Resuscitation Council UK

ncaa

icnarc intensive care national audit & research centre

National Cardiac Arrest Audit
Public Report 2022–23

Paediatric Summary Statistics, 1 April 2018 to 31 March 2023

Contents

About the Intensive Care National Audit & Research Centre (ICNARC)

ICNARC is an independent, scientific, not-for-profit organisation, established in 1994. Our vision is that all critically ill people receive appropriate, timely and optimal care and achieve best outcomes.

Our mission is to improve the quality of critical care through audit, research and data services conducted with, and in the interests of, patients and those who care for them.

The National Cardiac Arrest Audit (NCAA), run in collaboration with Resuscitation Council UK (RCUK), is one of four national clinical audits operated by ICNARC, including the Case Mix Programme (CMP) on adult critical care.

The National Cardiac Arrest Audit (NCAA)

The National Cardiac Arrest Audit (NCAA), launched in 2009, is the national clinical audit of in-hospital cardiac arrests in the UK, and is a collaboration between the RCUK and ICNARC.

Hospitals participating in NCAA submit data for "*Any resuscitation event, commencing in-hospital, where an individual (excluding neonates) receives chest compression(s) and/or defibrillation and is attended by the hospital-based resuscitation team (or equivalent) in response to a 2222 call*." This is referred to as a "team visit".

The NCAA Team works with hospitals to ensure the entry of timely and accurate data, which are used to provide quarterly, cumulative analysis reports to support local performance management and quality improvement.

The aims of the audit are to:

- improve patient outcomes after in-hospital cardiac arrest;
- decrease incidence of avoidable cardiac arrests;
- decrease incidence of inappropriate resuscitation; and
- promote adoption and compliance with evidence-based practice.

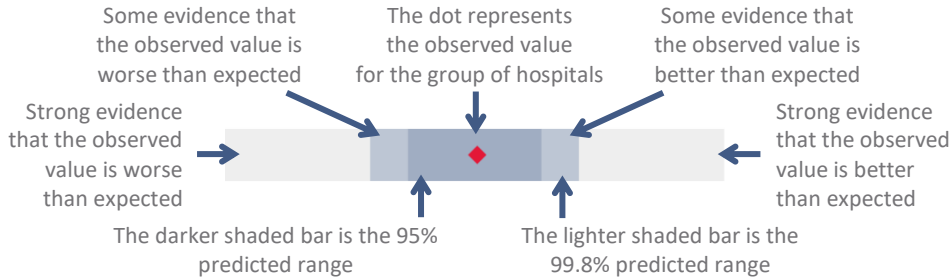
About the Resuscitation Council UK (RCUK)

RCUK is the national expert in resuscitation, saving lives by developing guidelines, influencing policy, delivering courses and supporting cutting-edge research. Through education, training and research, RCUK is working towards the day when everyone in the country has the skills they need to save a life.

Formed in 1983, RCUK is committed to ensuring that survival rates for in- and out-of-hospital cardiac arrest improve, doing this by driving CPR education, and encouraging everyone, from healthcare workers to the general public, to learn life-saving resuscitation skills.

Presentation of statistics

Results presented in this report include rates of cardiac arrest, return of spontaneous circulation for at least 20 minutes (ROSC >20 min), and survival to hospital discharge, by hospital type (paediatric centres vs other centres). Rates are presented with confidence intervals reflecting uncertainty surrounding the observed rate and show the range within which it is most likely that the true rate for the hospital lies. ROSC >20 min and survival to hospital discharge are presented with predicted ranges that are "risk-adjusted" using the $NCAA_{2023}$ Risk Models to also account for differences in patient and arrest characteristics between hospitals. Confidence intervals and predicted ranges are presented graphically. While observed results will always lie in the middle of a confidence interval, we expect observed results to lie within a 95% predicted range 19 times out of 20 and within a 99.8% predicted range 998 times out of 1000. Predicted ranges can be interpreted as follows:



Participation in the National Cardiac Arrest Audit

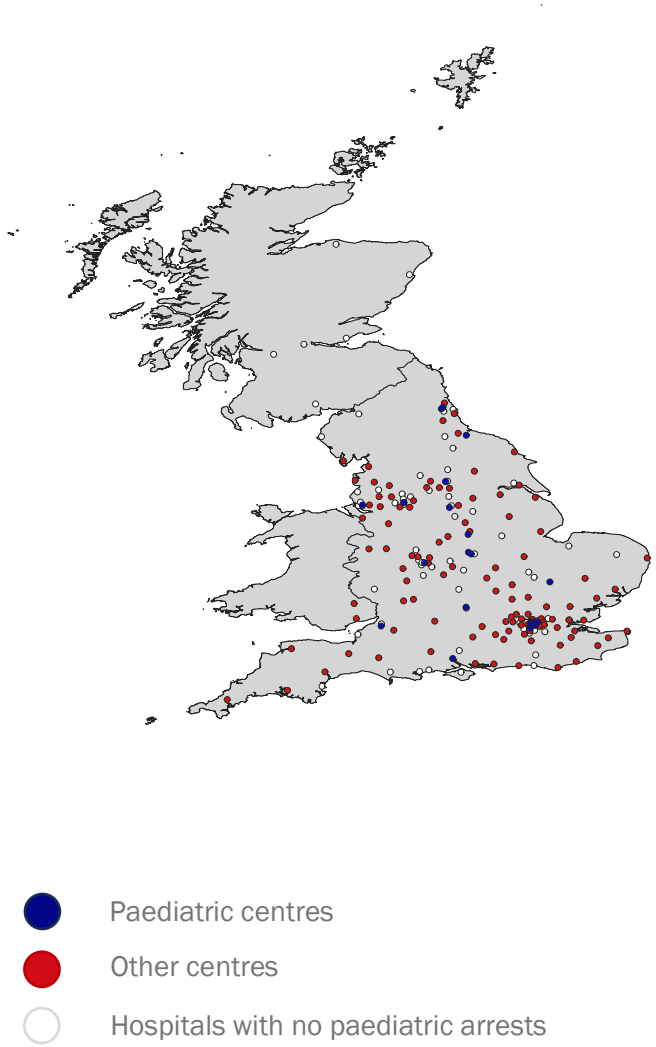
Due to the small number of cardiac arrests in children, these paediatric summary statistics include data from 1 April 2018 to 31 March 2023. In this period, there were a total of **134** hospitals in the UK participating in the National Cardiac Arrest Audit with at least one paediatric arrest (age less than 16 years). The breakdown of hospitals and team visits by hospital type is shown below:

Hospitals	Number of participating hospitals	Total number of reported in-hospital cardiac arrests	Total number of individuals
Paediatric centres*	22	606	545
1 Apr 2022 – 31 Mar 23	*22*	*114*	*106*
1 Apr 2021 – 31 Mar 22	*22*	*116*	*101*
1 Apr 2020 – 31 Mar 21	*22*	*92*	*87*
1 Apr 2019 – 31 Mar 20	*22*	*119*	*110*
1 Apr 2018 – 31 Mar 19	*22*	*165*	*141*
Other centres†	112	469	455
1 Apr 2022 – 31 Mar 23	*105*	*122*	*119*
1 Apr 2021 – 31 Mar 22	*109*	*89*	*84*
1 Apr 2020 – 31 Mar 21	*107*	*61*	*60*
1 Apr 2019 – 31 Mar 20	*111*	*108*	*104*
1 Apr 2018 – 31 Mar 19	*111*	*89*	*88*

* Includes all paediatric arrests in hospitals with tertiary paediatric services including a paediatric intensive care unit

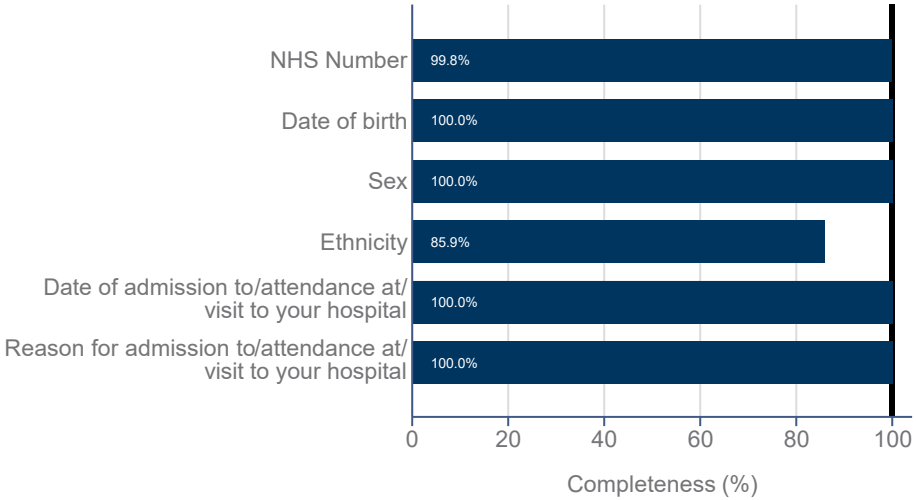
† Includes all paediatric arrests from all other acute hospitals

Note: Number of hospitals participating in NCAA includes those submitting data for all or part of the specified period

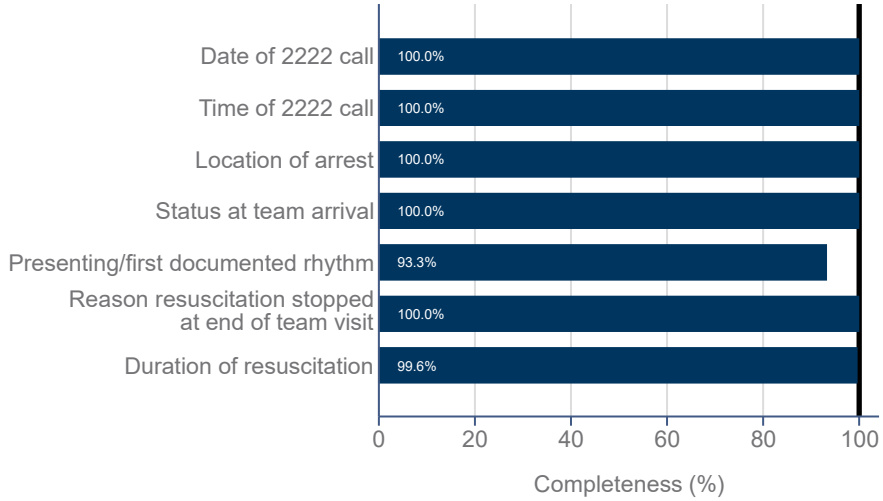


Data completeness

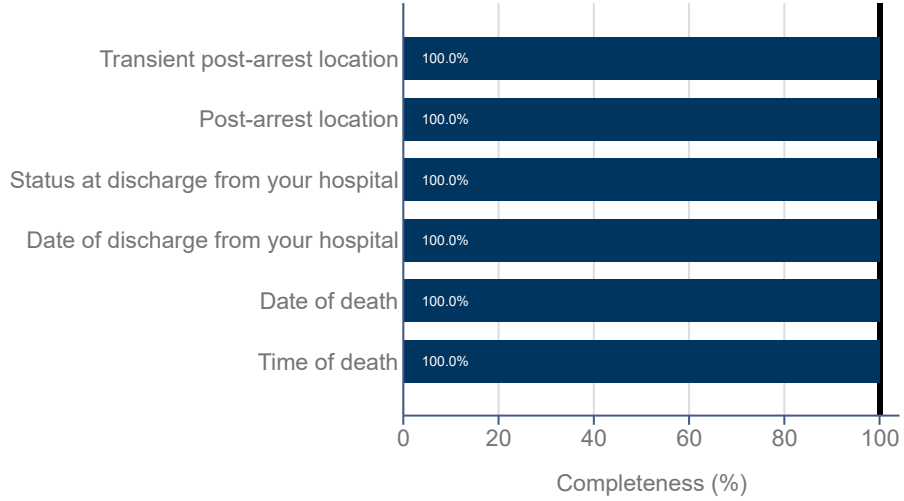
Patient details



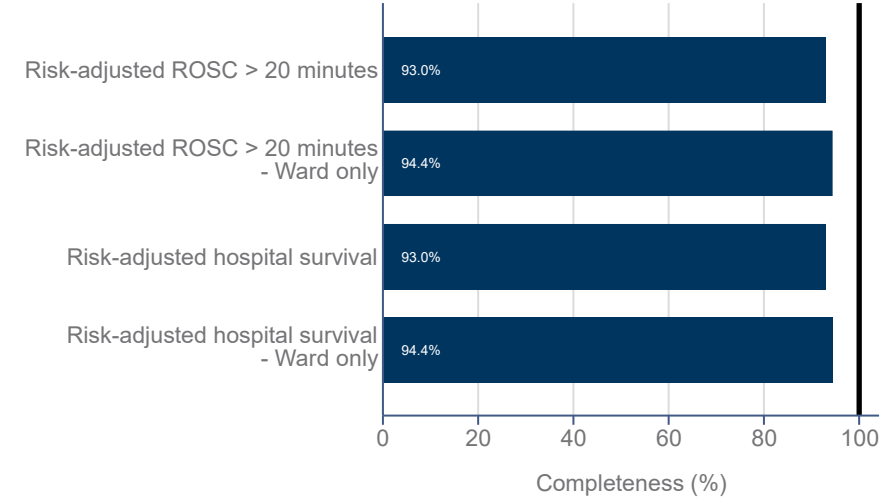
Team visit details



Patient outcomes



Risk-adjusted outcomes

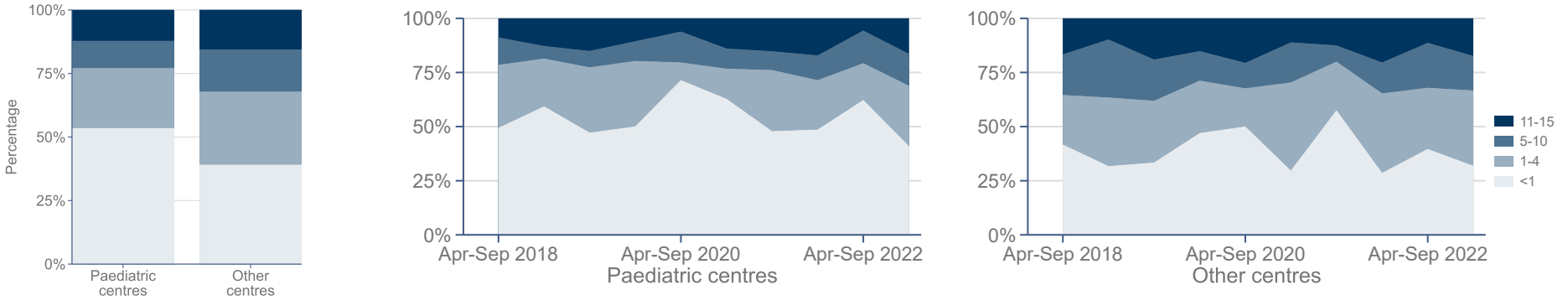


Patient characteristics

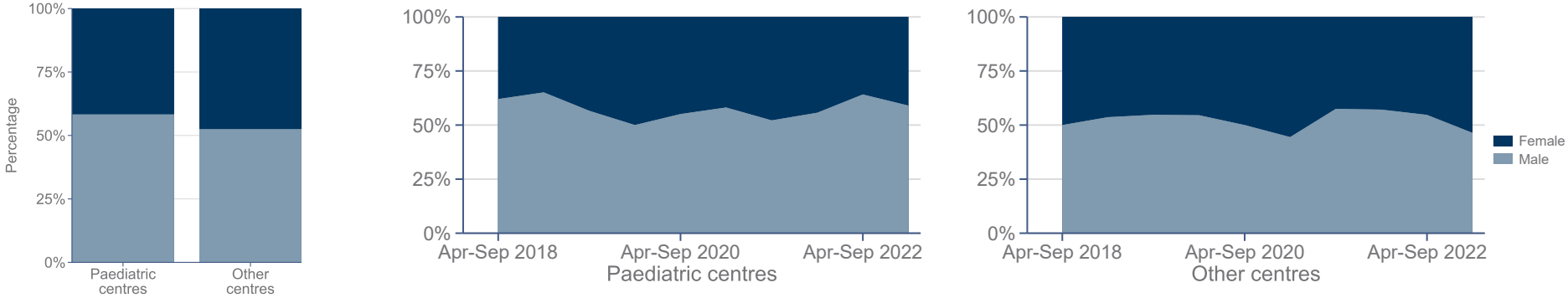
	Paediatric centres	Other centres	Overall
Age group (years), n (%)			
<1	324 (53.5)	183 (39.0)	507 (47.2)
1 – 4	143 (23.6)	135 (28.8)	278 (25.9)
5 – 10	65 (10.7)	78 (16.6)	143 (13.3)
11 – 15	74 (12.2)	73 (15.6)	147 (13.7)
Male, n (%)	353 (58.3)	246 (52.5)	599 (55.7)
Ethnic group, n (%)			
White	290 (47.9)	294 (62.7)	584 (54.3)
Mixed/multiple ethnic groups	29 (4.8)	11 (2.3)	40 (3.7)
Asian/Asian British	112 (18.5)	75 (16.0)	187 (17.4)
Black/African/Caribbean/Black British	29 (4.8)	21 (4.5)	50 (4.7)
All other	42 (6.9)	20 (4.3)	62 (5.8)
Not stated	104 (17.2)	48 (10.2)	152 (14.1)
Reason for hospital attendance, n (%)			
Patient – medical	463 (76.4)	439 (93.6)	902 (83.9)
Patient – surgical	128 (21.1)	8 (1.7)	136 (12.7)
Patient – other	10 (1.7)	15 (3.2)	25 (2.3)
Outpatient or visitor	5 (0.8)	7 (1.5)	12 (1.1)

Trends in patient characteristics

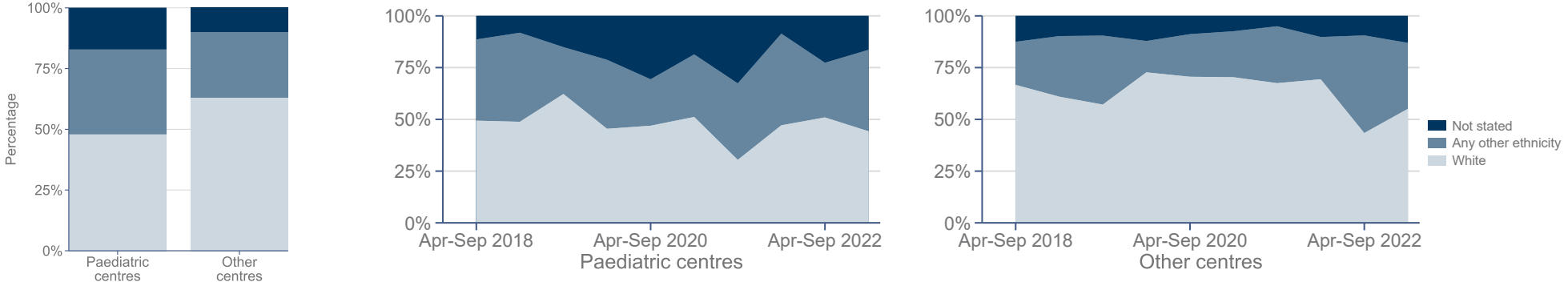
Age (years)



Sex



Ethnic Group



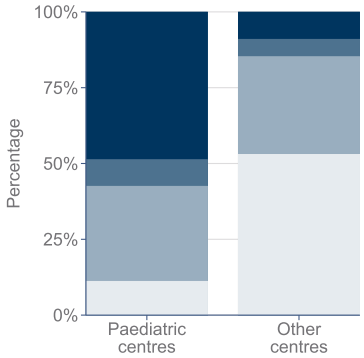
Cardiac arrest characteristics

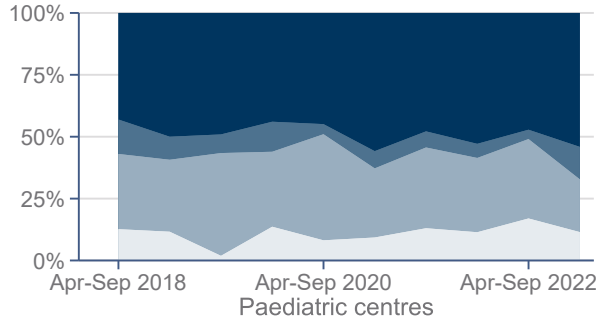
	Paediatric centres	Other centres	Overall
Time between admission and cardiac arrest (days), n (%)			
0 – 1	197 (32.5)	377 (80.4)	574 (53.4)
2 – 7	127 (21.0)	61 (13.0)	188 (17.5)
≥ 8	282 (46.5)	31 (6.6)	313 (29.1)
Location of arrest*, n (%)			
Presentation at hospital	68 (11.2)	249 (53.1)	317 (29.5)
In-hospital location	190 (31.4)	151 (32.2)	341 (31.7)
Treatment area	53 (8.7)	27 (5.8)	80 (7.4)
Critical/coronary care	295 (48.7)	42 (9.0)	337 (31.3)
Status at team arrival, n (%)			
Resuscitation ongoing	423 (69.8)	335 (71.4)	758 (70.5)
ROSC achieved	123 (20.3)	39 (8.3)	162 (15.1)
Deteriorating (not yet arrested)	60 (9.9)	95 (20.3)	155 (14.4)
Presenting/first documented rhythm, n (%)			
Shockable	45 (7.4)	22 (4.7)	67 (6.2)
Shockable – VF	28 (4.6)	14 (3.0)	42 (3.9)
Shockable – VT	15 (2.5)	6 (1.3)	21 (2.0)
Shockable – Unknown	2 (0.3)	2 (0.4)	4 (0.4)
Non-shockable	489 (80.7)	384 (81.9)	873 (81.2)
Non-shockable – Asystole	79 (13.0)	115 (24.5)	194 (18.0)
Non-shockable – PEA	188 (31.0)	172 (36.7)	360 (33.5)
Non-shockable – Bradycardia	188 (31.0)	78 (16.6)	266 (24.7)
Non-shockable – Unknown	34 (5.6)	19 (4.1)	53 (4.9)
Never determined	31 (5.1)	32 (6.8)	63 (5.9)
Unknown	41 (6.8)	31 (6.6)	72 (6.7)

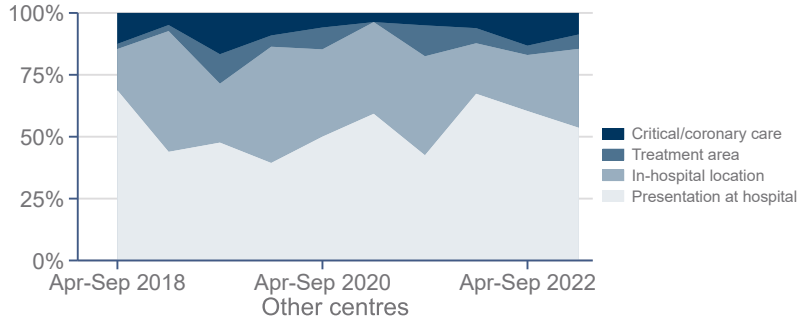
*Presentation at hospital includes: Emergency department, Emergency admissions unit, Clinic and Non-clinical area. In-hospital location includes: Ward, Obstetrics, Other intermediate care ward/unit and Other clinical location. Treatment area includes: Theatre, Imaging, Cardiac catheter laboratory and Specialist treatment area.

Trends in cardiac arrest characteristics

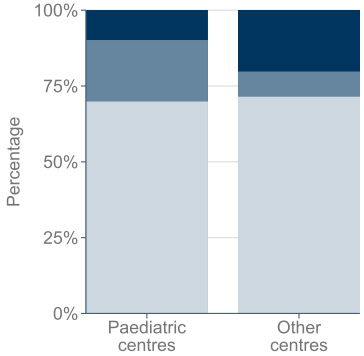
Location of arrest

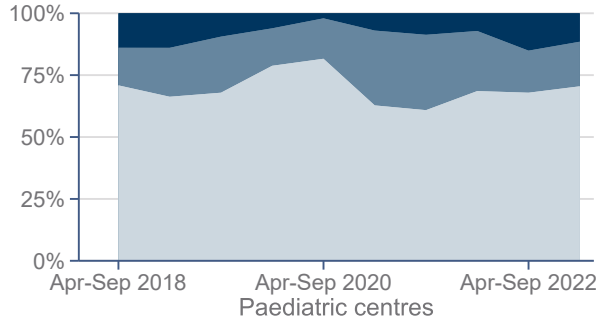


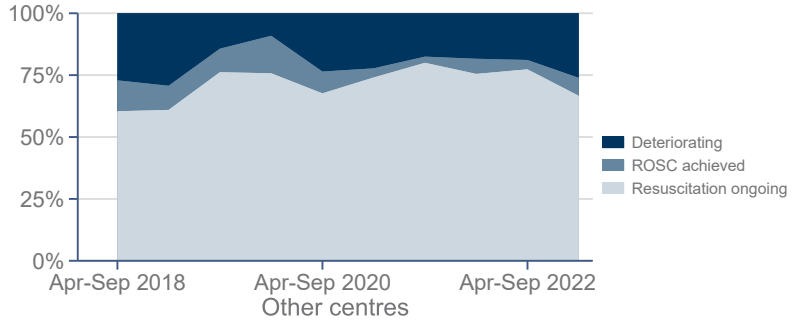




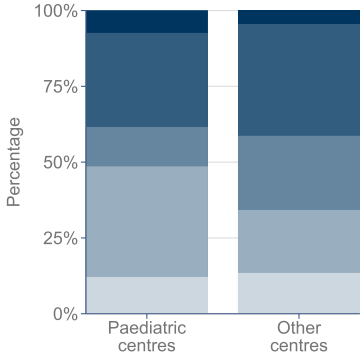
Status at team arrival

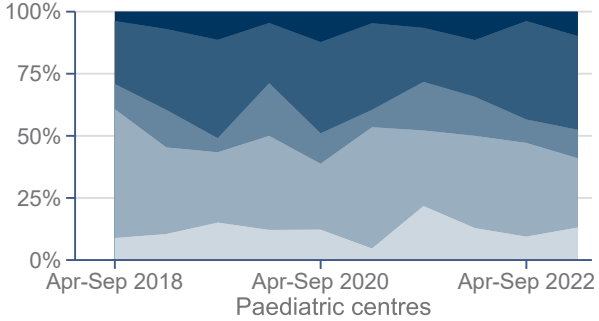


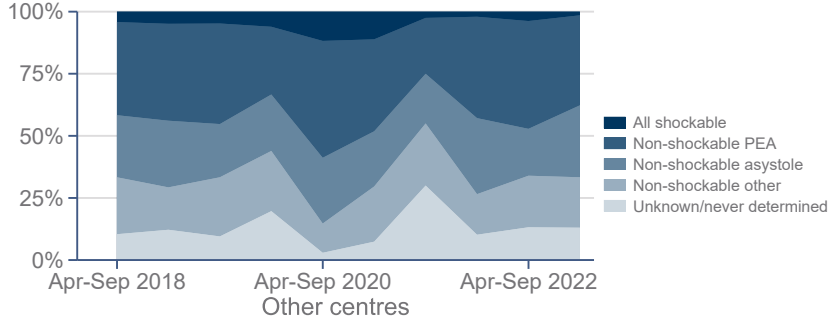




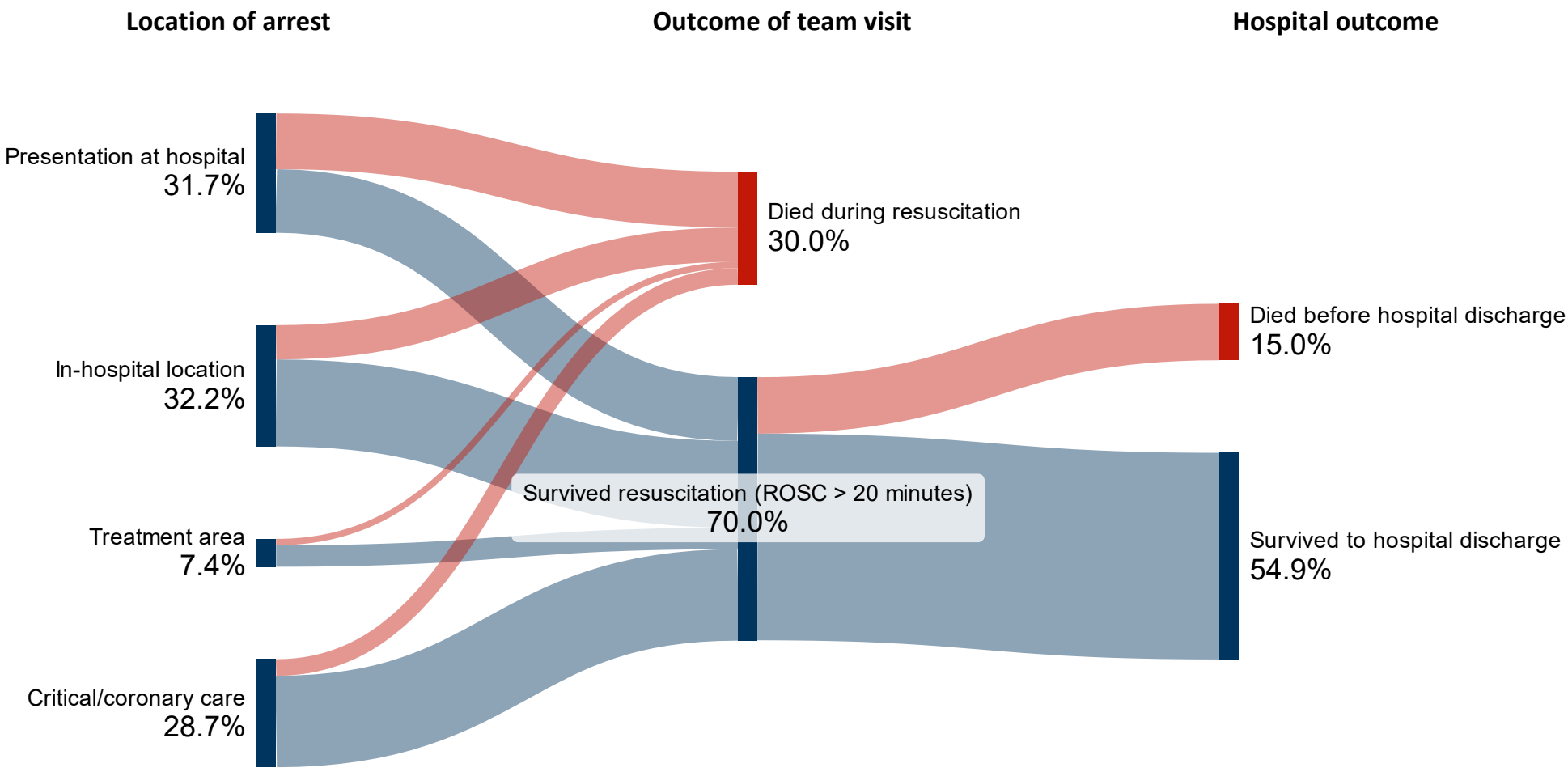
Presenting/First documented rhythm





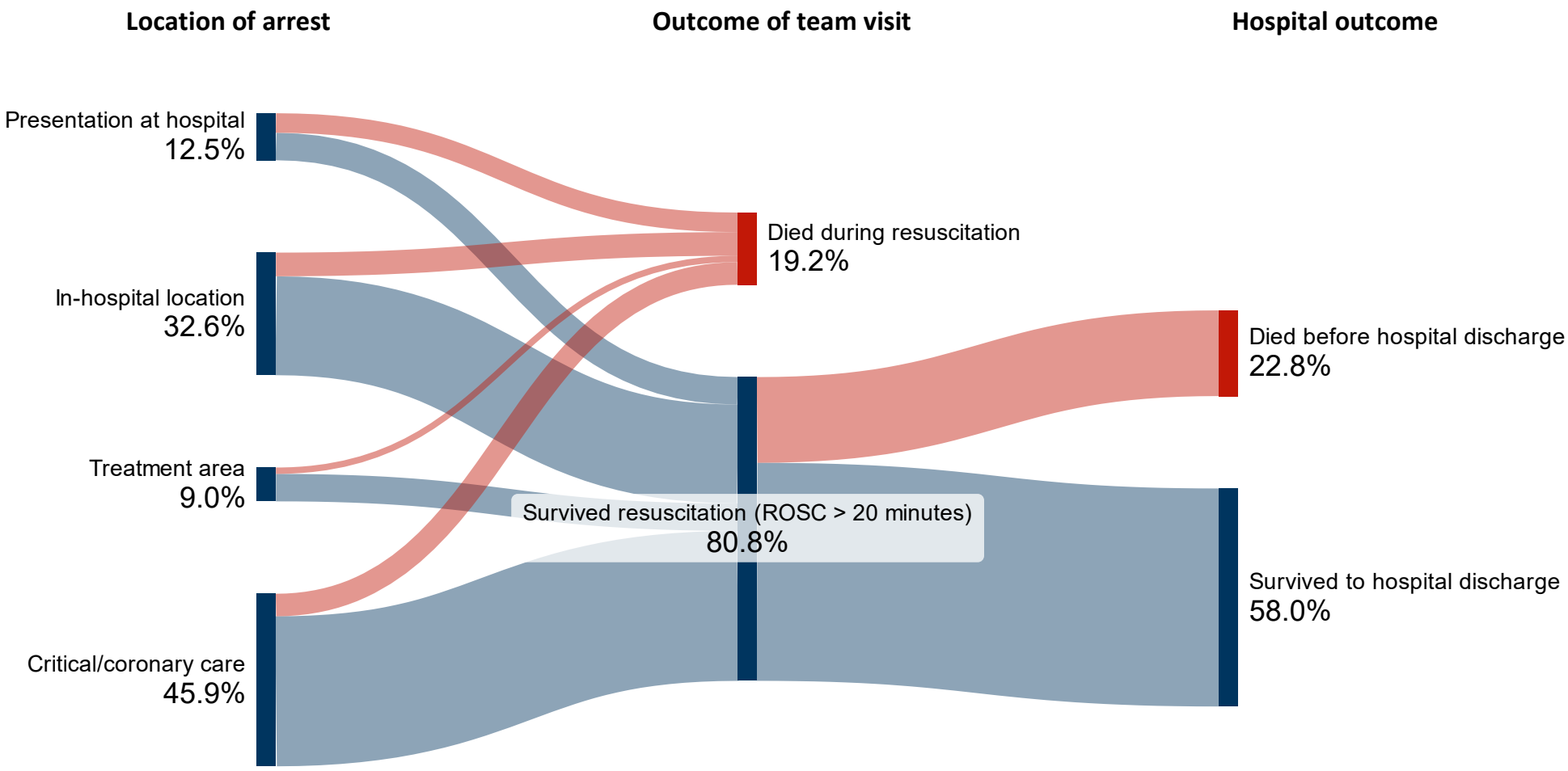


Outcome flow – Overall



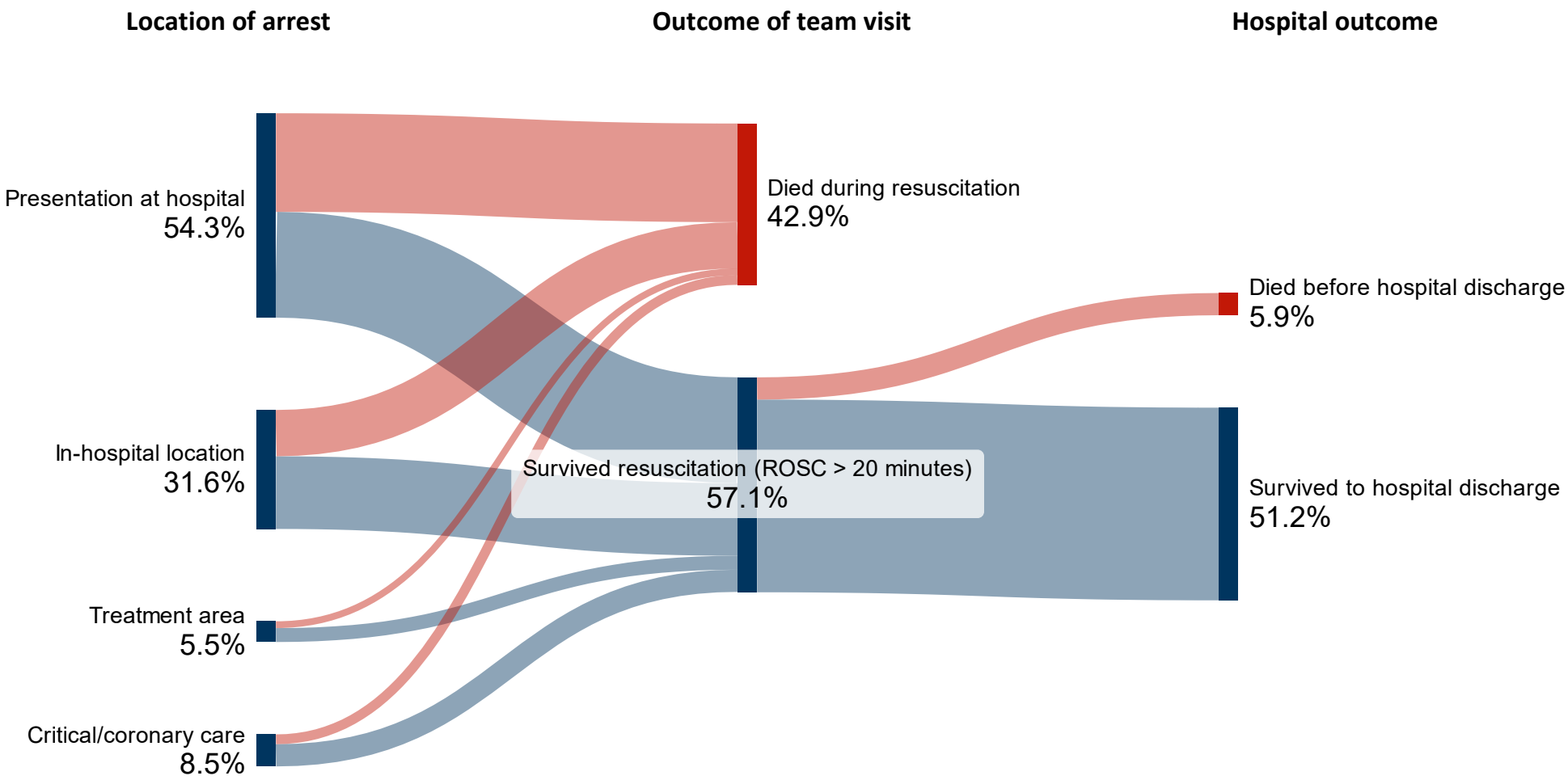
Note: Excludes subsequent team visits to the same patient within the same hospital stay and patients with unknown outcomes

Outcome flow – Paediatric centres



Note: Excludes subsequent team visits to the same patient within the same hospital stay and patients with unknown outcomes

Outcome flow – Other centres



Note: Excludes subsequent team visits to the same patient within the same hospital stay and patients with unknown outcomes

Patient outcomes

	Paediatric centres	Other centres	Overall
Duration of resuscitation (minutes), median (IQR)	6 (2, 22)	19 (4, 44)	9 (3, 34)
Sustained ROSC > 20 minutes, n (%)	491 (81.0)	272 (58.0)	763 (71.0)
Post-arrest location*, n (% of sustained ROSC), n (%)			
Emergency admissions unit	3 (0.6)	5 (1.8)	8 (1.0)
Critical/coronary care	431 (87.8)	42 (15.4)	473 (62.0)
Other in-hospital location	39 (7.9)	31 (11.4)	70 (9.2)
Did not survive to post-arrest location	8 (1.6)	7 (2.6)	15 (2.0)
Not in hospital	2 (0.4)	0 (0.0)	2 (0.3)
Other hospital	8 (1.6)	187 (68.8)	195 (25.6)
Survived to hospital discharge†, n (%)	311 (58.0)	233 (51.2)	544 (54.9)

* Post-arrest location completed for arrests with sustained ROSC > 20 minutes; Other in-hospital location includes: Ward, Obstetrics, Other intermediate care ward/unit and Other clinical location

† Excludes subsequent team visits to the same patient within the same hospital stay

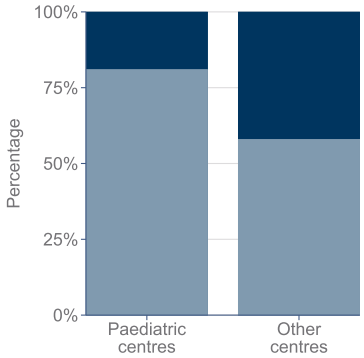
Outcomes by rhythm and age group

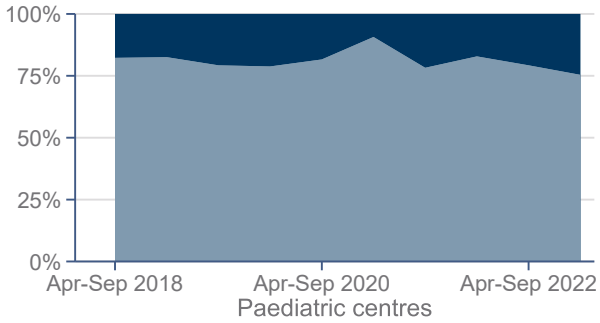
	Sustained ROSC > 20 mins		Survived to hospital discharge†	
	Paediatric centres	Other centres	Paediatric centres	Other centres
Overall				
<1 year	281/324 (86.7)	107/183 (58.5)	174/274 (63.5)	92/176 (52.3)
1 – 4 years	112/143 (78.3)	83/135 (61.5)	74/132 (56.1)	75/132 (56.8)
5 – 10 years	47/65 (72.3)	43/78 (55.1)	31/61 (50.8)	36/76 (47.4)
11 – 15 years	51/74 (68.9)	39/73 (53.4)	32/69 (46.4)	30/71 (42.3)
Overall	491/606 (81.0)	272/469 (58.0)	311/536 (58.0)	233/455 (51.2)
Shockable*	32/45 (71.1)	15/22 (68.2)	23/38 (60.5)	10/20 (50.0)
Non-shockable – Bradycardia				
<1 year	122/130 (93.8)	27/35 (77.1)	81/110 (73.6)	25/33 (75.8)
1 – 4 years	36/39 (92.3)	22/24 (91.7)	23/35 (65.7)	21/24 (87.5)
5 – 10 years	8/10 (80.0)	8/10 (80.0)	6/9 (66.7)	7/10 (70.0)
11 – 15 years	7/9 (77.8)	7/9 (77.8)	5/9 (55.6)	7/9 (77.8)
Overall	173/188 (92.0)	64/78 (82.1)	115/163 (70.6)	60/76 (78.9)
Non-shockable – All other				
<1 year	110/140 (78.6)	46/105 (43.8)	56/118 (47.5)	37/104 (35.6)
1 – 4 years	55/79 (69.6)	44/90 (48.9)	34/73 (46.6)	39/89 (43.8)
5 – 10 years	25/38 (65.8)	24/55 (43.6)	15/38 (39.5)	20/55 (36.4)
11 – 15 years	27/44 (61.4)	24/56 (42.9)	14/41 (34.1)	18/54 (33.3)
Overall	217/301 (72.1)	138/306 (45.1)	119/270 (44.1)	114/302 (37.7)

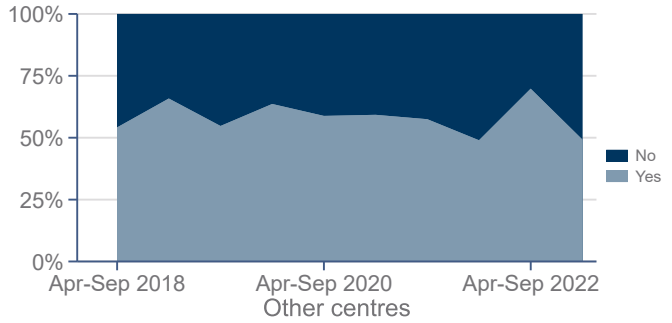
† Excludes subsequent team visits to the same patient within the same hospital stay
* Shockable rhythms and age groups are combined due to small numbers.

Trends in patient outcomes

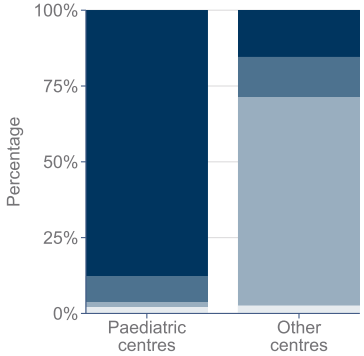
ROSC > 20 minutes achieved

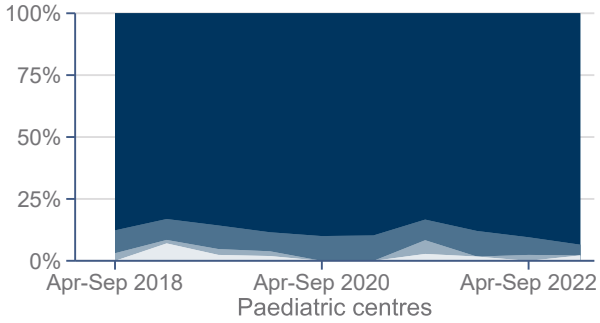


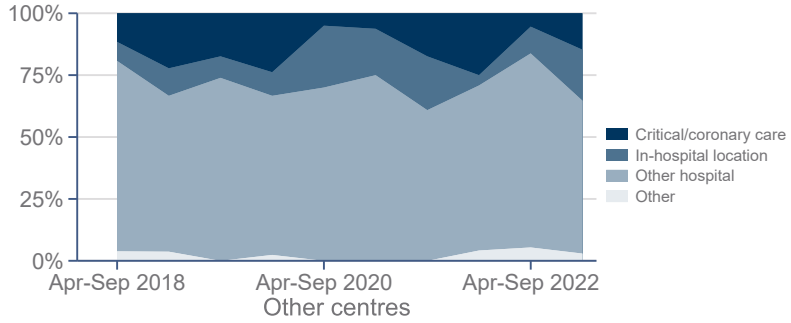




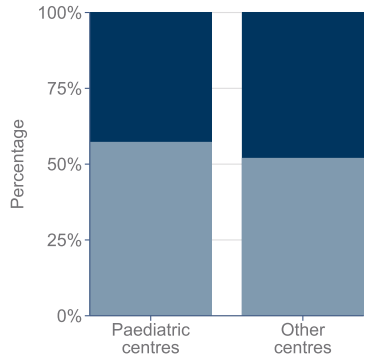
Post-arrest location

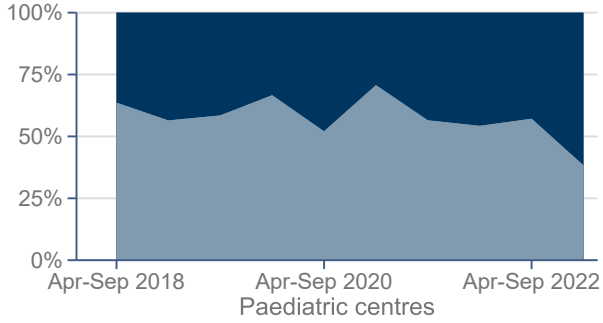


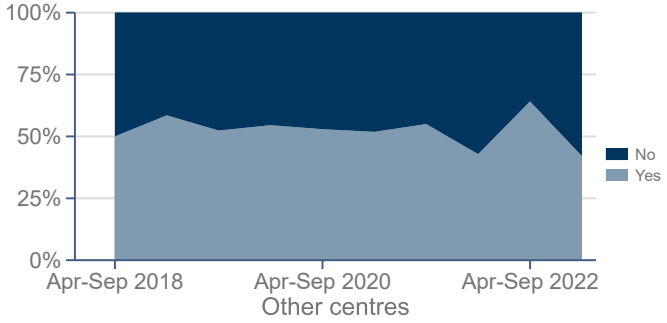




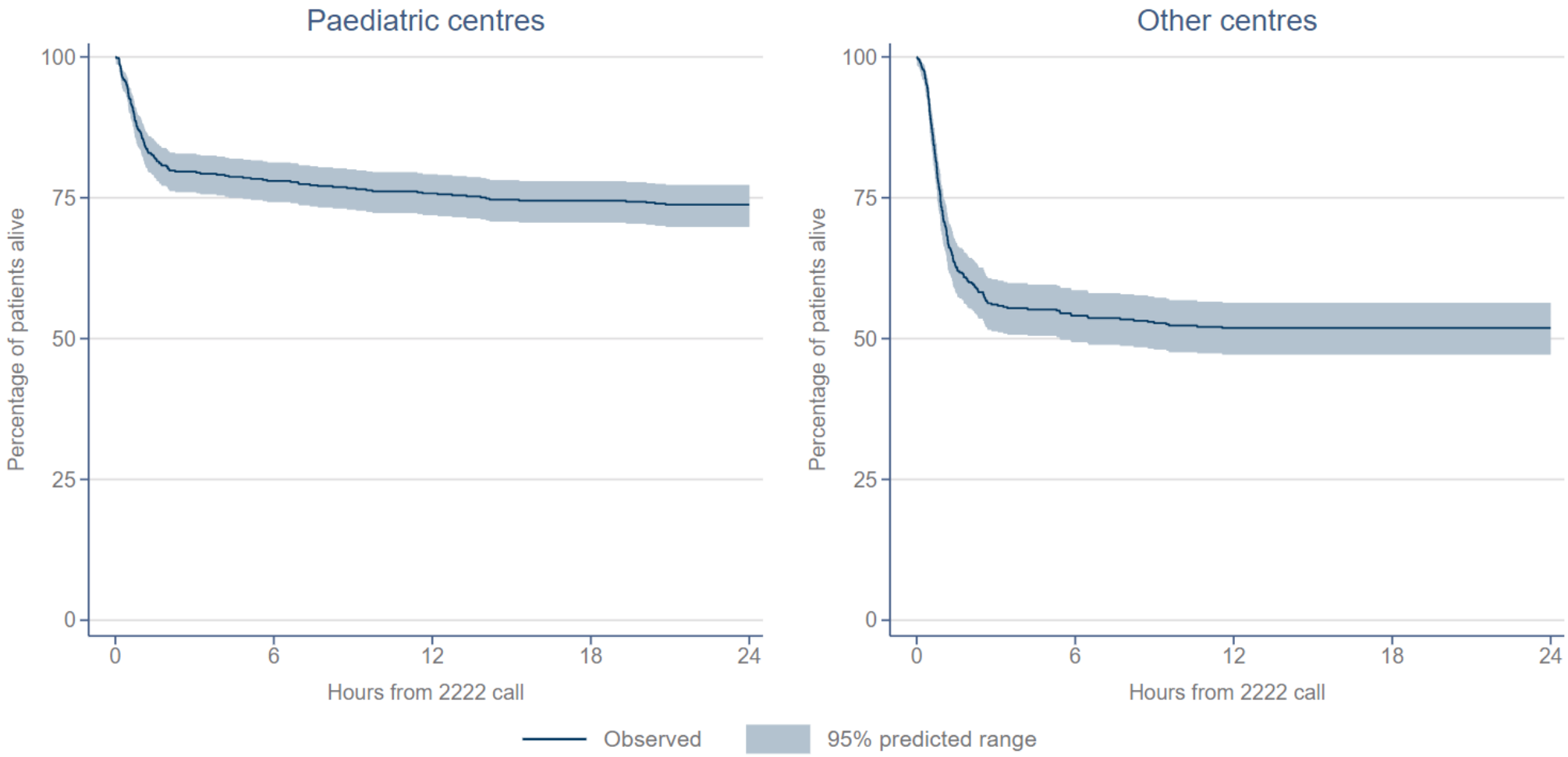
Survival to hospital discharge



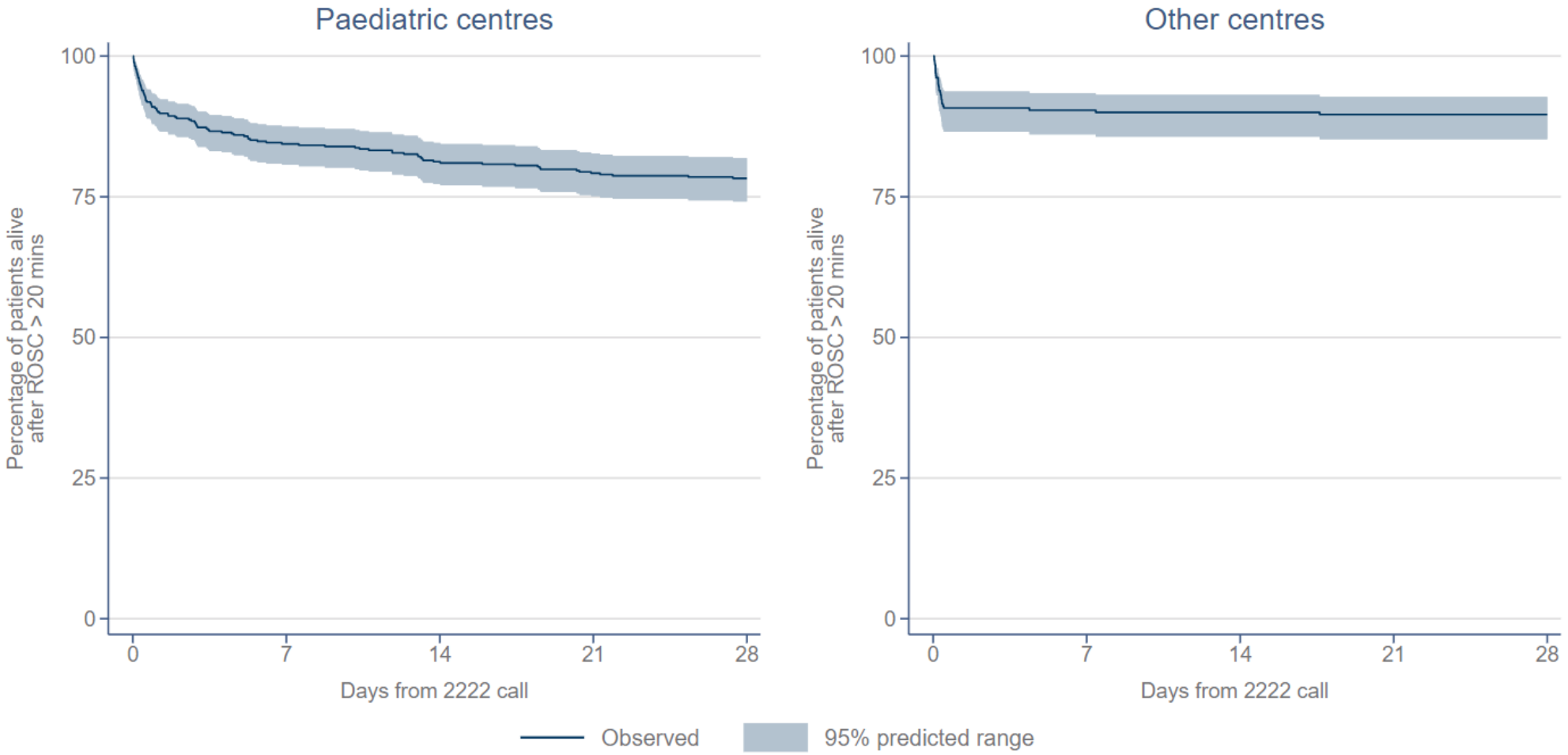




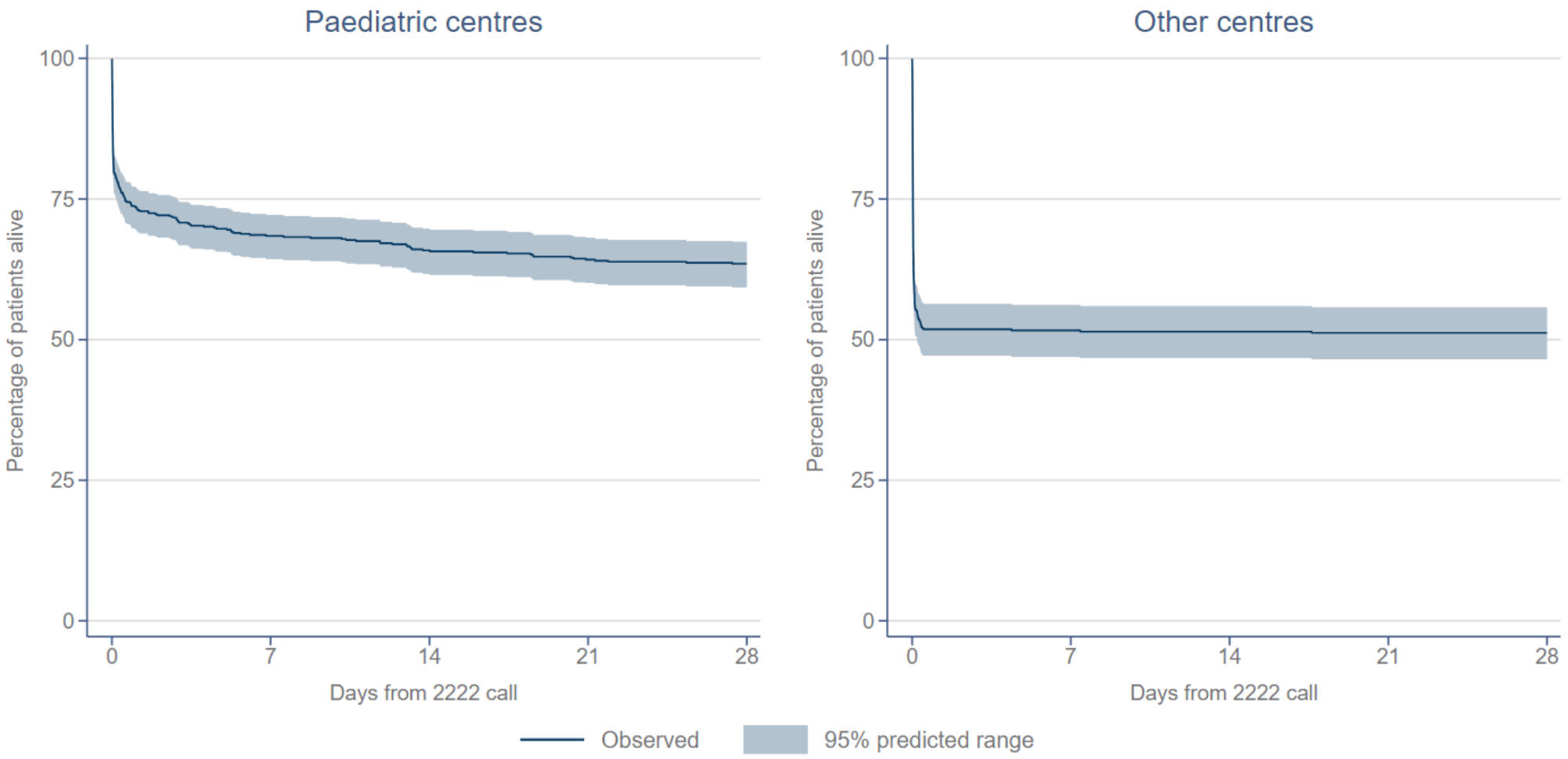
24-hour survival



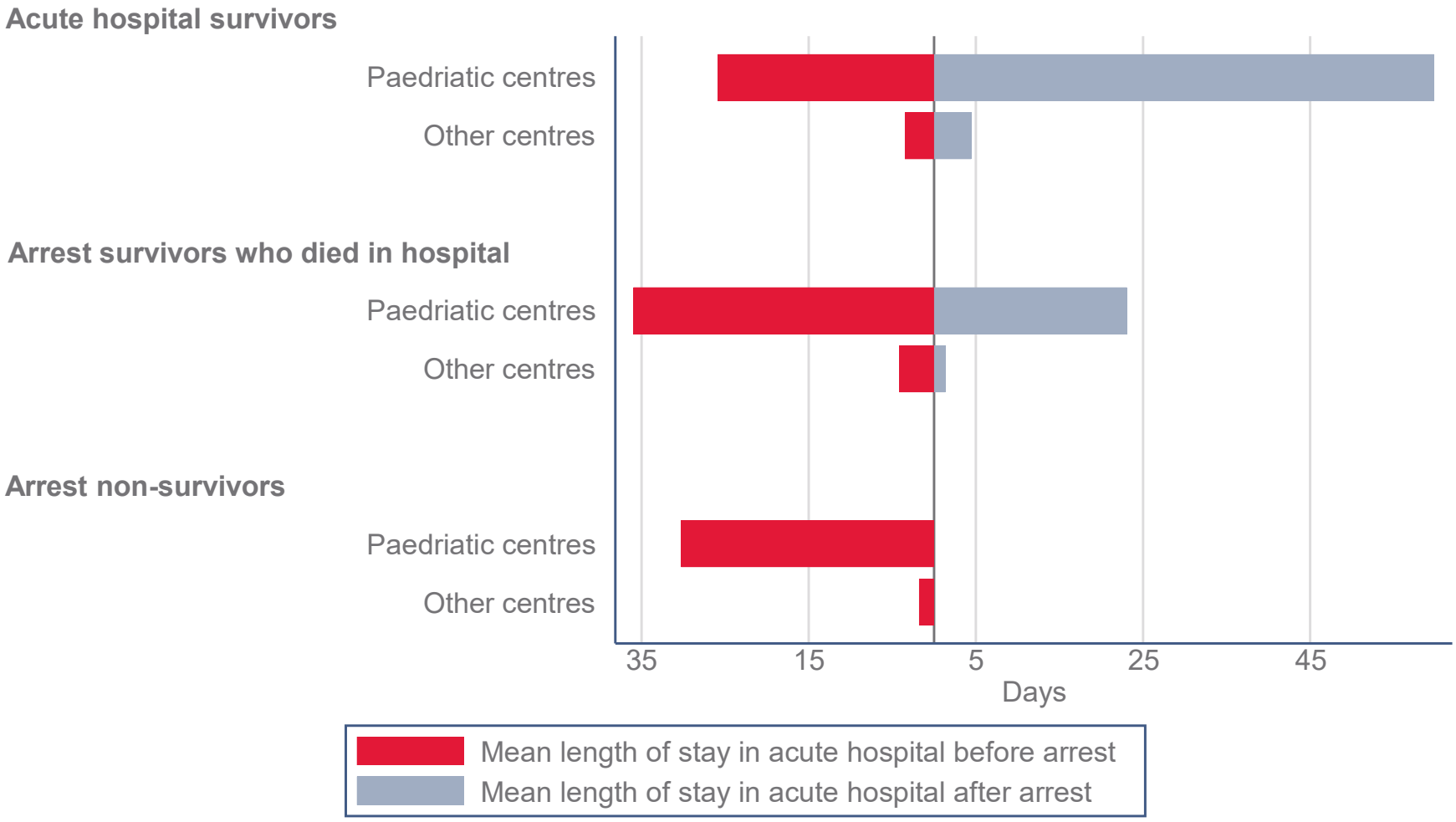
28-day in-hospital survival among patients with ROSC >20 mins



Overall 28-day in-hospital survival



Length of stay in hospital *

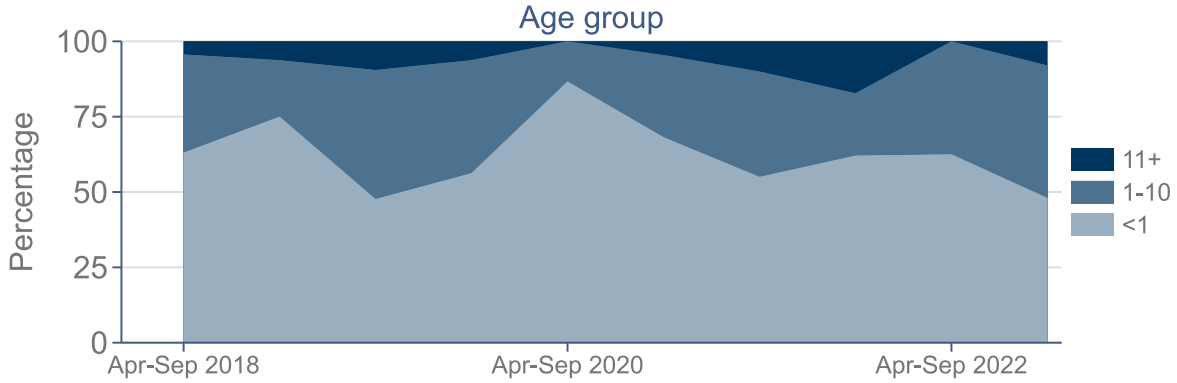


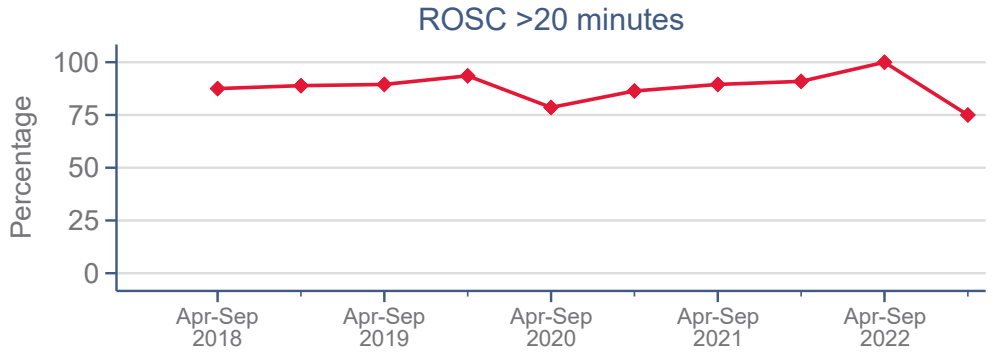
* Hospital in which arrest occurred

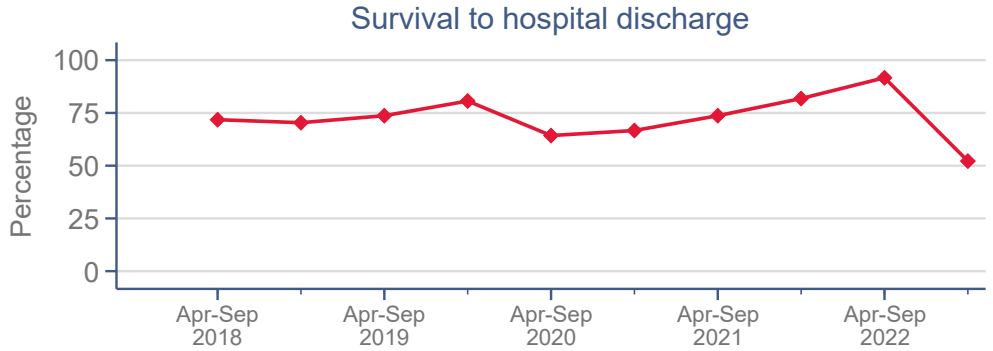
Patient subgroup: Non-shockable – Bradycardia

Patient characteristics	Overall
N (% of all team visits)	266 (24.7)
Age group (years)	
<1	165 (62.0)
1 – 4	63 (23.7)
5 – 10	20 (7.5)
11 – 15	18 (6.8)
Male, n (%)	156 (58.6)
Ethnic group, n (%)	
White	154 (57.9)
Any other ethnicity	75 (28.2)
Not stated	37 (13.9)
Reason for hospital attendance	
Patient – medical	224 (84.2)
Patient – surgical	35 (13.2)
Patient – other	5 (1.9)
Outpatient or visitor	2 (0.8)

Cardiac arrest characteristics	Overall
N (% of all team visits)	266 (24.7)
Time between admission and cardiac arrest (days)	
0 – 1	111 (41.7)
2 – 7	50 (18.8)
≥ 8	105 (39.5)
Location of arrest*, n (%)	
Presentation at hospital	49 (18.4)
In-hospital location	67 (25.2)
Treatment area	17 (6.4)
Critical/coronary care	133 (50.0)
Status at team arrival, n (%)	
Resuscitation ongoing	163 (61.3)
ROSC achieved	60 (22.6)
Deteriorating – (not yet arrested)	43 (16.2)



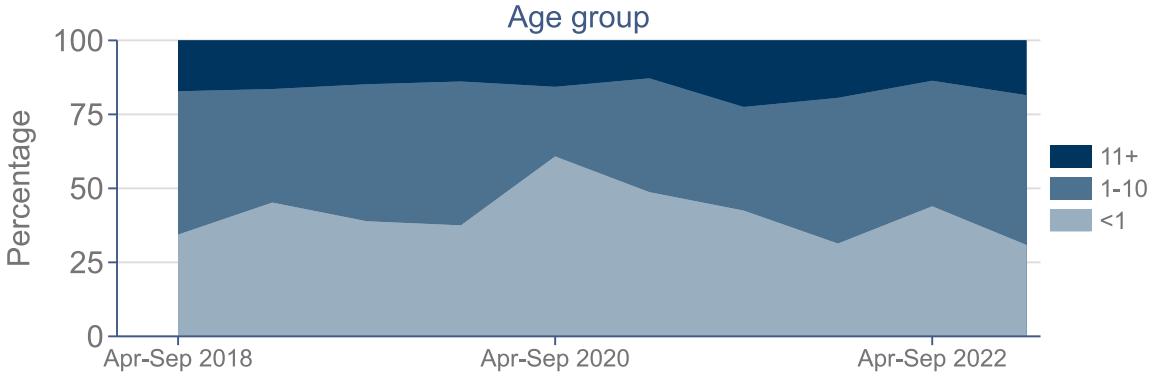


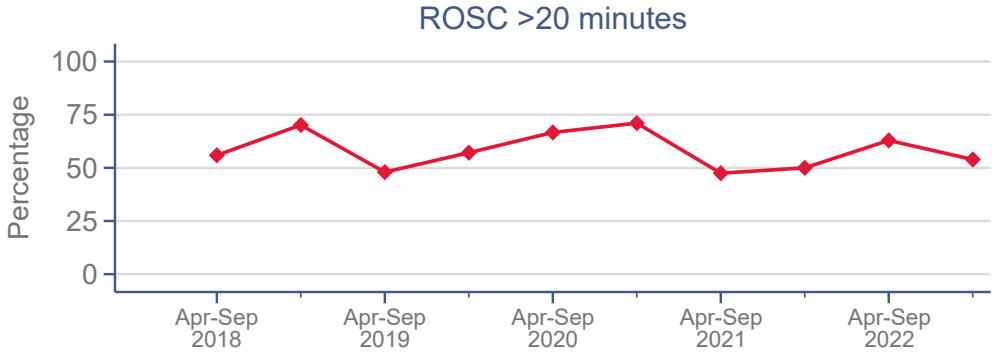


Patient subgroup: Non-shockable – All other

Patient characteristics	Overall
N (% of all team visits)	607 (56.5)
Age group (years)	
<1	245 (40.4)
1 – 4	169 (27.8)
5 – 10	93 (15.3)
11 – 15	100 (16.5)
Male, n (%)	330 (54.4)
Ethnic group, n (%)	
White	312 (51.4)
Any other ethnicity	199 (32.8)
Not stated	96 (15.8)
Reason for hospital attendance	
Patient – medical	520 (85.7)
Patient – surgical	72 (11.9)
Patient – other	11 (1.8)
Outpatient or visitor	4 (0.7)

Cardiac arrest characteristics	Overall
N (% of all team visits)	607 (56.5)
Time between admission and cardiac arrest (days)	
0 – 1	351 (57.8)
2 – 7	96 (15.8)
≥ 8	160 (26.4)
Location of arrest*, n (%)	
Presentation at hospital	219 (36.1)
In-hospital location	183 (30.1)
Treatment area	48 (7.9)
Critical/coronary care	157 (25.9)
Status at team arrival, n (%)	
Resuscitation ongoing	471 (77.6)
ROSC achieved	48 (7.9)
Deteriorating – (not yet arrested)	88 (14.5)

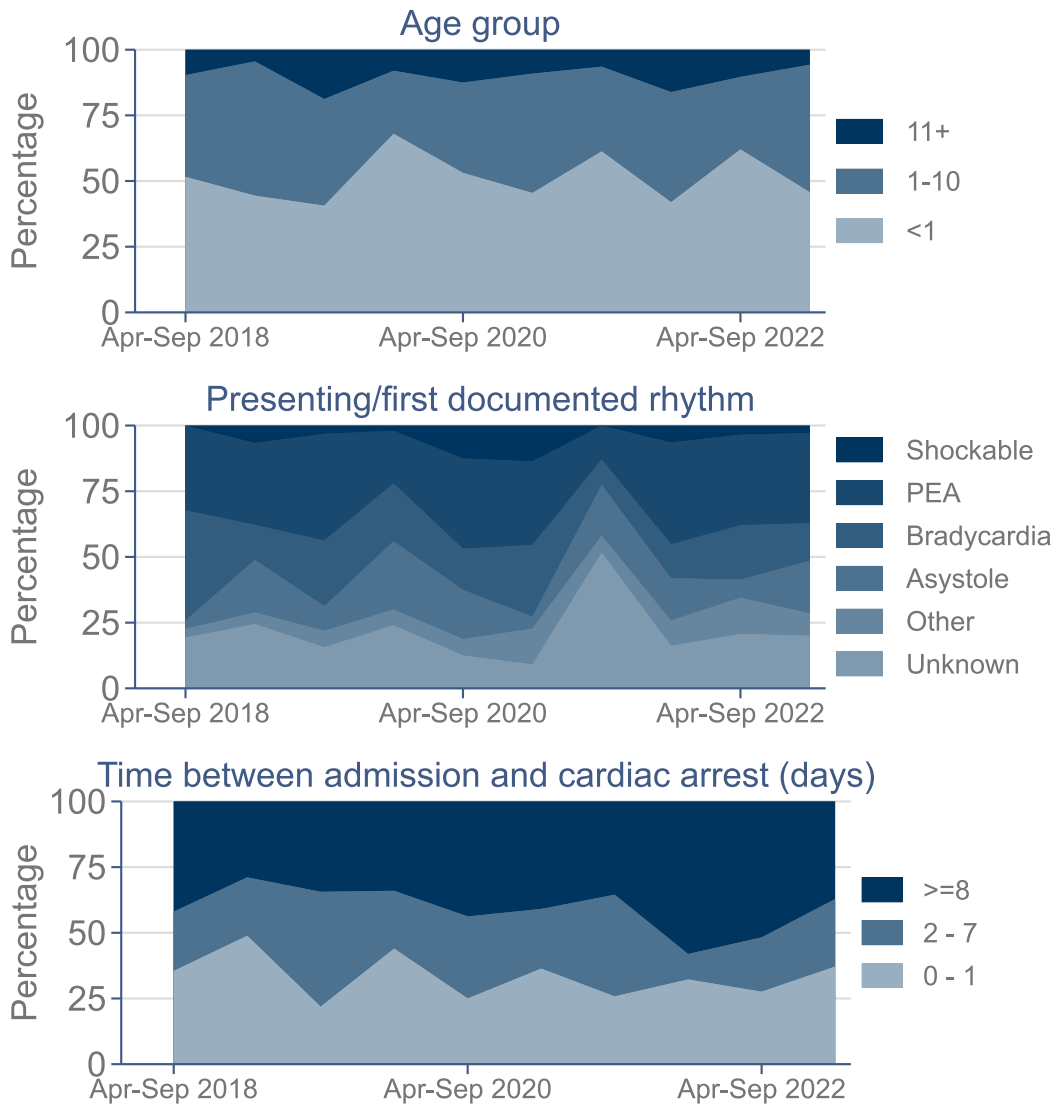




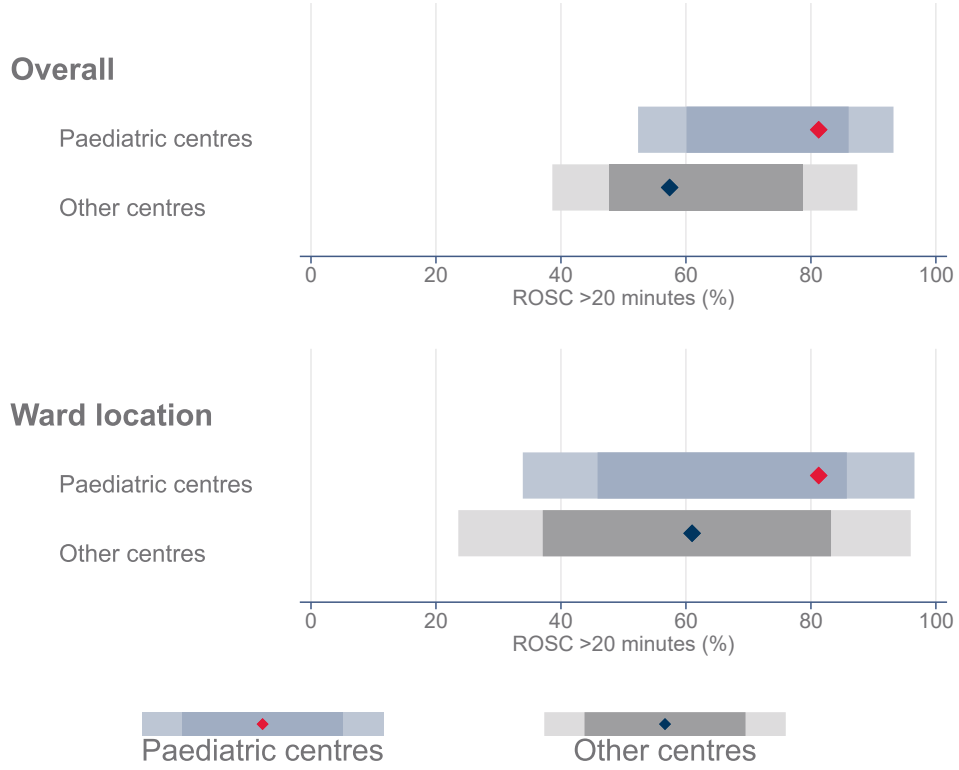
Patient subgroup: Team visits to the ward

Patient characteristics	Overall
N (% of all team visits)	338 (31.4)
Age group (years)	
<1	176 (52.1)
1 – 4	84 (24.9)
5 – 10	45 (13.3)
11 – 15	33 (9.8)
Male, n (%)	180 (53.3)
Ethnic group, n (%)	
White	179 (53.0)
Any other ethnicity	112 (33.1)
Not stated	47 (13.9)
Reason for hospital attendance	
Patient – medical	296 (87.6)
Patient – surgical	38 (11.2)
Patient – other	2 (0.6)
Outpatient or visitor	2 (0.6)

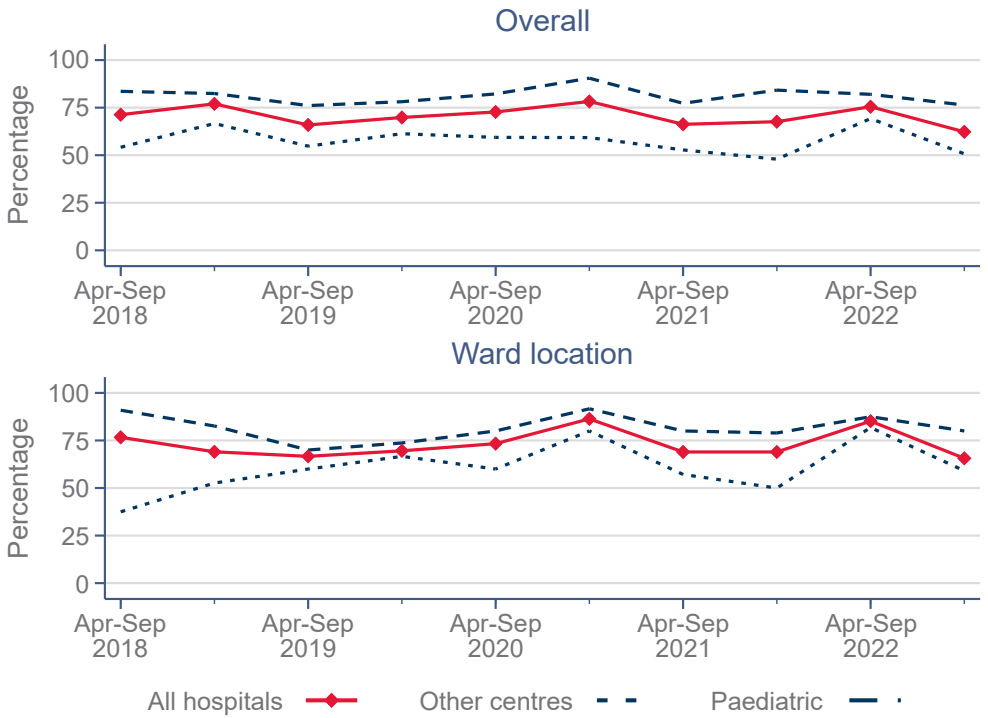
Cardiac arrest characteristics	Overall
N (% of all team visits)	338 (31.4)
Time between admission and cardiac arrest (days)	
0 – 1	117 (34.6)
2 – 7	87 (25.7)
≥ 8	134 (39.6)
Status at team arrival, n (%)	
Resuscitation ongoing	242 (71.6)
ROSC achieved	47 (13.9)
Deteriorating (not yet arrested)	49 (14.5)
Presenting/first documented rhythm	
All shockable	16 (4.7)
Non-shockable PEA	103 (30.5)
Non-shockable Asystole	53 (15.7)
Non-shockable Bradycardia	67 (19.8)
Non-shockable Other	25 (7.4)
Unknown/Never determined	74 (21.9)



Risk-adjusted ROSC > 20 minutes



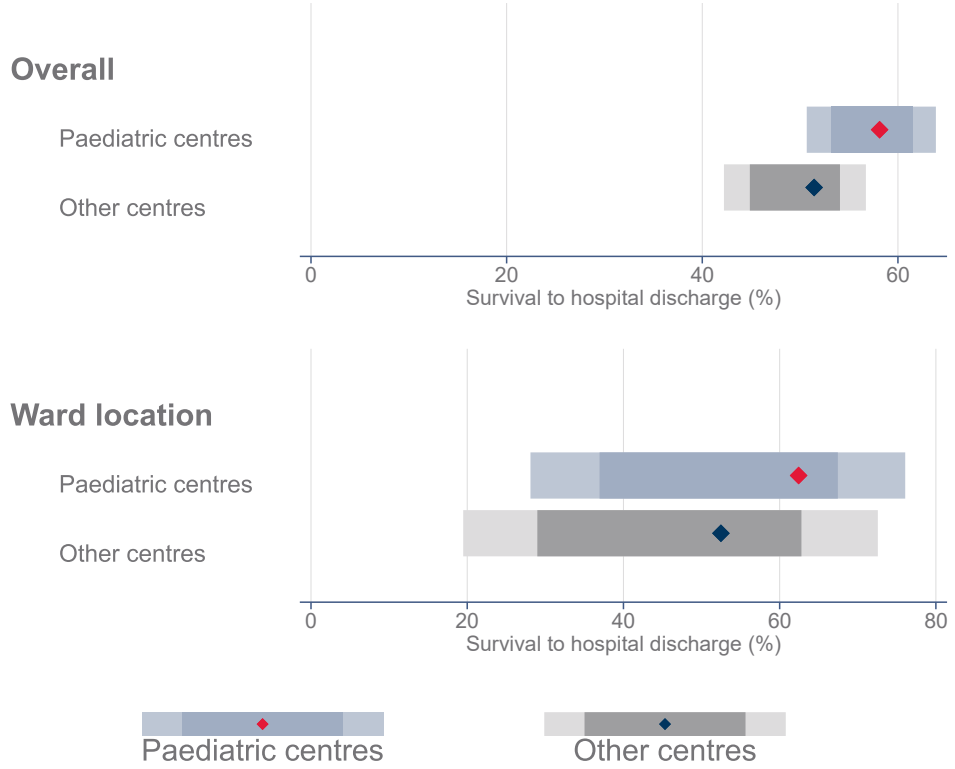
Type	Numerator	Denominator	Result
All			
Paediatric centres	442	544	81.2
Other centres	260	453	57.4
Ward location			
Paediatric centres	143	176	81.2
Other centres	86	141	61.0



Definition

- **Numerator:** Number of eligible team visits (overall or to the ward location) that achieved ROSC > 20 minutes
- **Denominator:** Number of eligible team visits (overall or to the ward location)
- **Result:** Observed percentage of eligible team visits where ROSC was sustained for >20 minutes
- **Predicted ranges:** see presentation of statistics

Risk-adjusted survival to hospital discharge



Type	Numerator	Denominator	Result
All			
Paediatric centres	311	535	58.1
Other centres	233	453	51.4
Ward location			
Paediatric centres	108	173	62.4
Other centres	74	141	52.5

Definition

- **Numerator:** Number of patients with an eligible team visit (overall or to the ward location) who survived to hospital discharge
- **Denominator:** Number of patients with an eligible team visit (overall or to the ward location)
- **Result:** Observed percentage of patients with an eligible team visit who survived to hospital discharge
- **Predicted ranges:** see presentation of statistics