

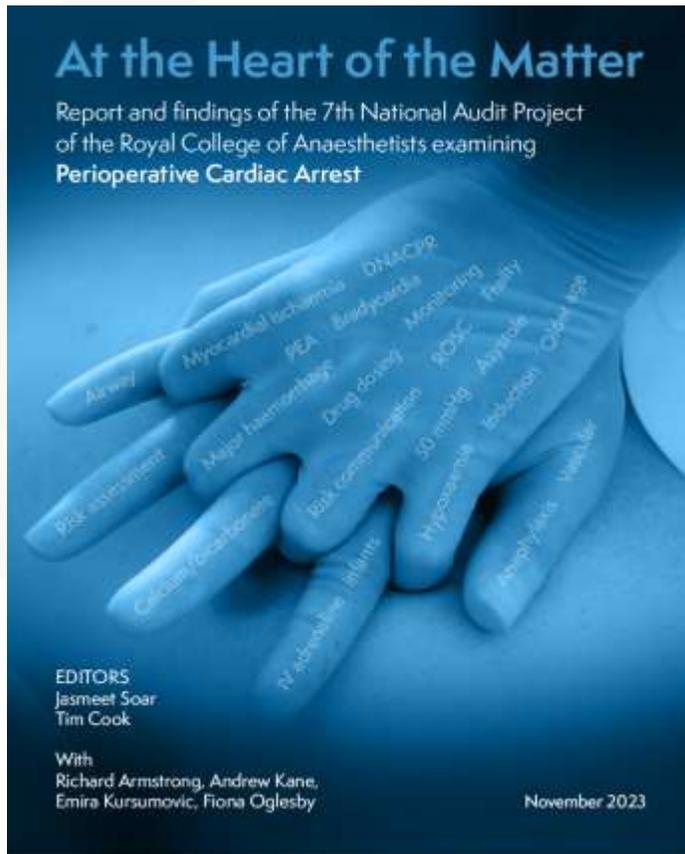


IRC THURSDAY AFTERNOON LIVE



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Resuscitation
Council

L'ARRESTO CARDIACO PERIOPERATORIO



NATIONAL AUDIT PROJECT



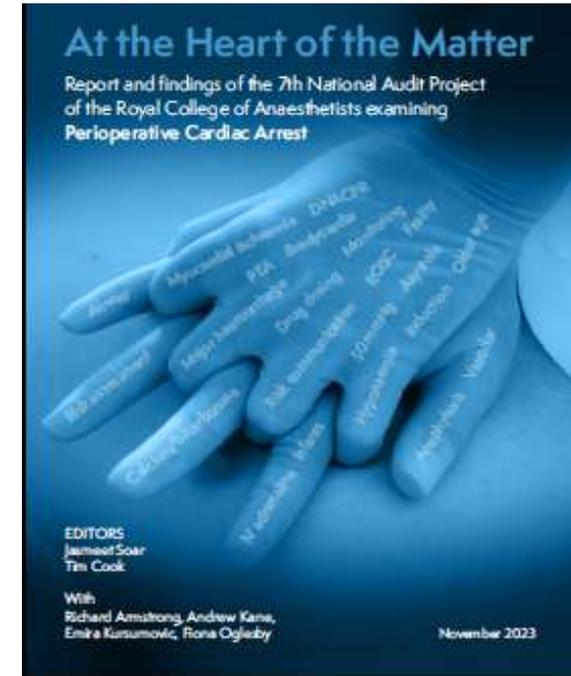
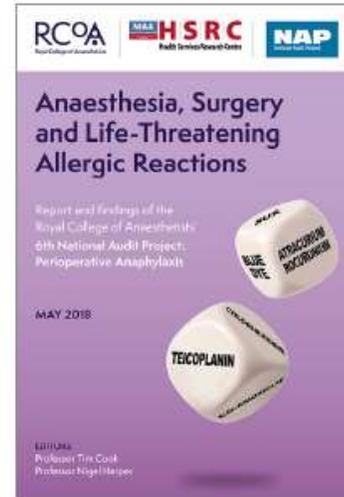
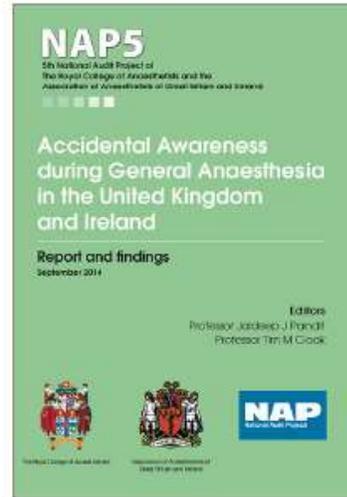
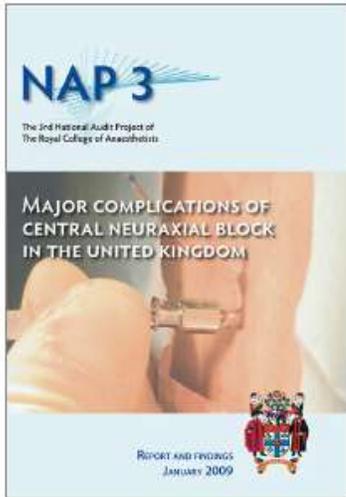
<https://rcoa.ac.uk/research/research-projects/national-audit-projects-naps/nap7-perioperative-cardiac-arrest>

At the Heart of the Matter. Report and findings of the 7th National Audit Project of the Royal College of Anaesthetists examining Perioperative Cardiac Arrest. Soar J, Cook TM editors. Royal College of Anaesthetists: 2023. ISBN 978-1-900936-35-4



NATIONAL AUDIT PROJECTS

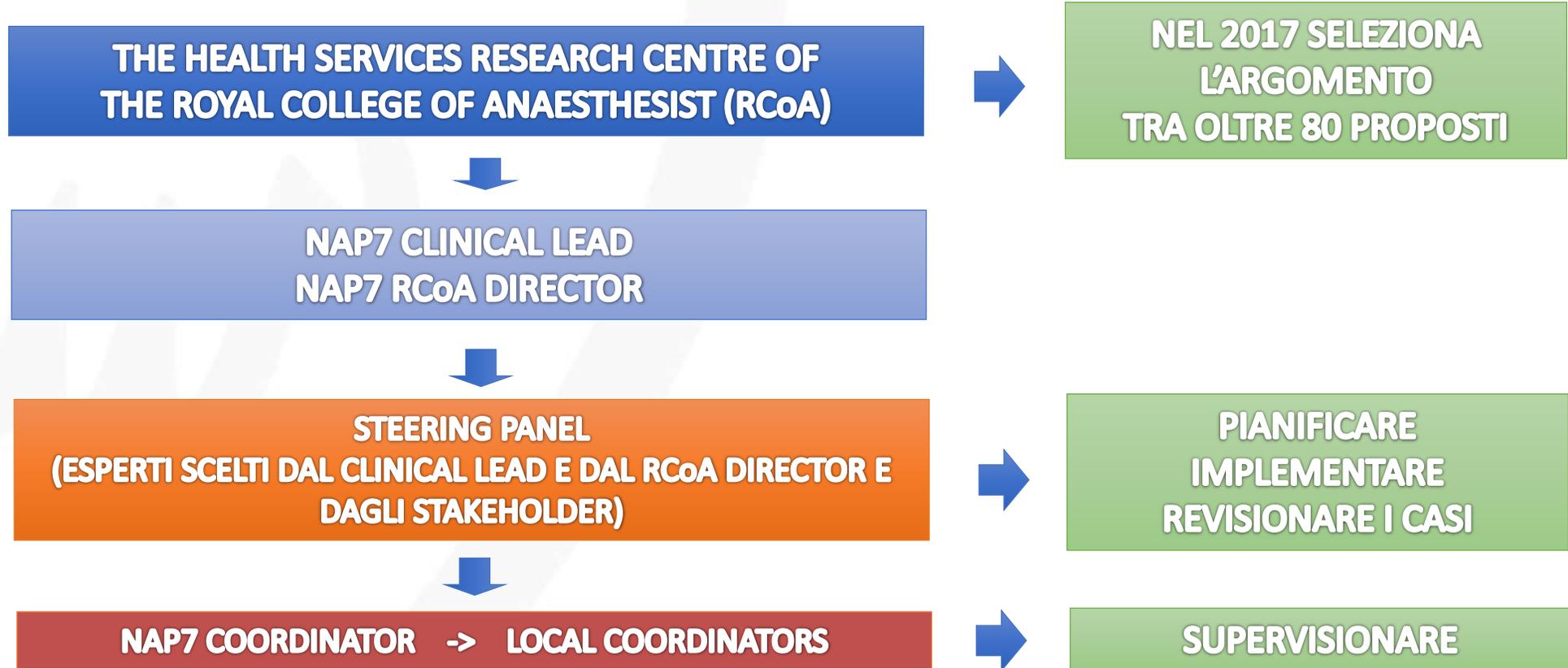
L'ARRESTO CARDIACO PERIOPERATORIO





L'ARRESTO CARDIACO PERIOPERATORIO

IL METODO





L'ARRESTO CARDIACO PERIOPERATORIO

IL METODO



BASELINE SURVEY

1

At start of NAP7

Local Coordinator:

Departmental structures
& processes

All anaesthetists and anaesthesia
associates:

Personal experiences of
perioperative cardiac arrest

ACTIVITY SURVEY

2

During NAP7

4-day activity survey of all sites

To estimate denominator data

CASE REPORTING

3

1 year

Report all cases that meet
inclusion criteria to Local
Coordinator

Complete detailed case
review form

Cases reviewed by NAP7 Panel

- ① INDAGINE DI BASE
- ① INDAGINE SULLE ATTIVITA' (CROSS-SECTIONAL STUDY) (4 giorni random)
- ③ RACCOLTA DEI CASI
16/6/2021 – 15/6/2022

**RACCOLTA DI CASI ANONIMA
(OSCURATO PAZIENTE,
MEDICO E OSPEDALE)**

**OGNI CASO INSERITO CON PASSWORD
CRIPTATA IN UN REGISTRO INFORMATICO SUL WEB**



L'ARRESTO CARDIACO PERIOPERATORIO

CRITERI DI INCLUSIONE



RCOA **NAP7** **NIAA HSRC**
 Royal College of Anaesthetists Perioperative Cardiac Arrest Health Services Research Centre

Perioperative Cardiac Arrest

NAP7 starts on 16 June 2021 for one year.

Inclusion criteria
 All new reports of Perioperative Cardiac Arrest in adults and children from start of anaesthesia care and up to 24 hours after handover (e.g. to recovery or ICU).

Which patients should be reported?

<p>Did the patient have 3 or more chest compressions and/or defibrillation?</p> <p>YES → NO → Do NOT report!</p>	<p>Were they having a procedure under the care of an anaesthetist?</p> <p>YES → NO → Do NOT report!</p>
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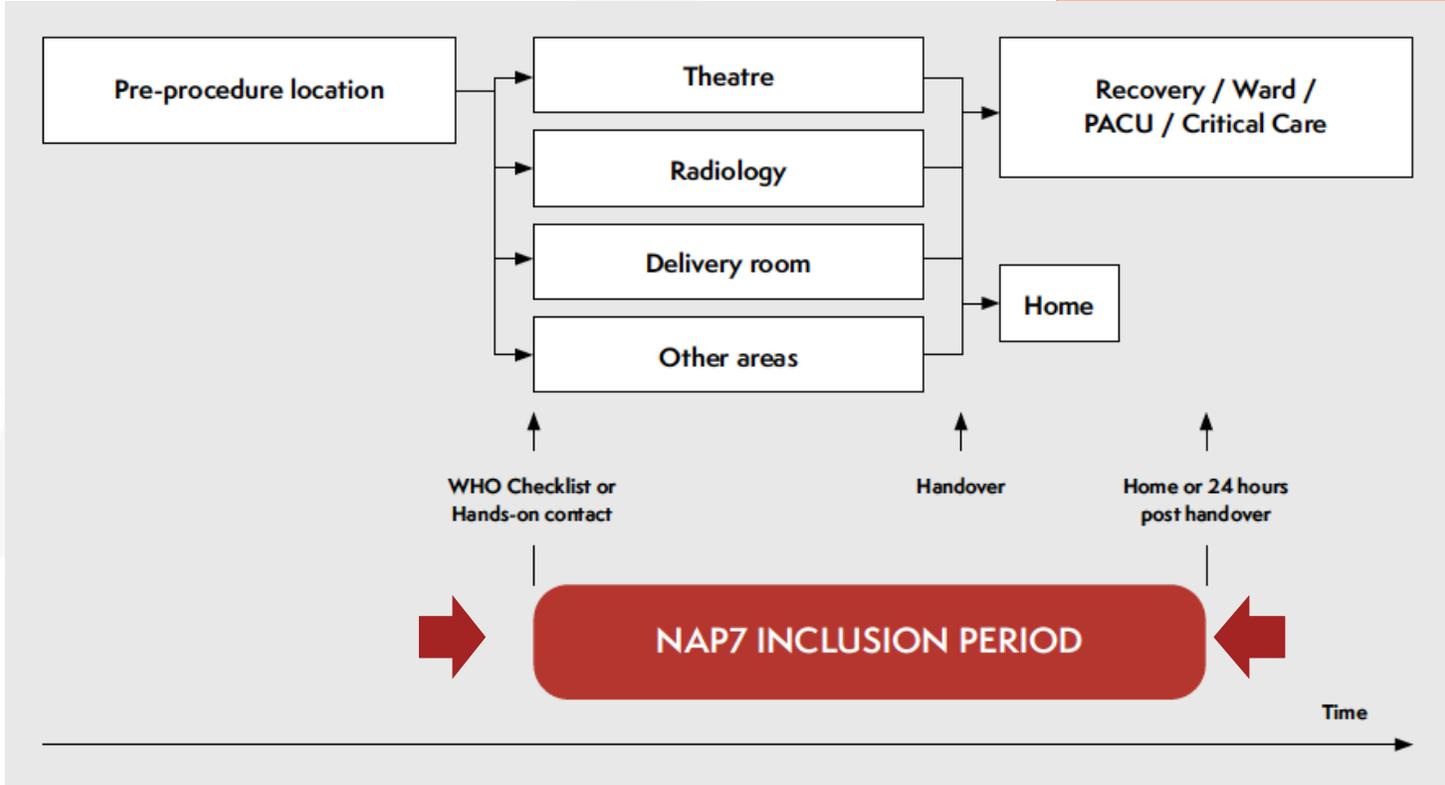
Special inclusion & report criteria:

- Critically ill children transferred for surgery/treatment to another hospital
- Situations in which a procedure is planned but does not occur before the patient is reported
- Regional blocks performed by anaesthetists outside of theatre
- Clinical scenarios including non-ventilated PCA

REPORT CASE via Local Coordinator

There will be a **Baseline Survey** starting on 8 June 2021.
 An **Activity Survey** will take place in September 2021.
 To report, contact your Local Coordinator. For more information contact the NAP7 Team at nap7@rcoa.ac.uk.

Your NAP7 Local Coordinator is: _____



CRITERI DI INCLUSIONE

CRITICHE SEDATI PER IL
 ALTRO OSPEDALE
 EL DIP EMERGENZA CON
 MA DI UNA PROCEDURA
 ETTUATI FUORI DALLA
 IA (AL DI FUORI DELLA



L'ARRESTO CARDIACO PERIOPERATORIO

CRITERI DI ESCLUSIONE



- **GESTIONE ANESTESIOLOGICA DOPO L'INIZIO DELL'ARRESTO**
- **DEFIBRILLAZIONI DURANTE PROCEDURE DI ELETTROFISIOLOGIA ATTESE COME PARTE DELLA PROCEDURA (ES. ABLAZIONE DI TV)**
- **PAZIENTI IN CLASSE ASA 6**





L'ARRESTO CARDIACO PERIOPERATORIO

RISULTATI



BASELINE SURVEY

1

At start of NAP7

10746 (71%) ANESTESISTI/
SPECIALIZZANDI/TECNICI

90% AGGIORNATI ALS
66% AGGIORNATI EPALS
10% MAI EFFETTUATO EPALS
2% MAI EFFETTUATO ALS

84% SI SENTE IN GRADO DI GESTIRE ACC
70% VORREBBE PIU' TRAINING

>50% VORREBBE LINEE GUIDA PIU' SPECIFICHE

85% HANNO GESTITO NELLA LORO CARRIERA 1 ACC

ACTIVITY SURVEY

2

During NAP7

352/416 (85%) OSPEDALI PUBBLICI
24172 PROCEDURE = 2,71 MILIONI /ANNO

ETA' MEDIA ↑

ASA 2-3-4 ↑

BMI ↑

ANESTESIA GENERALE 2% ↓

TIVA/PROPOFOL ↑

BLOCCHI LOCOREGIONALI ↑

ARRESTI CARDIACI 8,4/10000 CH. ELETTIVA

43,4/10000 CH. URGENZA



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L'ARRESTO CARDIACO PERIOPERATORIO

RISULTATI



CASE
REPORTING

1 year

3

Table 1 Breakdown of case types reported to NAP7.

	n = 881
Adult (aged > 18 y) and non-obstetric	718 (81%)
• Non-cardiac	614 (70%)
• Cardiac	50 (6%)
• Cardiology	54 (6%)
Obstetrics (excluding labour analgesia)	22 (2%)
Paediatrics	102 (12%)
Special inclusion criteria	39 (4%)
• Critically ill child before transfer	13 (1%)
• Emergency department	19* (2%)
• Obstetric analgesia	6 (< 1%)
• Regional block outside theatre	1 (< 1%)

*Two aged \leq 18 y.



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L'ARRESTO CARDIACO PERIOPERATORIO

RISULTATI



CASE
REPORTING

1 year

3

Group	Estimated denominator from Activity Survey data (n)	Cases reported (n)	Incidence of cardiac arrest, % (95% CI)	Incidence of cardiac arrest, 1 in n (95% CI)	Number of deaths (ie no ROSC)	Incidence of death, n (%)	Incidence of death, 1 in n (95% CI)
All cases	2,710,000	881	0.03 (0.030–0.035)	1 in 3,076 (2,882–3,289)	209	0.01 (0.007–0.009)	1 in 12,967 (11,299–14,881)
All ASA 1	660,000	62	0.01 (0.007–0.012)	1 in 10,645 (8,244–13,774)	5	0.001 (0.0003–0.002)	1 in 132,000 (53,220–358,423)
All ASA 1–2	1,990,000	235	0.01 (0.010–0.013)	1 in 8,468 (7,463–9,615)	21	0.001 (0.0007–0.002)	1 in 94,762 (60,976–149,254)
All elective cases	1,590,000	242	0.02 (0.01–0.02)	1 in 6,570 (5,780–7,463)	17	0.001 (0.0006–0.002)	1 in 93,529 (57,110–155,521)

Incidenza di arresto cardiaco 3/10000
Mortalità 1/12000

ROSC 75 %

SOPRAVVIVENZA ALLA FINE DELL'AUDIT 60%
SOPRAVVIVENZA ALLA DIMISSIONE 44%



L'ARRESTO CARDIACO PERIOPERATORIO

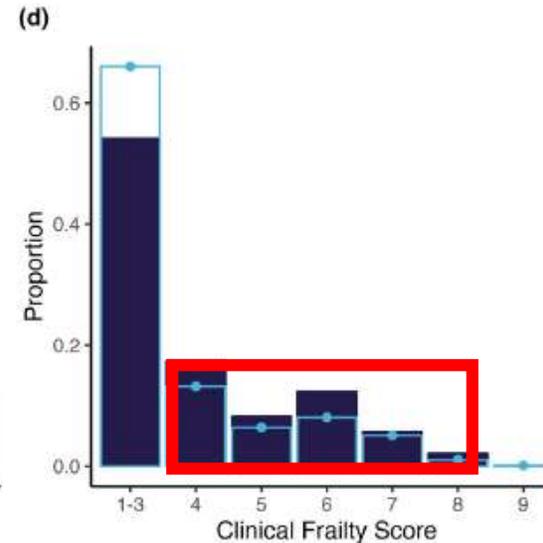
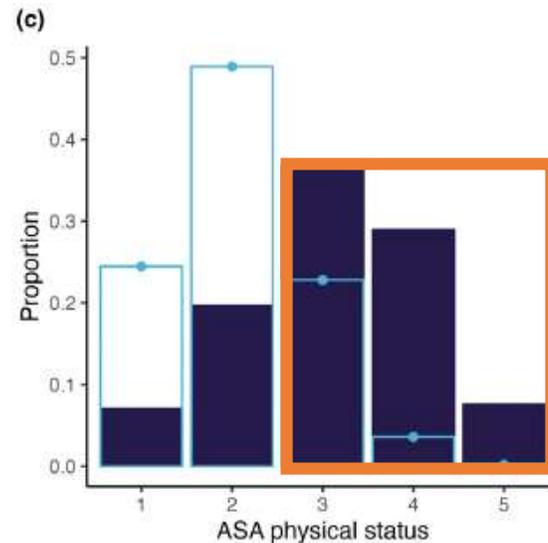
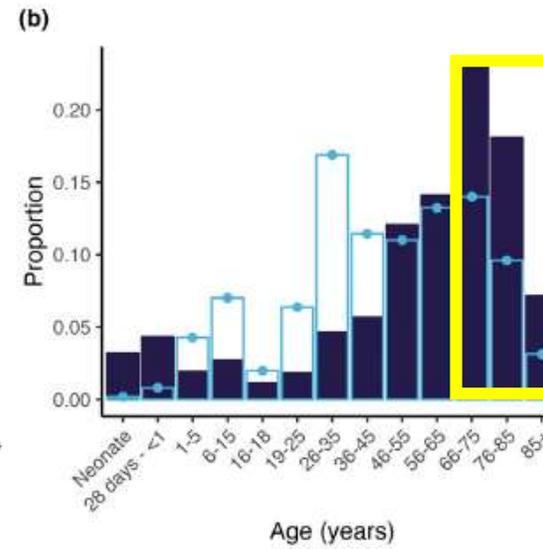
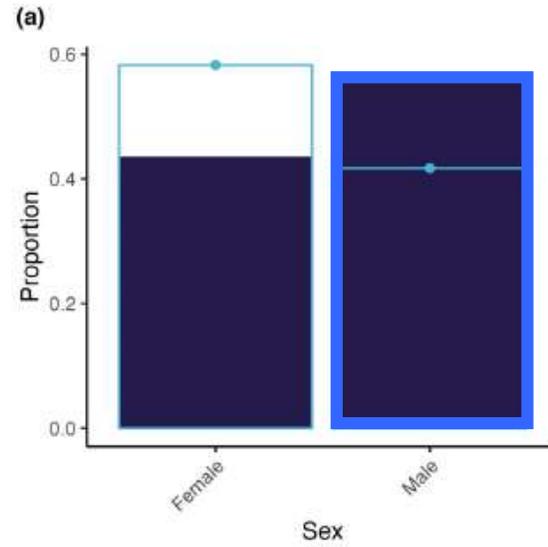


RISULTATI

CASE REPORTING

3

1 year





L'ARRESTO CARDIACO PERIOPERATORIO

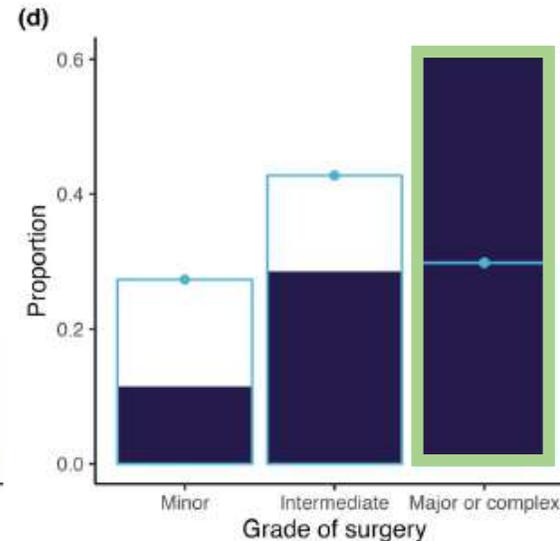
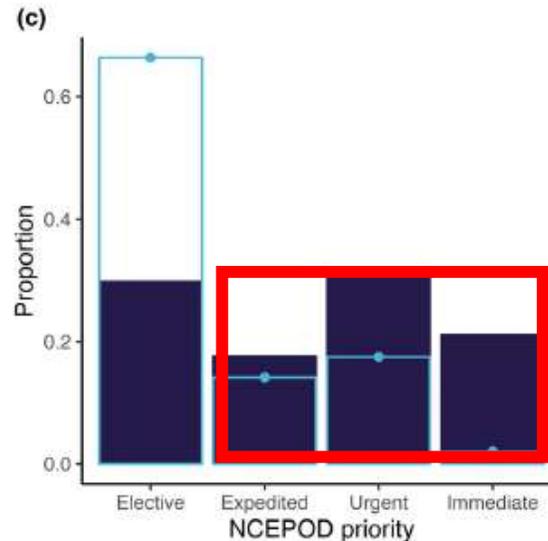
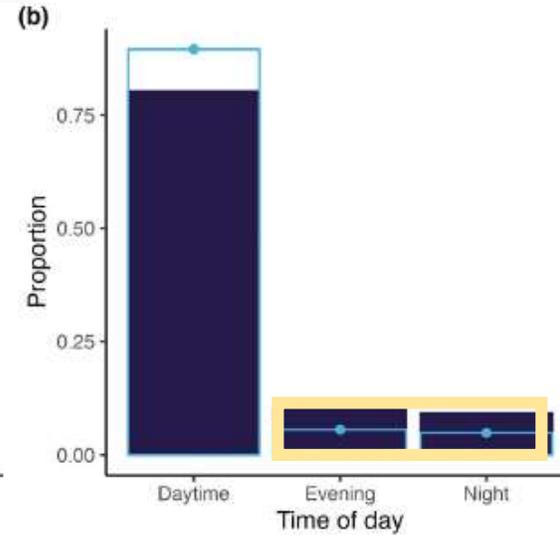
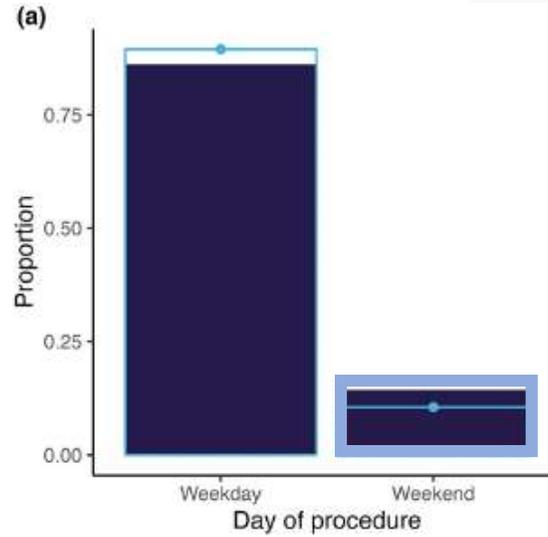


RISULTATI

CASE REPORTING

3

1 year



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L'ARRESTO CARDIACO PERIOPERATORIO

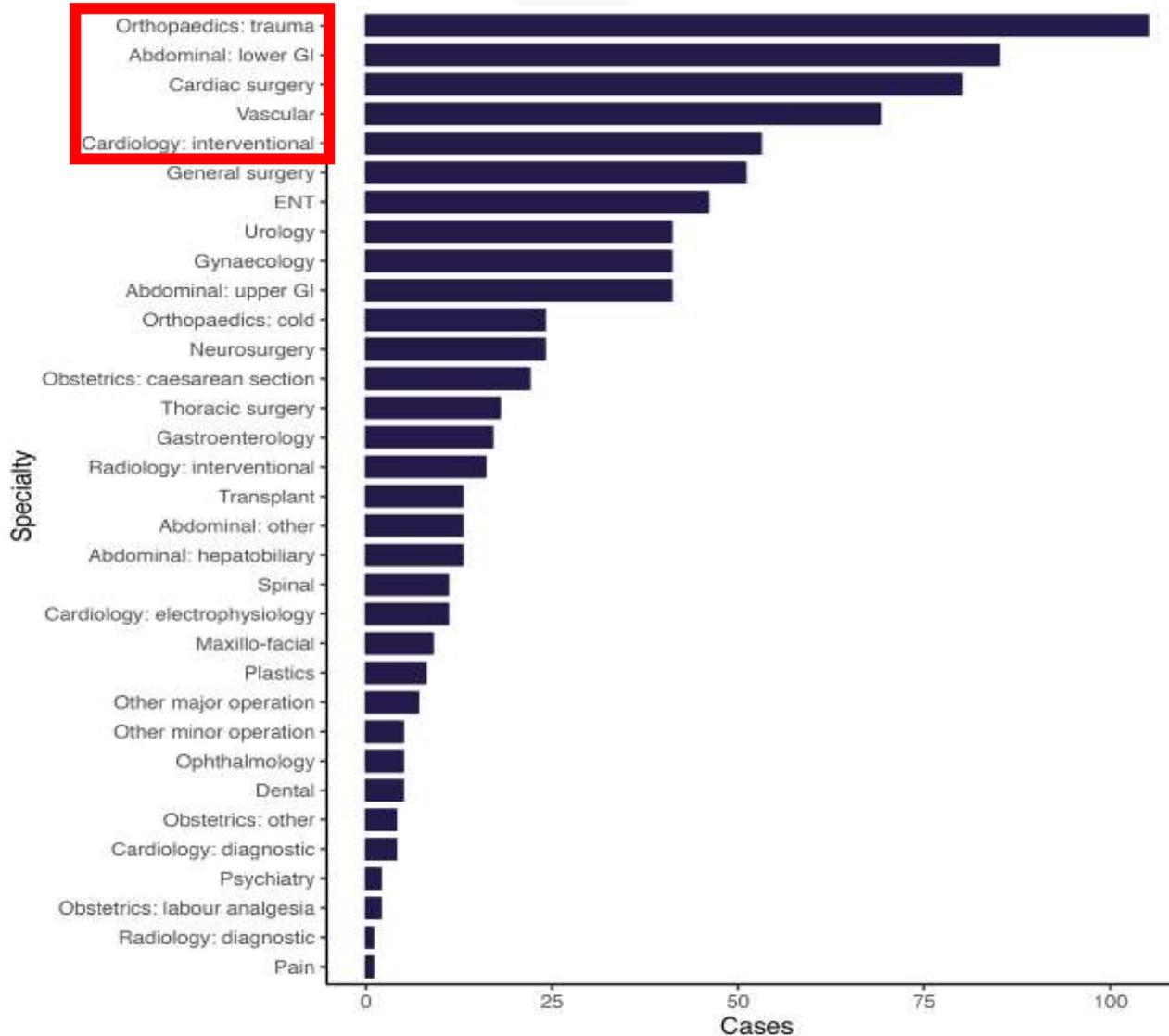


RISULTATI/chirurgie

CASE REPORTING

1 year

3



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L'ARRESTO CARDIACO PERIOPERATORIO



RISULTATI/caus
e

Cause	
Major haemorrhage	149 (17%)
Bradycardia	83 (9%)
Unknown	68 (8%)
Cardiac ischaemia	65 (7%)
Septic shock	60 (7%)
Isolated severe hypotension (central vasopressors considered/started)	54 (6%)
Severe hypoxaemia	54 (6%)
Anaphylaxis	35 (4%)
Vagal outflow (e.g. pneumoperitoneum, oculocardiac reflex)	33 (4%)
Ventricular fibrillation	26 (3%)
Bone cement implantation syndrome	20 (2%)
Drug error	16 (2%)
Pulmonary embolism	16 (2%)
Tachycardia	16 (2%)
Cardiac tamponade	15 (2%)
Complete heart block	13 (1%)
Ventricular tachycardia	13 (1%)
Significant hyperkalaemia	9 (1%)
Tension pneumothorax	8 (1%)
High neuraxial block	6 (1%)
Laryngospasm	5 (1%)
Other*	117 (13%)

*Details of causes classified under 'other' are given in online Supporting Information Appendix S7.

Speciality	Cause	
Abdominal: lower gastrointestinal	Septic shock	23/85 (27%)
Abdominal: upper gastrointestinal	Septic shock	10/41 (24%)
Cardiac surgery	Cardiac ischaemia	13/80 (16%)
Cardiology: interventional	Cardiac ischaemia	22/53 (42%)
Ear, nose and throat	Severe hypoxaemia	17/46 (37%)
General surgery	Septic shock	6/51 (12%)
Gynaecology	Bradycardia	13/41 (32%)
Orthopaedics: trauma	Other*	22/105 (21%)
Urology	Bradycardia	9/41 (22%)
Vascular	Major haemorrhage	39/69 (57%)

*Other: uncertain/unknown (10); patient factors including frailty/age/comorbid state (4); anaesthetic drugs (3); hypovolaemia (3); and cardiac failure (1).

CASE REPORTING

1 year

3



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IRC THURSDAY AFTERNOON LIVE

L'ARRESTO CARDIACO PERIOPERATORIO



RISULTATI/sopra
vivenza

CASE
REPORTING

3

1 year

Cause	Status at hospital discharge		
	Alive, n (%)	Died, n (%)	N/A, still admitted,* n (%)
Vagal outflow – eg pneumoperitoneum, oculo-cardiac reflex (n=33)	29 (88)	0 (0)	4 (12)
Ventricular tachycardia (n=13)	11 (85)	1 (7.7)	1 (7.7)
Drug error (n=16)	13 (81)	1 (6.2)	2 (12)
Anaphylaxis (n=35)	26 (74)	1 (2.9)	8 (23)
Bradyarrhythmia (n=83)	61 (73)	8 (9.6)	14 (17)
Severe hypoxaemia (n=54)	33 (61)	12 (22)	9 (17)
Tachyarrhythmia (n=16)	9 (56)	5 (31)	2 (12)
High neuraxial block (n=6)	3 (50)	0 (0)	3 (50)
Isolated severe hypotension (central vasopressors considered/started) (n=54)	26 (48)	17 (31)	11 (20)
Cardiac tamponade (n=15)	7 (47)	6 (40)	2 (13)
Ventricular fibrillation (n=26)	12 (46)	8 (31)	6 (23)
Complete heart block (n=13)	6 (46)	2 (15)	5 (38)
Major haemorrhage (n=149)	42 (28)	84 (56)	23 (15)
Bone cement implantation syndrome (n=20)	5 (25)	11 (55)	4 (20)
Tension pneumothorax (n=8)	2 (25)	3 (38)	3 (38)
Cardiac ischaemia (n=64)	15 (23)	42 (66)	7 (11)
Septic shock (n=57)	13 (23)	41 (72)	3 (5.3)
Significant hyperkalaemia (n=9)	1 (11)	4 (44)	4 (44)
Pulmonary embolism (n=16)	0 (0)	14 (88)	2 (12)
Other (n=100)	36 (36)	46 (46)	18 (18)

* Patient alive and still admitted at time of reporting to NAP7



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L'ARRESTO CARDIACO PERIOPERATORIO

RISULTATI



RITMI NON DEFIBRILLABILI
82%

RITMI DEFIBRILLABILI
17%

Event	Outcome of initial event				Patient alive at hospital discharge?		
	Survived (ROSC > 20 minutes), n (%)	Died, efforts terminated (no sustained ROSC), n (%)	Died, DNACPR in place before resuscitation attempt, n (%)	Unknown, n (%)	Yes, n (%)	No, n (%)	N/A still admitted, n (%)
Non-shockable (n=723)	536 (74)	177 (24)	6 (0.8)	4 (0.6)	308 (43)	299 (41)	116 (16)
Pulseless electrical activity (n=456)	312 (68)	139 (30)	4 (0.9)	1 (0.2)	156 (34)	232 (51)	68 (15)
Asystole (n=136)	111 (82)	23 (17)	2 (1.5)	0 (0)	74 (54)	41 (30)	21 (15)
Bradycardia (n=129)	111 (86)	15 (12)	0 (0)	3 (2.3)	77 (60)	26 (20)	26 (20)
AED used – non-shockable (n=2)	2 (100)	0 (0)	0 (0)	0 (0)	1 (50)	0 (0)	1 (50)
Shockable (n=106)	85 (80)	20 (19)	0 (0)	1 (0.9)	50 (47)	35 (33)	21 (20)
Ventricular fibrillation (n=57)	44 (77)	12 (21)	0 (0)	1 (1.8)	28 (49)	16 (28)	13 (23)
Pulseless ventricular tachycardia (n=49)	41 (84)	8 (16)	0 (0)	0 (0)	22 (45)	19 (39)	8 (16)
Unknown (n=52)	44 (85)	5 (9.6)	1 (1.9)	2 (3.8)	26 (50)	14 (27)	12 (23)



L'ARRESTO CARDIACO PERIOPERATORIO

RISULTATI/outcome neurologico



CASE REPORTING

1 year

3

Table 13.15 Admission and discharge modified Rankin Scale (mRS) score for reports with both values included.

Admission mRS	Discharge mRS, n (%)			
	0-3	4	5	6 (death)
0-3 (n=507)	243 (48)	16 (3.2)	8 (1.6)	240 (47)
4 (n=34)	4 (12)	6 (18)	2 (5.9)	22 (65)
5 (n=10)	2 (20)	0 (0)	3 (30)	5 (50)



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L'ARRESTO CARDIACO PERIOPERATORIO

RACCOMANDAZIONI



1) MATERIALE PER LA GESTIONE AVANZATA DELLE VIE AEREE E DEFIBRILLATORE DISPONIBILE

2) LINEE GUIDA PER LA GESTIONE DI

- PAZIENTI FRAGILI E ANZIANI
- CHIRURGIA VASCOLARE
- IPOVOLEMIA ED EMODINAMICA INSTABILE
- BRADICARDIA O CHIRURGIA A RISCHIO DI STIMOLO VAGALE

3) TRAINING PER GESTIONE DI ANAFILASSI, EMORRAGIA, GESTIONE VIE AEREE DIFFICILI, ARRESTO CARDIACO

4) INDICAZIONI CHIARE PER:

- INIZIO COMPRESSIONI
- USO DI FARMACI (ADRENALINA, CALCIO CLORURO, BICARBONATO)
- eCPR

5) CONSIDERARE RISK SCORE E DNACPR

6) MONITORAGGIO ADEGUATO (PA INVASIVA)

7) FORMAZIONE E DEBRIEFING

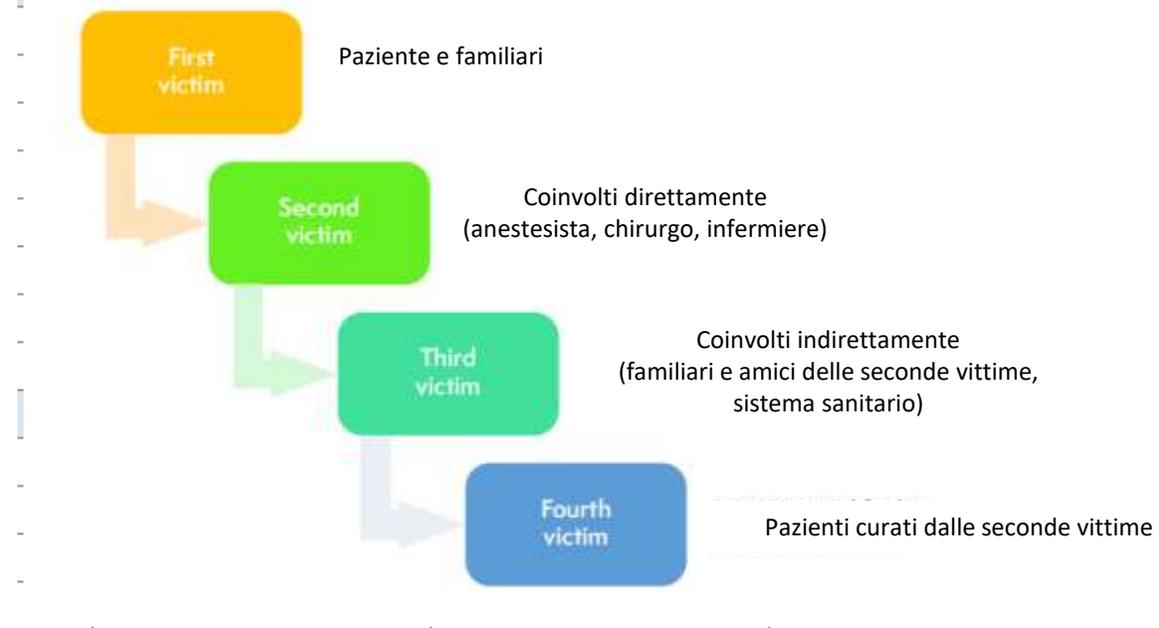




L'ARRESTO CARDIACO PERIOPERATORIO



Cases with psychological impact	Denominator of all cases in the case registry (n)	Proportion of cases leading to psychological impact (%)
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L'ARRESTO CARDIACO PERIOPERATORIO

Riassumendo....



L'arresto cardiaco perioperatorio è una complicanza relativamente rara ma con un impatto clinico importante

Elementi comuni ma anche peculiari delle differenti procedure chirurgiche

L'Audit come metodo di studio di fenomeni rari (**misurare per conoscere**)



Raccomandazioni per ottimizzare le procedure e l'organizzazione (**migliorare la sopravvivenza**)

GRAZIE!