



**Hato Hone  
St John**

# Out-of-Hospital Cardiac Arrest Registry

**Summary Report 2021/22**



---

**Clinical Audit and Research**

**Enquiries email:** [CART@stjohn.org.nz](mailto:CART@stjohn.org.nz)

**Publication date:** February 2023

**Authors:** Heather Hutchinson, Verity Todd, Graham Howie, Pablo Callejas, Glen Stewart, Bridget Dicker

ISSN 2703-4089 (Online)

© Copyright Hato Hone St John New Zealand 2023. Not to be reproduced in part or in whole without permission of the copyright holder.

# Lifesaving teamwork

**At 4am on Tuesday 14 June this year Julie McEwan woke suddenly to a real-life nightmare.**

Her husband of 36 years, Greg, was making a strange noise, then became unresponsive and stopped breathing. Julie dialled 111 immediately and from there the “well-oiled” emergency response unfolded.

“The emergency medical dispatcher talked me through exactly what to do, telling me to give him (Greg) chest compressions until the emergency services arrived,” Julie says.

“They were very quick. A team of people continued compressions, administering AED shocks until they got a heart rhythm. They were amazing, they never gave up.”

The emergency team and ambulance crew continued to work on Greg at Oamaru Hospital to intubate and stabilise him for the rescue helicopter team to take them both to Dunedin.

“The chopper guys were incredible working with the emergency team. We’re a little seaside village and all those people responded. Every single one of them saved his life. It is amazing what a well-oiled team they are.”

Julie and Greg’s experience followed the key ‘call, push, shock’ steps that can make all the difference for someone in a cardiac arrest.

Steven Renton, who is the Emergency Response Coordinator at OceanGold Macraes Mine, arrived on scene about the same time as Hato Hone St John Ambulance.

Steve says he was just leaving for work and had switched his truck radios on when the “All Stations, All Stations, Purple Call” came through indicating that someone nearby was in cardiac arrest.

“I actually only live around the corner from Julie and Greg, so was there pretty quickly. As I was grabbing my defibrillator and trauma pack out of the back of my truck, the ambulance pulled up,” Steve says.

“Julie had done a great job administering CPR but it was clear Greg needed to be shocked to get his heart going again and then onto hospital as quickly as possible.”



In 2019 Greg was diagnosed with a genetic heart muscle disorder called hypertrophic cardiomyopathy (HCM). Julie says the irony of Greg’s cardiac arrest was he was booked to have surgery to implant a cardioverter defibrillator (ICD) on the 15<sup>th</sup> June.

“This surgery was due early February but was delayed due to Covid-19,” she says.

“He was supposed to have the implant on Wednesday 15<sup>th</sup> at Mercy Hospital – so he was only one day away from getting this potentially lifesaving device.”

Greg finally got the implant after he had recovered enough on his 17<sup>th</sup> day in hospital.

He has little memory of the weeks leading up to and after his cardiac arrest but says it’s been a long journey – spending 32 days in hospital in total. Twenty of those were in Dunedin Hospital – nine of which were in the intensive care unit in a coma. He also spent 12 days in Oamaru.

Greg is now making steady progress at home and is incredibly grateful for the medical care he received.

“They were all so good, but especially the first responders, including the guys from FENZ. To get up in the middle of the night and help us like that – we are just so lucky to have so many good first responders in Oamaru,” he says.

Both Greg and Julie believe without the 111 medical dispatcher talking Julie through CPR and then Steve arriving with his AED, Greg wouldn’t be alive today.

“I am incredibly lucky and would encourage everyone to learn CPR and how to use an AED. Better yet, sign up to a St John 3 Steps for Life course and become a GoodSAM responder. The more people in our communities who know how to save a life, the more lives can be saved.” ●



# 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 the Hato Hone St John EAS in the period from 1 July 2021 to 30 June 2022.

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.

Unless otherwise stated, all analyses exclude cardiac arrests witnessed by EAS personnel. In cases where it was not recorded whether the patient was an adult or a child, the patient was assumed to be an adult and was included in that category.

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



# Executive summary



**6 people a day**

(approx) were treated for an out-of-hospital cardiac arrest by Hato Hone St John (around 2,000 per year)

31% female,  
69% male



**76%**

of patients received  
bystander CPR



The median time in which a Hato Hone St John ambulance reached a patient was **9 minutes** in urban communities and **12 minutes** in rural and remote communities



**4%**

received defibrillation by a  
Community Responder prior  
to ambulance arrival



**96%**

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



**21%**

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



**11%**







of patients  
survived

**All events, adult, resuscitation attempted:** includes adults ( $\geq 15$  years old), all-cause, resuscitation attempted. Excludes children, and EAS personnel witnessed events. Annual comparisons for these figures are shown in Table 1.

# Benchmarking executive summary

## Key figures for all-cause events

Table 1: Key figures for all-cause events<sup>A</sup>

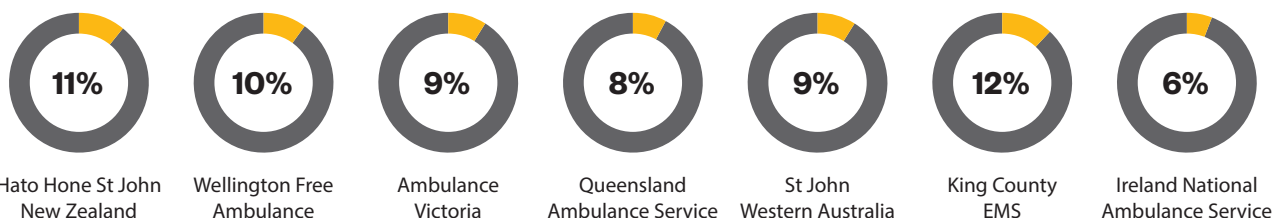
Year	Total number events	 % Bystander CPR	 % Community Responder AED use	 Urban median response time	 Rural & remote median response time	 % Attended by Fire & Emergency New Zealand	 % ROSC on handover	% Survival icon" data-bbox="830 215 885 240"/> % Survival
2013/14 (9mo)	1,101	75%	3.9%	8	11	45%	27%	13%
2014/15	1,690	74%	3.7%	8	10	82%	28%	12%
2015/16	1,696	72%	4.5%	7	10	79%	25%	11%
2016/17	1,792	72%	4.6%	5	8	82%	27%	12%
2017/18	1,927	74%	5.1%	6	9	84%	28%	13%
2018/19	1,808	76%	4.0%	8	13	92%	27%	13%
2019/20	2,003	75%	5.0%	8	12	95%	25%	12%
2020/21	1,967	75%	5.4%	8	12	96%	25%	11%
2021/22	2,114	76%	4.5%	9	12	96%	21%	11%

## Benchmarking (all-cause events)

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

Table 2: Benchmarking survival outcomes for all-cause events<sup>A</sup>

Ambulance Service	Collection period	Total number events	% ROSC on handover	% Survival <sup>B</sup>
Hato Hone St John New Zealand	1 July 2021 to 30 June 2022	2,114	21%	11%
Wellington Free Ambulance	1 July 2021 to 30 June 2022	234	26%	10%
Ambulance Victoria <sup>1</sup>	1 July 2021 to 30 June 2022	2,467	28%	9%
Queensland Ambulance Service <sup>C,2</sup>	1 January 2021 to 31 December 2021	2,057	25%	8%
St John Western Australia <sup>3</sup>	1 July 2021 to 30 June 2022	936	18%	9%
King County EMS <sup>4</sup>	1 July 2021 to 30 June 2022	971	39%	12%
Ireland National Ambulance Service <sup>5,C,D</sup>	1 January 2021 to 31 December 2021	2,906	16%	6%



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

**B** Hato Hone St John New Zealand, Wellington Free Ambulance, St John Western Australia, and Queensland Ambulance Service report on survival to 30-days, all other services report survival to hospital discharge.

**C** The Queensland Ambulance Service and Ireland National Ambulance Service report on all ages.

**D** Ireland National Ambulance Service data includes EAS personnel witnessed events.

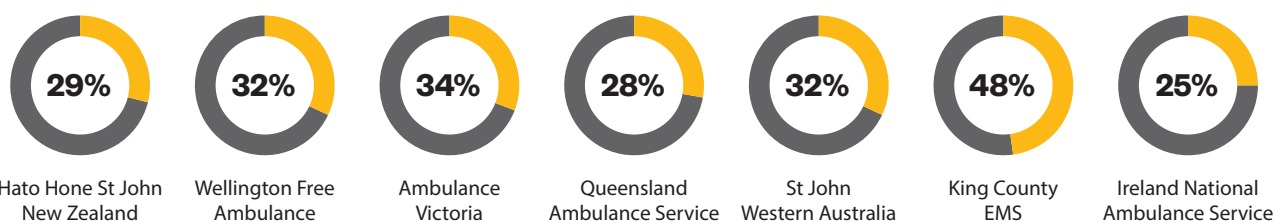


## Benchmarking (Utstein Comparator Group)<sup>A</sup>

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 ( $\geq 15$  years old), all-cause, resuscitation attempted, shockable presenting rhythm and bystander witnessed. Excludes children, EAS witnessed and no resuscitation attempt.

**Table 3: Benchmarking survival outcomes for adults (Utstein Comparator Group)<sup>A</sup>**

Ambulance Service	Collection period	Total number events	% ROSC on handover	% Survival <sup>B</sup>
Hato Hone St John New Zealand	1 July 2021 to 30 June 2022	530	43%	29%
Wellington Free Ambulance	1 July 2021 to 30 June 2022	62	50%	32%
Ambulance Victoria <sup>1</sup>	1 July 2021 to 30 June 2022	461	60%	34%
Queensland Ambulance Service <sup>2,C</sup>	1 January 2021 to 31 December 2021	338	49%	28%
St John Western Australia <sup>3</sup>	1 July 2021 to 30 June 2022	172	41%	32%
King County EMS <sup>4</sup>	1 July 2021 to 30 June 2022	141	74%	48%
Ireland National Ambulance Service <sup>5,D</sup>	1 January 2021 to 31 December 2021	365	37%	25%



**A Utstein Comparator Group:** includes adults ( $\geq 15$  years old), all-cause, resuscitation attempted, shockable presenting rhythm and bystander witnessed. Excludes children, EAS witnessed and no resuscitation attempt.

**B** Hato Hone St John New Zealand, Wellington Free Ambulance, St John Western Australia, and Queensland Ambulance Service report on survival to 30-days, all other services report survival to hospital discharge.

**C** Queensland Ambulance Service reports on all ages.

**D** Ireland National Ambulance Service reports on patients  $>17$  years old.



# The Global Resuscitation Alliance 10 Steps to improving outcomes

- |   |           |  |
|---|-----------|--|
|    | <b>1</b>  | <b>Establish a cardiac arrest registry</b>   |
|    | <b>2</b>  | <b>Provide telephone CPR instructions with ongoing training and quality improvement</b>                                  |
|    | <b>3</b>  | <b>Provide high-performance CPR with ongoing training and quality improvement</b>  |
|   | <b>4</b>  | <b>Use rapid dispatch</b>  |
|  | <b>5</b>  | <b>Measure resuscitation performance using the defibrillator recording</b>   |
|  | <b>6</b>  | <b>Begin an AED programme for first responders, including police officers, guards, and other security personnel</b>      |
|  | <b>7</b>  | <b>Use smart technologies to notify volunteer bystanders so they can respond to provide early CPR and defibrillation</b> |
|  | <b>8</b>  | <b>Make CPR and AED training mandatory in schools and communities</b>  |
|  | <b>9</b>  | <b>Be accountable – publicise annual reports</b>   |
|  | <b>10</b> | <b>Provide a culture of excellence</b>   |

The concept of the Resuscitation Alliance is that all members of the Global Resuscitation Alliance, of which Hato Hone St John NZ is one, will use and promote the 10 Steps for Improving Survival from Cardiac Arrest, thus extending the best practices in cardiac arrest survival internationally.

Each of the 10 Steps consists of a number of elements that are outlined in detail within the update from the Global Resuscitation Alliance here: <https://www.globalresuscitationalliance.org/resources/>





1

## Establish a cardiac arrest registry

The Hato Hone St John OHCA Registry was established in October 2013 and now contains over 40,000 records of OHCA. This continuous measuring

and reporting sets the stage for implementing change and making improvements over time.



2

## Provide telephone CPR instructions with ongoing training and quality improvement

The Ambulance Communications Centre personnel play a pivotal role in increasing the rates of early bystander CPR. As soon as emergency Call Handlers suspect a patient is in cardiac arrest they provide instructions to the caller over the phone on how to perform CPR. This Call Handler directed CPR has been in place since 2002.

Call Handlers may assist callers in locating the nearest AED. There are two key national registries of AEDs. Firstly, there is a website (<https://aedlocations.co.nz>) and secondly AEDs may also be registered with GoodSAM (<https://www.goodsamapp.org/aed>).

AED location details may also be logged within the Hato Hone St John dispatch system. If they are logged in this system then Call Handlers may pinpoint an AED within 200m of the person calling. However, the process for entering AEDs into this system is limited due to the requirement of manual entry and update of devices. This process is being reviewed as it is unable to be systematically maintained with the current infrastructure.

### Rates of bystander CPR

Of the OHCA where resuscitation was attempted, 76% of these had bystander CPR performed prior to ambulance arrival. This figure is similar to previous years (Figure 1).

**Bystander CPR rates**

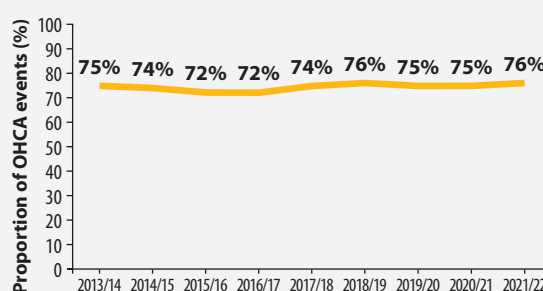


Figure 1: Bystander CPR rates (all events, adult, resuscitation attempted)<sup>A</sup>.

<sup>A</sup> **All events, adult, resuscitation attempted:** includes adults ( $\geq 15$  years old), all-cause, resuscitation attempted. Excludes children, and EAS personnel witnessed events.





3

## Provide High Performance CPR with ongoing training and quality improvement

The Hato Hone St John Clinical Development team provides Hato Hone St John and co-responder personnel with CPR training through a programme of Continuing Clinical Education (CCE). Since July 2017 specialised manikins that measure chest compression performance have been routinely used during CCE so that staff are able to use these scores to measure and improve their performance.

A New Zealand specific model of High Performance CPR has been jointly developed by Hato Hone St John, Wellington Free Ambulance, Fire and Emergency New Zealand and the Auckland University of Technology. This was introduced to ambulance crews nation-wide between April and December 2019. A video outlining the principles employed within the New Zealand model can be found here: <https://youtu.be/7L45-AsO4bA>.

High performance CPR is a professional resuscitation team approach, with carefully delegated roles and leadership, and highly polished coordination between team members. This highly choreographed team model of care relies on continuous high frequency short duration practice sessions, preferably quarterly.

However, there are a number of barriers such as Covid-19, increased staff vacancies and fiscal constraints that impact on access to training for ambulance staff. This is likely to have an ongoing impact on the quality of care delivered to patients, particularly the ability to perform High Performance CPR.



4

## Use rapid dispatch

With time to defibrillation being crucial, Hato Hone St John has protocols to ensure that patients in cardiac arrest are reached in the shortest possible time by responders trained in CPR and with access to a defibrillator. Ambulance Communications Centre staff give a cardiac arrest the highest priority and dispatch the closest resource immediately.

The time between when an emergency call is answered in the Ambulance Communications Centre to when an ambulance arrives is critical. This is one of the key performance indicators for Hato Hone St John EAS and the target is to get trained personnel with a defibrillator to the patient as quickly as possible.

For OHCA where resuscitation was attempted by Hato Hone St John EAS, the median response time (from call pick up in the Ambulance Communications Centre to arrival of the first vehicle on scene) was 9 minutes in urban areas and 12 minutes for rural and remote areas.



**Median urban response time<sup>A</sup>**  
**9 minutes**



**Median rural response time<sup>A</sup>**  
**12 minutes**

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



5

## Measure resuscitation performance using the defibrillator recording

Technology continues to improve. There is now a range of defibrillators on the market that are capable of monitoring and recording the quality of CPR being performed at the scene. These defibrillators are currently deployed within the ambulance sector. However, a significant resource is required

(approximately 60hrs–70hrs/week) to review and provide feedback to staff in order to improve resuscitation performance. Due to constraints (Covid-19, increased staff vacancies and fiscal) within the ambulance sector, such resourcing is not possible and this is likely to impact survival outcomes.



6

## Begin an AED programme for first responders, including police officers, guards, and other security personnel

When there is a suspected cardiac arrest the Ambulance Communications Centre immediately dispatches the closest resource, regardless of qualification. This may be an emergency ambulance or any other co-responder including the Hato Hone St John Patient Transfer Service, Fire and Emergency New Zealand, local first response groups or Primary Response in Medical Emergencies (PRIME) doctors and nurses. By dispatching the nearest resource, defibrillation and CPR can occur as quickly as possible, which may be before EAS arrival.

### Fire and Emergency New Zealand

Since December 2013, Fire and Emergency New Zealand has been part of the team of professionals available to co-respond to an OHCA.

During this reporting period, Fire and Emergency New Zealand attended 96% of adult OHCA events where resuscitation was attempted by EAS. Fire and Emergency New Zealand personnel were also fundamental in the early defibrillation of 169 adult patients in cardiac arrest. Of these patients, 28% survived to 30 days post-event.

Defibrillation of a patient by Fire and Emergency New Zealand or First Response Groups prior to the arrival of EAS is similar to previous years (Figure 2).

**Fire and Emergency New Zealand or First Response Groups defibrillation prior to EAS arrival**

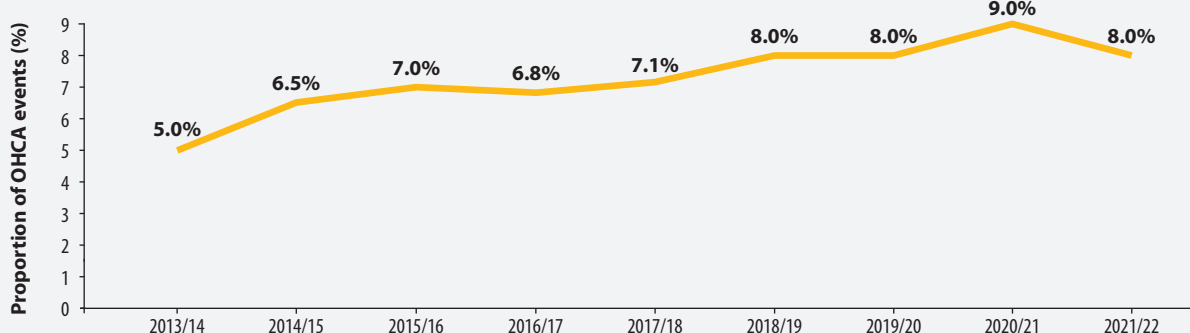


Figure 2: Proportion of events defibrillated prior to EAS arrival by Fire and Emergency New Zealand or First Response Groups (all events, adult, resuscitation attempted)<sup>A</sup>.

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





## Use smart technologies to notify volunteer bystanders so they can respond to provide early CPR and defibrillation

Public access defibrillators and community training have a large role to play in early defibrillation. If an emergency Call Handler suspects they are dealing with a cardiac arrest, one of the first questions they ask is, "Is there an AED available?". If so, they provide instructions on how to use it, as well as on how to perform CPR.

In this reporting period, 4.5% of the total OHCA were defibrillated by a community member using an AED prior to EAS arrival (Figure 3).

In April 2018 the GoodSAM (Good Smartphone Activated Medics) application that alerts community responders to nearby cardiac arrests was launched in New Zealand ([www.goodsamapp.org](http://www.goodsamapp.org)). Anyone who is trained in CPR and how to use an AED is able to register as a GoodSAM responder. Responders are carefully verified through provision of a copy of a formal identification such as a driver licence, passport or Hato Hone St John ID.

The GoodSAM programme could not operate during the Covid-19 lockdowns. That accounts for the percentage drop in number of OHCA attended by GoodSAM responders in the 2020/2021 period (7%).

**Table 4: GoodSAM statistics  
1 July 2018 to 30 June 2022**

Total number of people registered as GoodSAM responders	9,961
Total number of confirmed cardiac arrests with a GoodSAM responder in attendance (adults, resuscitation attempted)	9% (743/7,149)

**Table 5: Number and proportion of OHCA with a GoodSAM responder in attendance**

	Number of OHCA with a GoodSAM responder in attendance	Proportion of OHCA with GoodSAM in attendance
1 July 2018 to 30 June 2019	212	12%
1 July 2019 to 30 June 2020	179	9%
1 July 2020 to 30 June 2021	136	7%
1 July 2021 to 30 June 2022	216	10%
<b>Total</b>	<b>743</b>	<b>9%</b>

**Community defibrillation prior to ambulance arrival**

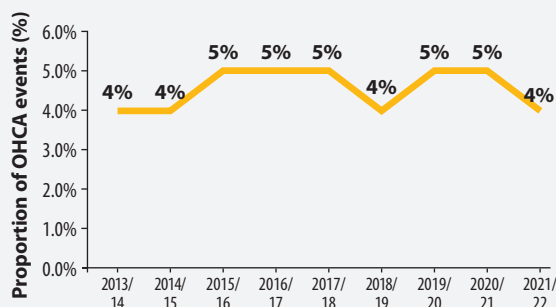
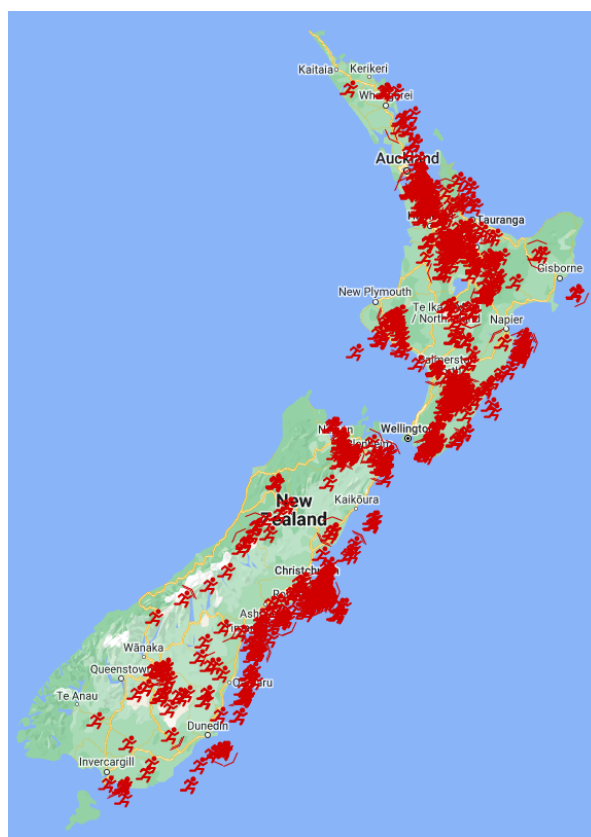


Figure 3: Proportion of events defibrillated prior to EAS arrival by Community Responders (all events, adult, resuscitation attempted)<sup>A</sup>



Location of Community Responders who are using the GoodSAM app across New Zealand.

<sup>A</sup> **All events, adult, resuscitation attempted:** includes adults ( $\geq 15$  years old), all-cause, resuscitation attempted. Excludes children, and EAS personnel witnessed events.



8

## Make CPR and AED training mandatory in schools and communities

To improve the rates of bystander CPR and AED use, Hato Hone St John supports several community initiatives. These include the 3 Steps for Life community awareness programme, Shocktober, the ASB St John in Schools programme, and the National Marae OHCA Project.

### Ngā Tohu Whakaora e 3 – 3 Steps For Life

<https://www.stjohn.org.nz/What-we-do/Community-programmes/3-steps-for-life/>



The mission of Ngā Tohu Whakaora e 3 (3 Steps for Life) is to empower members of the community to step forward when help is needed and increase out-of-hospital cardiac arrest survival rates in communities.

Delivered by Volunteer Community Educators, our programme is a free one-hour awareness session that is delivered to groups of 10 or more and is designed to give New Zealanders the confidence and knowledge around basic CPR and AED training. Our programme gives participants the skills to take action when responding to someone in cardiac arrest.

There are around 250 Volunteer Community Educators delivering 3 Steps for Life across Aotearoa, with over 25,000 members of the public trained since July 2022.

### Shocktober

In 2022, World Restart a Heart Day (October 16th) was revamped and named 'Shocktober'. Events were held across the motu with a total of 13,000 people trained in the 3 Steps for Life programme throughout the month of October.

Highlights for the month included our 3 Steps for Life programme featuring on RadioNZ, Seven Sharp and Māori Television. Over 90% of sessions were delivered by our Volunteer Community Educators, with a total of 141 sessions taught at either high schools, community groups or businesses.

### ASB St John in Schools

<https://www.stjohn.org.nz/What-we-do/Community-programmes/ASB-St-John-in-Schools-Programme/>

Hato Hone St John recognises that children also have a role to play in a community response to an OHCA. This programme delivers interactive sessions to children from preschool/ECE up to Year 9 and 10, empowering them to act in an emergency (including CPR), and keep themselves and others safe. Between 1 July 2021 and 30 June 2022, the ASB St John in Schools programme trained more than 106,000 primary school aged children.

Shocktober 2022



## National Marae OHCA project

Māori are more at risk of cardiac arrest than non-Māori. Hato Hone St John is working with marae around New Zealand to engage with Māori and provide support through improving access to AEDs and training in CPR.

## Online resources

Hato Hone St John has developed several online videos and a smartphone application which are freely available to the public to help them learn CPR and how to use an AED:

- › The Hato Hone St John CPR App: <https://www.stjohn.org.nz/First-Aid/CPR-App/>
- › Learn how to do CPR and to use an AED, 3 Steps for Life: <https://www.stjohn.org.nz/What-we-do/Community-programmes/3-steps-for-life/>

## Engagement with the Ministry of Education

Hato Hone St John supports the New Zealand Resuscitation Council who are engaged with the Ministry of Education, advocating that first aid training be added to the compulsory education curriculum, including performing CPR and using an AED.



## Be accountable – publicise annual reports

All Hato Hone St John OHCA Registry Annual Reports are publicly available. The current report and all previous reports can be downloaded from the Hato Hone St John website: [http://www.stjohn.org.](http://www.stjohn.org.nz/News--Info/Our-Performance/Cardiac-Arrest-Annual-Report/)

[nz/News--Info/Our-Performance/Cardiac-Arrest-Annual-Report/](http://www.stjohn.org.nz/News--Info/Our-Performance/Cardiac-Arrest-Annual-Report/)



## Provide a culture of excellence

To achieve change and a culture of excellence, Hato Hone St John relies on evidence gathered through research and audit. The Hato Hone St John Clinical Audit and Research Team frequently publishes in peer reviewed journals, presents at leadership meetings, analyses data in conjunction

with the Medical Directors and uses data to inform training.

Scientific publications by or in collaboration with the Clinical Audit and Research team can be found on the Hato Hone St John website <https://www.stjohn.org.nz/what-we-do/research-stjohn/>.





## Conclusion

**The 2021/22 reporting year shows an increase in the number of OHCA attended by Hato Hone St John. Survival at 30 days remained stable despite a reduction in ROSC.**

Nationwide impacts of the Covid-19 pandemic in this period included a prolonged lockdown in Auckland in the later part of 2021 and extreme pressures on the entire health system due to increased Covid-19 infections in the first half of 2022.

Within Hato Hone St John personnel absenteeism (due to illness and isolation), coupled with a large increase in emergency ambulance callouts likely accounts for the slight increase in urban response time.

Hato Hone St John needs to maintain and expand its investment into quality improvement in accord with the Global Resuscitation Alliance's 10 Steps to Improving OHCA Outcomes. ●

# Appendices

## The Hato Hone St John Out-of-Hospital Cardiac Arrest Registry

**The Hato Hone St John OHCA Registry was formally established in September 2013. Since the registry was established, data for cardiac arrests attended by Hato Hone St John has been successfully captured for more than 43,000 patients.**

The Hato Hone St John OHCA Registry is overseen by A/Prof Bridget Dicker, Hato Hone St John Head of Clinical Audit and Research and Auckland University of Technology Associate Professor, Paramedicine Department.

### Eligibility

Hato Hone St John captures data on all OHCA events attended by the Hato Hone St John EAS. Hato Hone St John defines a cardiac arrest 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.

**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 Hato Hone St John or one of its participating co-responders is the primary treatment provider
3	› Patients of all ages who on arrival of the Hato Hone St John EAS are unconscious and pulseless with either agonal breathing or no breathing <b>or</b> › Patients of all ages who become unconscious and pulseless with either agonal breathing or no breathing in the presence of Hato Hone St John EAS personnel <b>or</b> › Patients who have a pulse on arrival of Hato Hone St John 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 Hato Hone St John 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 Hato Hone St John 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 Hato Hone St John 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 Wellington Free Ambulance is the primary treatment provider

### 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 Hato Hone St John OHCA Registry.

### 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 is subject to quality improvement processes which involve continual auditing of existing data and updating of the registry entries as appropriate.

Registry reports are generated on a monthly and quarterly basis and these are analysed for variances in the numbers of cases and patient outcomes. Where appropriate, these results are compared with international data from EAS that are similar to Hato Hone St John.

## Missing data

This current OHCA report is based on full electronic data capture of EMS records. By contrast, in the 2018/19 period Hato Hone St John used paper data capture for a hiatus of 6 months (Dec 2018 to July 2019) due to industrial disruption. This likely affected the quality of data and makes comparisons between 2018/19 and the current period less exact.

## Ethical review

The Hato Hone St John 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 Hato Hone St John 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 Hato Hone St John 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 released from this registry. ●

# Abbreviations

<b>AED</b>	Automated external defibrillator	<b>GoodSAM</b>	Good Smartphone Activated Medics
<b>CAD</b>	Computer aided dispatch	<b>OHCA</b>	Out-of-hospital cardiac arrest
<b>CPR</b>	Cardiopulmonary resuscitation	<b>PRIME</b>	Primary Response in Medical Emergencies
<b>DHB</b>	District Health Board	<b>ROSC</b>	Return of spontaneous circulation
<b>EAS</b>	Emergency ambulance service		



# Glossary of terms

<b>Adjusted rates</b>	Rates are standardised to a control population.
<b>Adult</b>	Patients aged 15 years or older.
<b>Asystole</b>	The absence of any cardiac electrical activity.
<b>Children</b>	Patients aged less than 15 years.
<b>Community responder</b>	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.
<b>EAS attended</b>	This is the total population of all OHCA patients which Hato Hone St John EAS attended, regardless of whether emergency treatment was provided or not.
<b>EAS personnel</b>	Emergency ambulance crews dispatched to a medical emergency.
<b>Presumed cardiac aetiology</b>	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.
<b>Resuscitation attempted</b>	The performance of CPR by or under the direction of responding EAS personnel, or the delivery of a shock at any time (including before ambulance arrival).
<b>Return of spontaneous circulation</b>	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 <sub>2</sub> or active movement.
<b>Rural and remote service area</b>	Assigned according to the Geographic Classification for Health <sup>6</sup> . Rural includes: R1, R2 and R3.
<b>Shockable rhythm</b>	Ventricular fibrillation, ventricular tachycardia or unknown shockable (AED).
<b>Specific rates</b>	Rates for specific segments/groups of the population (e.g. sex, age, ethnicity).
<b>Survival to 30-days</b>	The patient is alive at 30-days post-OHCA event.
<b>Survived event</b>	The patient has sustained ROSC to handover at hospital.
<b>Urban area</b>	Assigned according to the Geographic Classification for Health <sup>6</sup> . Urban includes: U1 and U2.
<b>Witnessed event</b>	A witnessed cardiac arrest is one that is seen or heard by another person.

# References

1. Heriot, N. et al, *Ambulance Victoria: OHCA statistics 1 July 2021 to 30 June 2022*. 2023: Personal Communication. Email 27 January 2023
2. Queensland Ambulance Service. *2021 Annual report Out of Hospital Cardiac Arrest & Prehospital ST-segment Elevation Myocardial Infarction* [cited December 2022]; Available from: [https://www.ambulance.qld.gov.au/docs/QAS\\_Cardiac\\_Annual\\_Report\\_2021.pdf](https://www.ambulance.qld.gov.au/docs/QAS_Cardiac_Annual_Report_2021.pdf)
3. Ball, S. et al, *St John Western Australia: OHCA statistics 1 July 2021 to 30 June 2022*. 2022: Personal Communication. Email 16 December 2022.
4. Drucker, C., *Public Health-Seattle & King County, Division of Emergency Medical Services, King County, Washington, USA: OHCA statistics 1 July 2021 to 30 June 2022*. 2023: Personal Communication. Email 24 January 2023.
5. National Ambulance Service. *Out-of-Hospital Cardiac Arrest Register Annual Report 2021*. 2022; Available from: <https://www.hse.ie/eng/services/news/newsfeatures/out-of-hospital-cardiac-arrest-register-ohcar-/ohcar-annual-report-2021.pdf>.
6. Whitehead J, Davie G, de Graaf B, Crengle S, Fearnley D, Smith M, Lawrenson R, Nixon G. *Defining rural in Aotearoa New Zealand: a novel geographical classification for health purposes*. NZ Med J. 2022 Aug 5;135(1559):24-40.



**Hato Hone  
St John**

**HATO HONE ST JOHN  
NATIONAL HEADQUARTERS**

Level 3  
600 Great South Road  
Ellerslie  
Private Bag 14902  
Panmure  
Auckland 1741  
Tel: 09 579 1015

**HATO HONE ST JOHN  
NORTHERN REGION  
HEADQUARTERS**

Level 3  
600 Great South Road  
Ellerslie  
Private Bag 14902  
Panmure  
Auckland 1741  
Tel: 09 579 1015

**HATO HONE ST JOHN CENTRAL  
REGION HEADQUARTERS**

63 Seddon Road  
Private Bag 3215  
Hamilton 3240  
Tel: 07 847 2849

**HATO HONE ST JOHN  
IN WELLINGTON**

55 Waterloo Quay  
PO Box 10043  
Wellington 6143  
Tel: 04 472 3600

**HATO HONE ST JOHN  
SOUTH ISLAND REGION  
HEADQUARTERS**

PO Box 1143  
Christchurch 8140  
Tel: 03 353 7110

**stjohn.org.nz**  
**0800 ST JOHN (0800 785 646)**  
**info@stjohn.org.nz**

**Follow Hato Hone St John:**



facebook.com/StJohnNewZealand



twitter.com/StJohnNZ



linkedin.com/company/St-John-New-Zealand



instagram.com/stjohnnz