

COVID-19-pandemins påverkan på hjärtstoppen i Sverige

Studie från SHLR

doi:10.1093/eurheartj/ehaa1067

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Studiens syfte

Jämföra patienter med hjärtstopp, på och utanför sjukhus, **före** och **under** COVID-19-pandemin.

Frågeställning:

- Epidemiologiska skillnader?
- Skillnader i överlevnad ?

Bakgrund

- Paris och New York ↑ hjärtstoppsincidens & ↑ COVID-19-fall*
- Paris x 2 ↑ hjärtstopp & ↓ överlevnad
- ”Problem” med tidigare studier; Dålig tillförlitlighet /stor osäkerhet rörande COVID-19-status

* Marijon E, Karam N, Jost D, Perrot D, Frattini B, Derkenne C, Sharifzadehgan A, Waldmann V, Beganton F, Narayanan K, Lafont A, Bougouin W, Jouven X. Out-of-hospital cardiac arrest during the COVID-19 pandemic in Paris, France: a population-based, observational study. Lancet Public Health 2020;5: e437–e443.

* Lai PH, Lancet EA, Weiden MD, Weiden MD, Webber MP, Zeig-Owens R, Hall CB, Prezant DJ. Characteristics associated with out-of-hospital cardiac arrests and resuscitations during the novel coronavirus disease 2019 pandemic in New York City. JAMA Cardiol 2020;5:1154–1163.

Metod

- Studieperiod: 1 januari 2020 till 20 juli 2020
- Studiepopulation: SHLR
- Inklusionskriterier:
 - Hjärtstopp, på och utanför sjukhus i hela riket
 - Hjärtlungräddning påbörjats/defibrillering

Metod, forts.

- Folkhälsomyndigheten deklarerade 16 mars samhällsspridning av COVID-19
- SHLR började inhämta data rörande COVID-19-status from 1 april
- Stratifiering av pandemigruppen i 3 olika kategorier
 - Pågående COVID-19-infektion
 - Ej COVID-19-infektion
 - Oklart status

Baselinetabell, OHCA

Table 1 Characteristics of OHCA patients in relation to period and COVID-19 status

	Period			During pandemic ^a			
	Pre-pandemic	Pandemic	SMD	No infection	Ongoing infection	Unknown/NA	SMD
<i>n</i>	930	1016		334	88	455	
Age, mean (SD)	70.8 (16.6)	69.6 (17.8)	0.071	70.6 (16.4)	66.5 (18.4)	70.0 (17.6)	0.130
Female sex, <i>n</i> (%)	326 (35.1)	319 (32.6)	0.055	93 (28.4)	29 (33.3)	146 (33.6)	0.073
Location of cardiac arrest, <i>n</i> (%)			0.021				0.249
Home	710 (76.3)	784 (77.2)		257 (76.9)	77 (87.5)	337 (74.1)	
Public place	129 (13.9)	138 (13.6)		35 (10.5)	5 (5.7)	82 (18.0)	
Other place	91 (9.8)	94 (9.3)		42 (12.6)	6 (6.8)	36 (7.9)	
Time to EMS arrival, min, median (IQR)	12.00 (7.00–19.00)	12.00 (7.00–20.00)	0.030	12.00 (7.00–21.00)	11.00 (6.00–19.00)	12.00 (7.00–19.00)	0.065
Time to CPR, min, median (IQR)	2.00 (0.00–8.00)	2.00 (0.00–9.00)	0.004	2.00 (0.00–9.00)	4.00 (0.00–10.00)	2.00 (0.00–9.00)	0.103
Time to defibrillation, min, median (IQR)	13.00 (8.00–20.00)	14.00 (9.00–24.00)	0.087	14.00 (8.00–23.00)	15.00 (10.50–25.00)	15.00 (10.00–24.00)	0.105
Aetiology, <i>n</i> (%)			0.337				0.433
Medical condition	785 (90.8)	640 (80.2)		230 (81.3)	50 (73.5)	271 (81.1)	
Trauma	19 (2.2)	26 (3.3)		7 (2.5)	1 (1.5)	15 (4.5)	
Intoxication	26 (3.0)	34 (4.3)		10 (3.5)	0 (0.0)	18 (5.4)	
Drowning	1 (0.1)	12 (1.5)		3 (1.1)	0 (0.0)	4 (1.2)	
Electrical accident	0 (0.0)	2 (0.3)		1 (0.4)	0 (0.0)	1 (0.3)	
Asphyxia	34 (3.9)	84 (10.5)		32 (11.3)	17 (25.0)	25 (7.5)	
Witnessed arrest, <i>n</i> (%)	534 (57.5)	571 (57.6)	0.002	203 (61.5)	53 (63.1)	243 (55.1)	0.095
Bystander witnessed, <i>n</i> (%)	453 (85.8)	454 (94.0)	0.275	158 (95.8)	37 (94.9)	201 (93.1)	0.189
Bystander defibrillated, <i>n</i> (%)	13 (22.0)	12 (32.4)	0.235	4 (28.6)	0 (0.0)	8 (42.1)	0.622
Initial rhythm, <i>n</i> (%)			0.017				0.232
Ventricular fibrillation/pulseless ventricular tachycardia	168 (20.6)	170 (20.2)		63 (22.8)	6 (7.5)	80 (21.6)	
Pulseless electrical activity	139 (17.0)	148 (17.6)		49 (17.8)	19 (23.8)	62 (16.8)	
Asystole	510 (62.4)	522 (62.1)		164 (59.4)	55 (68.8)	228 (61.6)	
Bystander CPR, <i>n</i> (%)			0.256				0.282
No	2 (0.4)	10 (1.7)		3 (1.6)	3 (5.9)	3 (1.1)	
Chest compressions	354 (66.2)	439 (74.8)		142 (74.3)	40 (78.4)	200 (75.8)	
Ventilation	1 (0.2)	2 (0.3)		1 (0.5)	0 (0.0)	1 (0.4)	
Compressions + ventilation	178 (33.3)	136 (23.2)		45 (23.6)	8 (15.7)	60 (22.7)	
Defibrillated, <i>n</i> (%)	260 (28.2)	275 (30.2)	0.044	102 (33.6)	16 (21.3)	124 (30.2)	0.146
Adrenaline given, <i>n</i> (%)	683 (73.5)	770 (80.0)	0.153	257 (80.3)	71 (85.5)	344 (80.0)	0.152

Continued

Forts. baselinetabell OHCA

Table I Continued

	Period			During pandemic ^a			
	Pre-pandemic	Pandemic	SMD	No infection	Ongoing infection	Unknown/NA	SMD
Amiodarone given, <i>n</i> (%)	94 (10.2)	110 (13.1)	0.089	42 (15.1)	3 (4.2)	53 (13.9)	0.207
Active temperature control, <i>n</i> (%)	31 (34.4)	11 (26.2)	0.180	3 (14.3)	2 (33.3)	1 (25.0)	0.272
Coronary angiography, <i>n</i> (%)	44 (38.9)	13 (25.0)	0.302	9 (36.0)	1 (16.7)	0 (0.0)	0.641
Follow-up							
ROSC, <i>n</i> (%)	310 (33.4)	297 (30.3)	0.067	106 (32.3)	22 (25.9)	126 (29.1)	0.094
Treatment completed before hospital arrival, <i>n</i> (%)			1.097				0.612
No	469 (50.4)	508 (50.2)		180 (54.1)	42 (48.3)	217 (47.8)	
Yes	51 (5.5)	398 (39.3)		120 (36.0)	37 (42.5)	186 (41.0)	
Unknown	410 (44.1)	106 (10.5)		33 (9.9)	8 (9.2)	51 (11.2)	
Discharged alive, <i>n</i> (%)	65 (38.9)	17 (33.3)	0.117	9 (36.0)	0 (0.0)	1 (16.7)	0.641
Death within 30 days, <i>n</i> (%)	833 (89.6)	905 (89.1)	0.016	291 (87.1)	84 (95.5)	408 (89.7)	0.151
Death, overall, <i>n</i> (%)	838 (90.1)	908 (89.4)	0.024	293 (87.7)	84 (95.5)	408 (89.7)	0.144

^aAll 139 cases who were enrolled during the pandemic before data on COVID-19 were recorded have been excluded.

Abbreviations: SMD = standardized mean difference; CPR = cardiopulmonary resuscitation; EMS = emergency medical services (ambulance and first responders); ROSC = return of spontaneous circulation.

The variable discharge alive only includes cases who were hospitalized

Sammanfattningsvis, baselinetabell OHCA

- Patienter med COVID-19-infektion var cirka 4 år yngre än de utan infektion
- 1946 individer inkluderades i studien, 10 % med COVID-19-infektion
- COVID-19-infektion visade sig vara associerad med mindre fördelaktig initial rytm, 7.5 % defibrillerbar rytm kontra 22.8 % utan infektion
- Utförande av HLR visade att bystanders i större utsträckning enbart genomförde kompressioner, i linje med HLR-rådets uppdaterade rekommendationer under pandemin
- Både ROSC(33,4→30,3) och andelen utskrivna levande efter ROSC (38,9→33,3) minskade prepandemi vs pandemi
- Från pandemins start till 20 juli hade ingen som ådrog sig hjärtstopp med samtida COVID-19-infektion blivit utskriven från sjukhus

Baselinetabell, IHCA

Table 2 Characteristics of IHCA patients in relation to COVID-19 status and period

Variable	Period			During pandemic ^a			SMD
	Pre-pandemic	Pandemic	SMD	No infection	Ongoing infection	Unknown/NA	
<i>n</i>	532	548		285	72	89	
Age, mean (SD)	70.1 (18.2)	67.8 (18.9)	0.121	67.0 (20.8)	67.8 (13.0)	69.4 (15.6)	0.106
Female sex, <i>n</i> (%)	205 (38.6)	197 (36.1)	0.052	93 (32.6)	23 (32.4)	37 (42.0)	0.121
Location of cardiac arrest, <i>n</i> (%)			0.209				0.560
Coronary care unit	75 (14.1)	76 (13.9)		50 (17.5)	5 (6.9)	12 (13.5)	
Intensive care unit	58 (10.9)	52 (9.5)		29 (10.2)	10 (13.9)	5 (5.6)	
Operating room	13 (2.4)	11 (2.0)		7 (2.5)	0 (0.0)	2 (2.2)	
Emergency room	54 (10.2)	89 (16.2)		36 (12.6)	15 (20.8)	20 (22.5)	
Outpatient, lab, radiology ward	16 (3.0)	25 (4.6)		8 (2.8)	4 (5.6)	8 (9.0)	
Catheterization laboratory	54 (10.2)	49 (8.9)		24 (8.4)	3 (4.2)	15 (16.9)	
Intermediary ward	16 (3.0)	17 (3.1)		6 (2.1)	6 (8.3)	2 (2.2)	
Regular hospital ward	231 (43.4)	215 (39.2)		116 (40.7)	29 (40.3)	22 (24.7)	
Other	15 (2.8)	14 (2.6)		9 (3.2)	0 (0.0)	3 (3.4)	
Time to alert, median (IQR)	1.00 (1.00–1.00)	1.00 (1.00–1.00)	0.022	1.00 (1.00–1.00)	1.00 (1.00–1.00)	1.00 (1.00–1.00)	0.115
Time to CPR, median (IQR)	0.00 (0.00–1.00)	0.00 (0.00–1.00)	0.110	0.00 (0.00–1.00)	0.00 (0.00–0.00)	0.00 (0.00–1.00)	0.150
Time to defibrillation, median (IQR)	2.00 (1.00–6.00)	2.00 (1.00–5.00)	0.070	2.00 (1.00–6.50)	2.00 (1.00–4.00)	1.00 (0.25–2.75)	0.144
Status at arrival of alarm group							
Consciousness, <i>n</i> (%)	78 (17.0)	102 (22.7)	0.142	57 (23.7)	9 (15.5)	17 (25.0)	0.146
Breathing, <i>n</i> (%)	142 (31.2)	133 (29.6)	0.035	74 (30.7)	10 (17.2)	25 (37.3)	0.232
Palpable pulse, <i>n</i> (%)	151 (33.4)	143 (31.9)	0.032	80 (33.3)	14 (24.1)	27 (39.7)	0.169
Comorbidities							
Ongoing MI, <i>n</i> (%)	103 (28.9)	39 (20.0)	0.207	23 (22.5)	1 (3.7)	4 (30.8)	0.408
Ongoing stroke, <i>n</i> (%)	10 (2.7)	5 (2.5)	0.013	2 (1.9)	1 (3.7)	0 (0.0)	0.155
Previous cancer, <i>n</i> (%)	70 (18.7)	36 (18.2)	0.013	16 (15.5)	5 (20.0)	5 (38.5)	0.272
Previous diabetes, <i>n</i> (%)	124 (32.4)	60 (28.8)	0.077	28 (26.9)	11 (40.7)	4 (23.5)	0.207
Previous heart failure, <i>n</i> (%)	137 (37.1)	59 (29.9)	0.152	38 (37.6)	6 (22.2)	3 (23.1)	0.222
Previous MI, <i>n</i> (%)	81 (21.7)	37 (18.2)	0.087	20 (19.2)	3 (11.5)	2 (13.3)	0.165
Previous stroke, <i>n</i> (%)	39 (10.3)	16 (7.8)	0.087	5 (4.8)	1 (3.8)	3 (18.8)	0.280
Aetiology, <i>n</i> (%)			0.602				1.364
Anaphylactic shock	1 (0.3)	1 (0.6)		1 (1.1)	0 (0.0)	0 (0.0)	
Haemorrhage, any	7 (2.1)	7 (3.9)		4 (4.3)	0 (0.0)	0 (0.0)	
Acute abdomen	6 (1.8)	3 (1.7)		2 (2.1)	0 (0.0)	0 (0.0)	
Sepsis	18 (5.5)	5 (2.8)		0 (0.0)	4 (16.0)	0 (0.0)	
Infection, other	3 (0.9)	7 (3.9)		3 (3.2)	3 (12.0)	0 (0.0)	
Intoxication	0 (0.0)	0 (0.0)		0 (0.0)	0 (0.0)	0 (0.0)	

Continued

Forts. baselinetabell, IHCA

Table 2 *Continued*

Variable	Period			During pandemic ^a			SMD
	Pre-pandemic	Pandemic	SMD	No infection	Ongoing infection	Unknown/NA	
Suicide attempt	1 (0.3)	1 (0.6)		1 (1.1)	0 (0.0)	0 (0.0)	
Cancer	5 (1.5)	3 (1.7)		1 (1.1)	0 (0.0)	1 (10.0)	
Technical system failure	0 (0.0)	1 (0.6)		1 (1.1)	0 (0.0)	0 (0.0)	
Dehydration	0 (0.0)	0 (0.0)		0 (0.0)	0 (0.0)	0 (0.0)	
COPD, asthma	5 (1.5)	2 (1.1)		1 (1.1)	0 (0.0)	0 (0.0)	
Primary arrhythmia	59 (18.0)	16 (8.9)		13 (13.8)	1 (4.0)	0 (0.0)	
Cardiomyopathy	3 (0.9)	0 (0.0)		0 (0.0)	0 (0.0)	0 (0.0)	
Arrhythmia post-cardiac surgery	1 (0.3)	2 (1.1)		1 (1.1)	0 (0.0)	0 (0.0)	
Aspiration	3 (0.9)	4 (2.2)		0 (0.0)	0 (0.0)	0 (0.0)	
Respiratory insufficiency	38 (11.6)	37 (20.6)		15 (16.0)	9 (36.0)	3 (30.0)	
MI, ischaemia	111 (33.9)	43 (23.9)		24 (25.5)	1 (4.0)	5 (50.0)	
Other thrombo-embolism	10 (3.1)	7 (3.9)		3 (3.2)	1 (4.0)	0 (0.0)	
Aortic dissection/rupture	6 (1.8)	11 (6.1)		6 (6.4)	2 (8.0)	0 (0.0)	
Cardiac tamponade	4 (1.2)	2 (1.1)		2 (2.1)	0 (0.0)	0 (0.0)	
Other	45 (13.8)	25 (13.9)		13 (13.8)	4 (16.0)	1 (10.0)	
Stroke	1 (0.3)	3 (1.7)		3 (3.2)	0 (0.0)	0 (0.0)	
Witnessed arrest, <i>n</i> (%)	440 (82.9)	445 (82.6)	0.008	236 (83.7)	55 (76.4)	76 (89.4)	0.179
ECG monitored, <i>n</i> (%)	310 (58.9)	307 (57.4)	0.031	177 (62.8)	36 (50.7)	44 (53.0)	0.142
CPR before arrival of alarm group, <i>n</i> (%)	415 (90.2)	416 (91.8)	0.057	218 (91.6)	55 (93.2)	64 (90.1)	0.064
Defibrillated before arrival of alarm group, <i>n</i> (%)	90 (20.6)	72 (16.4)	0.109	43 (18.6)	5 (8.5)	16 (23.5)	0.218
Shockable rhythm, <i>n</i> (%)	138 (28.0)	116 (23.8)	0.096	68 (26.4)	12 (18.5)	20 (25.3)	0.117
Defibrillated, <i>n</i> (%)	181 (35.1)	152 (29.7)	0.115	86 (31.5)	15 (22.4)	26 (33.3)	0.148
Intubated, <i>n</i> (%)	271 (52.8)	239 (47.6)	0.104	113 (42.0)	35 (52.2)	42 (55.3)	0.135
Ventilated, <i>n</i> (%)	318 (81.7)	250 (62.3)	0.443	140 (66.7)	20 (37.0)	35 (56.5)	0.528
Adrenaline given, <i>n</i> (%)	327 (63.2)	336 (65.6)	0.050	176 (64.2)	49 (73.1)	49 (63.6)	0.109
Antiarrhythmics given, <i>n</i> (%)	74 (15.0)	59 (12.1)	0.085	34 (12.9)	6 (9.2)	10 (14.1)	0.094
Mechanical compressions, <i>n</i> (%)	67 (13.1)	62 (12.4)	0.022	33 (12.2)	6 (8.8)	10 (13.7)	0.082
Temperature control, <i>n</i> (%)	17 (7.2)	5 (5.0)	0.093	3 (5.6)	0 (0.0)	0 (0.0)	0.257
Coronary angiography, <i>n</i> (%)	62 (26.1)	27 (27.3)	0.028	16 (30.2)	1 (11.1)	2 (22.2)	0.257
Follow-up							
ROSC, <i>n</i> (%)	251 (47.2)	257 (46.9)	0.006	150 (52.6)	22 (30.6)	40 (44.9)	0.236
30-day mortality, <i>n</i> (%)	318 (59.8)	334 (60.9)	0.024	166 (58.2)	54 (75.0)	46 (51.7)	0.253
Overall mortality, <i>n</i> (%)	340 (63.9)	340 (62.0)	0.039	169 (59.3)	54 (75.0)	46 (51.7)	0.263

^aAll 102 cases who were enrolled during the pandemic before data on COVID-19 were recorded have been excluded.

Abbreviations: SMD = standardized mean difference; MI = myocardial infarction; CPR = cardiopulmonary resuscitation; EMS = emergency medical service (ambulance); ROSC = return of spontaneous circulation; COPD = chronic obstructive pulmonary disease.

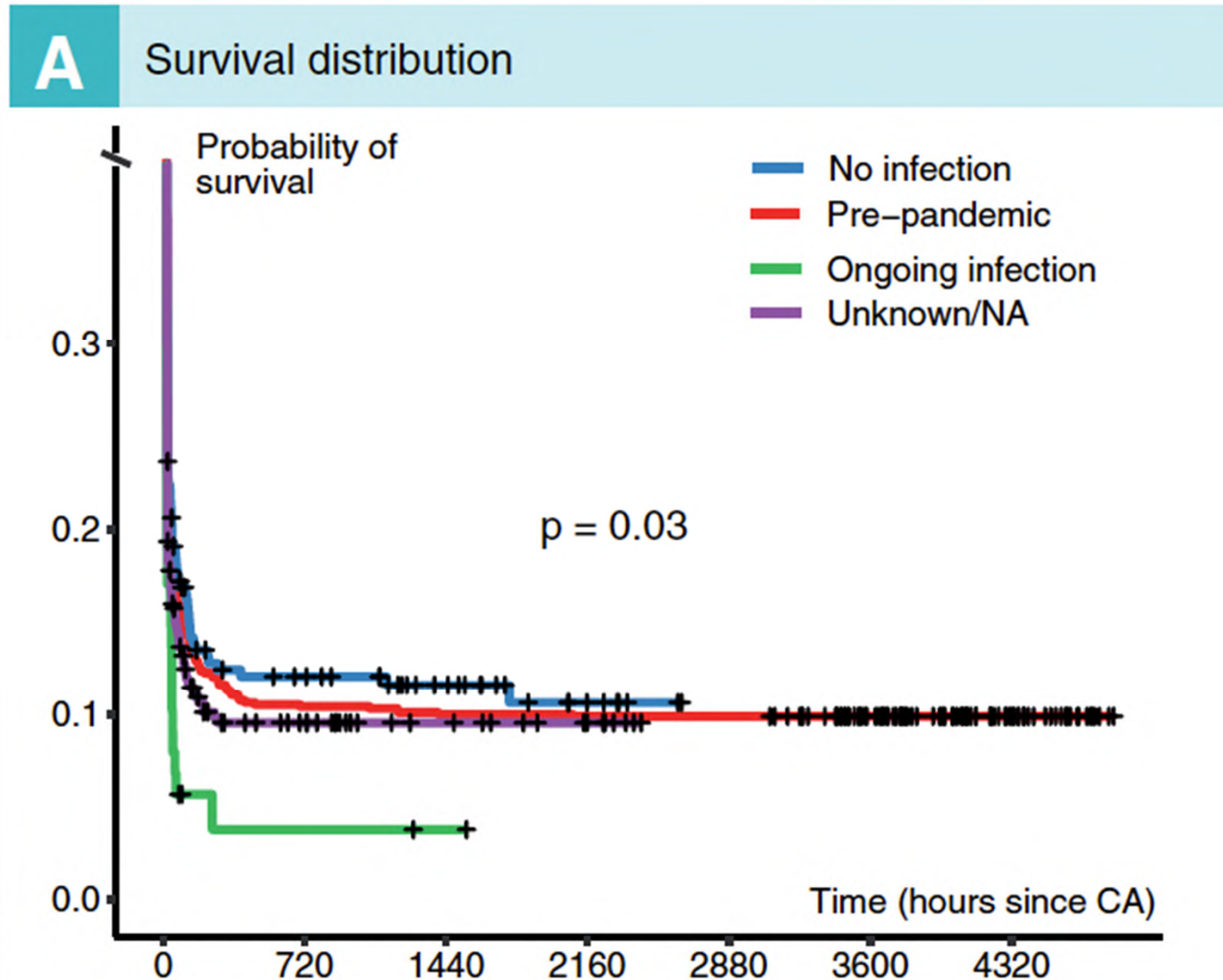
Sammanfattningsvis, baselinetabell IHCA

- Patienter något yngre, cirka 2 år under pandemin jmf med innan
- 1080 individer inkluderades i studien, 16 % med COVID-19-infektion
- Jämn könsfördelning
- Patienter med hjärtstopp under pandemin lägre grad av komorbiditet
- Respiratorisk insufficiens som etiologi var flerfaldigt ökad hos patienter med COVID-19-infektion
- Sämre övervakningsgrad inneliggande hos patienter med COVID-19-infektion, återspeglas också i senare detektion av hjärtstopp, witnessed arrests 76.4 % (ongoing infection) jmf 83.7% (no infection)

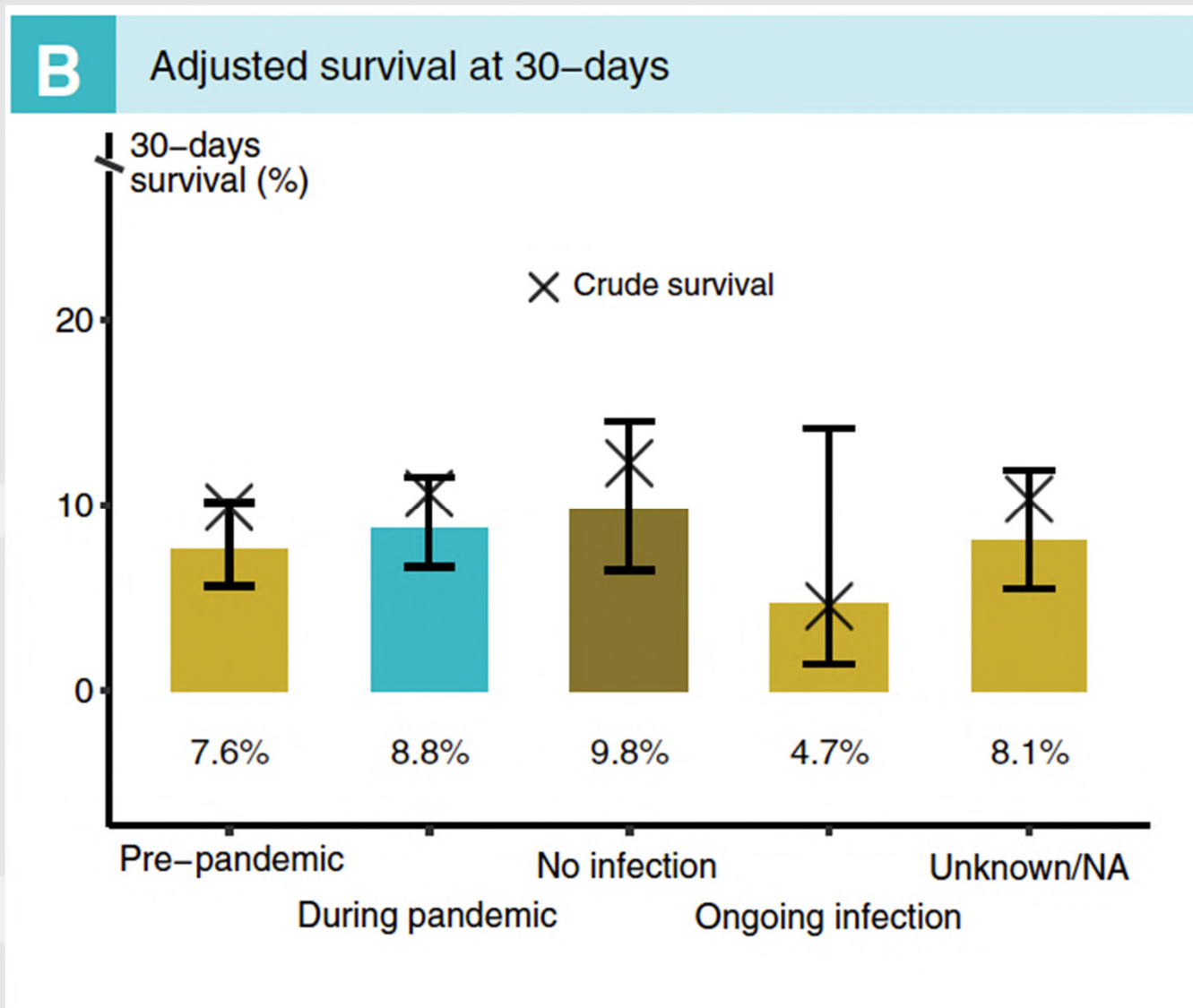
Forts. sammanfattning baseline IHCA

- Minskad defibrillerbar rytm hos patienter med COVID-19-infektion
- Sammantagen mortalitet för patienter med COVID-19-infektion 75 % jmf 59.3 % utan infektion

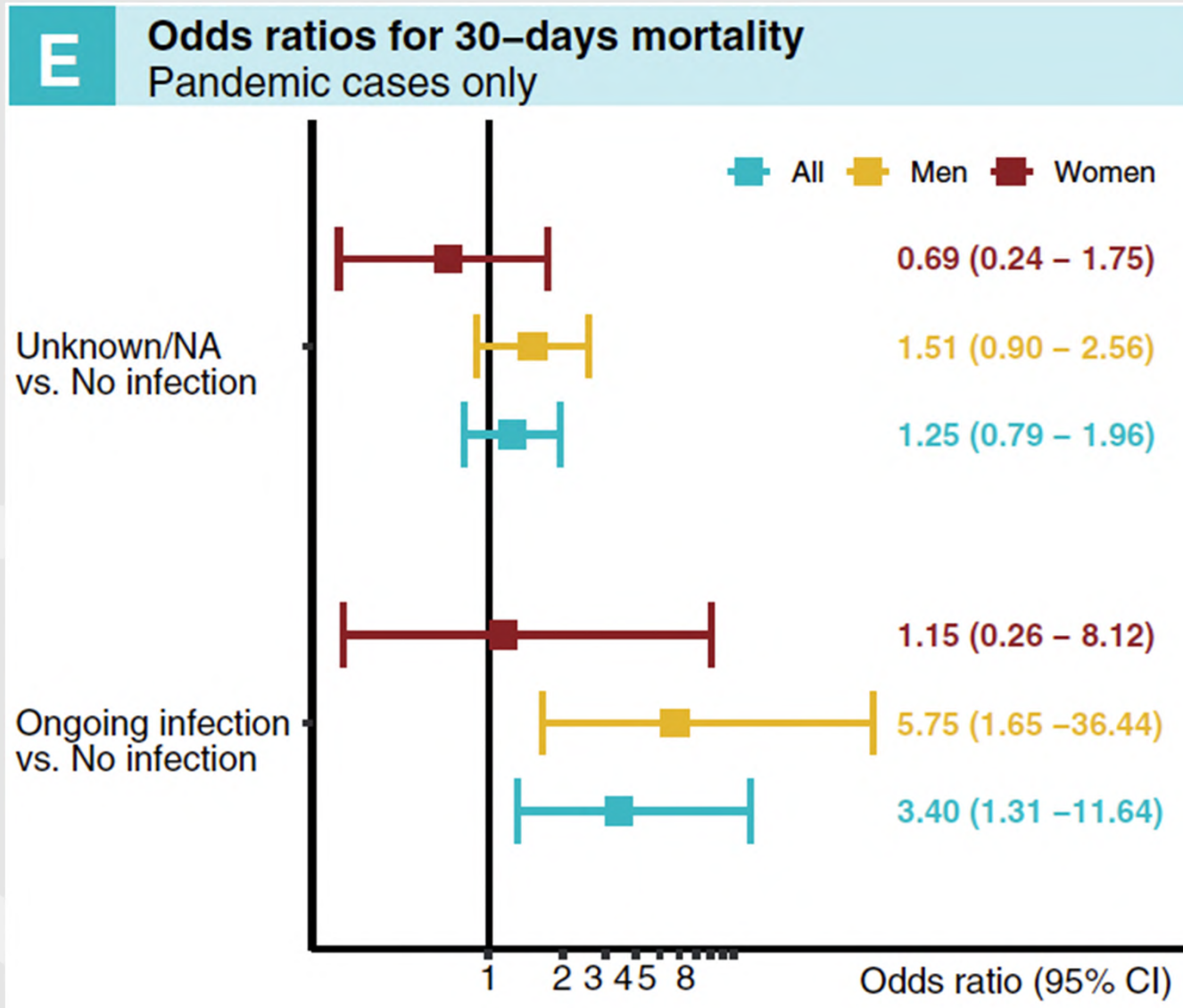
Kaplan Meier-analys, OHCA



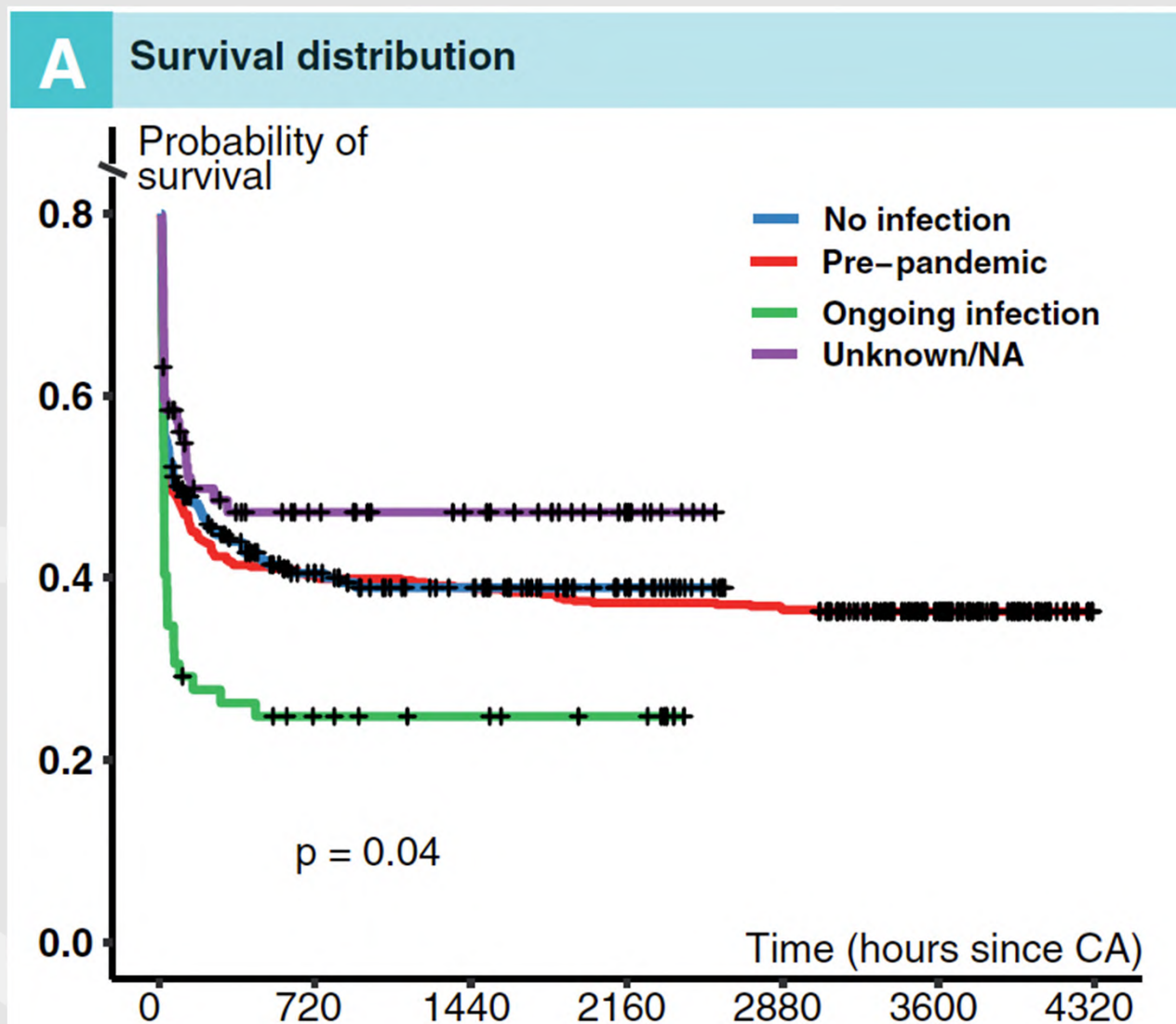
30-dagars överlevnad, OHCA



Oddsquot för 30-dagars överlevnad, OHCA

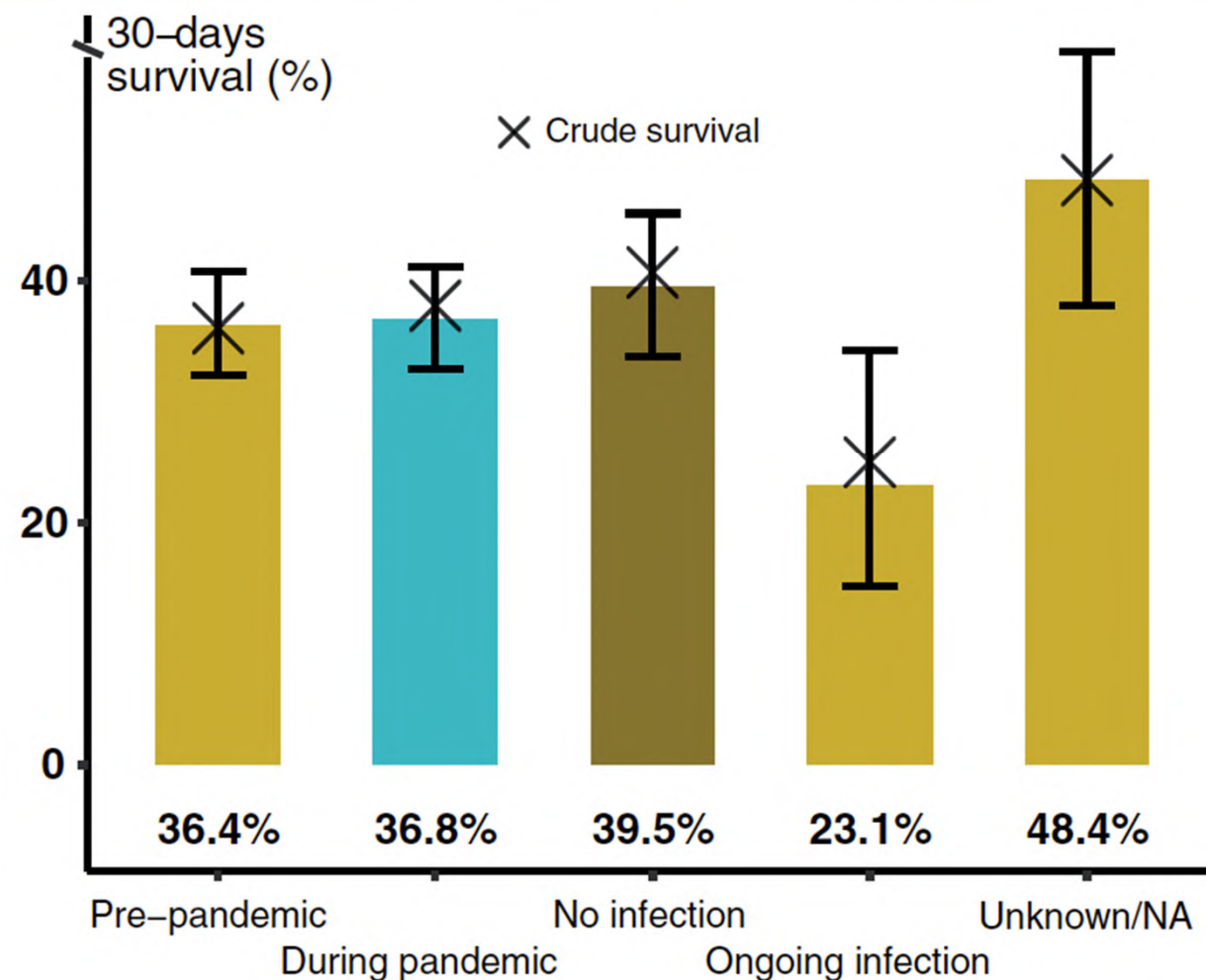


Kaplan Meier-analys, IHCA

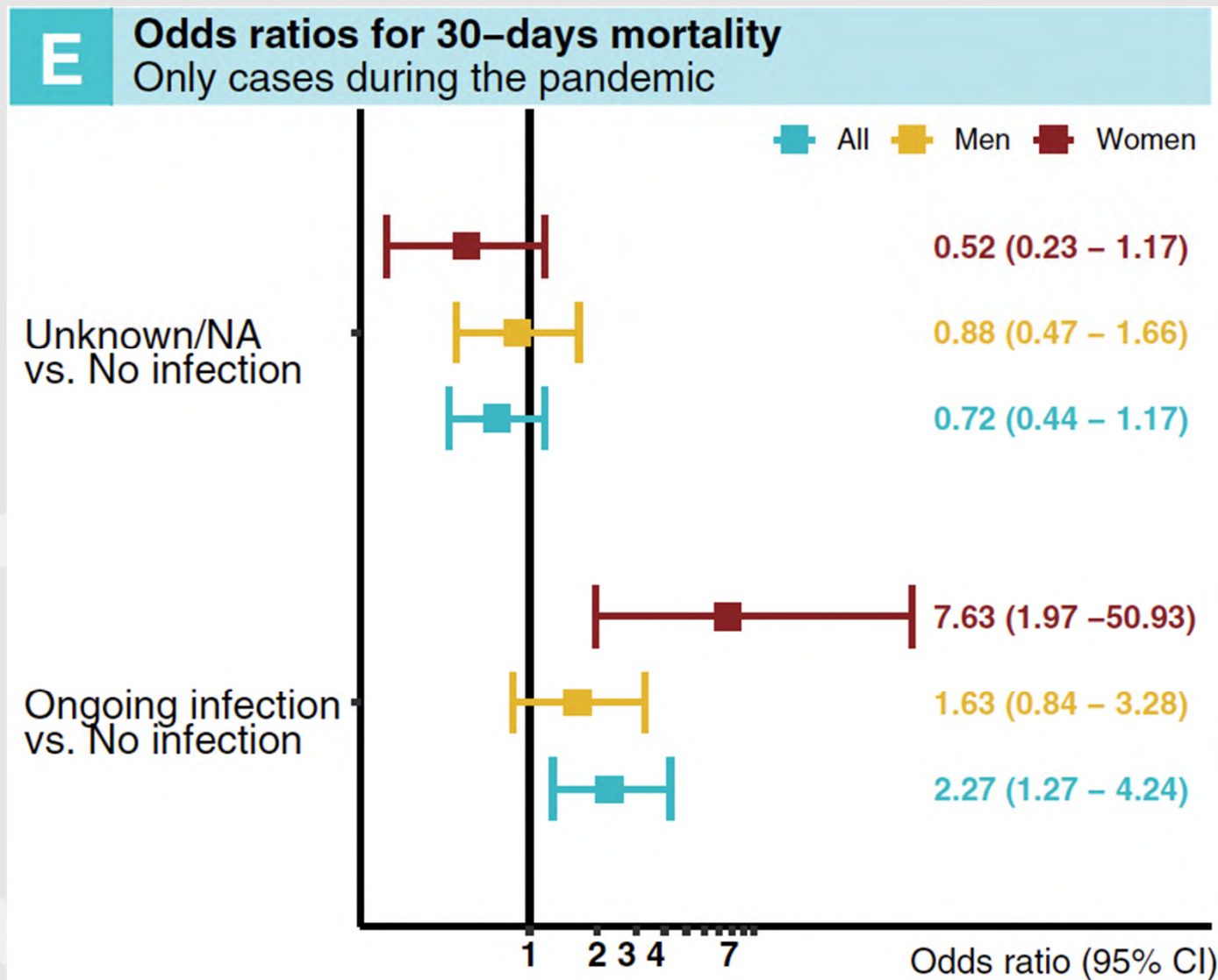


30-dagars överlevnad, IHCA

B Adjusted survival at 30-days



Oddskvot för 30-dagars överlevnad, IHCA



Sammanfattning

- COVID-19-infektion och hjärtstopp förenligt med dålig prognos, icke-defibrillerbar rytm och ökad grad respiratorisk insufficiens som bakomliggande orsak
- COVID-19-infektion påvisades i minst 10 % av OHCA och minst 16 % av IHCA
- 3.4 ggr ökad mortalitet om samtida COVID-19-infektion för OHCA
- 2.3 ggr ökad mortalitet om samtida COVID-19-infektion för IHCA
- Ingen patient med hjärtstopp och COVID-19-infektion utskriven under studieperioden!
- Patienter med COVID-19-infektion inneliggande i lägre grad monitorerade, samtidigt som högre risk för hjärtstopp föreligger

Tack för uppmärksamheten