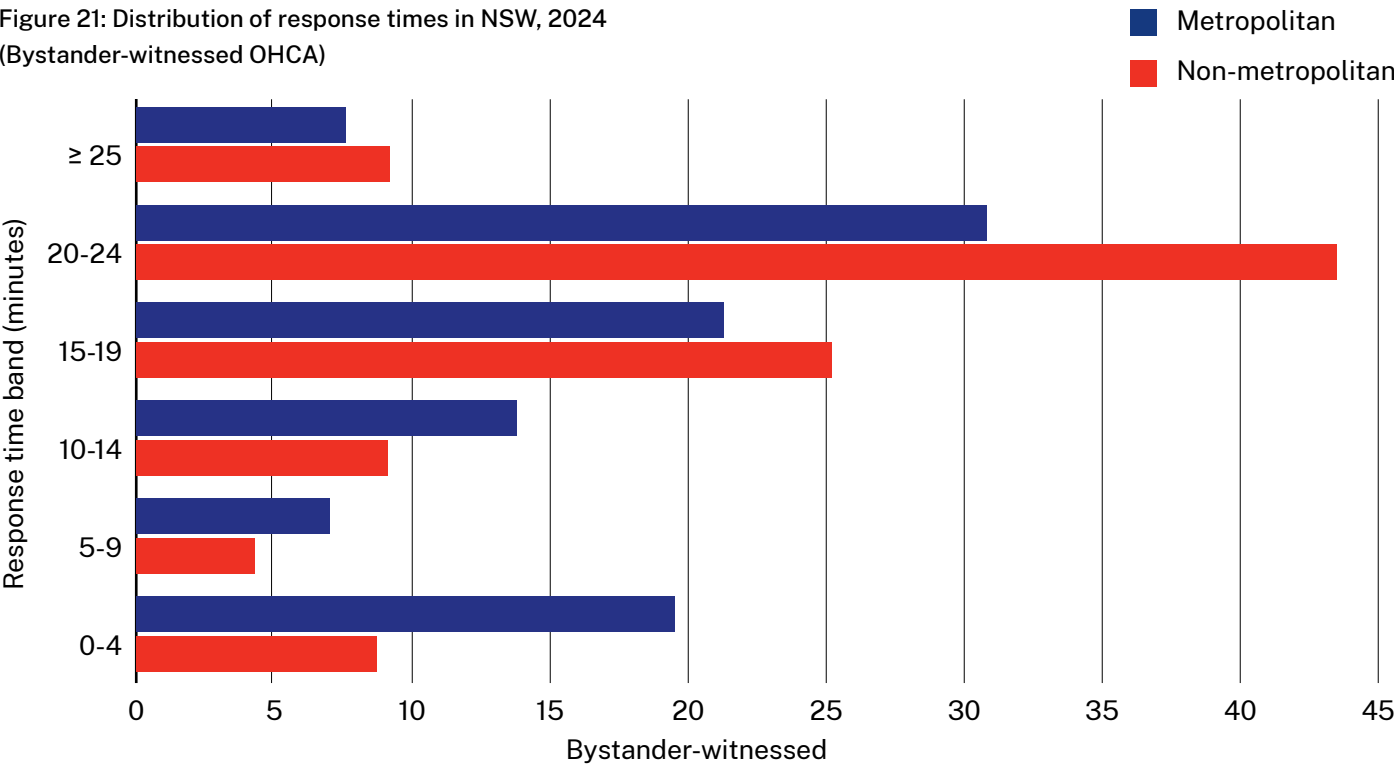


Figure 21: Distribution of response times in NSW, 2024 (Bystander-witnessed OHCA)



Out-of-hospital cardiac arrest emergency response

Nearly a third of all Australians live in New South Wales (NSW), with most living in the Greater Sydney region. NSW has the highest population of any state in Australia, with 8,484,357 residents as of 30 June 2024. Roughly 66% of the state's population live in Greater Sydney¹⁵.

NSW population continues to grow, increasing by roughly 140,000 people annually (1.7%). Population density is largest in Greater Sydney, with 440 people per square kilometre. Census data from 2021 shows the median age of NSW residents was 39 years, with 17.7% of the population aged 65 years and over, and 18.2% aged 0-14 years. NSW has Australia's largest population of Aboriginal and/or Torres Strait Islander people, making up 3.7% of the NSW population¹⁵.



In the 2023-2024 financial year NSW Ambulance received 1,180,733 Triple Zero (000) calls which resulted in over 1.5 million ambulance responses, and transportation of 820,445 patients. NSW Ambulance has over 7,400 employees including 5,982 paramedics working across 246 operational ambulance stations and 9 paramedic response points. NSW Ambulance also operates several clinical volunteer responder models across metropolitan, regional, and remote NSW in approximately 59 locations. These programs are an important part of building the resilience of small communities and minimising the time between calling for help and receiving initial care from clinically skilled responders, until paramedics arrive.

Australia operates a primary national emergency number Triple Zero (000) for community access to emergency service organisations which send Police, Fire and/or Ambulance to emergencies. Triple Zero (000) calls to NSW Ambulance are answered by an Emergency Medical Call Taker at one of four Control Centres. Emergency Medical Call Takers perform telephone triage using the Medical Priority Dispatch System (MPDS) software. When an out-of-hospital cardiac arrest is recognised (or suspected) Emergency Medical Call Takers provide telephone CPR advice commencing with 600 chest compressions followed by two mouth-to-mouth breaths, unless there is information to suggest that mouth-to-mouth breaths should be performed prior to chest compressions (e.g. drowning). A subsequent ratio of 100 compressions to two breaths is advised until help arrives.

Advanced life support (ALS) is a standard element of NSW Ambulance paramedic scope of practice, inclusive of manual defibrillation, supraglottic airway device and intravenous adrenaline administration (in adults). Specialist intensive care paramedics are also credentialed in intubation, intra-osseous access, and administration of additional ALS medications (e.g. amiodarone). NSW Ambulance cardiac arrest management is consistent with Australian and New Zealand Committee on Resuscitation (ANZCOR) guidelines and the recommendations of the Australian Resuscitation Council.

The closest ambulance resource is assigned to all OHCA with a minimum of three (usually four) paramedics. If closer, clinical volunteers are dispatched who are trained in basic life support including semi-automatic defibrillation. Once on scene, paramedics may decide not to continue or commence resuscitation if: the patient is clearly deceased or has injuries incompatible with life; no CPR was performed for at least 20 minutes prior to paramedic arrival; or there is a valid treatment directive in place. If resuscitation is commenced and the patient remains in asystole or pulseless electrical activity (PEA) for over 20 minutes without return of spontaneous circulation (ROSC), paramedics may discontinue resuscitation.



Stations

246 Operational Ambulance Stations plus 9 Paramedic Response Points



Aeromedical operations

12 helicopters
6 fixed wing aircraft
8 medical retrieval ambulances operating from 9 bases



Road operations

1,075 standard ambulances
107 intensive care unit ambulances
46 extended care paramedic vehicles
584 other operational vehicles



People

7,436 staff work at NSW Ambulance
5,982 paramedics
647 control centre staff
604 corporate and support staff
128 doctors
75 nurses
384 clinical volunteers
41 chaplains

The NSW Ambulance Cardiac Arrest Registry

Clinical quality registries provide a powerful tool with which to understand variation in treatments and outcomes, identify prognostic factors, examine standard of care patterns, evaluate effectiveness, monitor safety, and influence clinician behaviour through feedback. Clinical research has consistently demonstrated that instituting clinical quality registries improves patient outcomes and reduces health care costs.

NSW Ambulance Cardiac Arrest Registry

In 2017, NSW Ambulance established the Out-of-Hospital Cardiac Arrest (OHCA) clinical quality registry (The Registry), which was created to include all patients who experience a cardiac arrest outside of a hospital setting and who are attended by a NSW Ambulance clinician. The registry adheres to the widely accepted Utstein dataset and definitions⁶, with inclusion of all core variables and numerous supplementary variables to accommodate local requirements. The registry includes information on the arrest event, prehospital treatment, and prehospital outcome. Longer term survival outcomes are obtained via data linkage, conducted by the Centre for Health Record Linkage (CHeReL), and overseen by the NSW Ministry of Health. The registry is housed in the REDCap (Research Electronic Data Capture) platform, a secure, Health Records and Information Privacy Act (HRIPA) compliant, web-based, data collection application. Advantages to REDCap include secure multi-site

access, inbuilt data quality control tools, and multiple safeguards that protect health information and preserve privacy.

Case identification

Maintaining a consistent approach to case identification in OHCA is of central importance when comparing survival between ambulance services and contributing data to resuscitation trials. The case identification process used by NSW Ambulance aligns with other cardiac arrest registries and begins with the identification of cases from electronic and paper-based patient health care records. Inclusion and exclusion criteria include:

Inclusion criteria	Exclusion criteria
Patients of all ages who suffer a documented OHCA	Brief episodes of pulselessness that do not receive CPR
OHCA occurs in NSW (or neighbouring states) AND NSW Ambulance is the primary caregiver	Patients suffering an in-hospital cardiac arrest, where NSW Ambulance may attend, but is not the primary caregiver
Patient pulseless on arrival of EMS; OR becomes pulseless in the presence of EMS; OR has a pulse on EMS arrival, where a successful bystander resuscitation was undertaken prior to EMS arrival	Patients with a pulse on EMS arrival, where a bystander suspected an OHCA but there was no defibrillation prior to EMS arrival, and no other evidence verifying the OHCA





Since 2010, the details of patient encounters at NSW Ambulance have been electronically recorded using mobile computer tablets synchronised daily to a clinical data warehouse. A highly sensitive search algorithm is applied to these warehoused data to identify potential cardiac arrest cases. Registry data fields are initially populated through extraction of standardised data, eliminating the need for intermediary case report forms and minimising transcription errors and the level of missing data. The dataset is then completed through the abstraction of data of prognostic importance, by specifically trained data coders.

Quality Control

The implementation of real-time coding alerts has improved data quality through immediate flagging of inconsistencies, errors, or missing data, allowing for prompt correction, and ensuring the integrity of the registry's data. This proactive approach to quality control has over time, resulted in a marked reduction in the number of cases where initial rhythm and witnessed status were recorded as 'unknown', ultimately enhancing the reliability and validity of findings. Quality control is facilitated by data range and validity checks using embedded electronic algorithms. Incomplete or

erroneous data fields, such as negative time intervals, are remedied manually using information from patient health care records and computer aided dispatch data. Where patient identifiers are sufficient and death has occurred, linkage of the registry to the NSW Register of Births Deaths and Marriages (RBDM) is used to obtain the date of death.

Reporting

NSW Ambulance has utilised registry data to produce OHCA annual reports since 2017 which are public facing and readily available to community members. Each financial year, registry data is provided to The Council of Ambulance Authorities (CAA) for the Report on Government Services (ROGS), produced by the Productivity Commission.

The NSW Public Health Act 2010 allows for the Minister for Health to establish public health or disease registers to follow up the care and treatment of patients. The Centre for Epidemiology and Evidence establishes and manages a range of ad hoc and ongoing registers, based on linked administrative data. One such register is the Population Health and Risks Outcome Register (PHROR). Upon request, NSW Ambulance reports all instances of OHCA to the PHROR.



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Glossary of terms

ACLS	Advanced Cardiac Life Support
AED	Automated External Defibrillator
ANZCO	Australian and New Zealand Committee on Resuscitation
APDC	Admitted Patient Data Collection
CHeReL	Centre for Health Record Linkage
CPR	Cardiopulmonary Resuscitation
EDDC	Emergency Department Data Collection
EMD	Emergency Medical Dispatch
EMS	Emergency Medical Service
HRIPA	Health Records and Information Privacy Act
MPDS	Medical Priority Dispatch System
NSW	New South Wales
OHCA	Out-of-Hospital Cardiac Arrest
PEA	Pulseless Electrical Activity
PHROR	Population Health Risks and Outcomes Register
RBDM	Registry of Births Deaths and Marriages
REDCap	Research Electronic Data Capture
ROSC	Return Of Spontaneous Circulation
SA4	Statistical Area 4
SCA	Sudden Cardiac Arrest
SES	State Emergency Service
SUDI	Sudden Unexpected Death in Infancy
VF	Ventricular Fibrillation
VT	Ventricular Tachycardia
WA	Western Australia





Definitions

30-day survival: Patient is alive 30 days after the OHCA event.

Adult: Patient aged 16 years or older.

Aetiology: the cause, or set of causes of a disease or condition

Age-standardised incidence: the proportion that would have occurred if all communities had the same underlying age distribution.

Crude incidence: the proportion of events in the community.

EMS: EMS is an Emergency Medical Service providing pre-hospital patient care.

EMS-treated: Patient received resuscitation by NSW Ambulance clinicians or another emergency medical service.

Metropolitan NSW: defined as Greater Sydney and Central Coast SA4 regions.

Non-metropolitan NSW: defined as all SA4 regions other than Greater Sydney and Central Coast, also referred to as Rest of NSW.

n = represents the number or raw value.

Paediatric: Patient aged less than 16 years.

Paramedic-witnessed: OHCA that was witnessed by a NSW Ambulance clinician.

Return of Spontaneous Circulation (ROSC):
Where the OHCA patient regains a palpable pulse during resuscitation.

SA4: geographical areas or sub-State regions designed for the output of a variety of regional data.

Survived event: Patient(s) who achieved ROSC and survived to the Emergency Department.

Utstein subgroup: Patients where the following criteria are met: EMS-treated, bystander-witnessed OHCA, shockable initial rhythm, of presumed cardiac aetiology.

Witnessed arrest: The OHCA was seen or heard by another person.



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