Table S1. Univariate correlation analysis for quantitative variables in in-of-hospital cardiac arrest population.

Variable	Outcome at 3 months		P-value
	Good	Bad	
n	168	372	
Age (years)	61.7 (16.2)	63.7 (15.3)	0.003
Epinephrine (mg)	2 [1-3]	3 [1 − 5]	<0.0001
Lactate on admission (mmol/L)	4.6 [3.2 - 6.9]	6.4 [3.3 - 10.0]	<0.0001
Time to ROSC (min)	8 [4 − 15]	15 [9 − 24]	<0.0001
Weight (Kg)	80.5 (18.9)	78.2 (18.8)	0.29

One way ANOVA was used for normally distributed variables (Age and Weight): mean (s.d.) was reported. The non-parametric Mann Whitney U test was used for non-normally distributed variables: median [IQR] was reported.

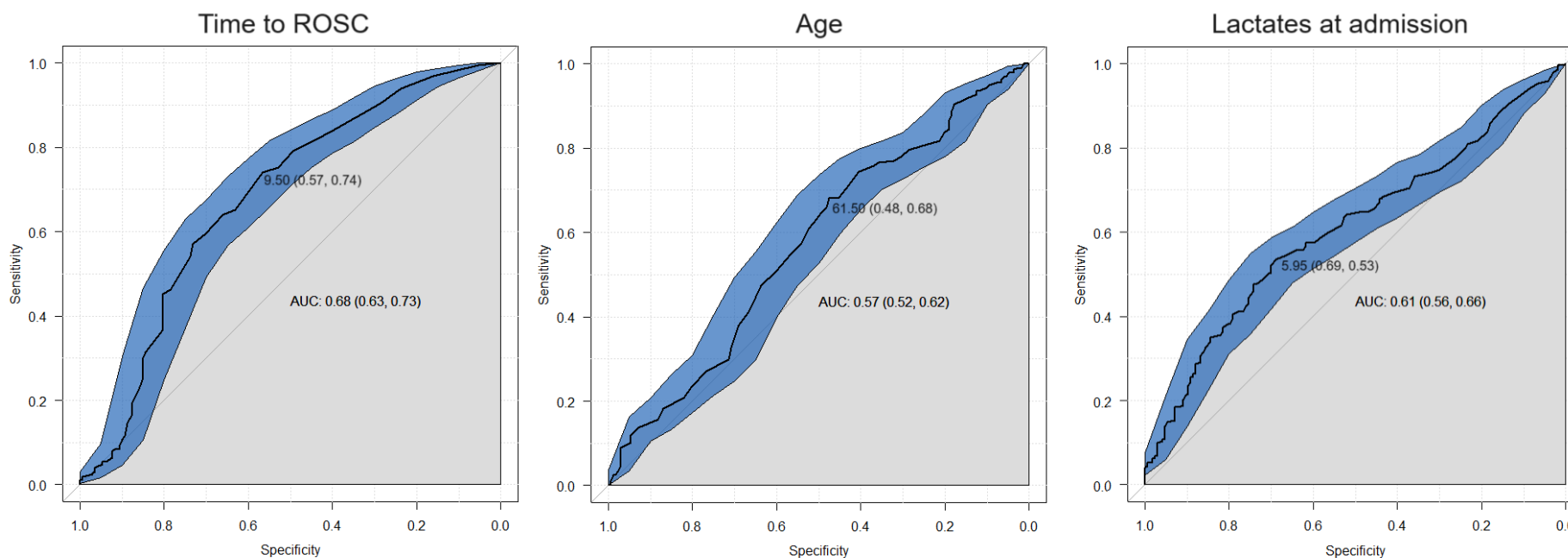**Table S2.** Univariate correlation analysis for categorial variables in IHCA population.

Units of measure	Factor	Group	Outcome at 3 months		X^2	df	P-value
			Good	Bad			
	n		168	372			
n (%)	Witnessed Arrest	0	17 (10.1)	66 (17.7)	4.6	1	0.032
		1	151 (90.0)	306 (82.3)			
n (%)	AKI	0	86 (51.2)	134 (36)	0.03	1	0.001
		1	82 (48.8)	238(64)			
n (%)	Bystander CPR	0	16 (9.5)	77 (20.7)	9.4	1	0.002
		1	152 (90.5)	295 (79.3)			
n (%)	Chronic Heart Failure	0	119 (70.8)	246 (66.1)	0.96	1	0.32
		1	49 (29.2)	126 (33.9)			
n (%)	Chronic Kidney Disease	0	130 (77.4)	267 (71.8)	1.6	1	0.21
		1	38 (22.6)	105 (28.2)			
n (%)	COPD	0	135 (80.4)	299 (80.4)	0	1	1
		1	33 (19.6)	73 (19.6)			
n (%)	Coronary artery disease	0	102 (60.7)	240 (64.5)	0.57	1	0.45
		1	66 (39.3)	132 (35.5)			

n (%)	Steroids	0	130 (77.4)	265 (71.2)	1.9	1	0.17
		1	38 (22.6)	107 (28.8)			
n (%)	CRRT	0	137 (81.5)	283 (76.1)	1.7	1	0.19
		1	31 (18.5)	89 (23.9)			
n (%)	Diabetes	0	119 (70.8)	260 (69.9)	0.014	1	0.90
		1	49 (29.2)	112 (30.1)			
n (%)	ECMO	0	156 (92.9)	334 (89.8)	0.96	1	0.33
		1	12 (7.1)	38 (10.2)			
n (%)	ECPR	0	153 (91.1)	341 (91.7)	3.7	1	0.15
		1	12 (8.9)	30 (8.3)			
n (%)	Haemorragic Events	0	159 (94.6)	328 (88.2)	4.8	1	0.029
		1	9 (5.4)	44 (11.8)			
n (%)	HIV	0	166 (98.8)	370 (99.5)	0.077	1	0.78
		1	2 (1.2)	2 (0.5)			
n (%)	Hypertension	0	83 (49.4)	203 (54.6)	1	1	0.31
		1	85 (50.6)	169(45.4)			
n (%)	Arterial Hypothermia	0	96 (57.1)	184 (49.5)	2.4	1	0.12
		1	72 (42.9)	188 (50.5)			
n (%)	IABP	0	157 (93.5)	355 (95.4)	0.56	1	0.45
		1	11 (6.5)	17 (4.6)			
n (%)	Dobutamine	0	105 (62.5)	201 (54)	3	1	0.08
		1	63 (37.5)	171 (46)			
n (%)	Vasopressors	0	51 (30.4)	68 (18.3)	9.1	1	0.002
		1	117 (69.6)	304 (81.7)			
n (%)	Liver Cirrhosis	0	164(97.6)	340 (91.4)	6.2	1	0.012
		1	4 (2.4)	32 (8.6)			
n (%)	Male Sex	0	63 (37.5)	139 (37.4)	0	1	1
		1	105 (62.5)	233 (62.6)			
n (%)	Previous Neurological Disease	0	148 (88.1)	299 (80.4)	4.3	1	0.038
		1	20 (11.9)	73 (19.6)			
n (%)	Cause of cardiac arrest	Cardiac	96 (57.1)	160 (43)	8.7	1	0.003
		Non-cardiac	72 (42.9)	212 (57)			
n (%)	Percutaneous Coronary Intervention	0	145 (86.3)	358 (96.2)	16	1	0.0001
		1	23 (13.7)	14 (3.8)			
n (%)	Presentation Rhythm	Non-shockable	72 (42.9)	260 (69.9)	38	2	<0.0001 [#]
		Shockable	88 (52.4)	95 (25.5)			
		Unkown	8 (4.7)	17 (4.6)			
n (%)	Shock	0	96 (57.1)	146 (39.2)	14	1	<0.001
		1	72 (42.9)	226 (60.8)			

n (%)	Presentation Rhythm	Asystole	35 (20.8)	171 (46)	44	3	<0.0001[#]
		Shockable-Rhythm	88 (52.4)	95 (25.5)			
		PEA	37 (22)	89 (23.9)			
		Unkown	8 (4.8)	17 (4.6)			

Pearson X^2 test was used for comparison between two groups; [#] Overall p-value (adjustment method: Bonferroni). HIV: human immunodeficiency virus; CRP: cardiopulmonary resuscitation; PEA: pulseless electrical activity; ROSC: return to spontaneous circulation; CRRT: Continuous Renal Replacement Therapy; ECMO: extracorporeal membrane oxygenation; ECPR: extracorporeal cardiopulmonary resuscitation; IABP: Intra-Aortic Balloon Pump; ICU: intensive Care Unit; AKI: acute kidney insufficiency; COPD: chronic obstructive pulmonary disease.

Figure S1. ROC curves for time to ROSC, age and lactate on admission for Unfavourable Outcome in IHCA population

The optimal cut-off in IHCA population for time to ROSC, age and lactate on admission to predict UO were 9.5 min (Se 74%; Sp 57%; AUC 0.68 [95%CI 0.63-0.73]), 61.5 years (Se 68%, Sp 48%; AUC 0.57 [95%CI 0.52-0.63]) and 5.95 mmol/L (Se 53%, Sp 69%; AUC 0.61 [95%CI 0.56-0.66]), respectively.

Table S3. Univariate correlation analysis for quantitative variables in out-of-hospital cardiac arrest population.

Factor		Outcome at 3 months		P-value
		Good	**Bad**	
	n	160	407	
Age (years)		57.66 (12.9)	63.70 (15.3)	<0.0001
Epinephrine (mg)		3 [1-5]	4 [2-7]	<0.0001
Lactate on admission (mmol/L)		4.5 [3.6 – 7.9]	7.1 [3.9 – 10.9]	<0.0001
Time to ROSC (min)		15 [10 – 25]	22 [15 – 30]	<0.0001
Weight (kg)		76.5 [70 – 83.3]	77 [65.3 – 89.0]	0.28

One way ANOVA was used for normally distributed variables (Age): mean (s.d.) was reported. The non-parametric Mann Whitney U test was used for non-normally distributed variables: median [IQR] was reported.

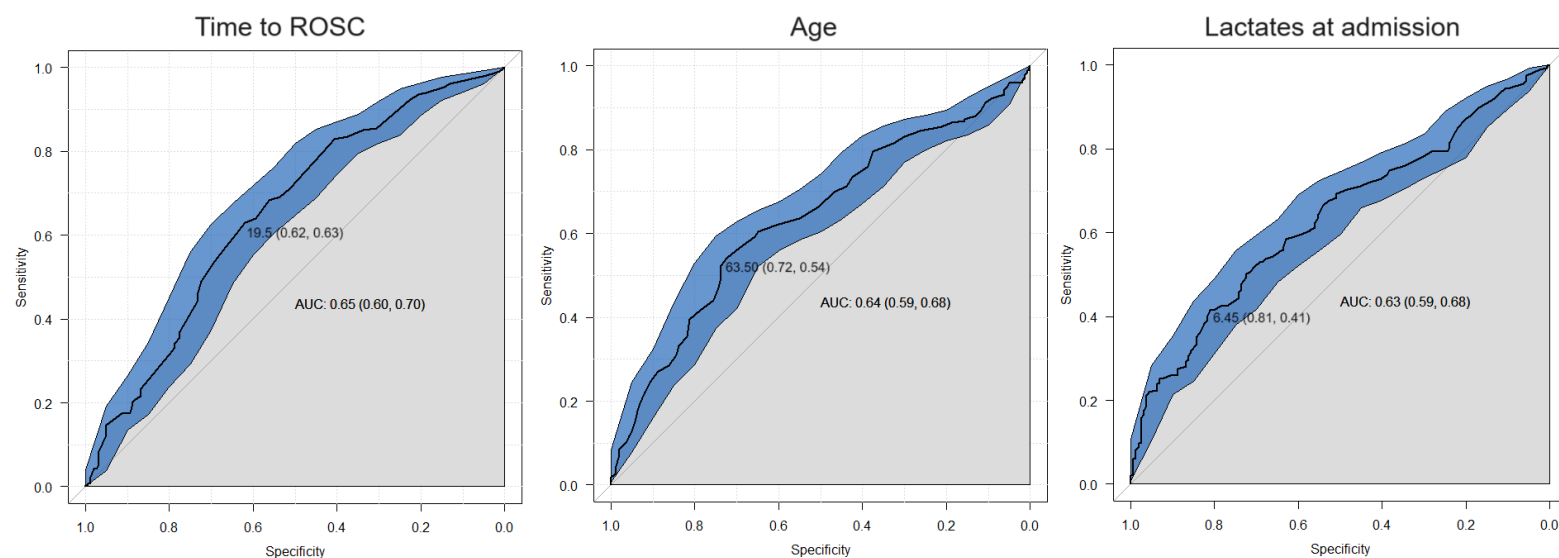**Table S4.** Univariate correlation analysis for categorial variables in OHCA population.

Units of measure	Factor	Group	Outcome at 3 months		X^2	df	p-value
			Good	**Bad**			
		n	160	407			
n (%)	Witnessed Arrest	0	32 (20)	146 (35.9)	13	1	<0.001
		1	128 (80)	261 (64.1)			
n (%)	AKI	0	91 (56.9)	203 (49.9)	2	1	0.16
		1	69 (43.1)	204 (50.1)			
n (%)	Bystander CPR	0	68 (42.5)	224 (55)	6.7	1	0.009
		1	92 (57.5)	183 (45)			
n (%)	Chronic Heart Failure	0	133 (83.1)	338 (83)	0	1	1
		1	27 (16.9)	69 (17)			
n (%)	Chronic Kidney Disease	0	151 (94.4)	374 (91.9)	0.7	1	0.40
		1	9 (5.6)	33 (8.1)			
n (%)	COPD	0	139 (86.9)	330 (81.1)	2.3	1	0.10
		1	21 (13.1)	77 (18.9)			
n (%)	Coronary Artery Disease	0	99 (61.9)	262 (64.4)	0.21	1	0.65
		1	61 (38.1)	145 (35.6)			

n (%)	Steroids	0	140 (87.5)	326 (80.1)	3.8	1	0.051
		1	20 (12.5)	81 (19.9)			
n (%)	CRRT	0	147 (91.9)	367 (90.2)	0.23	1	0.63
		1	13 (8.1)	40 (9.8)			
n (%)	Diabetes	0	136 (85)	326 (80.1)	1.5	1	0.22
		1	24 (15)	81 (19.9)			
n (%)	ECMO	0	145 (90.6)	356 (87.5)	0.83	1	0.36
		1	15 (9.4)	51 (12.5)			
n (%)	ECPR	0	150 (93.7)	371 (91.2)	0.61	1	0.44
		1	10 (6.3)	36 (8.8)			
n (%)	Hemorragic Events	0	151 (94.4)	382 (93,9)	0.0014	1	0.97
		1	9 (5.6)	25 (6.1)			
n (%)	HIV	0	159 (99.4)	406 (99.7)	0.23	1	0.63
		1	1 (0.6)	1 (0.3)			
n (%)	Arterial Hypertension	0	100 (62.5)	250 (61.4)	0.02	1	0.89
		1	60 (37.5)	157 (38.6)			
n (%)	Hypothermia	0	35 (21.9)	112 (27.5)	1.6	1	0.20
		1	125 (78.1)	295 (72.5)			
n (%)	IABP	0	153 (95.6)	392 (96.3)	0.02	1	0.89
		1	7 (4.4)	15 (3.7)			
n (%)	Dobutamine	0	101 (63.1)	234 (57.5)	1.3	1	0.26
		1	59 (36.9)	173 (42.5)			
n (%)	Vasopressors	0	66 (41.2)	86 (21.1)	23	1	<0.0001
		1	94 (58.8)	321 (78.9)			
n (%)	Liver Cirrhosis	0	159 (99.4)	391 (96.1)	3.3	1	0.07
		1	1 (0.6)	16 (3.9)			
n (%)	Male Sex	0	40 (25)	137 (33.7)	3.6	1	0.057
		1	120 (75)	270 (66.3)			
n (%)	Previous Neurological Disease	0	146 (91.2)	339 (83.3)	5.3	1	0.022
		1	14 (8.8)	68 (16.7)			
n (%)	Cause of cardiac arrest	Cardiac	125 (78.1)	231 (56.8)	22	1	0.07
		Non-cardiac	35 (21.9)	176 (43.2)			
n (%)	Percutaneous Coronary Intervention	0	103 (64.4)	347 (85.3)	29	1	<0.0001
		1	57 (35.6)	60 (14.7)			
n (%)	Presentation Rhythm	Non-shockable	36 (22.6)	267 (65.6)	17	1	<0.0001
		Shockable	123 (76.8)	132 (32.4)			
		Unknown	1 (0.6)	8 (2)			
n (%)	Shock	0	114 (71.2)	211 (51.8)	17	1	<0.0001

		1	46 (28.8)	196 (48.2)			
n (%)	Presentation Rhythm	Shockable Rhythm	123 (76.8)	132 (32.4)	95	3	<0.0001#
		Asystole	26 (16.3)	209 (51.3)			
		PEA	10 (6.3)	58 (14.3)			
		Unkown	1 (0.6)	8 (2)			

Pearson X^2 test was used for comparison between two groups; # Overall p-value (adjustment method: Bonferroni). HIV: human immunodeficiency virus; CRP: cardiopulmonary resuscitation; PEA: pulseless electrical activity; ROSC: return to spontaneous circulation; CRRT: Continuous Renal Replacement Therapy; ECMO: extracorporeal membrane oxygenation; ECPR: extracorporeal cardiopulmonary resuscitation; IABP: Intra-Aortic Balloon Pump; ICU: intensive Care Unit; AKI: acute kidney insufficiency; COPD: chronic obstructive pulmonary disease.

Figure S2. ROC curves for time to ROSC, age and lactate on admission for Unfavourable Outcome in OHCA population

The optimal cut-off for OHCA population for time to ROSC, age, and lactate on admission to predict UO were 19.5 min (Se 63%; Sp62%; AUC 0.65 [95%CI 0.60-0.70]), 63.5 years (Se 54%, Sp 72%; AUC 0.64 [95%CI 0.59-0.68]) and 6.45 mmol/L (Se 41%, Sp 81%; AUC 0.63 [95%CI 0.58-0.68]), respectively.

Table S5. Univariate correlation analysis for quantitative variables in overall cohort.

Factor	Outcome at 3 months		P-value
	Good	Bad	
n	328	779	
Age	59.71 (14.76)	64.70 (15.01)	<0.0001
Epinephrine (mg)	2.00 [1.00-4.00]	3.00 [2.00, 6.00]	<0.0001
Lactate on admission (mmol/L)	4.55 [3.30, 7.27]	6.80 [3.70, 10.30]	<0.0001
Time to ROSC (min)	11.00 [5.00, 20.00]	20.00 [11.50, 28.00]	<0.0001
Weight (kg)	77.00 [68.00, 88.00]	77.00 [65.00, 89.00]	0.83

One way ANOVA was used for normally distributed variables (Age): mean (s.d.) was reported. The non-parametric Mann

Whitney U test was used for non-normally distributed variables: median [IQR] was reported.

Table S6. Univariate correlation analysis for categorial variables in overall cohort

Units of measure	Factor	Group	Outcome at 3 months		X^2	df	P-value
			Good	Bad			
	n		328	779			
n (%)	Witnessed CA	0	49 (14.9)	212 (27.2)	19	1	<0.0001
		1	279 (85.1)	567 (72.8)			
n (%)	AKI	0	177 (54)	337 (43.3)	10	1	0.001
		1	151 (46)	442 (56.7)			
n (%)	Bystander CPR	0	84 (25.6)	301 (38.6)	17	1	<0.0001
		1	244 (74.4)	478 (61.4)			
n (%)	Chronic Heart Failure	0	252 (76.8)	584 (75)	0.34	1	0.56
		1	76 (23.2)	195 (25)			
n (%)	Chronic Kidney Disease	0	281 (85.7)	641 (82.3)	1.7	1	0.2
		1	47 (14.3)	138 (17.7)			
n (%)	COPD	0	274 (83.5)	629 (80.7)	1	1	0.31
		1	54 (16.5)	150 (19.3)			

n (%)							
n (%)	Coronary Artery Disease	0	201 (61.3)	502 (64.4)	0.86	1	0.35
		1	127 (38.7)	277 (35.6)			
n (%)	Steroids	0	270 (82.3)	591 (75.9)	5.2	1	0.02
		1	58 (17.7)	188 (24.1)			
n (%)	CRRT	0	284 (86.6)	649 (83.4)	1.5	1	0.22
		1	44 (13.4)	129 (16.6)			
n (%)	Diabetes	0	255 (77.7)	586 (75.2)	0.67	1	0.40
		1	73 (22.3)	193 (24.8)			
n (%)	ECMO	0	301 (91.8)	690 (88.6)	2.2	1	0.14
		1	27 (8.2)	89 (11.4)			
n (%)	ECPR	0	299 (93.1)	711 (91.5)	0.62	1	0.43
		1	22 (6.9)	66 (8.5)			
n (%)	Hemorragic Events	0	310 (94.5)	710 (91.1)	3.2	1	0.07
		1	18 (5.5)	69 (8.9)			
n (%)	HIV	0	325 (99.1)	776 (99.6)	0.42	1	0.52
		1	3 (0.9)	3 (0.4)			
n (%)	Arterial Hypertension	0	183 (55.8)	453 (58.2)	0.43	1	0.51
		1	145 (44.2)	326 (41.8)			
n (%)	Hypothermia	0	131 (39.9)	296 (38)	0.29	1	0.60
		1	197 (60.1)	483 (62.0)			
n (%)	IABP	0	310 (94.5)	747 (95.9)	0.72	1	0.39
		1	18 (5.5)	32 (4.1)			
n (%)	Dobutamine	0	206 (62.8)	435 (55.8)	4.3	1	0.038
		1	122 (37.2)	344 (44.2)			
n (%)	Vasopressors	0	117 (35.7)	154 (19.8)	31	1	<0.0001
		1	211 (64.3)	625 (80.2)			
n (%)	Liver Cirrhosis	0	323 (98.5)	731 (93.8)	9.9	1	0.002
		1	5 (1.5)	48 (6.2)			
n (%)	Male Sex	0	103 (31.4)	276 (35.4)	1.5	1	0.22
		1	225 (68.6)	503 (64.6)			
n (%)	Previous Neurological Disease	0	294 (89.6)	638 (81.9)	9.8	1	0.001
		1	34 (10.4)	141 (18.1)			
n (%)	Cause of cardiac arrest	Cardiac	221 (67.4)	391 (50.2)	27	1	<0.0001
		Non-cardiac	107 (32.6)	388 (49.8)			
n (%)	Site of Cardiac Arrest	IHCA	168 (51.2)	372 (47.8)	0.98	1	0.32
		OHCA	160 (48.8)	407 (52.2)			
n (%)	Percutaneous Coronary Intervention	0	248 (75.6)	705 (90.5)	42	1	<0.0001
		1	80 (24.4)	74 (9.5)			
n (%)	Presentation Rhythm	Non-shockable	108 (33)	527 (67.7)	120	1	<0.0001
		Shockable	211 (64.3)	227 (29.1)			

		Unknown	9 (2.7)	25 (3.2)			
n (%)	Shock	0	210 (64.0)	357 (45.8)	30	1	<0.0001
		1	118 (36.0)	422 (54.2)			
n (%)	Presentation Rhythm	Shockable	211 (64.3)	227 (29.1)	128	3	<0.0001#
		Asystole	61 (18.6)	380 (48.8)			
		PEA	47 (14.3)	147 (18.9)			
		Unkown	9 (2.7)	25 (3.2)			
n (%)	Age according to ROC threshold	<63.5	199 (60.7)	318 (40.8)	36	1	<0.0001
		≥ 63.5	129 (39.3)	461 (59.2)			
n (%)	Lactate on admission according to ROC threshold	<6.75	234 (71.8)	380 (49.6)	45	1	<0.0001
		≥ 6.75	92 (28.2)	386 (50.4)			
n (%)	Time to ROSC according to ROC threshold	< 13.5	188 (57.3)	230 (29.5)	75	1	<0.0001
		≥ 13.5	140 (42.7)	549 (70.5)			

Pearson X2 test was used for comparison between two groups; # Overall p-value (adjustment method: Bonferroni). HIV: human immunodeficiency virus; CRP: cardiopulmonary resuscitation; PEA: pulseless electrical activity; ROSC: return to spontaneous circulation; CRRT: Continuous Renal Replacement Therapy; ECMO: extracorporeal membrane oxygenation; ECPR: extracorporeal cardiopulmonary resuscitation; IABP: Intra-Aortic Balloon Pump; ICU: intensive Care Unit; AKI: acute kidney insufficiency; COPD: chronic obstructive pulmonary disease.
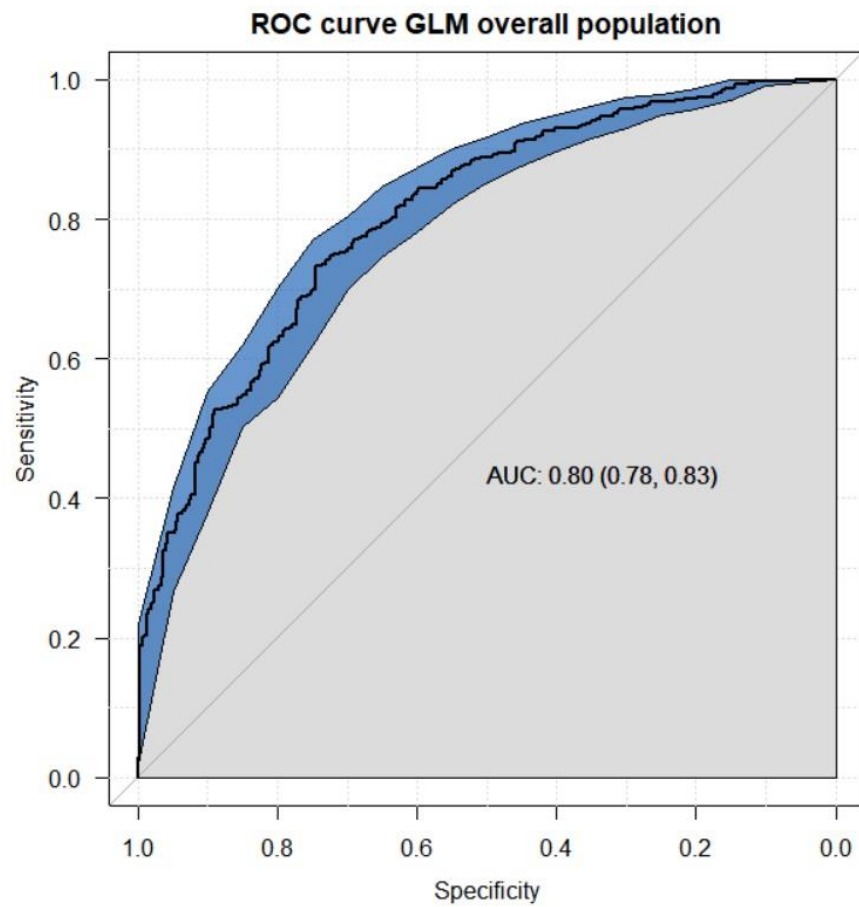
Table S7. Multivariate logistic regression for overall cohort.

VARIABLE	Complete Logistic Multivariate Model				Final Model (Stepwise back-/forward based on AIC)			
	OR	IC95%		p-value	OR	IC95%		p-value
Witnessed CA [T.1]	0.478	0.319	0.717	<0.001	0.491	0.330	0.731	<0.001
Time to ROSC (min)	1.030	1.020	1.050	<0.0001	1.030	1.020	1.050	<0.0001
Site of Cardiac Arrest [OHCA]	1.300	0.924	1.840	0.13	1.300	0.934	1.810	0.12
Non-cardiac cause [T.1]	1.790	1.280	2.510	<0.001	1.800	1.290	2.500	<0.001
Previous Neurological disease [T.1]	1.880	1.180	2.990	0.007	1.930	1.220	3.050	0.005
Lactate on admission (mmol/L)	1.090	1.040	1.140	<0.001	1.090	1.040	1.130	<0.001
Liver Cirrhosis [T.1]	3.000	1.100	8.210	0.032	3.020	1.110	8.160	0.03
Presentation Rhythm [Shockable]				#				#
Presentation Rhythm [T.Asystole]	4.920	3.410	7.100	<0.0001	4.910	3.410	7.060	<0.0001
Presentation Rhythm [T.PEA]	2.120	1.370	3.270	<0.001	2.140	1.390	3.290	<0.001
Presentation Rhythm [T.Unknown]	2.680	1.100	6.510	0.029	2.520	1.060	6.030	0.04
Shock [T.1]	1.770	1.260	2.490	0.001	1.800	1.310	2.470	<0.001
Age (years)	1.030	1.020	1.050	<0.0001	1.040	1.020	1.050	<0.0001

Male Sex [T.1]	0.899	0.647	1.250	0.52	-	-	-
CRRT [T.1]	0.895	0.551	1.460	0.655	-	-	-
Chronic Kidney Disease [T.1]	0.915	0.568	1.470	0.71	-	-	-
HIV [T.1]	0.409	0.068	2.470	0.33	-	-	-
ECMO [T.1]	0.932	0.519	1.680	0.81	-	-	-
Steroids [T.1]	1.060	0.714	1.580	0.77	-	-	-
AKI [T.1]	1.260	0.892	1.770	0.191	-	-	-
Hemorragic Events[T.1]	0.901	0.483	1.680	0.74	-	-	-
Null deviance	1330.7 on 1090 degrees of freedom				1331.4 on 1091 degrees of freedom		
Residual deviance	1034.8 on 1069 degrees of freedom				1039.9 on 1079 degrees of freedom		
AIC	1079				1066		
Hosmer and Lemeshow goodness of fit (GOF)	$\chi^2 = 7.5$, df = 8, p-value = 0.5				$\chi^2 = 10$, df = 8, p-value = 0.2		
AUC Model's ROC curve	0.807 [95% CI 0.78 - 0.834]				0.805 [95% CI 0.777 - 0.832]		

Complete regression analysis and final reduced model after stepwise back/forward selection based on Akaike Information Criterion (AIC). Overall p value for Presentation Rhythm: <0.0001. *Lo*nger time to ROSC, older age, higher lactate on admission, an unwitnessed CA, a *p*resentation non-shockable rhythm, a non-cardiac cause of CA, the occurrence of shock, the presence of previous neurological disease, the presence of liver cirrhosis were independent predictors of UO. HIV: human immunodeficiency virus; PEA: pulseless electrical activity; ROSC: return to spontaneous circulation; CRRT: Continuous Renal Replacement Therapy; ECMO: extracorporeal membrane oxygenation; AKI: acute kidney insufficiency.

Figure S3. ROC curve for Generalised Logistic Model for overall population

ROC curve GLM overall population

AUC: 0.80 (0.78, 0.83)

The ROC curve to assess the discriminatory ability of the model was 0.805 [95% CI 0.777 - 0.832].