

## Supplemental Material

Supplemental Table 1. Hospital group stratification summary statistics

<b>Group (n)</b>	<b>Facility Count (n = 34)</b>	<b>Geographic Location</b>	<b>Teaching Status</b>	<b>C-CPR (n=3,165)</b>	<b>E-CPR (n=591)</b>
A (353)	3	West	Major	311	42
B (510)	6	South	Major	476	34
C (335)	4	East	Major	267	68
D (395)	2	South	Major	337	58
E (481)	6	Midwest	Major	411	70
F (341)	6	West/Midwest	Minor	308	33
G (441)	3	South	Minor	401	40
H (423)	2	East	Major/Minor	314	109
I (287)	1	South	Minor	202	85
J (190)	1	East	Minor	138	52

Hospitals were grouped into 10 categories based on the pre-selected characteristics (geographic location and major/minor teaching status) for the purpose of developing propensity scores that balance patient-level covariates within hospital group. This process of grouping sought to stratify hospitals as might be done in a randomized controlled trial with stratified randomization (of patients) within institution. See methods section for details.

*Key: C-CPR, conventional cardiopulmonary resuscitation; E-CPR, extracorporeal cardiopulmonary resuscitation*

Supplemental Table 2: F-statistic between CPR groups before and after stratification by region.

<b>Region A (n = 353)</b>		
<b>Variable</b>	<b>F-Statistic Before Stratification</b>	<b>F-Statistic After Stratification</b>
Age	3.64	0.57
Illness category	0.81	0.09
Initial Rhythm	1.52	0.00
Gender	2.77	0.17
Hypotension	0.66	0.15
Assisted/Mechanical Ventilation	9.27	0.18
Intra-Arterial Catheter	10.59	0.48
Invasive Airway	5.91	0.03
Continuous Infusion of Vasoactive Medications	7.61	2.24
Inhaled Nitric Oxide	5.38	0.04
Acute Respiratory Insufficiency	2.75	0.44
Sodium Bicarbonate Administration	1.53	0.10
Event during Weekend (Fri 11:00PM-Mon 6:59AM)	2.09	0.00
Year	10.28	0.60
Number of Doses-Epinephrine	17.67	8.50
Duration of CPR (minutes)	30.49	2.27

<b>Region B (n = 510)</b>		
<b>Variable</b>	<b>F-Statistic Before Stratification</b>	<b>F-Statistic After Stratification</b>
Age	0.79	0.00
Illness category	1.87	0.09
Initial Rhythm	0.40	1.26
Hypotension	0.01	0.17

Assisted/Mechanical Ventilation	1.25	0.05
Intra-Arterial Catheter	7.52	0.00
Invasive Airway	0.34	0.01
Continuous Infusion of Vasoactive Medications	2.48	1.01
Acute Respiratory Insufficiency	4.02	0.68
Sodium Bicarbonate Administration	14.15	1.18
Event during Weekend (Fri 11:00PM-Mon 6:59AM)	0.62	0.01
Year	1.46	0.10
Time of Day	0.01	0.10
Number of Doses-Epinephrine	9.01	13.14
Duration of CPR	21.80	0.12

<b>Region C (n = 335)</b>		
<b>Variable</b>	<b>F-Statistic Before Stratification</b>	<b>F-Statistic After Stratification</b>
Age	0.42	0.02
Illness category	1.72	0.15
Initial Rhythm	0.20	0.00
Gender	0.03	0.37
Hypotension	8.11	0.77
Assisted/Mechanical Ventilation	1.07	0.05
Intra-Arterial Catheter	0.01	0.09
Invasive Airway	2.55	0.00
Acute Respiratory Insufficiency	2.78	0.02
Sodium Bicarbonate Administration	1.00	0.00
Time of Day	0.01	0.03
Year	59.58	0.01
Number of Doses-Epinephrine	1.72	0.09
Duration of CPR	0.48	0.00

<b>Region D (n = 395)</b>		
<b>Variable</b>	<b>F-Statistic Before Stratification</b>	<b>F-Statistic After Stratification</b>
Age	0.16	0.08
Illness category	1.75	0.08
Initial Rhythm	1.29	0.00
Gender	0.16	0.17
Hypotension	4.55	0.02
Assisted/Mechanical Ventilation	0.10	0.07

Intra-Arterial Catheter	3.99	0.22
Invasive Airway	0.35	0.02
Acute Respiratory Insufficiency	0.32	0.12
Sodium Bicarbonate Administration	3.23	0.13
Time of Day	0.96	0.06
Year	3.24	0.03
Number of Doses-Epinephrine	12.86	2.25
Duration of CPR	12.30	0.14

<b>Region E (n = 481)</b>		
<b>Variable</b>	<b>F-Statistic Before Stratification</b>	<b>F-Statistic After Stratification</b>
Age	1.85	0.00
Illness category	0.27	0.03
Initial Rhythm	19.81	0.00
Hypotension	3.49	0.00
Assisted/Mechanical Ventilation	33.91	0.49
Intra-Arterial Catheter	30.76	0.50
Invasive Airway	5.77	0.34
Inhaled Nitric Oxide	57.75	0.25
Acute Respiratory Insufficiency	43.10	0.40
Sodium Bicarbonate Administration	13.70	0.36
Event during Weekend (Fri 11:00PM-Mon 6:59AM)	0.22	0.04
Year	0.05	0.01
Number of Doses-Epinephrine	28.14	2.82
Duration of CPR	14.63	0.89

<b>Region F (n = 341)</b>		
<b>Variable</b>	<b>F-Statistic Before Stratification</b>	<b>F-Statistic After Stratification</b>
Age	4.33	0.22
Illness category	3.49	0.61
Initial Rhythm	0.10	0.15
Gender	0.19	0.00
Hypotension	3.68	0.17
Assisted/Mechanical Ventilation	0.21	0.01
Intra-Arterial Catheter	9.15	1.53
Invasive Airway	1.48	0.08
Inhaled Nitric Oxide	7.07	0.00
Acute Respiratory Insufficiency	7.07	0.51
Sodium Bicarbonate Administration	3.99	0.72
Year	5.19	0.00
Number of Doses-Epinephrine	4.62	2.33
Duration of CPR	2.73	0.01

<b>Region G (n = 441)</b>		
<b>Variable</b>	<b>F-Statistic Before Stratification</b>	<b>F-Statistic After Stratification</b>
Age	0.89	0.58
Illness category	0.48	0.02
Initial Rhythm	0.24	0.10
Gender	2.83	0.47
Hypotension	1.21	0.50
Assisted/Mechanical Ventilation	0.00	0.00
Intra-Arterial Catheter	30.50	0.96
Invasive Airway	0.85	0.06
Inhaled Nitric Oxide	0.28	0.10
Acute Respiratory Insufficiency	0.04	0.00
Sodium Bicarbonate Administration	5.96	0.35
Year	0.34	0.10
Number of Doses-Epinephrine	5.93	1.48
Duration of CPR	8.75	2.36

<b>Region H (n = 423)</b>		
<b>Variable</b>	<b>F-Statistic Before Stratification</b>	<b>F-Statistic After Stratification</b>
Age	7.94	0.00
Illness category	1.33	0.92
Initial Rhythm	6.02	0.08
Gender	0.56	0.27
Hypotension	0.89	0.37
Assisted/Mechanical Ventilation	1.94	0.00
Intra-Arterial Catheter	31.38	0.28

Invasive Airway	4.99	0.00
Continuous Infusion of Vasoactive Medications	11.24	0.07
Inhaled Nitric Oxide	5.10	0.03
Acute Respiratory Insufficiency	0.96	0.40
Sodium Bicarbonate Administration	0.44	0.20
Event during Weekend (Fri 11:00PM-Mon 6:59AM)	3.83	0.04
Time of Day	0.73	0.05
Year	6.97	0.06
Number of Doses-Epinephrine	1.84	0.00
Duration of CPR	83.15	0.45



<b>Region I (n = 287)</b>		
<b>Variable</b>	<b>F-Statistic Before Stratification</b>	<b>F-Statistic After Stratification</b>
Age	1.73	0.30
Illness category	3.11	0.00
Initial Rhythm	5.77	0.01
Hypotension	3.04	0.08
Assisted/Mechanical Ventilation	4.77	0.28
Intra-Arterial Catheter	4.34	0.17
Invasive Airway	5.46	0.45
Continuous Infusion of Vasoactive Medications	13.34	0.00
Inhaled Nitric Oxide	2.66	0.00
Acute Respiratory Insufficiency	9.78	0.44
Sodium Bicarbonate Administration	0.11	0.03
Event during Weekend (Fri 11:00PM-Mon 6:59AM)	1.39	0.13
Year	5.57	0.00
Number of Doses-Epinephrine	16.75	1.06
Duration of CPR	23.85	0.52

<b>Region J (n = 190)</b>		
<b>Variable</b>	<b>F-Statistic Before Stratification</b>	<b>F-Statistic After Stratification</b>
Age	1.71	0.01
Illness category	3.39	0.00
Initial Rhythm	0.10	0.01
Hypotension	0.15	0.46
Assisted/Mechanical Ventilation	2.74	0.41
Intra-Arterial Catheter	23.96	0.05

Invasive Airway	2.39	0.39
Continuous Infusion of Vasoactive Medications	5.62	0.14
Inhaled Nitric Oxide	0.06	0.20
Acute Respiratory Insufficiency	8.55	0.07
Event during Weekend (Fri 11:00PM-Mon 6:59AM)	1.86	0.04
Time of Day	0.32	0.01
Year	0.01	0.25
Number of Doses-Epinephrine	0.22	0.02
Duration of CPR	14.65	0.26

Supplemental Table 3. Baseline and arrest characteristics for initial cohort and propensity-matched E-CPR and C-CPR patients.

	All Patients (n=3,756)		Propensity Matched Patients (n =2,178)		p-value
	C-CPR (n=3,165) n (%)	E-CPR (n=591) n (%)	C-CPR (n=1,673) n (%)	E-CPR (n=505) n (%)	
<b>Arrest Location</b>					
Intensive care unit(s)	2522 (79.7)	478 (80.9)			<0.0001
Inpatient area	199 (6.3)	13 (2.2)			
Procedural area	140 (4.4)	56 (9.5)			
Emergency Department	187 (5.9)	9 (1.5)			
Other	117 (3.7)	35 (5.9)			
Missing	0 (0)	0 (0)			
<b>Admission PCPC Score**</b>					
1. Normal – age appropriate neurodevelopment	871 (27.5)	236 (39.9)			<0.0001
2. Mild disability	279 (8.8)	32 (5.4)			
3. Moderate disability	244 (7.7)	19 (3.2)			
4. Severe disability	247 (7.8)	22 (3.7)			
5. Coma or vegetative state	137 (4.3)	17 (2.9)			
6. Missing	1,387 (43.8)	265 (44.8)			
<b>Pre-existing Conditions at time of Arrest</b>					
Any Congestive Heart Failure					
Yes	512 (16)	176 (30)	361 (22)	153 (30)	<0.001
No	2,227 (70)	398 (67)	1212 (72)	337 (67)	
Missing	426 (13)	17 (3)	100 (6)	15 (3)	
Hypotension					
Yes	1012 (32)	248 (42)	657 (39)	204 (40)	0.40
No	1727 (55)	326 (55)	916 (55)	286 (57)	
Missing	426 (13)	17 (3)	100 (6)	15 (3)	
<b>Interventions in Place at Time of Arrest</b>					
Assisted/Mechanical Ventilation					
Yes	2,058 (65)	448 (76)	1,202 (72)	382 (76)	0.051
No	1,107 (35)	143 (24)	471 (28)	123 (24)	
Missing	0 (0)	0 (0)	0 (0)	0 (0)	
Intra-Arterial Catheter					
Yes	903 (29)	319 (54)	623 (37)	256 (51)	<0.001

No Missing	2,262 (71) 0 (0)	272 (46) 0 (0)	0 (0)	0 (0)	
<b>Infusions of Anti-arrhythmics</b>					
Yes	48 (1)	20 (3)	44 (3)	18 (4)	0.15
No	2,836 (90)	565 (96)	1,595 (95)	483 (96)	
Missing	281 (9)	6 (1)	34 (2)	4 (<1)	
<b>Continuous Infusions of Vasoactive Medications</b>					
Yes	369 (12)	186 (31)	279 (17)	147 (29)	<0.001
No	252 (79)	399 (68)	1,360 (81)	354 (70)	
Missing	281 (9)	6 (1)	34 (2)	4 (<1)	
<b>Inhaled Nitric Oxide</b>					
Yes	145 (5)	42 (7)	90 (5)	36 (7)	0.092
No	2,318 (73)	478 (81)	1,339 (80)	408 (81)	
Missing	702 (22)	71 (12)	244 (15)	61 (12)	
<b>Cause of Arrest</b>					
<b>Acute Respiratory Insufficiency</b>					
Yes	1,462 (46)	229 (39)	780 (47)	204 (40)	<0.001
No	1,401 (44)	356 (60)	836 (50)	295 (58)	
Missing	302 (10)	6 (1)	57 (3)	6 (1)	
<b>Pharmacologic Interventions</b>					
<b>Calcium Administration</b>					
Yes	1,621 (51)	430 (73)	1,047 (63)	361 (71)	<0.001
No	1,544 (49)	160 (27)	626 (37)	144 (29)	
Missing	0 (0)	1 (<1)	0 (0)	0 (0)	
<b>Event during Weekend</b> (Fri 11:00 PM – Mon 6:59 AM)					
Missing	904 (29)	122 (21)	484 (30)	120 (24)	0.011
	0 (0)	0 (0)	0 (0)	0 (0)	
<b>Time of Day</b>					
Daytime (7:00AM - 10:59PM)	2,173 (69)	421 (71)	1,181 (71)	362 (72)	0.37
Nighttime (11:00PM - 6:59AM)	992 (31)	162 (27)	492 (29)	136 (27)	
Missing	0 (0)	8 (1)	0 (0)	7 (1)	

Key: C-CPR, conventional cardiopulmonary resuscitation; E-CPR, extracorporeal cardiopulmonary resuscitation; PCPC, Pediatric Cerebral Performance Category; PEA, pulseless electrical activity; VF, ventricular fibrillation; VT, ventricular tachycardia

\*\* P-value for Admission PCPC score does not include missing group.

Supplemental Table 4. Survival to discharge and neurologic outcome: summary statistics for conditional logistic regression cohort.

	Survival to Discharge (n=3,756)		Neurologic Outcome (n=3,336)	
	No (n=2,657) n (%)	Yes (n=1,099) n (%)	Unfavorable (n=2,688) n (%)	Favorable (n=648) n (%)
<b>Arrest Location</b>				
Intensive care unit(s)	2169 (81.6)	831 (75.6)	2188 (81.4)	478 (73.8)
Inpatient area	136 (5.1)	76 (6.9)	141 (5.3)	49 (7.6)
Procedural area	104 (3.9)	92 (8.4)	107 (4.0)	65 (10.0)
Emergency Department	153 (5.8)	43 (3.9)	156 (5.8)	29 (4.5)
Other	95 (3.6)	57 (5.2)	96 (3.6)	27 (4.2)
Missing	0 (0)	0 (0)	0 (0)	0 (0)
<b>Admission PCPC Score**</b>				
1. Normal – age appropriate	735 (27.7)	372 (33.9)	753 (28.0)	328 (50.6)
2. Mild disability	209 (7.9)	102 (9.3)	215 (8.0)	92 (14.2)
3. Moderate disability	186 (7.0)	77 (7.0)	193 (7.2)	68 (10.5)
4. Severe disability	214 (8.1)	55 (5.0)	214 (8.0)	54 (8.3)
5. Coma or vegetative state	133 (5.0)	21 (1.9)	133 (5.0)	17 (2.6)
6. Missing	1180 (44.4)	472 (43)	1180 (43.9)	89 (13.7)
<b>Pre-existing Conditions at time of Arrest</b>				
Any Congestive Heart Failure				
Yes	476 (18)	212 (19)	484 (18)	136 (21)
No	1851 (70)	774 (70)	1874 (70)	496 (77)
Missing	330 (12)	113 (10)	330 (12)	16 (2)
Hypotension				
Yes	968 (36)	292 (27)	980 (36)	203 (31)
No	1359 (51)	694 (63)	1378 (51)	429 (66)
Missing	330 (12)	113 (10)	330 (12)	16 (2)
<b>Interventions in Place at Time of Arrest</b>				
Assisted/Mechanical Ventilation				
Yes	1,850 (70)	656(60)	1,862 (69)	398 (61)
No	807 (30)	443 (40)	826 (31)	250 (39)
Missing	0 (0)	0 (0)	0 (0)	0 (0)
Intra-Arterial Catheter				
Yes	894 (34)	328 (30)	899 (33)	197 (30)
	1763 (66)	771 (70)	1789 (67)	451 (70)

No Missing	0 (0)	0 (0)	0 (0)	0 (0)
Infusions of Anti-arrhythmics				
Yes	42 (2)	26 (2)	42 (2)	19 (3)
No	2396 (90)	1005 (91)	2427 (90)	615 (95)
Missing	219 (8)	68 (6)	219 (8)	14 (2)
Continuous Infusions of Vasoactive Medications				
Yes	382 (14)	173 (16)	385 (14)	127 (20)
No	2056 (77)	858 (78)	2084 (76)	507 (78)
Missing	219 (8)	68 (6)	219 (8)	14 (2)
Inhaled Nitric Oxide				
Yes	146 (5)	41 (4)	148 (6)	23 (4)
No	1951 (73)	845 (77)	1968 (73)	508 (78)
Missing	560 (21)	213 (19)	572 (21)	117 (18)
<b>Cause of Arrest</b>				
Acute Respiratory Insufficiency				
Yes	1,181 (44)	510 (46)	1,200 (45)	307 (47)
No	1254 (47)	503 (46)	1266 (47)	332 (51)
Missing	222 (8)	86 (8)	222 (8)	9 (2)
<b>Pharmacologic Interventions</b>				
Calcium Administration				
Yes	1,587 (60)	464 (42)	1,606 (60)	187 (44)
No	1069 (40)	635 (58)	1081 (40)	361 (56)
Missing	1 (<1)	0 (0)	1 (<1)	0 (0)
<b>Event during Weekend</b> (Fri 11:00 PM – Mon 6:59 AM)				
Missing	742 (28)	284 (26)	751 (28)	169 (26)
	0 (0)	0 (0)	0 (0)	0 (0)
<b>Time of Day</b>				
Daytime (7:00AM - 10:59PM)	1,808 (68)	786 (72)	1,832 (68)	476 (74)
Nighttime (11:00PM - 6:59AM)	846 (32)	308 (28)	853 (32)	167 (26)
Missing	3 (<1)	5 (<1)	3 (<1)	5 (1)

Key: C-CPR, conventional cardiopulmonary resuscitation; E-CPR, extracorporeal cardiopulmonary resuscitation; PCPC, Pediatric Cerebral Performance Category; PEA, pulseless electrical activity; VF, ventricular fibrillation; VT, ventricular tachycardia

\*\* P-value for Admission PCPC score does not include missing group.

*Note: Due to missing neurologic outcome data, the total n for neurologic outcome is different than survival to discharge numbers. See text for details.*