

Figure 1. Percentage of patients undergoing continuous EEG monitoring by condition over years.

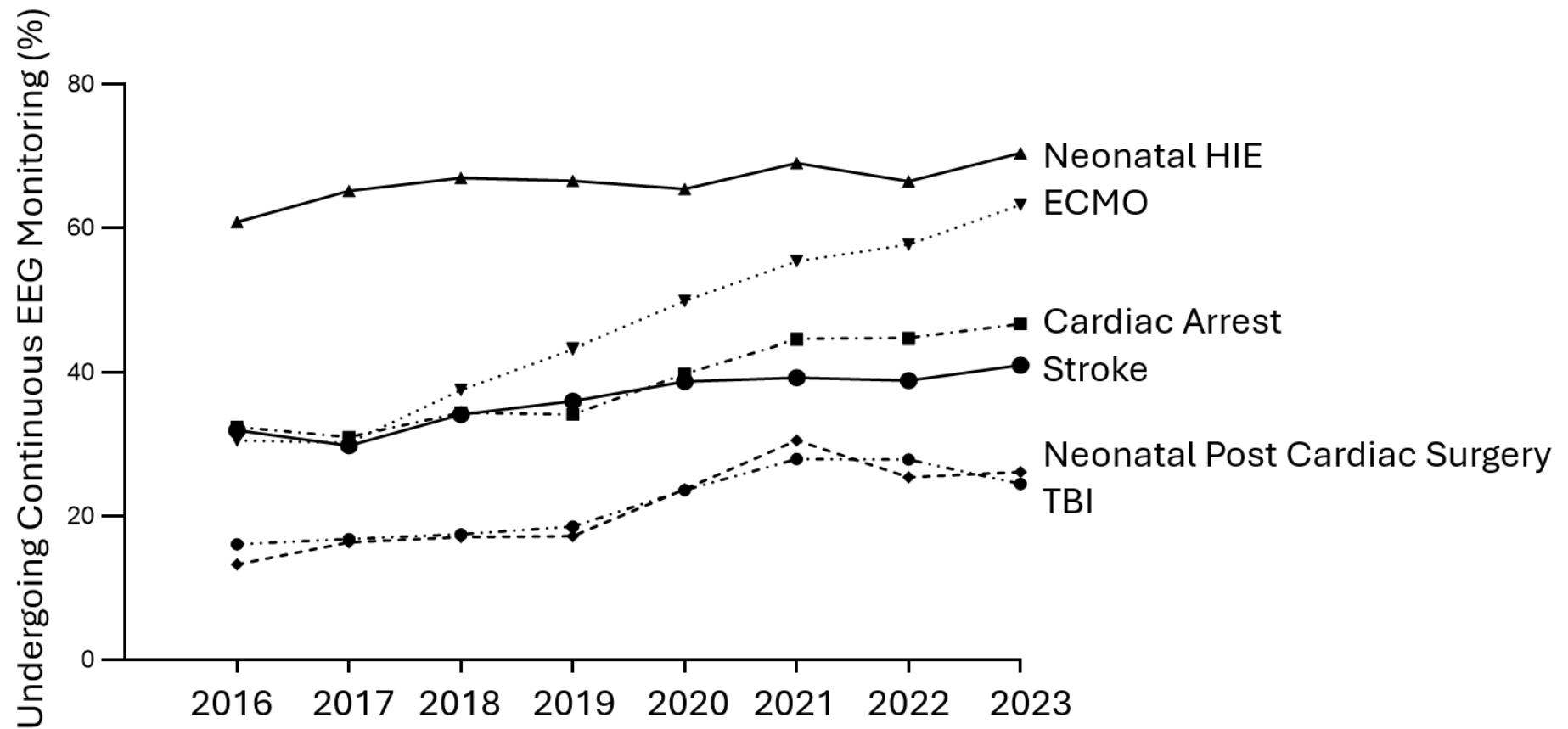


Figure 2. Adjusted Odds of Undergoing CEEG by Year (reference year 2016) by Condition. Bubble size represents volume.

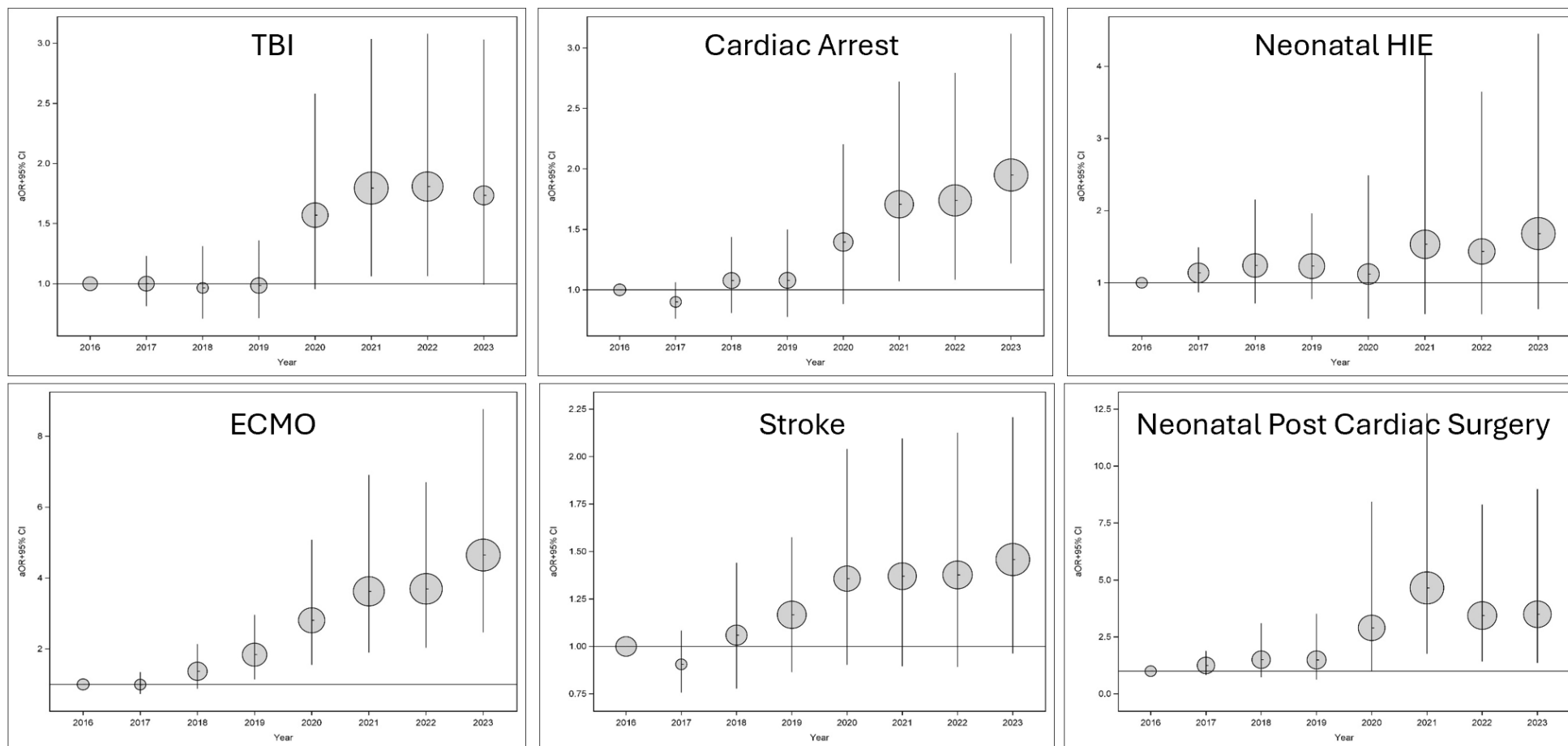


Figure 3. Adjusted Odds of Undergoing Continuous EEG by Condition. Bubble size represents volume. Bubble greyscale represents region.

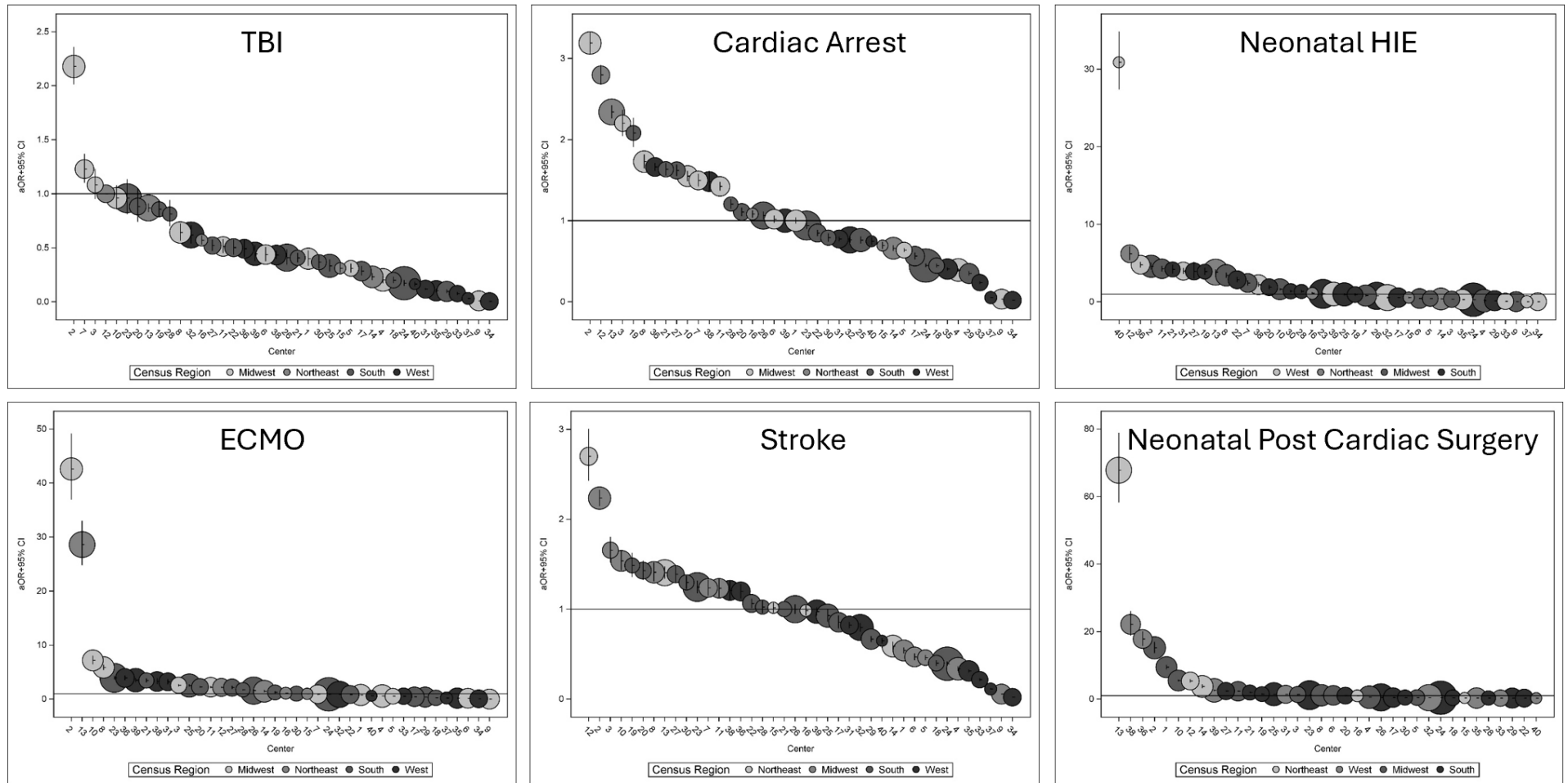


Table 1. Rates of CEEG Use by Cohort. Data are presented as N (% for condition and variable) or median [interquartile range].

Variable		TBI		Cardiac Arrest		ECMO		Stroke		Neonatal HIE		Neonatal Post Cardiac Surgery	
		No CEEG	CEEG	No CEEG	CEEG	No CEEG	CEEG	No CEEG	CEEG	No CEEG	CEEG	No CEEG	CEEG
Year	2016	3048 (83.9)	584 (16.1)	1291 (67.6)	620 (32.4)	850 (69.4)	374 (30.6)	1214 (68)	570 (32)	458 (39.2)	711 (60.8)	1973 (86.7)	303 (13.3)
	2017	2955 (83.2)	597 (16.8)	1347 (68.9)	607 (31.1)	846 (69.7)	367 (30.3)	1179 (70.1)	502 (29.9)	446 (34.8)	835 (65.2)	1785 (83.6)	350 (16.4)
	2018	2598 (82.5)	551 (17.5)	1316 (65.5)	692 (34.5)	850 (62.5)	511 (37.5)	1107 (65.9)	574 (34.1)	449 (33)	910 (67)	1745 (82.9)	360 (17.1)
	2019	2655 (81.4)	605 (18.6)	1324 (65.8)	688 (34.2)	841 (56.7)	641 (43.3)	1174 (64)	661 (36)	469 (33.4)	935 (66.6)	1761 (82.8)	366 (17.2)
	2020	2452 (76.3)	760 (23.7)	1125 (60.2)	744 (39.8)	704 (50.2)	699 (49.8)	1000 (61.2)	633 (38.8)	449 (34.5)	851 (65.5)	1479 (76.2)	461 (23.8)
	2021	2427 (72)	942 (28)	1230 (55.4)	989 (44.6)	689 (44.6)	855 (55.4)	1008 (60.7)	653 (39.3)	456 (31)	1017 (69)	1300 (69.4)	573 (30.6)
	2022	2252 (72.1)	871 (27.9)	1390 (55.3)	1124 (44.7)	663 (42.3)	905 (57.7)	1050 (61.1)	668 (38.9)	477 (33.5)	948 (66.5)	1454 (74.6)	495 (25.4)
Hospital Region	2023	2031 (75.5)	658 (24.5)	1334 (53.4)	1164 (46.6)	561 (36.7)	966 (63.3)	1048 (58.9)	730 (41.1)	469 (29.6)	1117 (70.4)	1347 (73.8)	477 (26.2)
	Midwest	4071 (70.8)	1677 (29.2)	2683 (56.8)	2041 (43.2)	2662 (64.5)	1467 (35.5)	2202 (62.6)	1317 (37.4)	1440 (43.1)	1901 (56.9)	3077 (77.5)	893 (22.5)
	Northeast	2576 (77.5)	748 (22.5)	952 (50.5)	933 (49.5)	513 (32.1)	1083 (67.9)	1049 (56.6)	803 (43.4)	204 (19.5)	843 (80.5)	1269 (52.2)	1161 (47.8)
	South	6556 (74.4)	2250 (25.6)	4088 (62.9)	2413 (37.1)	1788 (50.6)	1746 (49.4)	2998 (62.1)	1827 (37.9)	757 (20.8)	2880 (79.2)	5188 (92)	454 (8)
Age	West	7215 (89)	893 (11)	2634 (68)	1241 (32)	1041 (50.5)	1022 (49.5)	2531 (70.8)	1044 (29.2)	1272 (42.8)	1700 (57.2)	3310 (79.1)	877 (20.9)
	0-30 days	704 (79)	187 (21)	2646 (70.7)	1096 (29.3)	2571 (51.4)	2433 (48.6)	1050 (57.8)	766 (42.2)	3673 (33.4)	7324 (66.6)	12844 (79.1)	3385 (20.9)
	31 days - 1 year	3387 (63)	1990 (37)	2588 (59.1)	1793 (40.9)	1176 (54.1)	998 (45.9)	1938 (58.4)	1381 (41.6)	Not Applicable		Not Applicable	
	1-6 years	6278 (80.5)	1517 (19.5)	2364 (57.1)	1774 (42.9)	1022 (54.5)	852 (45.5)	1871 (62.6)	1117 (37.4)				
	7-13 years	5830 (85.5)	991 (14.5)	1373 (58.5)	973 (41.5)	598 (53.7)	516 (46.3)	2050 (68.2)	954 (31.8)				
	14-17 years	4084 (82.9)	844 (17.1)	1125 (57.6)	829 (42.4)	482 (52.7)	433 (47.3)	1584 (71.3)	637 (28.7)				
	18-21 years	135 (77.6)	39 (22.4)	261 (61.6)	163 (38.4)	155 (64.3)	86 (35.7)	287 (67.8)	136 (32.2)				
Sex	Male	12903 (78.7)	3483 (21.3)	5740 (60.5)	3749 (39.5)	3241 (52.9)	2887 (47.1)	4984 (63.5)	2859 (36.5)	2167 (33.8)	4248 (66.2)	7683 (79.3)	2002 (20.7)
Race/Ethnicity	Non-Hispanic White	10063 (78.6)	2738 (21.4)	4279 (58.8)	3004 (41.2)	3071 (54.5)	2559 (45.5)	3946 (63.4)	2279 (36.6)	1623 (31.6)	3512 (68.4)	6445 (77.9)	1832 (22.1)
	Non-Hispanic Black	3087 (70.5)	1290 (29.5)	2245 (60.7)	1452 (39.3)	976 (51.9)	903 (48.1)	1490 (62.1)	911 (37.9)	551 (31.4)	1202 (68.6)	1457 (82.9)	301 (17.1)
	Hispanic	4599 (83.6)	902 (16.4)	2097 (64)	1178 (36)	975 (51.3)	926 (48.7)	2031 (66.4)	1026 (33.6)	707 (35.5)	1286 (64.5)	2828 (82.8)	587 (17.2)
	Asian	625 (89.3)	75 (10.7)	346 (62.7)	206 (37.3)	204 (51.3)	194 (48.7)	375 (65.1)	201 (34.9)	172 (39.8)	260 (60.2)	346 (75.7)	111 (24.3)
Prior History of Seizures or Epilepsy	Other	2044 (78.4)	563 (21.6)	1390 (63.8)	788 (36.2)	778 (51.4)	736 (48.6)	938 (62)	574 (38)	620 (36.8)	1064 (63.2)	1768 (76.1)	554 (23.9)
		173 (71.2)	70 (28.8)	754 (55.9)	596 (44.1)	115 (39.9)	173 (60.1)	626 (61.9)	386 (38.1)	0 (0)	0 (0)	3 (100)	0 (0)
APR-DRG SOI/ROM	Median [IQR]	2 [1,3]	4 [3,4]	4 [4,4]	4 [4,4]	4 [3,4]	4 [4,4]	4 [3,4]	4 [4,4]	4 [3,4]	4 [3,4]	4 [3,4]	4 [4,4]
	1	6709 (97.3)	183 (2.7)	171 (77.7)	49 (22.3)	439 (59.1)	304 (40.9)	399 (86.6)	62 (13.4)	101 (34.8)	189 (65.2)	50 (78.1)	14 (21.9)
	2	5000 (90.3)	535 (9.7)	485 (74.7)	164 (25.3)	632 (56.9)	478 (43.1)	842 (82.5)	179 (17.5)	563 (38.1)	915 (61.9)	889 (81.2)	206 (18.8)
	3	4267 (78.1)	1199 (21.9)	1714 (71.3)	690 (28.7)	1052 (76.8)	318 (23.2)	2160 (74.5)	739 (25.5)	1099 (33.6)	2174 (66.4)	2862 (82.6)	602 (17.4)
	4	4441 (54.9)	3650 (45.1)	7974 (58.2)	5720 (41.8)	3868 (47.9)	4213 (52.1)	5369 (57.2)	4011 (42.8)	1902 (32)	4037 (68)	8989 (77.8)	2559 (22.2)
Payor	Government	10920 (74.5)	3734 (25.5)	6123 (60.1)	4062 (39.9)	3090 (51.3)	2928 (48.7)	4637 (62.6)	2774 (37.4)	1928 (33.1)	3905 (66.9)	6562 (80.7)	1573 (19.3)
	Private	8498 (84.5)	1553 (15.5)	3845 (62.4)	2313 (37.6)	2636 (54.8)	2175 (45.2)	3711 (65.3)	1970 (34.7)	1642 (34.2)	3153 (65.8)	5892 (77.7)	1695 (22.3)
	Other	1000 (78.1)	281 (21.9)	389 (60.6)	253 (39.4)	278 (56.4)	215 (43.6)	432 (63.6)	247 (36.4)	103 (27.9)	266 (72.1)	390 (76.9)	117 (23.1)
Childhood Opportunity Index	Very low	5404 (76.7)	1642 (23.3)	3024 (63.5)	1740 (36.5)	1518 (55.1)	1237 (44.9)	2245 (63.9)	1271 (36.1)	869 (34)	1684 (66)	3246 (85.8)	538 (14.2)
	Low	4561 (76.6)	1397 (23.4)	2246 (60.9)	1441 (39.1)	1211 (50.6)	1180 (49.4)	1791 (61.8)	1108 (38.2)	769 (31.2)	1696 (68.8)	2906 (81.6)	655 (18.4)
	Moderate	3794 (77.7)	1088 (22.3)	1936 (59)	1344 (41)	1256 (53)	1115 (47)	1654 (63.8)	938 (36.2)	678 (31.2)	1497 (68.8)	2575 (77.8)	733 (22.2)
	High	3441 (79.9)	864 (20.1)	1760 (59.9)	1177 (40.1)	1198 (53.8)	1027 (46.2)	1569 (64.1)	877 (35.9)	700 (33.7)	1375 (66.3)	2380 (76.3)	741 (23.7)
	Very High	3120 (84.9)	555 (15.1)	1319 (59.6)	894 (40.4)	796 (52.2)	728 (47.8)	1450 (65.5)	763 (34.5)	640 (38)	1044 (62)	1680 (70.4)	706 (29.6)
	Missing	98 (81.7)	22 (18.3)	72 (69.2)	32 (30.8)	25 (44.6)	31 (55.4)	71 (67.6)	34 (32.4)	17 (37.8)	28 (62.2)	57 (82.6)	12 (17.4)

Table 2. Multivariable Analysis of CEEG Use by Cohort. Bold text indicates significant difference (p<0.05). Data are presented as adjusted odds ratio (aOR) with 95% confidence interval (95% CI).

Variable		TBI		Cardiac Arrest		ECMO		Stroke		Neonatal HIE		Neonatal Post Cardiac Surgery	
		aOR (95% CI)	p-value	aOR (95% CI)	p-value	aOR (95% CI)	p-value	aOR (95% CI)	p-value	aOR (95% CI)	p-value	aOR (95% CI)	p-value
Year	2016	Referent		Referent		Referent		Referent		Referent		Referent	
	2017	1.00 (0.81,1.23)	0.994	0.90 (0.76,1.06)	0.214	0.99 (0.73,1.35)	0.966	0.91 (0.76,1.08)	0.281	1.14 (0.87,1.49)	0.352	1.25 (0.83,1.88)	0.283
	2018	0.97 (0.71,1.31)	0.825	1.08 (0.81,1.44)	0.615	1.37 (0.88,2.14)	0.164	1.06 (0.78,1.44)	0.714	1.24 (0.71,2.15)	0.444	1.50 (0.73,3.1)	0.268
	2019	0.99 (0.71,1.36)	0.929	1.08 (0.78,1.5)	0.656	1.84 (1.14,2.96)	0.012	1.17 (0.86,1.58)	0.314	1.23 (0.77,1.96)	0.380	1.49 (0.63,3.52)	0.363
	2020	1.57 (0.96,2.58)	0.075	1.39 (0.88,2.2)	0.154	2.81 (1.55,5.09)	<.001	1.36 (0.90,2.04)	0.142	1.12 (0.50,2.49)	0.780	2.90 (0.99,8.44)	0.051
	2021	1.8 (1.06,3.04)	0.029	1.71 (1.07,2.72)	0.025	3.63 (1.90,6.91)	<.001	1.37 (0.90,2.10)	0.146	1.53 (0.57,4.15)	0.399	4.65 (1.76,12.32)	0.002
	2022	1.81 (1.06,3.08)	0.029	1.74 (1.08,2.80)	0.022	3.7 (2.04,6.71)	<.001	1.38 (0.89,2.13)	0.149	1.43 (0.56,3.65)	0.449	3.44 (1.42,8.32)	0.006
Age	2023	1.73 (0.99,3.03)	0.053	1.95 (1.22,3.12)	0.005	4.65 (2.47,8.77)	<.001	1.46 (0.96,2.21)	0.075	1.68 (0.64,4.45)	0.295	3.5 (1.36,8.99)	0.009
	0-30 days	2.51 (1.95,3.21)	<.001	0.47 (0.40,0.55)	<.001	1.34 (0.98,1.82)	0.067	1.38 (1.10,1.73)	0.005	Not Applicable		Not Applicable	
	31 days - 1 year	4.71 (3.66,6.05)	<.001	0.86 (0.76,0.99)	0.032	1.35 (1.04,1.74)	0.022	1.45 (1.24,1.71)	<.001				
	1-6 years	1.54 (1.40,1.70)	<.001	1 (0.90,1.11)	0.960	1.12 (0.92,1.36)	0.269	1.33 (1.20,1.47)	<.001				
	7-13 years	1.03 (0.93,1.13)	0.608	0.95 (0.84,1.09)	0.481	1.09 (0.84,1.41)	0.521	1.08 (0.95,1.22)	0.246				
	14-17 years	Referent		Referent		Referent		Referent					
	18-21 years	1.22 (0.70,2.12)	0.489	0.81 (0.67,0.99)	0.039	0.65 (0.42,1.01)	0.053	1.11 (0.84,1.47)	0.450				
Sex	Female	0.98 (0.88,1.08)	0.618	0.94 (0.88,0.99)	0.033	0.97 (0.91,1.04)	0.445	0.95 (0.87,1.03)	0.216	1.04 (0.92,1.17)	0.557	1.12 (1.03,1.22)	0.007
Race/Ethnicity	Non-Hispanic White	Referent		Referent		Referent		Referent		Referent		Referent	
	Non-Hispanic Black	1.13 (1.02,1.26)	0.015	0.95 (0.87,1.03)	0.179	1.11 (0.95,1.30)	0.201	1.03 (0.92,1.16)	0.600	1.07 (0.93,1.23)	0.359	0.97 (0.75,1.25)	0.808
	Hispanic	1.00 (0.90,1.12)	0.996	0.93 (0.84,1.04)	0.188	1.04 (0.90,1.20)	0.590	1.01 (0.91,1.13)	0.808	1.06 (0.85,1.31)	0.625	0.96 (0.82,1.13)	0.648
	Asian	0.91 (0.7,1.18)	0.468	1.01 (0.84,1.21)	0.948	1.52 (1.19,1.94)	<.001	1.05 (0.83,1.34)	0.675	1.07 (0.84,1.38)	0.577	0.98 (0.75,1.29)	0.901
	Other	0.98 (0.84,1.15)	0.834	0.91 (0.81,1.01)	0.088	1.03 (0.82,1.29)	0.801	1.16 (0.99,1.37)	0.074	1.05 (0.91,1.21)	0.506	1.16 (1.00,1.35)	0.050
Patient History of Seizures/Epilepsy		1.39 (0.97,2.00)	0.072	1.04 (0.91,1.19)	0.592	1.77 (1.26,2.48)	0.001	1.16 (1.01,1.33)	0.041				
APR-DRG SOI/ROM	1	Referent		Referent		Referent		Referent		Referent		Referent	
	2	3.74 (3.05,4.59)	<.001	1.24 (0.73,2.10)	0.429	0.82 (0.66,1.01)	0.059	1.46 (1.13,1.88)	0.003	0.95 (0.61,1.49)	0.834	0.89 (0.36,2.22)	0.808
	3	11.05 (9.04,13.52)	<.001	1.36 (0.82,2.26)	0.237	0.32 (0.21,0.48)	<.001	2.44 (1.97,3.01)	<.001	1.42 (0.93,2.17)	0.103	1.43 (0.61,3.33)	0.407
	4	39.23 (28.73,53.56)	<.001	2.83 (1.71,4.68)	<.001	1.14 (0.71,1.81)	0.594	5.38 (4.30,6.73)	<.001	1.52 (1.02,2.27)	0.042	2.92 (1.32,6.45)	0.008
Payor	Government	Referent		Referent		Referent		Referent		Referent		Referent	
	Private	0.82 (0.73,0.92)	<.001	0.86 (0.81,0.91)	<.001	0.95 (0.85,1.06)	0.337	0.95 (0.88,1.03)	0.231	1.00 (0.88,1.14)	1.000	0.91 (0.8,1.03)	0.141
	Other	0.80 (0.67,0.96)	0.015	0.70 (0.56,0.88)	0.002	0.82 (0.6,1.13)	0.233	0.78 (0.65,0.93)	0.008	1.06 (0.69,1.64)	0.783	0.57 (0.47,0.70)	<.001
Childhood Opportunity Index	Very low	Referent		Referent		Referent		Referent		Referent		Referent	
	Low	1.04 (0.95,1.13)	0.402	1.07 (0.94,1.21)	0.290	1.04 (0.92,1.17)	0.556	1.04 (0.92,1.17)	0.568	1.00 (0.84,1.19)	0.996	0.88 (0.76,1.02)	0.097
	Moderate	1.07 (0.98,1.17)	0.144	1.13 (1.02,1.24)	0.016	1.11 (0.96,1.28)	0.150	0.97 (0.87,1.08)	0.560	1.05 (0.89,1.24)	0.588	1.02 (0.9,1.17)	0.723
	High	1.14 (1.03,1.27)	0.011	1.10 (0.98,1.24)	0.120	1.13 (0.94,1.36)	0.196	1.02 (0.89,1.17)	0.761	1.19 (1.1,1.41)	0.052	0.95 (0.85,1.07)	0.390
	Very High	1.18 (1.02,1.35)	0.021	1.12 (0.98,1.27)	0.094	0.96 (0.82,1.13)	0.618	0.99 (0.88,1.13)	0.915	1.14 (0.92,1.40)	0.229	0.99 (0.85,1.16)	0.907
	Missing	0.91 (0.5,1.65)	0.753	0.78 (0.53,1.13)	0.184	1.32 (0.66,2.64)	0.439	0.81 (0.59,1.13)	0.216	0.37 (0.17,0.81)	0.012	0.7 (0.41,1.19)	0.188

Supplemental Table. Demographics by Cohort. Data are presented as N (%).

Variable		TBI	Cardiac Arrest	ECMO	Stroke	Neonatal HIE	Neonatal Post Cardiac Surgery
N		25986	16985	11322	13771	10997	16229
Year	2016	3632 (14)	1911 (11.3)	1224 (10.8)	1169 (10.6)	2276 (14)	1784 (13)
	2017	3552 (13.7)	1954 (11.5)	1213 (10.7)	1281 (11.6)	2135 (13.2)	1681 (12.2)
	2018	3149 (12.1)	2008 (11.8)	1361 (12)	1359 (12.4)	2105 (13)	1681 (12.2)
	2019	3260 (12.5)	2012 (11.8)	1482 (13.1)	1404 (12.8)	2127 (13.1)	1835 (13.3)
	2020	3212 (12.4)	1869 (11)	1403 (12.4)	1300 (11.8)	1940 (12)	1633 (11.9)
	2021	3369 (13)	2219 (13.1)	1544 (13.6)	1473 (13.4)	1873 (11.5)	1661 (12.1)
	2022	3123 (12)	2514 (14.8)	1568 (13.8)	1425 (13)	1949 (12)	1718 (12.5)
Hospital Region	2023	2689 (10.3)	2498 (14.7)	1527 (13.5)	1586 (14.4)	1824 (11.2)	1778 (12.9)
	Midwest	5748 (22.1)	4724 (27.8)	4129 (36.5)	3341 (30.4)	3970 (24.5)	3519 (25.6)
	Northeast	3324 (12.8)	1885 (11.1)	1596 (14.1)	1047 (9.5)	2430 (15)	1852 (13.4)
	South	8806 (33.9)	6501 (38.3)	3534 (31.2)	3637 (33.1)	5642 (34.8)	4825 (35)
Sex	West	8108 (31.2)	3875 (22.8)	2063 (18.2)	2972 (27)	4187 (25.8)	3575 (26)
	Female	9458 (36.4)	7397 (43.6)	5187 (45.8)	4569 (41.5)	6529 (40.2)	5917 (43)
Race/Ethnicity	Non-Hispanic White	12801 (49.3)	7283 (42.9)	5630 (49.7)	5135 (46.7)	8277 (51)	6225 (45.2)
	Non-Hispanic Black	4377 (16.8)	3697 (21.8)	1879 (16.6)	1753 (15.9)	1758 (10.8)	2401 (17.4)
	Hispanic	5501 (21.2)	3275 (19.3)	1901 (16.8)	1993 (18.1)	3415 (21)	3057 (22.2)
	Asian	700 (2.7)	552 (3.2)	398 (3.5)	432 (3.9)	457 (2.8)	576 (4.2)
	Other	2607 (10)	2178 (12.8)	1514 (13.4)	1684 (15.3)	2322 (14.3)	1512 (11)
Patient History of Seizures/Epilepsy		243 (0.9)	1350 (7.9)	288 (2.5)	0(0)	3 (0)	1012 (7.3)
APR-DRG SOI/ROM	median iqr	3 [1,4]	4 [4,4]	4 [3,4]	4 [3,4]	4 [3,4]	4 [3,4]
	1	6892 (26.5)	220 (1.3)	743 (6.6)	290 (2.6)	64 (0.4)	461 (3.3)
	2	5535 (21.3)	649 (3.8)	1110 (9.8)	1478 (13.4)	1095 (6.7)	1021 (7.4)
	3	5466 (21)	2404 (14.2)	1370 (12.1)	3273 (29.8)	3464 (21.3)	2899 (21.1)
	4	8091 (31.1)	13694 (80.6)	8081 (71.4)	5939 (54)	11548 (71.2)	9380 (68.1)
Payor	Government	14654 (56.4)	10185 (60)	6018 (53.2)	5833 (53)	8135 (50.1)	7411 (53.8)
	Private	10051 (38.7)	6158 (36.3)	4811 (42.5)	4795 (43.6)	7587 (46.7)	5681 (41.3)
	Other	1281 (4.9)	642 (3.8)	493 (4.4)	369 (3.4)	507 (3.1)	679 (4.9)
Childhood Opportunity Index	Very low	7046 (27.1)	4764 (28)	2755 (24.3)	2553 (23.2)	3784 (23.3)	3516 (25.5)
	Low	5958 (22.9)	3687 (21.7)	2391 (21.1)	2465 (22.4)	3561 (21.9)	2899 (21.1)
	Moderate	4882 (18.8)	3280 (19.3)	2371 (20.9)	2175 (19.8)	3308 (20.4)	2592 (18.8)
	High	4305 (16.6)	2937 (17.3)	2225 (19.7)	2075 (18.9)	3121 (19.2)	2446 (17.8)
	Very High	3675 (14.1)	2213 (13)	1524 (13.5)	1684 (15.3)	2386 (14.7)	2213 (16.1)
	Missing	120 (0.5)	104 (0.6)	56 (0.5)	45 (0.4)	69 (0.4)	105 (0.8)