**Supplemental Digital Content and Legend:**

**Supplemental Digital Content 1: Pre-Matching and Post-Matching Comparison of Baseline Variables, All Cardiac Patients**

|  |
| --- |
| **Pre-matching Comparison of Baseline Variables**  |
| **Variable** | **Calcium****(n=1986)** | **No Calcium****(n=2570)** | **SMD** |
| **Age Group*a*** | n=1986 | n=2570 |  |
|  Newborn | 695 (35) | 749 (29.1) | 0.13 |
|  Neonate/Infant | 998 (50.3) | 1259 (49) | 0.03 |
|  Pediatric | 293 (14.8) | 562 (21.9) | 0.19 |
| **Event Location*b*** | n=1986 | n=2569 |  |
|  ICUs | 1644 (82.8) | 1938 (75.4) | 0.18 |
|  Procedural Areas | 161 (8.1) | 286 (11.1) | 0.1 |
|  Other | 181 (9.1) | 345 (13.4) | 0.14 |
| **Pre-existing conditions** | n=1984 | n=2445 |  |
|  Metabolic/electrolyte derangement | 325 (16.4) | 306 (12.5) | 0.11 |
|  Hypotension | 732 (36.9) | 649 (26.5) | 0.22 |
| **Initial rhythm** | n=1254 | n=1073 |  |
|  PEA/Asystole | 999 (79.7) | 836 (77.9) | 0.04 |
|  Ventricular Tachycardia/Ventricular Fibrillation | 255 (20.3) | 237 (22.1) | 0.04 |
| **CPR duration*c*** | n=1930 | n=2450 |  |
|  First Quartile | 468 (24.3) | 1579 (64.5) | 0.89 |
|  Second Quartile | 294 (15.2) | 329 (13.4) | 0.05 |
|  Third Quartile | 247 (12.8) | 211 (8.6) | 0.14 |
|  Fourth Quartile | 921 (47.7) | 331 (13.5) | 0.8 |
| **Illness category** |  |  |  |
|  Medical cardiac | 810 (40.8) | 1419 (55.2) | 0.29 |
|  Surgical cardiac | 1176 (59.2) | 1151 (44.8) | 0.29 |
| **Co-linear variables** |  |  |  |
|  Epinephrine doses, median (IQR) | 4 (2,8) | 2 (1,3) | 0.74 |
|  Sodium bicarbonate | 1589 (80.0) | 617 (24.0) | 1.36 |
|  E-CPR*d* | 495 (25.2) | 204 (8.0) | 0.48 |
| **Post-matching Comparison of Baseline Variables Based on 1:1 Propensity Score Matching** |
| **Variable** | **Calcium****(n=678)** | **No Calcium****(n=678)** | **SMD** |
| **Age Group*a*** |  |  |  |
|  Newborn | 264 (38.9) | 289 (42.6) | 0.08 |
|  Neonate/Infant | 328 (48.4) | 297 (43.8) | 0.09 |
|  Pediatric | 86 (12.7) | 92 (13.6) | 0.03 |
| **Event Location*b*** |  |  |  |
|  ICUs | 540 (79.7) | 538 (79.4) | 0.01 |
|  Procedural Areas | 58 (8.6) | 55 (8.1) | 0.02 |
|  Other | 80 (11.8) | 85 (12.5) | 0.02 |
| **Pre-existing conditions** |  |  |  |
|  Metabolic/electrolyte derangement | 109 (16.1) | 110 (16.2) | <0.01 |
|  Hypotension | 253 (37.3) | 244 (36) | 0.03 |
| **Initial rhythm** |  |  |  |
|  PEA/Asystole | 543 (80.1) | 538 (79.4) | 0.02 |
|  Ventricular Tachycardia/Ventricular Fibrillation | 135 (19.9) | 140 (20.7) | 0.02 |
| **CPR duration*c*** |  |  |  |
|  First Quartile | 215 (31.7) | 232 (34.2) | 0.05 |
|  Second Quartile | 138 (20.4) | 137 (20.2) | <0.01 |
|  Third Quartile | 119 (17.6) | 114 (16.8) | 0.02 |
|  Fourth Quartile | 206 (30.4) | 195 (28.8) | 0.04 |
| **Illness category** |  |  |  |
|  Medical cardiac | 303 (44.7) | 329 (48.5) | 0.08 |
|  Surgical cardiac | 375 (55.3) | 349 (51.5) | 0.08 |
| **Co-linear variables** |  |  |  |
|  Epinephrine doses, median (IQR) | 4 (2,7) | 3 (1,5) | 0.28 |
|  Sodium bicarbonate | 525 (77.4) | 282 (41.6) | 0.78 |
|  E-CPR*d* | 128 (19.1) | 99 (14.7) | 0.12 |

Data presented as n(%)

SMD: absolute standardized mean difference; SMD values < 0.1 indicating good post-matching balance

ICU – intensive care unit; PEA – pulseless electrical activity; CPR – cardiopulmonary resuscitation

*a*Newborn <1 day old; Neonate/Infant 1 day to < 1 year old; Pediatric 1 year to < 18 years old

*b*Event locations categorized into three categories: ICUs (adult intensive care unit, neonatal intensive care unit, pediatric intensive care unit, all intensive care units, pediatric cardiac intensive care unit), procedural areas (cardiac catheterization laboratory, diagnostic/interventional area, operating room, diagnostic/interventional area including cath lab/pre-PMT), other (ambulatory/outpatient clinic, adult coronary care unit, labor/delivery, emergency department, inpatient ward, newborn nursery, post-anesthesia care unit, same-day surgical area, telemetry/step-down unit, other, general inpatient including telemetry/pre-PMT)

*c*CPR duration categorized based on quartiles of variable distribution

*d*E-CPR n-670 for “Calcium” group and n=675 for “No Calcium” group

**Supplemental Digital Content 2: Pre-Matching and Post-Matching Comparison of Baseline Variables, Medical Cardiac Patients**

|  |
| --- |
| **Pre-matching Comparison of Baseline Variables**  |
| **Variable** | **Calcium****(n=810)** | **No Calcium****(n=1419)** | **SMD** |
| **Age Group*a*** | n=810 | n=1419 |  |
|  Newborn | 384 (47.4) | 439 (30.9) | 0.34 |
|  Neonate/Infant | 312 (38.5) | 615 (43.3) | 0.10 |
|  Pediatric | 114 (14.1) | 365 (25.7) | 0.30 |
| **Event Location*b*** | n=810 | n=1418 |  |
|  ICUs | 667 (82.4) | 1033 (72.9) | 0.23 |
|  Procedural Areas | 47 (5.8) | 134 (9.5) | 0.14 |
|  Other | 96 (11.9) | 251 (17.7) | 0.17 |
| **Pre-existing conditions** | n=809 | n=1304 |  |
|  Metabolic/electrolyte derangement | 138 (17.1) | 172 (13.2) | 0.11 |
|  Hypotension | 275 (34.0) | 313 (24.0) | 0.22 |
| **Initial rhythm** | n=533 | n=558 |  |
|  PEA/Asystole | 400 (75.1) | 448 (80.3) | 0.13 |
|  Ventricular Tachycardia/Ventricular Fibrillation | 133 (25.0) | 110 (19.7) | 0.13 |
| **CPR duration*c*** | n=793 | n=1350 |  |
|  First Quartile | 159 (20.1) | 835 (61.9) | 0.94 |
|  Second Quartile | 121 (15.3) | 202 (15.0) | 0.01 |
|  Third Quartile | 108 (13.6) | 133 (9.9) | 0.12 |
|  Fourth Quartile | n=793 | n=1350) |  |
| **Post-matching Comparison of Baseline Variables Based on 1:1 Propensity Score Matching** |
| **Variable** | **Calcium****(n=322)** | **No Calcium****(n=322)** | **SMD** |
| **Age Group*a*** |  |  |  |
|  Newborn | 163 (50.6) | 158 (49.1) | 0.03 |
|  Neonate/Infant | 120 (37.3) | 123 (38.2) | 0.02 |
|  Pediatric | 39 (12.1) | 41 (12.7) | 0.02 |
| **Event Location*b*** |  |  |  |
|  ICUs | 252 (78.3) | 243 (75.5) | 0.07 |
|  Procedural Areas | 20 (6.2) | 23 (7.1) | 0.04 |
|  Other | 50 (15.5) | 56 (17.4) | 0.05 |
| **Pre-existing conditions** |  |  |  |
|  Metabolic/electrolyte derangement | 56 (17.4) | 61 (18.9) | 0.04 |
|  Hypotension | 100 (31.1) | 103 (32) | 0.02 |
| **Initial rhythm** |  |  |  |
|  PEA/Asystole | 245 (76.1) | 255 (79.2) | 0.07 |
|  Ventricular Tachycardia/Ventricular Fibrillation | 77 (23.9) | 67 (20.8) | 0.07 |
| **CPR duration*c*** |  |  |  |
|  First Quartile | 75 (23.3) | 85 (26.4) | 0.07 |
|  Second Quartile | 71 (22.1) | 73 (22.7) | 0.02 |
|  Third Quartile | 76 (23.6) | 63 (19.6) | 0.09 |
|  Fourth Quartile | 100 (31.1) | 101 (31.4) | 0.01 |

Data presented as n(%)

SMD: absolute standardized mean difference; SMD values < 0.1 indicating good post-matching balance

ICU – intensive care unit; PEA – pulseless electrical activity; CPR – cardiopulmonary resuscitation

*a*Newborn <1 day old; Neonate/Infant 1 day to < 1 year old; Pediatric 1 year to < 18 years old

*b*Event locations categorized into three categories: ICUs (adult intensive care unit, neonatal intensive care unit, pediatric intensive care unit, all intensive care units, pediatric cardiac intensive care unit), procedural areas (cardiac catheterization laboratory, diagnostic/interventional area, operating room, diagnostic/interventional area including cath lab/pre-PMT), other (ambulatory/outpatient clinic, adult coronary care unit, labor/delivery, emergency department, inpatient ward, newborn nursery, post-anesthesia care unit, same-day surgical area, telemetry/step-down unit, other, general inpatient including telemetry/pre-PMT)

*c*CPR duration categorized based on quartiles of variable distribution

**Supplemental Digital Content 3: Pre-Matching and Post-Matching Comparison of Baseline Variables, Surgical Cardiac Patients**

|  |
| --- |
| **Pre-matching Comparison of Baseline Variables**  |
| **Variable** | **Calcium****(n=1176)** | **No Calcium****(n=1151)** | **SMD** |
| **Age Group*a*** | n=1176 | n=1151 |  |
|  Newborn | 311 (26.5) | 310 (26.9) | 0.01 |
|  Neonate/Infant | 686 (58.3) | 644 (56.0) | 0.05 |
|  Pediatric | 179 (15.2) | 197 (17.1) | 0.05 |
| **Event Location*b*** | n=1176 | n=1151 |  |
|  ICUs | 977 (83.1) | 905 (78.6) | 0.11 |
|  Procedural Areas | 114 (9.7) | 152 (13.2) | 0.11 |
|  Other | 85 (7.2) | 94 (8.2) | 0.04 |
| **Pre-existing conditions** | n=1175 | n=1141 |  |
|  Metabolic/electrolyte derangement | 187 (15.9) | 134 (11.7) | 0.12 |
|  Hypotension | 457 (38.9) | 336 (29.5) | 0.20 |
| **Initial rhythm** | n=721 | n=515 |  |
|  PEA/Asystole | 599 (83.1) | 388 (75.3) | 0.19 |
|  Ventricular Tachycardia/Ventricular Fibrillation | 122 (16.9) | 127 (24.7) | 0.19 |
| **CPR duration*c*** | n=1137 | n=1100 |  |
|  First Quartile | 309 (27.2) | 744 (67.6) | 0.89 |
|  Second Quartile | 173 (15.2) | 127 (11.6) | 0.11 |
|  Third Quartile | 139 (12.2) | 78 (7.1) | 0.17 |
|  Fourth Quartile | 516 (45.4) | 151 (13.7) | 0.74 |
| **Post-matching Comparison of Baseline Variables Based on 1:1 Propensity Score Matching** |
| **Variable** | **Calcium****(n=339)** | **No Calcium****(n=339)** | **SMD** |
| **Age Group*a*** |  |  |  |
|  Newborn | 109 (32.2) | 116 (34.2) | 0.04 |
|  Neonate/Infant | 185 (54.6) | 180 (53.1) | 0.03 |
|  Pediatric | 45 (13.3) | 43 (12.7) | 0.02 |
| **Event Location*b*** |  |  |  |
|  ICUs | 278 (82.0) | 275 (81.1) | 0.02 |
|  Procedural Areas | 35 (10.3) | 38 (11.2) | 0.03 |
|  Other | 26 (7.7) | 26 (7.7) | 0.00 |
| **Pre-existing conditions** |  |  |  |
|  Metabolic/electrolyte derangement | 58 (17.1) | 47 (13.9) | 0.09 |
|  Hypotension | 138 (40.7) | 135 (39.8) | 0.02 |
| **Initial rhythm** |  |  |  |
|  PEA/Asystole | 280 (82.6) | 273 (80.5) | 0.05 |
|  Ventricular Tachycardia/Ventricular Fibrillation | 59 (17.4) | 66 (19.5) | 0.05 |
| **CPR duration*c*** |  |  |  |
|  First Quartile | 140 (41.3) | 143 (42.2) | 0.02 |
|  Second Quartile | 57 (16.8) | 58 (17.1) | 0.01 |
|  Third Quartile | 36 (10.6) | 44 (13.0) | 0.07 |
|  Fourth Quartile | 106 (31.3) | 94 (27.7) | 0.08 |

Data presented as n(%)

SMD: absolute standardized mean difference; SMD values < 0.1 indicating good post-matching balance

ICU – intensive care unit; PEA – pulseless electrical activity; CPR – cardiopulmonary resuscitation

*a*Newborn <1 day old; Neonate/Infant 1 day to < 1 year old; Pediatric 1 year to < 18 years old

*b*Event locations categorized into three categories: ICUs (adult intensive care unit, neonatal intensive care unit, pediatric intensive care unit, all intensive care units, pediatric cardiac intensive care unit), procedural areas (cardiac catheterization laboratory, diagnostic/interventional area, operating room, diagnostic/interventional area including cath lab/pre-PMT), other (ambulatory/outpatient clinic, adult coronary care unit, labor/delivery, emergency department, inpatient ward, newborn nursery, post-anesthesia care unit, same-day surgical area, telemetry/step-down unit, other, general inpatient including telemetry/pre-PMT)

*c*CPR duration categorized based on quartiles of variable distribution

**Supplemental Digital Content 4: Comparison of Outcomes Using Multivariable Adjustment by the Propensity Scores, Unmatched Full Cohort and Sub-Group Analysis**

|  |  |  |  |
| --- | --- | --- | --- |
| **Primary and Secondary Outcomes** | **Adjusted Odds Ratio or Coefficient (Calcium vs No Calcium)** | **95% CI** | **p-value** |
| **All Cardiac Patients** |  |  |  |
|  Survival to Hospital Discharge | 0.78 | (0.64, 0.95) | **0.01** |
|  ROSC | 0.93 | (0.75, 1.16) | 0.53 |
|  Survival to 24 hours  | 0.85 | (0.69, 1.04) | 0.11 |
| Discharge with favorable neurologic outcome (PCPC Score)*a* | 0.74 | (0.59, 0.93) | **0.01** |
|  E-CPR*b* | 1.36 | (1.05, 1.77) | **0.01** |
|  Survival to discharge after E-CPR | 0.85 | (0.54, 1.35) | 0.5 |
|  Hospital length of stay, days*c* | 1.8 | (-1.4, 5.1) | 0.26 |
| **Medical Cardiac**  |  |  |  |
|  Survival to Hospital Discharge | 0.83 | (0.62, 1.11) | 0.21 |
|  ROSC | 1.04 | (0.77, 1.42) | 0.78 |
|  Survival to 24 hours  | 0.92 | (0.69, 1.23) | 0.59 |
| Discharge with favorable neurologic outcome (PCPC Score)*a* | 0.88 | (0.62, 1.23) | 0.45 |
|  E-CPR*b* | 1.28 | (0.78, 2.1) | 0.33 |
|  Survival to discharge after E-CPR | 1.08 | (0.46, 2.55) | 0.86 |
|  Hospital length of stay, days*c* | -3.1 | (-6.5, 0.3) | 0.07 |
| **Surgical Cardiac**  |  |  |  |
|  Survival to Hospital Discharge | 0.60 | (0.46, 0.79) | **<0.001** |
|  ROSC | 0.65 | (0.46, 0.93) | **0.02** |
|  Survival to 24 hours  | 0.59 | (0.42, 0.81) | **0.001** |
| Discharge with favorable neurologic outcome (PCPC Score)*a* | 0.54 | (0.40, 0.74) | **<0.001** |
|  E-CPR*b* | 1.27 | (0.91, 1.76) | 0.16 |
|  Survival to discharge after E-CPR | 0.79 | (0.46, 1.36) | 0.40 |
|  Hospital length of stay, days*c* | 0.2 | (-4.5, 4.9) | 0.93 |

Regression analysis and p-values calculated with multivariable adjustment for the propensity scores in the unmatched data of eligible patients (n=4,556)

ROSC – return of spontaneous circulation; PCPC – Pediatric Cerebral Performance Category; E-CPR – extracorporeal cardiopulmonary resuscitation

*a*For All Cardiac patients PCPC scores available for n=1623 in “Calcium” group and n=1845 in “No Calcium” group; For Medical Cardiac patients PCPC scores available for n=713 in “Calcium” group and n=1068 in “No Calcium” group; For Surgical Cardiac patients PCPC scores available for n=910 in “Calcium” group and n=777 in “No Calcium” group

*b*For All Cardiac patients E-CPR data available for n=1968 in “Calcium” group and n=2561 in “No Calcium” group; For Medical Cardiac patients E-CPR data available for n=807 in “Calcium” group and n=1417 in “No Calcium” group; For Surgical Cardiac patients-CPR data available for n=1161 in “Calcium” group and n=1144 in “No Calcium” group

*c*Hospital length of stay data truncated at 365 days

**Supplemental Digital Content 6: Comparison of Matched Versus Unmatched Cohorts**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variable** | **Total** **(n=4556)** | **Matched (n=1356)** | **Not Matched (n=3200)** | **p-value** |
| **Illness Category** |  |  |  | **0.04** |
|  Medical Cardiac | 2229 (48.9) | 632 (46.6) | 1597 (49.9) |  |
|  Surgical Cardiac | 2327 (51.1) | 724 (53.4) | 1603 (50.1) |  |
| **Age Group*a*** |  |  |  | **<0.001** |
|  Newborn | 855 (18.8) | 178 (13.1) | 677 (21.2) |  |
|  Neonate/Infant | 2257 (49.5) | 625 (46.1) | 1632 (51) |  |
|  Pediatric | 1444 (31.7) | 553 (40.8) | 891 (27.8) |  |
| **Event Location*b*** |  |  |  | 0.08 |
|  All Intensive Care Units | 3582/4555 (78.6) | 1078 (79.5) | 2504/3199 (78.3) |  |
|  Procedural Areas | 447/4555 (9.8) | 113 (8.3) | 334/3199 (10.4) |  |
|  Other | 526/4555 (11.6) | 165 (12.2) | 361/3199 (11.3) |  |
| **Pre-existing conditions** |  |  |  |  |
|  Metabolic/electrolyte derangement | 631/4429 (14.3) | 219 (16.2) | 412/3073 (13.4) | **0.02** |
|  Hypotension | 1381/4429 (31.2) | 497 (36.7) | 884/3073 (28.8) | **<0.001** |
| **Interventions in Place Prior to Arrest** |  |  |  |  |
|  Arterial line | 1725 (37.9) | 547 (40.3) | 1178 (36.8) | **0.03** |
|  Mechanical ventilation | 2260 (49.6) | 687 (50.7) | 1573 (49.2) | 0.36 |
|  Vasoactive infusions | 1869 (41) | 632 (46.6) | 1237 (38.7) | **<0.001** |
| **Initial Rhythm Preceding Arrest** |  |  |  |  |
|  PEA/Asystole | 1278 (28.1) | 767 (56.6) | 511 (16) | **<0.001** |
|  VT/VF | 369 (8.1) | 215 (15.9) | 154 (4.8) | **<0.001** |
|  Bradycardia with Initial Pulse | 2194 (48.2) | 326 (24) | 1868 (58.4) | **<0.001** |
| **Pharmacologic and Circulatory Support Interventions** |  |  |  |  |
|  Epinephrine doses | 3 (1, 6) | 3 (2, 6) | 3 (1, 6) | **<0.001** |
|  Sodium bicarbonate  | 2205 (48.4) | 807 (59.5) | 1398 (43.7) | **<0.001** |
|  E-CPR deployment | 699/4529 (15.4) | 227/1345 (16.9) | 472/3184 (14.8) | 0.08 |
| **CPR duration, minutes** | 11.5 (3,34) | 17 (6, 34) | 8 (3, 33) | **<0.001** |
| **Hospital length of stay, days** | 23 (7, 54) | 20 (5, 48) | 24 (7, 58) | **<0.001** |

Data represented as n(%) for categorical variables and median (IQR) for continuous variables

p-value for categorical variables calculated using Pearson Chi-square analysis, p-values for continuous variables calculated using Wilcoxon rank sum test

PEA – pulseless electrical activity, VT – ventricular tachycardia, VF – ventricular fibrillation, E-CPR – extracorporeal cardiopulmonary resuscitation, CPR – cardiopulmonary resuscitation

Denominators presented to denote missing data for categorical variables.

For epinephrine doses, n=1,124 for matched patients, n=2,178 for unmatched patients.

For CPR duration, n=1,356 for matched patients, n=3,024 for unmatched patients.

For length of stay, n=1,351 for matched patients, n=3,011 for unmatched patients. Length of stay truncated at 365 days.

*a*Newborn <1 day old; Neonate/Infant 1 day – < 1 year old; Pediatric 1 year - < 18 years old

*b*Event locations categorized into three categories: ICUs (adult intensive care unit, neonatal intensive care unit, pediatric intensive care unit, all intensive care units, pediatric cardiac intensive care unit), procedural areas (cardiac catheterization laboratory, diagnostic/interventional area, operating room, diagnostic/interventional area including cath lab/pre-PMT), other (ambulatory/outpatient clinic, adult coronary care unit, labor/delivery, emergency department, inpatient ward, newborn nursery, post-anesthesia care unit, same-day surgical area, telemetry/step-down unit, other, general inpatient including telemetry/pre-PMT)

**Supplemental Digital Content 7: Prearrest and Arrest Characteristics, Medical and Surgical Cardiac Cohorts**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Total (n=4556)** | **Medical Cardiac (n=2229)** | **Surgical Cardiac (n=2327)** | **p-value** |
| **Demographics** |  |
| **Age Group*a*** | **<0.001** |
| Newborn | 855 (18.8) | 479 (21.5) | 376 (16.2) |  |
| Neonate/Infant | 2257 (49.5) | 927 (41.6) | 1330 (57.2) |  |
| Pediatric  | 1444 (31.7) | 823 (36.9) | 621 (26.7) |  |
| **Age** |  |  |  |  |
| 0-28 days | 1403 (30.8) | 654 (29.3) | 749 (32.2) | **0.04** |
| 29 days - < 12 months | 1687 (37.0) | 741 (33.2) | 946 (40.7) | **<0.001** |
| 12 months - < 8 years | 900 (19.8) | 474 (21.3) | 426 (18.3) | **0.01** |
| 8 years - < 18 years  | 566 (12.4) | 360 (16.2) | 206 (8.9) | **<0.001** |
| **Age at time of event, years**  | **<0.001** |
|  Age < 1 year | 3090 (67.8) | 1395 (62.6) | 1695 (72.8) |  |
|  Age ≥ 1 year | 1466 (32.2) | 834 (37.4) | 632 (27.2) |  |
| **Sex** | 0.46 |
|  Male  | 2448 (53.7) | 1185 (53.2) | 1263 (54.3) |  |
|  Female | 2107 (46.2) | 1044 (46.8) | 1063 (45.7) |  |
|  Unknown  | 1 (0.02) | 0 (0.0) | 1 (0.04) |  |
| **Race/Ethnicity** | **<0.001** |
|  Non-Hispanic white | 2092 (45.9) | 926 (41.5) | 1166 (50.1) |  |
|  Non-Hispanic black | 838 (18.4) | 478 (21.4) | 360 (15.5) |  |
|  Hispanic white | 474 (10.4) | 256 (11.5) | 218 (9.4) |  |
|  Hispanic black | 20 (0.4) | 9 (0.4) | 11 (0.5) |  |
|  Hispanic other | 349 (7.7) | 185 (8.3) | 164 (7.0) |  |
|  Asian/Indian subcontinent/Pacific Islander | 153 (3.4) | 70 (3.1) | 83 (3.6) |  |
|  Native American/Eskimo/Aleut | 30 (0.7) | 14 (0.6) | 16 (0.7) |  |
|  Other, including middle eastern, mixed, biracial | 56 (1.2) | 28 (1.3) | 28 (1.2) |  |
|  Unknown  | 544 (11.9) | 263 (11.8) | 281 (12.1) |  |
| **Event Location*b*** | **<0.001** |
|  Ambulatory/outpatient clinic  | 19 (0.4) | 14 (0.6) | 5 (0.2) |  |
|  Cardiac catheterization laboratory  | 230 (5.0) | 101 (4.5) | 129 (5.5) |  |
|  Operating room | 150 (3.3) | 39 (1.8) | 111 (4.8) |  |
|  Inpatient ward | 131 (2.9) | 81 (3.6) | 50 (2.1) |  |
|  Emergency department | 67 (1.5) | 62 (2.8) | 5 (0.2) |  |
|  Neonatal intensive care unit | 439 (9.6) | 351 (15.8) | 88 (3.8) |  |
|  Cardiac intensive care unit | 1043 (22.9) | 369 (16.6) | 674 (29.0) |  |
|  Pediatric intensive care unit | 1457 (32.0) | 679 (30.5) | 778 (33.4) |  |
|  Telemetry/Step-down unit  | 118 (2.6) | 51 (2.3) | 67 (2.9) |  |
|  Labor and delivery  | 85 (1.9) | 84 (3.8) | 1 (0.04) |  |
|  Newborn nursery  | 4 (0.1) | 4 (100.0) | 0 (0.0) |  |
|  Post anesthesia recovery unit | 22 (0.5) | 11 (0.5) | 11 (0.5) |  |
|  Same-day surgical area | 2 (0.04) | 2 (0.1) | 0 (0.0) |  |
|  Diagnostic/Interventional area  | 37 (0.8) | 24 (1.1) | 13 (0.6) |  |
|  Diagnostic/Interventional area including cath lab/pre-PMT*c* | 30 (0.7) | 17 (0.8) | 13 (0.6) |  |
|  All intensive care units | 637 (14.0) | 297 (13.3) | 340 (14.6) |  |
| **Hospital Characteristics** |
|  **Number of Pediatric Intensive Care Unit Beds <0.001**  |
|  0 beds  | 262 (6.2) | 198 (9.7) | 64 (2.9) |  |
|  1-5 beds | 49 (1.2) | 46 (2.2) | 3 (0.1) |  |
|  6-10 beds | 91 (2.1) | 62 (3.0) | 29 (1.3) |  |
|  11-20 beds | 711 (16.8) | 445 (21.7) | 266 (12.1) |  |
|  21-30 beds | 937 (22.1) | 417 (20.4) | 520 (23.7) |  |
|  31-40 beds | 930 (21.9) | 506 (24.7) | 424 (19.4) |  |
|  > 40 beds  | 1257 (29.7) | 372 (18.2) | 855 (40.4) |  |
|  **Number of Pediatric beds <0.001**  |
|  0 beds | 223 (5.3) | 162 (7.9) | 61 (2.8) |  |
|  1-10 beds | 24 (0.6) | 21 (1.0) | 3 (0.1) |  |
|  11-25 beds | 109 (2.6) | 100 (4.9) | 9 (0.4) |  |
|  26-50 beds  | 325 (7.7) | 230 (11.2) | 95 (4.3) |  |
|  51-100 beds | 1038 (24.5) | 521 (25.5) | 517 (23.6) |  |
|  101-150 beds | 1034 (24.4) | 334 (16.3) | 700 (31.9) |  |
|  151-200 beds | 202 (4.8) | 92 (4.5) | 110 (5.0) |  |
|  201-250 beds | 416 (9.8) | 266 (13.0) | 150 (6.8) |  |
|  > 250 beds  | 866 (20.4) | 320 (15.6) | 546 (24.9) |  |
|  **Teaching Status <0.001**  |
|  No status  | 24 (0.5) | 21 (1.0) | 3 (0.1) |  |
|  Major teaching hospital | 3247 (74.4) | 1478 (70.0) | 1769 (78.4) |  |
|  Minor teaching hospital | 1096 (25.1) | 613 (29.0) | 483 (21.4) |  |
| **Peri-Arrest and Arrest Characteristics**  |
| **Congenital malformation/abnormality** | 573 (16.5) | 293 (17.7) | 280 (15.4) | 0.07 |
| **Pre-existing conditions** |
|  Renal insufficiency  | 361 (8.2) | 171 (8.1) | 190 (8.2) | 0.89 |
|  Respiratory insufficiency  | 2500 (56.4) | 1228 (58.1) | 1272 (54.9) | **0.03** |
|  Metabolic/electrolyte derangement  | 631 (14.2) | 310 (14.7) | 321 (13.9) | 0.44 |
|  Hypotension  | 1381 (31.2) | 588 (27.8) | 793 (34.2) | **<0.001** |
|  Sepsis  | 9 (2.7) | 7 (4.1) | 2 (1.2) | 0.11 |
|  Pneumonia | 152 (3.4) | 121 (5.7) | 31 (1.3) | **<0.001** |
|  Congestive heart failure (this admission)  | 878 (19.8) | 390 (18.5) | 488 (21.1) | **0.03** |
|  Congestive heart failure (prior admission) | 728 (16.4) | 357 (16.9) | 371 (16.0) | 0.43 |
|  Metastatic/hematologic malignancy  | 30 (0.7) | 24 (1.1) | 6 (0.3) | **<0.001** |
|  Hepatic insufficiency  | 111 (2.5) | 59 (2.8) | 52 (2.2) | 0.25 |
|  Major trauma  | 19 (0.4) | 13 (0.6) | 6 (0.3) | 0.07 |
|  Cyanotic congenital heart disease  | 1756 (50.4) | 606 (36.5) | 1150 (63.1) | **<0.001** |
|  Acyanotic congenital heart disease  | 1052 (30.2) | 437 (26.3) | 615 (33.7) | **<0.001** |
| **Interventions in Place Prior to Arrest** |
|  Arterial line  | 1725 (37.9) | 509 (22.8) | 1216 (52.3) | **<0.001** |
|  Mechanical ventilation  | 2260 (49.6) | 919 (41.2) | 1341 (57.6) | **<0.001** |
|  Vasoactive infusions  | 1869 (41.0) | 677 (30.4) | 1192 (51.2) | **<0.001** |
|  Dialysis  | 103 (2.3) | 23 (1.0) | 80 (3.4) | **<0.001** |
| **Initial rhythm:** |
|  PEA | 1161 (42.6) | 495 (38.0) | 666 (46.8) | **<0.001** |
|  Asystole  | 674 (24.7) | 353 (27.1) | 321 (22.6) | **0.006** |
|  Ventricular tachycardia | 186 (6.8) | 104 (8.0) | 82 (5.8) | **0.02** |
|  Ventricular fibrillation | 306 (11.2) | 139 (10.7) | 167 (11.7) | 0.39 |
|  Bradycardia, never pulseless or becomes pulseless*d* | 2194 (85.7) | 1078 (86.7) | 1116 (84.7) | **0.001** |
|  Unknown | 397 (14.6) | 210 (16.1) | 187 (13.1) | **<0.001** |
| **Pharmacologic and Circulatory Support Interventions** |
|  Epinephrine  | 3583 (78.6) | 1657 (74.3) | 1926 (82.8) | **<0.001** |
|  Epinephrine doses, median (IQR)  | 3 (1,6) | 3 (1,6) | 3 (1,6) | 0.29  |
|  Sodium bicarbonate  | 2205 (48.4) | 1008 (45.2) | 1197 (51.4) | **<0.001** |
|  Calcium chloride/gluconate  | 1986 (43.6) | 810 (36.3) | 1176 (50.5) | **<0.001** |
|  Amiodarone  | 269 (5.9) | 134 (6.0) | 135 (5.8) | 0.76 |
|  Lidocaine  | 327 (7.2) | 165 (7.4) | 162 (7.0) | 0.57 |
|  Magnesium sulfate  | 221 (4.9) | 103 (4.6) | 118 (5.1) | 0.48 |
|  Defibrillation  | 654 (71.6) | 301 (70.8) | 353 (72.2) | 0.59  |
|  Number of shocks, median (IQR) | 2 (1,3) | 2 (1,4) | 2 (1,3) | **0.03** |
|  E-CPR deployment  | 699 (15.4) | 193 (8.7) | 506 (22.0) | **<0.001** |
| **CPR duration,** mins,median (IQR) | 12 (3,34) | 12 (4,32) | 11 (3,35) | 0.53 |
| **Pediatric Cerebral Performance Category (PCPC)** |  |  |  |  |
|  Admission PCPC, mean (SD) | 1.75 (1.15) | 1.94 (1.25) | 1.54 (0.99) | **<0.001** |
|  Discharge PCPC, mean (SD) | 1.59 (0.96) | 1.72 (1.07) | 1.48 (0.85) | **<0.001** |
|  Favorable Neurologic Outcome | 1293 (37.1) | 586 (32.8) | 707 (41.7) | **<0.001** |
|  Unfavorable Neurologic Outcome | 2190 (62.9) | 1203 (67.2) | 987 (58.3) | **<0.001** |
| **Hospital Length of Stay, days [median (IQR)]*e*** | 23 (7,54) | 16 (2,47) | 28 (12,60) | **<0.001** |

Data presented as number (percentage) for categorical variables and median (interquartile range) or mean (standard deviation) for continuous variables

p-value for categorical variables calculated using Pearson Chi-Square analysis, p-value for continuous variables calculated using Wilcoxon rank sum test

PMT – pre-patient management tool; PEA – pulseless electrical activity; E-CPR – extracorporeal cardiopulmonary resuscitation; CPR – cardiopulmonary resuscitation; PCPC – Pediatric Cerebral Performance Category

*a*Newborn <1 day old; Neonate/Infant 1 day to < 1 year old; Pediatric 1 year to < 18 years old

*b*For event location, Emergency Department arrests only included if documented not to be an out-of-hospital cardiac arrest

*c*Pre-PMT – pre-patient management tool

*d*Total cohort of 2561 patients who received cardiopulmonary resuscitation with initial pulse (other rhythm etiologies include: accelerated idioventricular rhythm, pacemaker rhythm, supraventricular tachycardia, sinus rhythm, ventricular tachycardia with pulse, unknown)

*e*Hospital length of stay data truncated at 365 days

**Supplemental Digital Content 8: Prearrest and Arrest Characteristics in Medical and Surgical Cardiac Subgroups, Calcium vs No Calcium**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Total**  | **Calcium** | **No Calcium** | **p-value** |
| **Medical Cardiac**  | 2229 | 810 (36.3) | 1419 (63.6) |  |
| **Demographics** |
| **Age** |  |  |  |  |
| 0-28 days | 654 (29.3) | 184 (22.7) | 470 (33.1) | **<0.001** |
| 29 days - < 12 months | 741 (33.2) | 238 (29.4) | 503 (35.4) | **0.003** |
| 12 months - < 8 years | 474 (21.3) | 230 (28.4) | 244 (17.2) | **<0.001** |
| 8 years - < 18 years  | 360 (16.2)  | 158 (19.5) | 202 (14.2) | **0.001** |
| **Age Group***a* | **<0.001** |
| Newborn | 479 (21.5) | 114 (14.1) | 365 (25.7) |  |
| Neonate/Infant | 927 (41.6) | 312 (38.5) | 615 (43.3) |  |
| Pediatric  | 823 (36.9) | 384 (47.4) | 439 (30.9) |  |
| **Age at time of event, years**  | **<0.001** |
|  Age < 1 year | 1395 (62.6) | 422 (52.1) | 973 (68.6) |  |
|  Age ≥ 1 year | 834 (37.4) | 388 (47.9) | 446 (31.4) |  |
| **Sex** |  |  |  | 0.64 |
|  Male  | 1185 (53.2) | 436 (53.8) | 749 (52.8) |  |
|  Female | 1044 (46.8) | 374 (46.2) | 670 (47.2) |  |
| **Race/Ethnicity** | 0.11 |
|  Non-Hispanic white | 926 (41.5) | 355 (43.8) | 571 (40.2) |  |
|  Non-Hispanic black | 478 (21.4) | 166 (20.5) | 312 (22.0) |  |
|  Hispanic white | 256 (11.5) | 89 (11.0) | 167 (11.8) |  |
|  Hispanic black | 9 (0.4) | 3 (0.4) | 6 (0.4) |  |
|  Hispanic other | 185 (8.3) | 61 (7.5) | 124 (8.7) |  |
|  Asian/Indian subcontinent/Pacific Islander | 70 (3.1) | 29 (3.6) | 41 (2.9) |  |
|  Native American/Eskimo/Aleut | 14 (0.6) | 5 (0.6) | 9 (0.6) |  |
|  Other, including middle eastern, mixed, biracial | 28 (1.3) | 17 (2.1) | 11 (0.8) |  |
|  Unknown  | 263 (11.8) | 85 (10.5) | 178 (12.5) |  |
| **Event Location***b* | **<0.001** |
|  Ambulatory/outpatient clinic  | 14 (0.6) | 5 (0.6) | 9 (0.6) |  |
|  Cardiac catheterization laboratory  | 101 (4.5) | 31 (3.8) | 70 (4.9) |  |
|  Operating room | 39 (1.8) | 4 (0.5) | 35 (2.5) |  |
|  Inpatient ward | 81 (3.6) | 32 (4.0) | 49 (3.5) |  |
|  Emergency department | 62 (2.8) | 18 (2.2) | 44 (3.1) |  |
|  Neonatal intensive care unit | 351 (15.8) | 60 (7.4) | 291 (20.5) |  |
|  Cardiac intensive care unit | 369 (16.6) | 156 (19.3) | 213 (15.0) |  |
|  Pediatric intensive care unit | 679 (30.5) | 295 (36.4) | 384 (27.1) |  |
|  Telemetry/Step-down unit  | 51 (2.3) | 21 (2.6) | 30 (2.1) |  |
|  Labor and delivery  | 84 (3.8) | 0 (0.0) | 84 (5.9) |  |
|  Newborn nursery  | 4 (0.2) | 0 (0.0) | 4 (0.3) |  |
|  Post anesthesia care unit  | 11 (0.5) | 3 (0.4) | 8 (0.6) |  |
|  Same-day surgical area | 2 (0.1) | 1 (0.1) | 1 (0.1) |  |
|  Diagnostic/Interventional area  | 24 (1.1) | 7 (0.9) | 17 (1.2) |  |
|  Diagnostic/Interventional area including cath lab/pre-PMT*c* | 13 (0.6) | 6 (0.7) | 7 (0.5) |  |
|  All intensive care units | 297 (13.3) | 153 (18.9) | 144 (10.2) |  |
| **Hospital Characteristics:**  |
|  **Number of Pediatric Intensive Care Unit Beds** **<0.001**  |
|  0 beds  | 198 (9.7) | 39 (5.2) | 159 (12.2) |  |
|  1-5 beds | 46 (2.2) | 9 (1.2) | 37 (2.8) |  |
|  6-10 beds | 62 (3.0) | 20 (2.7) | 42 (3.2) |  |
|  11-20 beds | 445 (21.7) | 144 (19.4) | 301 (23.1) |  |
|  21-30 beds | 417 (20.4) | 179 (24.1) | 238 (18.3) |  |
|  31-40 beds | 506 (24.7) | 193 (25.9) | 313 (24.0) |  |
|  > 40 beds  | 372 (18.2) | 160 (21.5) | 212 (16.3) |  |
|  **Number of Pediatric beds** **<0.001**  |
|  0 beds | 162 (7.9)  | 28 (3.8) | 134 (10.3) |  |
|  1-10 beds | 21 (1.0) | 7 (0.9) | 14 (1.1) |  |
|  11-25 beds | 100 (4.9) | 25 (3.4) | 75 (5.8) |  |
|  26-50 beds  | 230 (11.2) | 78 (10.5) | 152 (11.7) |  |
|  51-100 beds | 521 (25.5) | 199 (26.7) | 322 (24.7) |  |
|  101-150 beds | 334 (16.3) | 123 (16.5) | 211 (16.2) |  |
|  151-200 beds | 92 (4.5) | 54 (7.3) | 38 (2.9) |  |
|  201-250 beds | 266 (13.0) | 102 (13.7) | 164 (12.6) |  |
|  > 250 beds  | 320 (15.6) | 128 (17.2) | 192 (14.7) |  |
|  **Teaching Status** 0.11  |
|  No status  | 21 (1.0) | 3 (0.4) | 18 (1.3) |  |
|  Major teaching hospital | 1478 (70.0) | 539 (70.5) | 939 (69.7) |  |
|  Minor teaching hospital | 613 (29.0) | 223 (29.2) | 390 (29.0) |  |
| **Peri-Arrest and Arrest Characteristics** |
| **Congenital malformation/abnormality** | 293 (17.7) | 103 (17.5) | 190 (17.7) | 0.90 |
| **Pre-existing conditions** |
|  Renal insufficiency | 171 (8.1) | 68 (8.4) | 103 (7.9) | 0.68 |
|  Respiratory insufficiency | 1228 (58.2) | 471 (58.2) | 757 (58.1) | 0.94 |
|  Metabolic/electrolyte derangement | 310 (14.7) | 138 (17.1) | 172 (13.2) | **0.02** |
|  Hypotension | 588 (27.8) | 275 (34.0) | 313 (24.0) | **<0.001** |
|  Sepsis | 7 (4.1) | 4 (7.5) | 3 (2.5) | 0.12 |
|  Pneumonia | 121 (5.7) | 52 (6.4) | 69 (5.3) | 0.28 |
|  Congestive heart failure (this admission) | 390 (18.5) | 196 (24.2) | 194 (14.9) | **<0.001** |
|  Congestive heart failure (prior admission) | 357 (16.9) | 168 (20.8) | 189 (14.5) | **<0.001** |
|  Metastatic/hematologic malignancy | 24 (1.1) | 11 (1.4) | 13 (1.0) | 0.44 |
|  Hepatic insufficiency  | 59 (2.8) | 27 (3.3) | 32 (2.5) | 0.23 |
|  Major trauma | 13 (0.6) | 3 (0.4) | 10 (0.8) | 0.26 |
|  Cyanotic congenital heart disease | 606 (36.5) | 224 (38.0) | 382 (35.7) | 0.34 |
|  Acyanotic congenital heart disease  | 437 (26.3) | 161 (27.3) | 276 (25.8) | 0.49 |
| **Interventions in Place Prior to Arrest** |
|  Arterial line  | 509 (22.8) | 229 (28.3) | 280 (19.7) | **<0.001** |
|  Mechanical ventilation  | 919 (41.2) | 374 (46.2) | 545 (38.4) | **<0.001** |
|  Vasoactive infusions  | 677 (30.4) | 327 (40.4) | 350 (24.7) | **<0.001** |
|  Dialysis  | 23 (1.0) | 8 (1.0) | 15 (1.1) | 0.88 |
| **Initial rhythm** |
|  Pulseless electrical activity | 495 (38.0) | 251 (39.8) | 244 (36.4) | **0.03** |
|  Asystole  | 353 (27.1) | 149 (23.6) | 204 (30.4) | **0.03** |
|  Ventricular tachycardia, pulseless  | 104 (8.0) | 56 (8.9) | 48 (7.2) | **0.03** |
|  Ventricular fibrillation | 139 (10.7) | 77 (12.2) | 62 (9.3) | **0.03** |
|  Bradycardia, never pulseless or becomes pulseless*d* | 1078 (86.7) | 346 (81.8) | 732 (89.3) | **0.001** |
|  Unknown | 210 (16.1) | 98 (15.5) | 112 (16.7) | **0.03** |
| **Pharmacologic and Circulatory Interventions** |
|  Epinephrine  | 1657 (74.3) | 762 (94.1) | 895 (63.1) | **<0.001** |
|  Epinephrine doses, median (IQR) | 3 (1,6) | 5 (3,8) | 2 (1,3) | **<0.001** |
|  Sodium bicarbonate  | 1008 (45.2) | 679 (83.8) | 329 (23.2) | **<0.001** |
|  Amiodarone  | 134 (6.0) | 85 (10.5) | 49 (3.5) | **<0.001** |
|  Lidocaine  | 165 (7.4) | 115 (14.2) | 50 (3.5) | **<0.001** |
|  Magnesium sulfate  | 103 (4.6) | 76 (9.4) | 27 (1.9) | **<0.001** |
|  Defibrillation  | 301 (70.8) | 182 (77.1) | 119 (63.0) | **0.003** |
|  Number of shocks, median (IQR) | 2 (1,4) | 2 (1,4) | 1 (1,3) | **<0.001** |
|  E-CPR deployment  | 193 (8.7) | 125 (15.5) | 68 (4.8) | **<0.001** |
| **CPR duration,** median (IQR) | 12 (4,32) | 30 (13,53) | 6 (2,17) | **<0.001** |
| **Pediatric Cerebral Performance Category (PCPC) Score** |
|  Admission PCPC, mean (SD) | 1.94 (1.25) | 1.93 (1.24) | 1.95 (1.26) | 0.92 |
|  Discharge PCPC, mean (SD) | 1.72 (1.07) | 1.75 (1.10) | 1.71 (1.06) | 0.75 |
| **Unadjusted Outcomes** |
|  ROSC | 1714 (76.9) | 530 (65.5) | 1184 (83.4) | **<0.001** |
|  Survival to 24 hours post-ROSC | 1504 (67.5) | 437 (54.0) | 1067 (75.2) | **<0.001** |
|  Survival to hospital discharge | 964 (44.8) | 234 (29.5) | 730 (53.8) | **<0.001** |
|  Survival with favorable neurologic outcome (PCPC) | 586 (32.8) | 149 (20.8) | 437 (40.8) | **<0.001** |
|  Hospital length of stay, days, median (IQR)*e* | 16 (2,47) | 10 (1,34) | 19 (4,54) | **<0.001** |
|  |
| **Surgical Cardiac** | 2327 | 1176 (50.5) | 1151 (49.5) |  |
| **Demographics** |
| **Age** |  |  |  |  |
| 0-28 days | 749 (32.2) | 406 (34.5) | 343 (29.8) | **0.02** |
| 29 days - < 12 months | 946 (40.7) | 458 (38.9) | 488 (42.4) | 0.09 |
| 12 months - < 8 years | 426 (18.3) | 219 (18.6) | 207 (18.0) | 0.69 |
| 8 years - < 18 years  | 206 (8.9) | 93 (7.9) | 113 (9.8) | 0.11 |
| **Age Group***a* | 0.38 |
| Newborn | 376 (16.2) | 179 (15.2) | 197 (17.1) |  |
| Neonate/Infant | 1330 (57.2) | 686 (58.3) | 644 (56.0) |  |
| Pediatric  | 621 (26.7) | 311 (26.4) | 310 (26.9) |  |
| **Age at time of event, years**  | 0.49 |
|  Age < 1 year | 1695 (72.8) | 864 (73.5) | 831 (72.2) |  |
|  Age ≥ 1 year | 632 (27.2) | 312 (26.5) | 320 (27.8) |  |
| **Sex** | 0.58 |
|  Male  | 1263 (54.3) | 642 (54.6) | 621 (54.0) |  |
|  Female | 1063 (45.7) | 534 (45.4) | 529 (46.0) |  |
|  Unknown  | 1 (0.04) | 0 (0.0) | 1 (0.1) |  |
| **Race/Ethnicity** | 0.76 |
|  Non-Hispanic white | 1166 (50.1) | 594 (50.5) | 572 (49.7) |  |
|  Non-Hispanic black | 360 (15.5) | 172 (14.6) | 188 (16.3) |  |
|  Hispanic white | 218 (9.4) | 112 (9.5) | 106 (9.2) |  |
|  Hispanic black | 11 (0.5)  | 6 (0.5) | 5 (0.4) |  |
|  Hispanic other | 164 (7.0) | 80 (6.8) | 84 (7.3) |  |
|  Asian/Indian subcontinent/Pacific Islander | 83 (3.6) | 44 (3.7) | 39 (3.4) |  |
|  Native American/Eskimo/Aleut | 16 (0.7) | 6 (0.5) | 10 (0.9) |  |
|  Other, including middle eastern, mixed, biracial | 28 (1.2) | 18 (1.5) | 10 (0.9) |  |
|  Unknown  | 281 (12.1) | 144 (12.2) | 137 (11.9) |  |
| **Event Location***b* | **<0.001** |
|  Ambulatory/outpatient clinics  | 5 (0.2) | 1 (0.1) | 4 (0.3) |  |
|  Cardiac catheterization laboratory  | 129 (5.5) | 64 (5.4) | 65 (5.6) |  |
|  Operating room | 111 (4.8) | 41 (3.5) | 70 (6.1) |  |
|  Inpatient ward | 50 (2.1) | 24 (2.0) | 26 (2.3) |  |
|  Emergency department | 5 (0.2) | 4 (0.3) | 1 (0.1) |  |
|  Neonatal intensive care unit  | 88 (3.8) | 23 (2.0) | 65 (5.6) |  |
|  Cardiac intensive care unit | 674 (29.0) | 342 (29.1) | 332 (28.8) |  |
|  Pediatric intensive care unit | 778 (33.4) | 417 (35.5) | 361 (31.4) |  |
|  Telemetry/Step-down unit  | 67 (2.9) | 31 (2.6) | 36 (3.1) |  |
|  Labor and delivery  | 1 (0.04) | 0 (0.0) | 1 (0.1) |  |
|  Newborn nursery  | -- | -- | -- | -- |
|  Post anesthesia recovery unit  | 11 (0.5) | 6 (0.5) | 5 (0.4) |  |
|  Same-day surgical area | -- | -- | -- | -- |
|  Diagnostic/Interventional area  | 13 (0.6) | 6 (0.5) | 7 (0.6) |  |
|  Diagnostic/Interventional area including cath lab/pre-PMT*c* | 4 (0.2) | 3 (0.3) | 1 (0.1) |  |
|  All intensive care units | 340 (14.6) | 193 (16.4) | 147 (12.8) |  |
| **Hospital Characteristics:**  |
|  **Number of Pediatric Intensive Care Unit Beds** 0.10  |
|  0 beds | 64 (2.9) | 23 (2.1) | 41 (3.8) |  |
|  1-5 beds | 3 (0.1) | 1 (0.1) | 2 (0.2) |  |
|  6-10 beds | 29 (1.3) | 18 (1.6) | 11 (1.0) |  |
|  11-20 beds | 266 (12.1) | 130 (11.7) | 136 (12.6) |  |
|  21-30 beds | 520 (23.7) | 277 (24.9) | 243 (22.5) |  |
|  31-40 beds | 424 (19.4) | 225 (20.2) | 199 (18.5) |  |
|  > 40 beds  | 885 (40.4) | 439 (39.4) | 446 (41.4) |  |
|  **Number of Pediatric beds** **0.01**  |
|  0 beds | 61 (2.8) | 24 (2.2) | 37 (3.4) |  |
|  1-10 beds | 3 (0.1)  | 0 (0.0) | 3 (0.3) |  |
|  11-25 beds | 9 (0.4)  | 2 (0.2) | 7 (0.6) |  |
|  26-50 beds  | 95 (4.3)  | 49 (4.4) | 46 (4.3) |  |
|  51-100 beds | 517 (23.6) | 263 (23.6) | 254 (23.6) |  |
|  101-150 beds | 700 (31.9) | 385 (34.6) | 315 (29.2) |  |
|  151-200 beds | 110 (5.0) | 56 (5.0) | 54 (5.0) |  |
|  201-250 beds | 150 (6.8) | 63 (5.7) | 87 (8.1) |  |
|  > 250 beds  | 546 (24.9) | 271 (24.3) | 275 (25.5) |  |
|  **Teaching Status** |  |  |  | 0.54 |
|  No status  | 3 (0.1) | 1 (0.1) | 2 (0.2) |  |
|  Major teaching hospital | 1769 (78.4) | 907 (79.3) | 862 (77.6) |  |
|  Minor teaching hospital | 483 (21.4) | 236 (20.6) | 247 (22.2) |  |
| **Peri-Arrest and Arrest Characteristics**  |
| **Congenital malformation/abnormality** | 280 (15.4) | 122 (13.6) | 158 (17.1) | **0.04** |
| **Pre-existing conditions** |
|  Renal insufficiency | 190 (8.2) | 116 (9.9) | 74 (6.5) | **0.003** |
|  Respiratory insufficiency | 1272 (54.9) | 660 (56.2) | 612 (53.6) | 0.22 |
|  Metabolic/electrolyte derangement | 321 (13.9) | 187 (15.9) | 134 (11.7) | **0.004** |
|  Hypotension | 793 (34.2) | 457 (38.9) | 336 (29.4) | **<0.001** |
|  Sepsis | 2 (1.2) | 1 (1.3) | 1 (1.2) | 1.00 |
|  Pneumonia | 31 (1.3) | 22 (1.9) | 9 (0.8) | **0.02** |
|  Congestive heart failure (this admission) | 488 (21.1) | 269 (22.9) | 219 (19.2) | **0.03** |
|  Congestive heart failure (prior admission) | 371 (16.0) | 193 (16.4) | 178 (15.6) | 0.59 |
|  Metastatic/hematologic malignancy | 6 (0.3) | 2 (0.2) | 4 (0.4) | 0.45 |
|  Hepatic insufficiency  | 52 (2.2) | 23 (2.0) | 29 (2.5) | 0.34 |
|  Major trauma | 6 (0.3) | 3 (0.3) | 3 (0.3) | 0.97 |
|  Cyanotic congenital heart disease | 1150 (63.1) | 606 (67.4) | 544 (58.9) | **<0.001** |
|  Acyanotic congenital heart disease  | 615 (33.7) | 267 (29.7) | 348 (37.7) | **<0.001** |
| **Interventions in Place Prior to Arrest** |
|  Arterial line  | 1216 (52.3) | 651 (55.4) | 565 (49.1) | **0.002** |
|  Mechanical ventilation  | 1341 (57.6) | 718 (61.1) | 623 (54.1) | **0.001** |
|  Vasoactive infusions  | 1192 (51.2) | 674 (57.3) | 518 (45.0) | **<0.001** |
|  Dialysis  | 80 (3.4) | 59 (5.0) | 21 (1.8) | **<0.001** |
| **Initial rhythm** |
|  Pulseless electrical activity | 666 (46.8) | 413 (49.6) | 253 (42.9) | **<0.001** |
|  Asystole  | 321 (22.6) | 186 (22.3) | 135 (22.9) | **<0.001** |
|  Ventricular tachycardia, pulseless  | 82 (5.8) | 40 (4.8) | 42 (7.1) | **<0.001** |
|  Ventricular fibrillation | 167 (11.7) | 82 (9.8) | 85 (14.4) | **<0.001** |
|  Bradycardia, never pulseless or becomes pulseless*d* | 1116 (84.7) | 523 (83.0) | 593 (86.2) | 0.27 |
|  Unknown | 187 (13.1) | 112 (13.4) | 75 (12.7) | **<0.001** |
| **Pharmacologic and Circulatory Support Interventions** |
|  Epinephrine  | 1926 (82.8) | 1124 (95.6) | 802 (69.7) | **<0.001** |
|  Epinephrine doses, median (IQR) | 3 (1,6) | 4 (2,8) | 2 (1,3) | **<0.001** |
|  Sodium bicarbonate  | 1197 (51.4) | 910 (77.4) | 287 (24.9) | **<0.001** |
|  Amiodarone  | 135 (5.8) | 88 (7.5) | 47 (4.1) | **<0.001** |
|  Lidocaine  | 162 (7.0) | 104 (8.8) | 58 (5.0) | **<0.001** |
|  Magnesium sulfate  | 118 (5.1) | 90 (7.7) | 28 (2.4) | **<0.001** |
|  Defibrillation  | 353 (72.2) | 211 (73.5) | 142 (70.3) | 0.22 |
|  Number of shocks, median (IQR) | 2 (1,3) | 2 (1,4) | 1 (1,3) | **<0.001** |
|  E-CPR deployment | 506 (22.0) | 370 (31.9) | 136 (11.9) | **<0.001** |
| **CPR duration,** mins, median (IQR) | 11 (3,35) | 25 (8,49) | 5 (2,15) | **<0.001** |
| **Pediatric Cerebral Performance Category (PCPC) Score** |  |  |  |  |
|  Admission PCPC, mean (SD) | 1.54 (0.99) | 1.55 (1.00) | 1.53 (0.98) | 0.78 |
|  Discharge PCPC, mean (SD) | 1.48 (0.85) | 1.59 (0.98) | 1.42 (0.74) | 0.06 |
| **Unadjusted Outcomes** |  |  |  |  |
|  ROSC | 1991 (85.6) | 918 (78.1) | 1073 (93.2) | **<0.001** |
|  Survival to 24 hours post-ROSC | 1882 (80.9) | 842 (71.6) | 1040 (90.4) | **<0.001** |
|  Survival to hospital discharge | 1272 (56.8) | 507 (44.6) | 765 (69.2) | **<0.001** |
|  Survival with favorable neurologic outcome (PCPC) | 707 (41.7) | 270 (29.6) | 437 (55.9) | **<0.001** |
|  Hospital length of stay, days, median (IQR)*e* | 28 (12,60) | 26 (11,55) | 32 (13,66) | **<0.001** |

Data presented as number (percentage) for categorical variables and median (interquartile range) or mean (standard deviation) for continuous variables

p-value for categorical variables calculated using Pearson Chi-Square analysis, p-value for continuous variables calculated using Wilcoxon rank sum test

PMT – pre-patient management tool; PEA – pulseless electrical activity; E-CPR – extracorporeal cardiopulmonary resuscitation; CPR – cardiopulmonary resuscitation; PCPC – Pediatric Cerebral Performance Category

*a*Newborn <1 day old; Neonate/Infant 1 day to < 1 year old; Pediatric 1 year to < 18 years old

*b*For event location, Emergency Department arrests only included if documented not to be an out-of-hospital cardiac arrest

*c*Pre-PMT – pre-patient management tool

*d*Total cohort of 1243 patients in MC group and 1318 patients in SC group who received cardiopulmonary resuscitation with initial pulse (other rhythm etiologies include: accelerated idioventricular rhythm, pacemaker rhythm, supraventricular tachycardia, sinus rhythm, ventricular tachycardia with pulse, unknown)

*e*Hospital length of stay data truncated at 365 days

**Supplemental Digital Content 10: Prearrest/Arrest Characteristics and Unadjusted Outcomes, All Cardiac Patients**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Total**  | **Calcium, n(%)** | **No Calcium, n(%)** | **p-value** |
|  | 4556 | 1986 (43.6) | 2570 (56.4) |  |
| **Demographics** |
| **Illness Category**  |  |  |  | **<0.001** |
|  Medical Cardiac | 2229 (48.9) | 810 (36.3) | 1419 (63.7) |  |
|  Surgical Cardiac | 2327 ((51.1) | 1176 (50.5) | 1151 (49.5) |  |
| **Age** |  |  |  |  |
|  0-28 days | 1403 (30.8) | 590 (29.7) | 813 (31.6) | 0.16 |
|  29 days - < 12 months | 1687 (37.0) | 696 (35.0) | 991 (38.6) | **0.02** |
|  12 months - < 8 years | 900 (19.8) | 449 (22.6) | 451 (17.5) | **<0.001** |
|  8 years - < 18 years  | 566 (12.4) | 251 (12.6) | 315 (12.3) | 0.70 |
| **Sex** |  |  |  | 0.55 |
|  Male  | 2448 (53.7) | 1078 (54.3) | 1370 (53.3) |  |
|  Female | 2107 (46.2) | 908 (45.7) | 1199 (46.7) |  |
|  Unknown  | 1 (0.1) | 0 (0.0) | 1 (0.01) |  |
| **Race/Ethnicity** | **0.02** |
|  Non-Hispanic white | 2092 (45.9) | 949 (47.8) | 1143 (44.5) |  |
|  Non-Hispanic black | 838 (18.4) | 338 (17.0) | 500 (19.5) |  |
|  Hispanic white | 474 (10.4) | 201 (10.1) | 273 (10.6) |  |
|  Hispanic black | 20 (0.4) | 9 (0.5) | 11 (0.4) |  |
|  Hispanic other | 349 (7.7) | 141 (7.1) | 208 (8.1) |  |
|  Asian/Indian subcontinent/Pacific Islander | 153 (3.4) | 73 (3.7) | 80 (3.1) |  |
|  Native American/Eskimo/Aleut | 30 (0.7) | 11 (0.6) | 19 (0.7) |  |
|  Other, including middle eastern, mixed, biracial | 56 (1.2) | 35 (1.8) | 21 (0.8) |  |
|  Unknown  | 544 (11.9) | 229 (11.5) | 315 (12.3) |  |
| **Event Location*a*** | **<0.001** |
|  All Intensive Care Units | 3582 (78.6) | 1644 (82.8) | 1938 (75.4) |  |
|  Procedural Areas | 447 (9.8) | 161 (8.1) | 286 (11.1) |  |
|  Other | 526 (11.5) | 181 (9.1) | 345 (13.4) |  |
| **Peri-Arrest and Arrest Characteristics** |
| **Congenital malformation/abnormality** | 573 (16.5) | 225 (15.1) | 348 (17.4) | 0.07 |
| **Pre-existing conditions** |
|  Renal insufficiency | 361 (8.2) | 184 (9.3) | 177 (7.2) | **0.01** |
|  Respiratory insufficiency | 2500 (56.4) | 1131 (57.0) | 1369 (56.0) | 0.50 |
|  Metabolic/electrolyte derangement | 631 (14.2) | 325 (16.4) | 306 (12.5) | **<0.001** |
|  Hypotension | 1381 (31.2) | 732 (36.9) | 649 (26.5) | **<0.001** |
|  Congestive heart failure (prior admission) | 728 (16.4) | 361 (18.2) | 367 (15.0) | **0.004** |
|  Hepatic insufficiency  | 111 (2.5) | 50 (2.5) | 61 (2.5) | 0.96 |
|  Cyanotic congenital heart disease | 1756 (50.4) | 830 (55.8) | 926 (46.4) | **<0.001** |
|  Acyanotic congenital heart disease  | 1052 (30.2) | 428 (28.8) | 624 (31.3) | 0.11 |
| **Interventions in Place Prior to Arrest** |
|  Arterial line  | 1725 (37.9) | 880 (44.3) | 845 (32.9) | **<0.001** |
|  Mechanical ventilation  | 2260 (49.6) | 1092 (55.0) | 1168 (45.4) | **<0.001** |
|  Vasoactive infusions  | 1869 (41.0) | 1001 (50.4) | 868 (33.8) | **<0.001** |
|  Dialysis  | 103 (2.3) | 67 (3.4) | 36 (1.4) | **<0.001** |
| **Initial rhythm:**  |
|  Pulseless electrical activity | 1161 (42.6) | 664 (45.4) | 497 (39.4) | **0.03** |
|  Asystole  | 674 (24.7) | 335 (22.9) | 339 (26.9) | **0.03** |
|  Ventricular tachycardia | 186 (6.8) | 96 (6.6) | 90 (7.1) | **0.03** |
|  Ventricular fibrillation | 306 (11.2) | 159 (10.9) | 147 (11.7) | **0.03** |
|  Bradycardia, never pulseless or becomes pulseless*b* | 2194 (85.7) | 869 (82.5) | 1325 (87.9) | **0.006** |
|  Unknown | 397 (14.6) | 210 (14.3) | 187 (14.8) | **0.03** |
| **Pharmacologic and Circulatory Support Interventions** |
|  Epinephrine  | 3583 (78.6) | 1886 (95.0) | 1697 (66.0) | **<0.001** |
|  Epinephrine doses, median (IQR) | 3 (1,6) | 4 (2,8) | 2 (1,3) | **<0.001** |
|  Sodium bicarbonate  | 2205 (48.4) | 1589 (80.0) | 616 (24.0) | **<0.001** |
|  Amiodarone  | 269 (5.9) | 173 (8.7) | 96 (3.7) | **<0.001** |
|  Lidocaine  | 327 (7.2) | 219 (11.0) | 108 (4.2) | **<0.001** |
|  Magnesium sulfate  | 221 (4.9) | 166 (8.4) | 55 (2.1) | **<0.001** |
|  Defibrillation  | 654 (71.6) | 393 (75.1) | 261 (66.8) | **0.003** |
|  Number of shocks, median (IQR) | 2 (1,3) | 2 (1,4) | 1 (1,3) | **<0.001** |
|  E-CPR deployment  | 699 (15.4) | 495 (25.2) | 204 (8.0) | **<0.001** |
| **CPR duration,** mins,median (IQR) | 11.5 (3,34) | 27 (10,50) | 5 (2,16) | **<0.001** |
| **Pediatric Cerebral Performance Category (PCPC) Score** |
|  Admission PCPC, mean (SD) | 1.75 (1.15) | 1.72 (1.13) | 1.77 (1.16) | 0.27 |
|  Discharge PCPC, mean (SD) | 1.59 (0.96) | 1.64 (1.03) | 1.57 (0.93) | 0.16 |
| **Unadjusted Outcomes** |
|  ROSC | 3705 (81.3) | 1448 (72.9) | 2257 (87.8) | **<0.001** |
|  Survival to 24 hours post-ROSC | 3386 (74.3) | 1279 (64.4) | 2107 (82.0) | **<0.001** |
|  Survival to hospital discharge | 2236 (50.9) | 741 (38.4) | 1495 (60.7) | **<0.001** |
|  Survival with favorable neurologic outcome (PCPC) | 1293 (37.1) | 419 (25.7) | 874 (47.1) | **<0.001** |
|  Hospital length of stay, days, median (IQR)*c* | 23 (7,54) | 20 (6,47) | 25 (8,60) | **<0.001** |

Data presented as number (percentage) for categorical variables and median (interquartile range) or mean (standard deviation) for continuous variables

p-value for categorical variables calculated using Pearson Chi-Square analysis, p-value for continuous variables calculated using Wilcoxon rank sum test

E-CPR – extracorporeal cardiopulmonary resuscitation; CPR – cardiopulmonary resuscitation; PCPC – Pediatric Cerebral Performance Category; ROSC – return of spontaneous circulation

*a*Event location grouped into 3 categories: all intensive care units (ICU) (adult ICU, neonatal ICU, pediatric ICU, pediatric cardiac ICU, all ICUs) procedural areas (cardiac catheterization laboratory, diagnostic/interventional area, operating room, diagnostic/interventional area including catheterization laboratory/pre-patient management tool), and other (ambulatory/outpatient clinic, adult coronary care unit, labor/delivery, emergency department, inpatient ward, newborn nursery, post-anesthesia care unit, same-day surgical area, telemetry/step-down unit, other, general inpatient including telemetry/pre-patient management tool)

*b*Total cohort of 2561 patients who received cardiopulmonary resuscitation with initial pulse (other rhythm etiologies include: accelerated idioventricular rhythm, pacemaker rhythm, supraventricular tachycardia, sinus rhythm, ventricular tachycardia with pulse, unknown)

*c*Hospital length of stay data truncated at 365 days

**Supplemental Digital Content 11: Prearrest and Arrest Characteristics in Medical and Surgical Cardiac Cohorts Less Than 1 Year of Age, Calcium vs No Calcium**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Total**  | **Calcium**  | **No Calcium** | **p-value** |
| **Medical Cardiac**  | 1395 | 422 (30.3) | 973 (69.7) |  |
| **Demographics** |
| **Age** |  |  |  |  |
| 0-28 days | 654 (46.9) | 184 (43.6) | 470 (48.3) | 0.11 |
| 29 days - < 12 months | 741 (53.1) | 238 (56.4) | 503 (51.7) | 0.11 |
| **Age Group***a* | **<0.001** |
| Newborn | 479 (34.3) | 114 (27.0) | 365 (37.5) |  |
| Neonate/Infant | 915 (65.6) | 307 (72.7) | 608 (62.5) |  |
| Pediatric  | 1 (0.1) | 1 (0.1) | 0 (0.0) |  |
| **Sex** | 0.72 |
|  Male  | 747 (53.5) | 229 (54.3) | 518 (53.2) |  |
|  Female | 648 (46.5) | 193 (45.7) | 455 (46.8) |  |
| **Race/Ethnicity** | 0.08 |
|  Non-Hispanic white | 557 (39.9) | 181 (42.9) | 376 (38.6) |  |
|  Non-Hispanic black | 289 (20.7) | 83 (19.7) | 206 (21.2) |  |
|  Hispanic white | 156 (11.2) | 45 (10.7) | 111 (11.4) |  |
|  Hispanic black | 7 (0.5) | 2 (0.5) | 5 (0.5) |  |
|  Hispanic other | 121 (8.7) | 31 (7.3) | 90 (9.2) |  |
|  Asian/Indian subcontinent/Pacific Islander | 37 (2.7) | 10 (2.4) | 27 (2.8) |  |
|  Native American/Eskimo/Aleut | 7 (0.5) | 1 (0.2) | 6 (0.6) |  |
|  Other, including middle eastern, mixed, biracial | 19 (1.4) | 12 (2.8) | 7 (0.7) |  |
|  Unknown  | 202 (14.5) | 57 (13.5) | 145 (14.9) |  |
| **Event Location***b* | **<0.001** |
|  Ambulatory/outpatient clinic  | 5 (0.4) | 2 (0.5) | 3 (0.3) |  |
|  Cardiac catheterization laboratory  | 51 (3.7) | 15 (3.6) | 36 (3.7) |  |
|  Operating room | 32 (2.3) | 2 (0.5) | 30 (3.1) |  |
|  Inpatient ward | 40 (2.9) | 13 (3.1) | 27 (2.8) |  |
|  Emergency department | 29 (2.1) | 8 (1.9) | 21 (2.2) |  |
|  Neonatal intensive care unit | 345 (24.7) | 56 (13.3) | 289 (29.7) |  |
|  Cardiac intensive care unit | 235 (16.9) | 93 (22.0 | 142 (14.6) |  |
|  Pediatric intensive care unit | 337 (24.2) | 128 (30.3) | 209 (21.5) |  |
|  Telemetry/Step-down unit  | 26 (1.9) | 9 (2.1) | 17 (1.7) |  |
|  Labor and delivery  | 84 (6.0) | 0 (0.0) | 84 (8.6) |  |
|  Newborn nursery  | 4 (0.3) | 0 (0.0) | 4 (0.4) |  |
|  Post anesthesia care unit  | 6 (0.4) | 1 (0.2) | 5 (0.5) |  |
|  Same-day surgical area | 2 (0.1) | 1 (0.2) | 1 (0.1) |  |
|  Diagnostic/Interventional area  | 11 (0.8) | 3 (0.7) | 8 (0.8) |  |
|  Diagnostic/Interventional area including cath lab/pre-PMT*c* | 3 (0.2) | 2 (0.5) | 1 (0.1) |  |
|  All intensive care units | 155 (11.1) | 78 (18.5) | 77 (7.9) |  |
| **Hospital Characteristics:**  |  |  |  |  |
|  **Number of Pediatric Intensive Care Unit Beds** **<0.001**  |
|  0 beds  | 152 (11.8) | 20 (5.1) | 132 (14.8) |  |
|  1-5 beds | 35 (2.7) | 5 (1.3) | 30 (3.4) |  |
|  6-10 beds | 34 (2.7) | 7 (1.8) | 27 (3.0) |  |
|  11-20 beds | 284 (22.1) | 82 (21.0) | 202 (22.6) |  |
|  21-30 beds | 250 (19.5) | 95 (24.4) | 155 (17.4) |  |
|  31-40 beds | 296 (23.1) | 85 (21.8) | 211 (23.6) |  |
|  > 40 beds  | 232 (18.1) | 96 (24.6) | 136 (15.2) |  |
|  **Number of Pediatric beds** **<0.001**  |
|  0 beds | 124 (9.7) | 17 (4.4) | 107 (12.0) |  |
|  1-10 beds | 17 (1.3) | 3 (0.8) | 14 (1.6) |  |
|  11-25 beds | 66 (5.1) | 9 (2.3) | 57 (6.4) |  |
|  26-50 beds  | 137 (10.7) | 38 (9.7) | 99 (11.1) |  |
|  51-100 beds | 318 (24.8) | 111 (28.5) | 207 (23.2) |  |
|  101-150 beds | 207 (16.1) | 65 (16.7) | 142 (15.9) |  |
|  151-200 beds | 49 (3.8) | 25 (6.4) | 24 (2.7) |  |
|  201-250 beds | 152 (11.8) | 41 (10.5) | 111 (12.4) |  |
|  > 250 beds  | 213 (16.6) | 81 (20.8) | 132 (14.8) |  |
|  **Teaching Status**  **0.049**  |
|  No status  | 16 (1.2) | 1 (0.3) | 15 (1.6) |  |
|  Major teaching hospital | 923 (69.9) | 290 (73.0) | 633 (68.6) |  |
|  Minor teaching hospital | 381 (28.9) | 106 (26.7) | 275 (29.8) |  |
| **Peri-Arrest and Arrest Characteristics** |
| **Congenital malformation/abnormality** | 218 (20.8) | 69 (22.1) | 149 (20.3) | 0.50 |
| **Pre-existing conditions** |
|  Renal insufficiency | 92 (7.2) | 29 (6.9) | 63 (7.3) | 0.77 |
|  Respiratory insufficiency | 791 (61.8) | 258 (61.3) | 533 (62.0) | 0.79 |
|  Metabolic/electrolyte derangement | 178 (13.9) | 75 (17.8) | 103 (12.0) | **0.005** |
|  Hypotension | 330 (25.8) | 143 (34.0) | 187 (21.8) | **<0.001** |
|  Sepsis | 3 (2.6) | 1 (3.1) | 2 (2.4) | 1.00 |
|  Pneumonia | 52 (4.1) | 20 (4.8) | 32 (3.7) | 0.38 |
|  Congestive heart failure (this admission) | 192 (15.0) | 86 (20.4) | 106 (12.3) | **<0.001** |
|  Congestive heart failure (prior admission) | 168 (13.1) | 73 (17.3) | 95 (11.1) |  **0.002** |
|  Metastatic/hematologic malignancy | 9 (0.7) | 7 (1.7) | 2 (0.2) | **0.004** |
|  Hepatic insufficiency  | 23 (1.8) | 10 (2.4) | 13 (1.5) | 0.28 |
|  Major trauma | 4 (0.3) | 0 (0.0) | 4 (0.5) | 0.31 |
|  Cyanotic congenital heart disease | 431 (41.2) | 144 (46.2) | 287 (39.0) | 0.03 |
|  Acyanotic congenital heart disease  | 302 (28.8) | 97 (31.1) | 205 (27.9) | 0.30 |
| **Interventions in Place Prior to Arrest** |
|  Arterial line  | 302 (21.6) | 125 (29.6) | 177 (18.2) | **<0.001** |
|  Mechanical ventilation  | 572 (41.0) | 199 (47.2) | 373 (38.3) | **0.002** |
|  Vasoactive infusions  | 373 (26.7) | 163 (38.6) | 210 (21.6) | **<0.001** |
|  Dialysis  | 12 (0.9) | 4 (0.9) | 8 (0.8) | 0.82 |
| **Initial rhythm:** |
|  Pulseless electrical activity | 252 (38.4) | 121 (39.9) | 131 (37.1) | **0.02** |
|  Asystole  | 201 (30.6) | 82 (27.1) | 119 (33.7) | **0.02** |
|  Ventricular tachycardia, pulseless  | 31 (4.7) | 19 (6.3) | 12 (3.4) | **0.02** |
|  Ventricular fibrillation | 50 (7.6) | 31 (10.2) | 19 (5.4) | **0.02** |
|  Bradycardia, never pulseless or becomes pulseless*d* | 789 (90.2) | 220 (85.9) | 569 (91.9) | **0.03** |
|  Unknown | 122 (18.6) | 50 (16.5) | 72 (20.4) | **0.02** |
| **Pharmacologic and Circulatory Support Interventions** |
|  Epinephrine  | 978 (70.1) | 397 (94.1) | 581 (59.7) | **<0.001** |
|  Epinephrine doses, median (IQR) | 3 (1,5) | 4 (1,4) | 2 (1,3) | **<0.001** |
|  Sodium bicarbonate  | 538 (38.6) | 349 (82.7) | 189 (19.4) | **<0.001** |
|  Amiodarone  | 39 (2.8) | 26 (6.2) | 13 (1.3) | **<0.001** |
|  Lidocaine  | 52 (3.7) | 39 (9.2) | 13 (1.3) | **<0.001** |
|  Magnesium sulfate  | 33 (2.4) | 26 (6.2) | 7 (0.7) | **<0.001** |
|  Defibrillation  | 92 (54.4) | 63 (67.7) | 29 (38.2) | **<0.001** |
|  Number of shocks, median (IQR) | 2 (1,4) | 2 (1,4) | 2 (1,3) | 0.06 |
|  E-CPR deployment | 94 (6.8) | 59 (62.8) | 35 (37.2) | **<0.001** |
| **CPR duration,** mins,median (IQR) | 10 (3,27) | 27 (12,50) | 5 (2,15) | **<0.001** |
| **Pediatric Cerebral Performance Category (PCPC)** |
|  Admission PCPC, mean (SD) | 1.95 (1.27) | 1.89 (1.20) | 1.99 (1.30) | 0.50 |
|  Discharge PCPC, mean (SD) | 1.69 (1.03) | 1.76 (1.01) | 1.67 (1.03) | 0.31 |
| **Unadjusted Outcomes** |
|  ROSC | 1103 (79.1) | 284 (67.3) | 819 (84.2) | **<0.001** |
|  Survival to 24 hours post-ROSC | 982 (70.4) | 237 (56.2) | 745 (76.6) | **<0.001** |
|  Survival to hospital discharge | 639 (47.6) | 127 (30.8) | 512 (55.1) | **<0.001** |
|  Survival with favorable neurologic outcome (PCPC) | 368 (34.2) | 79 (21.4) | 289 (40.8) | **<0.001** |
|  Hospital length of stay, days, median (IQR)*e* | 21 (4,59) | 16 (2,45) | 24 (5,65) | **<0.001** |
|  |
| **Surgical Cardiac** | 1695 | 864 (51.0) | 831 (49.0) |  |
| **Demographics** |
| **Age** |  |  |  |  |
| 0-28 days | 749 (44.2) | 406 (47.0) | 343 (41.3) | **0.02** |
| 29 days - < 12 months | 946 (55.8) | 458 (53.0) | 488 (58.7) | **0.02** |
| **Age Group***a* | 0.14 |
| Newborn | 376 (22.2) | 179 (20.7) | 197 (23.7) |  |
| Neonate/Infant | 1319 (77.8) | 685 (79.3) | 634 (76.3) |  |
| **Sex** | 0.53 |
|  Male  | 920 (54.3) | 474 (54.9) | 446 (53.7) |  |
|  Female | 774 (45.7) | 390 (45.1) | 384 (46.2) |  |
|  Unknown  | 1 (0.1) | 0 (0.0) | 1 (0.1) |  |
| **Race/Ethnicity** | 0.29 |
|  Non-Hispanic white | 826 (48.7) | 418 (48.4) | 408 (49.1) |  |
|  Non-Hispanic black | 266 (15.7) | 127 (14.7) | 139 (16.7) |  |
|  Hispanic white | 162 (9.6) | 86 (10.0) | 76 (9.1) |  |
|  Hispanic black | 9 (0.5) | 5 (0.6) | 4 (0.5) |  |
|  Hispanic other | 128 (7.6) | 64 (7.4) | 64 (7.7) |  |
|  Asian/Indian subcontinent/Pacific Islander | 55 (3.2) | 30 (3.5) | 25 (3.0) |  |
|  Native American/Eskimo/Aleut | 12 (0.7) | 3 (0.3) | 9 (1.1) |  |
|  Other, including middle eastern, mixed, biracial | 19 (1.1) | 14 (1.6) | 5 (0.6) |  |
|  Unknown  | 218 (12.9) | 117 (13.5) | 101 (12.2) |  |
| **Event Location***b* | **<0.001** |
|  Ambulatory/outpatient clinics  | 3 (0.2) | 1 (0.1) | 2 (0.2) |  |
|  Cardiac catheterization laboratory  | 77 (4.5) | 39 (4.5) | 38 (4.6) |  |
|  Operating room | 67 (4.0) | 29 (3.4) | 38 (4.6) |  |
|  Inpatient ward | 38 (2.2) | 18 (2.1) | 20 (2.4) |  |
|  Emergency department | 2 (0.1) | 2 (0.2) | 0 (0.0) |  |
|  Neonatal intensive care unit  | 88 (5.2) | 23 (2.7) | 65 (7.8) |  |
|  Cardiac intensive care unit | 510 (30.1) | 251 (29.1) | 259 (31.2) |  |
|  Pediatric intensive care unit | 561 (33.1) | 306 (35.4) | 255 (30.7) |  |
|  Telemetry/Step-down unit  | 49 (2.9) | 21 (2.4) | 28 (3.4) |  |
|  Labor and delivery  | 1 (0.1) | 0 (0.0) | 1 (0.1) |  |
|  Newborn nursery  | -- | -- | -- |  |
|  Post anesthesia care unit  | 5 (0.3) | 4 (0.5) | 1 (0.1) |  |
|  Same-day surgical area | -- | -- | -- |  |
|  Diagnostic/Interventional area  | 5 (0.3) | 4 (0.5) | 1 (0.1) |  |
|  Diagnostic/Interventional area including cath lab/pre-PMT*c* | 2 (0.1) | 2 (0.2) | 0 (0.0) |  |
|  All intensive care units | 244 (14.4) | 148 (17.1) | 96 (11.6) |  |
| **Hospital Characteristics:**  |
|  **Number of Pediatric Intensive Care Unit Beds** 0.12  |
|  0 beds | 45 (2.8) | 18 (2.2) | 27 (3.5) |  |
|  1-5 beds | 3 (0.2) | 1 (0.1) | 2 (0.3) |  |
|  6-10 beds | 22 (1.4) | 16 (2.0) | 6 (0.8) |  |
|  11-20 beds | 212 (13.3) | 103 (12.7) | 109 (14.0) |  |
|  21-30 beds | 382 (23.9) | 201 (24.7) | 181 (23.2) |  |
|  31-40 beds | 324 (20.3) | 177 (21.7) | 147 (18.8) |  |
|  > 40 beds  | 607 (38.1) | 298 (36.6) | 309 (39.6) |  |
|  **Number of Pediatric beds** 0.50  |
|  0 beds | 45 (2.8) | 19 (2.3) | 26 (3.3) |  |
|  1-10 beds | 2 (0.1) | 0 (0.0) | 2 (0.3) |  |
|  11-25 beds | 5 (0.3) | 2 (0.2) | 3 (0.4) |  |
|  26-50 beds  | 65 (4.1) | 34 (4.2) | 31 (4.0) |  |
|  51-100 beds | 392 (24.6) | 203 (24.9) | 189 (24.2) |  |
|  101-150 beds | 535 (33.5) | 286 (35.1) | 249 (31.9) |  |
|  151-200 beds | 90 (5.6) | 43 (5.3) | 47 (6.0) |  |
|  201-250 beds | 108 (6.8) | 48 (5.9) | 60 (7.7) |  |
|  > 250 beds  | 353 (22.1) | 179 (22.0) | 174 (22.3) |  |
|  **Teaching Status** 0.27  |
|  No status  | 2 (0.1) | 0 (0.0) | 2 (0.2) |  |
|  Major teaching hospital | 1279 (77.9) | 661 (78.7) | 618 (77.1) |  |
|  Minor teaching hospital | 361 (22.0) | 179 (21.3) | 182 (22.7) |  |
| **Peri-Arrest and Arrest Characteristics**  |
| **Congenital malformation/abnormality** | 231 (17.3) | 99 (15.0) | 132 (19.4) | **0.03** |
| **Pre-existing conditions** |
|  Renal insufficiency | 127 (7.5) | 79 (9.2) | 48 (5.8) | **0.01** |
|  Respiratory insufficiency | 979 (58.1) | 503 (58.3) | 476 (57.9) | 0.88 |
|  Metabolic/electrolyte derangement | 249 (14.8) | 147 (17.0) | 102 (12.4) | **0.007** |
|  Hypotension | 582 (34.5) | 346 (40.1) | 236 (28.7) | **<0.001** |
|  Sepsis | 1 (0.8) | 0 (0.0) | 1 (1.7) | 1.00 |
|  Pneumonia | 22 (1.3) | 15 (1.7) | 7 (0.9) | 0.11 |
|  Congestive heart failure (this admission) | 350 (20.8) | 189 (21.9) | 161 (19.6) | 0.24 |
|  Congestive heart failure (prior admission) | 221 (13.1) | 108 (12.5) | 113 (13.7) | 0.45 |
|  Metastatic/hematologic malignancy | 4 (0.2) | 2 (0.2) | 2 (0.2) | 1.00 |
|  Hepatic insufficiency  | 39 (2.3) | 17 (2.0) | 22 (2.7) | 0.34 |
|  Major trauma | 0 (0) | -- | -- | -- |
|  Cyanotic congenital heart disease | 879 (65.7) | 464 (70.4) | 415 (61.1) | **<0.001** |
|  Acyanotic congenital heart disease  | 448 (33.5) | 195 (29.6) | 253 (37.3) | **0.003** |
| **Interventions in Place Prior to Arrest** |
|  Arterial line  | 889 (52.4) | 483 (55.9) | 406 (48.9) | **0.004** |
|  Mechanical ventilation  | 1007 (59.4) | 551 (63.8) | 456 (54.9) | **<0.001** |
|  Vasoactive infusions  | 867 (51.2) | 493 (57.1) | 374 (45.0) | **<0.001** |
|  Dialysis  | 56 (3.3) | 44 (5.1) | 12 (1.4) | **<0.001** |
| **Initial rhythm:** |
|  Pulseless electrical activity | 498 (50.5) | 316 (52.4) | 182 (47.5) | 0.17 |
|  Asystole  | 216 (21.9) | 126 (20.9) | 90 (23.5) | 0.17 |
|  Ventricular tachycardia, pulseless  | 37 (3.8) | 26 (4.3) | 11 (2.9) | 0.17 |
|  Ventricular fibrillation | 87 (8.8) | 45 (7.5) | 42 (11.0) | 0.17 |
|  Bradycardia, never pulseless or becomes pulseless*d* | 892 (87.1) | 412 (84.4) | 480 (89.6) | **0.03** |
|  Unknown | 148 (15.0) | 90 (14.9) | 58 (15.1) | 0.17 |
| **Pharmacologic and Circulatory Support Interventions** |
|  Epinephrine  | 1393 (82.2) | 830 (96.1) | 563 (67.7) | **<0.001** |
|  Epinephrine doses, median (IQR) | 3 (1,6) | 4 (2,8) | 2 (1,3) | **<0.001** |
|  Sodium bicarbonate  | 873 (51.5) | 676 (78.2) | 197 (23.7) | **<0.001** |
|  Amiodarone  | 79 (4.7) | 54 (6.3) | 25 (3.0) | **0.002** |
|  Lidocaine use | 70 (4.1) | 52 (6.0) | 18 (2.2) | **<0.001** |
|  Magnesium sulfate  | 65 (3.8) | 54 (6.3) | 11 (1.3) | **<0.001** |
|  Defibrillation  | 182 (67.9) | 125 (72.3) | 57 (60.0) | **0.03** |
|  Number of shocks, median (IQR) | 2 (1,3) | 2 (1,3) | 2 (1,3) | **0.048** |
|  E-CPR deployment  | 342 (20.4) | 258 (75.4) | 84 (24.6) | **<0.001** |
| **CPR duration,** mins,median (IQR) | 11 (3,34) | 25 (9,47) | 4 (2,14) | **<0.001** |
| **Pediatric Cerebral Performance Category (PCPC)** |
|  Admission PCPC, mean (SD) | 1.54 (1.03) | 1.56 (1.05) | 1.52 (1.00) | 0.76 |
|  Discharge PCPC, mean (SD) | 1.43 (0.79) | 1.52 (0.94) | 1.37 (0.69) | 0.30 |
| **Unadjusted Outcomes**  |
|  ROSC | 1440 (85.0) | 667 (77.2) | 773 (93.0) | **<0.001** |
|  Survival to 24 hours post-ROSC | 1359 (80.2) | 607 (70.3) | 752 (90.5) | **<0.001** |
|  Survival to hospital discharge | 907 (55.9) | 365 (43.9) | 542 (68.5) | **<0.001** |
|  Survival with favorable neurologic outcome (PCPC) | 500 (40.9) | 186 (28.2) | 314 (55.7) | **<0.001** |
|  Hospital length of stay, days, median (IQR)*e* | 31 (14,65) | 28 (13,57) | 36 (15,80) | **<0.001** |

Data presented as number (percentage) for categorical variables and median (interquartile range) or mean (standard deviation) for continuous variables

p-value for categorical variables calculated using Pearson Chi-Square analysis, p-value for continuous variables calculated using Wilcoxon rank sum test

PMT – pre-patient management tool; PEA – pulseless electrical activity; E-CPR – extracorporeal cardiopulmonary resuscitation; CPR – cardiopulmonary resuscitation; PCPC – Pediatric Cerebral Performance Category

*a*Newborn <1 day old; Neonate/Infant 1 day to < 1 year old; Pediatric 1 year to < 18 years old

*b*For event location, Emergency Department arrests only included if documented not to be an out-of-hospital cardiac arrest

*c*Pre-PMT – pre-patient management tool

*d*Total cohort of 875 patients in MC group and 1024 patients in SC group who received cardiopulmonary resuscitation with initial pulse (other rhythm etiologies include: accelerated idioventricular rhythm, pacemaker rhythm, supraventricular tachycardia, sinus rhythm, ventricular tachycardia with pulse, unknown)

*e*Hospital length of stay data truncated at 365 days

**Supplemental Digital Content Legend:**

**Supplemental Digital Content 1:** Pre-Matching and Post-Matching Comparison of Baseline Variables, All Cardiac Patients

Data presented as n(%)

SMD: absolute standardized mean difference; SMD values < 0.1 indicating good post-matching balance

ICU – intensive care unit; PEA – pulseless electrical activity; CPR – cardiopulmonary resuscitation

*a*Newborn <1 day old; Neonate/Infant 1 day to < 1 year old; Pediatric 1 year to < 18 years old

*b*Event locations categorized into three categories: ICUs (adult intensive care unit, neonatal intensive care unit, pediatric intensive care unit, all intensive care units, pediatric cardiac intensive care unit), procedural areas (cardiac catheterization laboratory, diagnostic/interventional area, operating room, diagnostic/interventional area including cath lab/pre-PMT), other (ambulatory/outpatient clinic, adult coronary care unit, labor/delivery, emergency department, inpatient ward, newborn nursery, post-anesthesia care unit, same-day surgical area, telemetry/step-down unit, other, general inpatient including telemetry/pre-PMT)

*c*CPR duration categorized based on quartiles of variable distribution

*d*E-CPR n-670 for “Calcium” group and n=675 for “No Calcium” group

**Supplemental Digital Content 2:** Pre-Matching and Post-Matching Comparison of Baseline Variables, Medical Cardiac Patients

Data presented as n(%)

SMD: absolute standardized mean difference; SMD values < 0.1 indicating good post-matching balance

ICU – intensive care unit; PEA – pulseless electrical activity; CPR – cardiopulmonary resuscitation

*a*Newborn <1 day old; Neonate/Infant 1 day to < 1 year old; Pediatric 1 year to < 18 years old

*b*Event locations categorized into three categories: ICUs (adult intensive care unit, neonatal intensive care unit, pediatric intensive care unit, all intensive care units, pediatric cardiac intensive care unit), procedural areas (cardiac catheterization laboratory, diagnostic/interventional area, operating room, diagnostic/interventional area including cath lab/pre-PMT), other (ambulatory/outpatient clinic, adult coronary care unit, labor/delivery, emergency department, inpatient ward, newborn nursery, post-anesthesia care unit, same-day surgical area, telemetry/step-down unit, other, general inpatient including telemetry/pre-PMT)

*c*CPR duration categorized based on quartiles of variable distribution

**Supplemental Digital Content 3:** Pre-Matching and Post-Matching Comparison of Baseline Variables, Surgical Cardiac Patients

Data presented as n(%)

SMD: absolute standardized mean difference; SMD values < 0.1 indicating good post-matching balance

ICU – intensive care unit; PEA – pulseless electrical activity; CPR – cardiopulmonary resuscitation

*a*Newborn <1 day old; Neonate/Infant 1 day to < 1 year old; Pediatric 1 year to < 18 years old

*b*Event locations categorized into three categories: ICUs (adult intensive care unit, neonatal intensive care unit, pediatric intensive care unit, all intensive care units, pediatric cardiac intensive care unit), procedural areas (cardiac catheterization laboratory, diagnostic/interventional area, operating room, diagnostic/interventional area including cath lab/pre-PMT), other (ambulatory/outpatient clinic, adult coronary care unit, labor/delivery, emergency department, inpatient ward, newborn nursery, post-anesthesia care unit, same-day surgical area, telemetry/step-down unit, other, general inpatient including telemetry/pre-PMT)

*c*CPR duration categorized based on quartiles of variable distribution

**Supplemental Digital Content 4:** Comparison of Outcomes Using Multivariable Adjustment by the Propensity Scores, Unmatched Full Cohort and Sub-Group Analysis

Regression analysis and p-values calculated with multivariable adjustment for the propensity scores in the unmatched data of eligible patients (n=4,556)

ROSC – return of spontaneous circulation; PCPC – Pediatric Cerebral Performance Category; E-CPR – extracorporeal cardiopulmonary resuscitation

*a*For All Cardiac patients PCPC scores available for n=1623 in “Calcium” group and n=1845 in “No Calcium” group; For Medical Cardiac patients PCPC scores available for n=713 in “Calcium” group and n=1068 in “No Calcium” group; For Surgical Cardiac patients PCPC scores available for n=910 in “Calcium” group and n=777 in “No Calcium” group

*b*For All Cardiac patients E-CPR data available for n=1968 in “Calcium” group and n=2561 in “No Calcium” group; For Medical Cardiac patients E-CPR data available for n=807 in “Calcium” group and n=1417 in “No Calcium” group; For Surgical Cardiac patients-CPR data available for n=1161 in “Calcium” group and n=1144 in “No Calcium” group

*c*Hospital length of stay data truncated at 365 days

**Supplemental Digital Content 5:** Overlapping Histograms of Propensity Score Distribution

Distribution of propensity scores for full cohort, medical cardiac cohort, and surgical cardiac cohort in “Calcium” and “No Calcium” groups. Distribution of propensity scores for matching depicted by overlapping histograms; red is “Calcium” group and white is “No Calcium” group.

**Supplemental Digital Content 6:** Comparison of Matched Versus Unmatched Cohorts

Data represented as n(%) for categorical variables and median (IQR) for continuous variables

p-value for categorical variables calculated using Pearson Chi-square analysis, p-values for continuous variables calculated using Wilcoxon rank sum test

PEA – pulseless electrical activity, VT – ventricular tachycardia, VF – ventricular fibrillation, E-CPR – extracorporeal cardiopulmonary resuscitation, CPR – cardiopulmonary resuscitation

Denominators presented to denote missing data for categorical variables.

For epinephrine doses, n=1,124 for matched patients, n=2,178 for unmatched patients.

For CPR duration, n=1,356 for matched patients, n=3,024 for unmatched patients.

For length of stay, n=1,351 for matched patients, n=3,011 for unmatched patients. Length of stay truncated at 365 days.

*a*Newborn <1 day old; Neonate/Infant 1 day – < 1 year old; Pediatric 1 year - < 18 years old

*b*Event locations categorized into three categories: ICUs (adult intensive care unit, neonatal intensive care unit, pediatric intensive care unit, all intensive care units, pediatric cardiac intensive care unit), procedural areas (cardiac catheterization laboratory, diagnostic/interventional area, operating room, diagnostic/interventional area including cath lab/pre-PMT), other (ambulatory/outpatient clinic, adult coronary care unit, labor/delivery, emergency department, inpatient ward, newborn nursery, post-anesthesia care unit, same-day surgical area, telemetry/step-down unit, other, general inpatient including telemetry/pre-PMT)

**Supplemental Digital Content 7:** Prearrest and Arrest Characteristics, Medical and Surgical Cardiac Cohorts

Data presented as number (percentage) for categorical variables and median (interquartile range) or mean (standard deviation) for continuous variables

p-value for categorical variables calculated using Pearson Chi-Square analysis, p-value for continuous variables calculated using Wilcoxon rank sum test

PMT – pre-patient management tool; PEA – pulseless electrical activity; E-CPR – extracorporeal cardiopulmonary resuscitation; CPR – cardiopulmonary resuscitation; PCPC – Pediatric Cerebral Performance Category

*a*Newborn <1 day old; Neonate/Infant 1 day to < 1 year old; Pediatric 1 year to < 18 years old

*b*For event location, Emergency Department arrests only included if documented not to be an out-of-hospital cardiac arrest

*c*Pre-PMT – pre-patient management tool

*d*Total cohort of 2561 patients who received cardiopulmonary resuscitation with initial pulse (other rhythm etiologies include: accelerated idioventricular rhythm, pacemaker rhythm, supraventricular tachycardia, sinus rhythm, ventricular tachycardia with pulse, unknown)

*e*Hospital length of stay data truncated at 365 days

**Supplemental Digital Content 8:** Prearrest and Arrest Characteristics in Medical and Surgical Cardiac Subgroups, Calcium vs No Calcium

Data presented as number (percentage) for categorical variables and median (interquartile range) or mean (standard deviation) for continuous variables

p-value for categorical variables calculated using Pearson Chi-Square analysis, p-value for continuous variables calculated using Wilcoxon rank sum test

PMT – pre-patient management tool; PEA – pulseless electrical activity; E-CPR – extracorporeal cardiopulmonary resuscitation; CPR – cardiopulmonary resuscitation; PCPC – Pediatric Cerebral Performance Category

*a*Newborn <1 day old; Neonate/Infant 1 day to < 1 year old; Pediatric 1 year to < 18 years old

*b*For event location, Emergency Department arrests only included if documented not to be an out-of-hospital cardiac arrest

*c*Pre-PMT – pre-patient management tool

*d*Total cohort of 1243 patients in MC group and 1318 patients in SC group who received cardiopulmonary resuscitation with initial pulse (other rhythm etiologies include: accelerated idioventricular rhythm, pacemaker rhythm, supraventricular tachycardia, sinus rhythm, ventricular tachycardia with pulse, unknown)

*e*Hospital length of stay data truncated at 365 days

**Supplemental Digital Content 9:** Survival Trends over Time By Illness Category and Calcium Administration during Cardiopulmonary Resuscitation for In-Hospital Cardiac Arrest

p-value calculated using Cochran-Armitage test for trend

**Supplemental Digital Content 10:** Prearrest/Arrest Characteristics and Unadjusted Outcomes, All Cardiac Patients

Data presented as number (percentage) for categorical variables and median (interquartile range) or mean (standard deviation) for continuous variables

p-value for categorical variables calculated using Pearson Chi-Square analysis, p-value for continuous variables calculated using Wilcoxon rank sum test

E-CPR – extracorporeal cardiopulmonary resuscitation; CPR – cardiopulmonary resuscitation; PCPC – Pediatric Cerebral Performance Category; ROSC – return of spontaneous circulation

*a*Event location grouped into 3 categories: all intensive care units (ICU) (adult ICU, neonatal ICU, pediatric ICU, pediatric cardiac ICU, all ICUs) procedural areas (cardiac catheterization laboratory, diagnostic/interventional area, operating room, diagnostic/interventional area including catheterization laboratory/pre-patient management tool), and other (ambulatory/outpatient clinic, adult coronary care unit, labor/delivery, emergency department, inpatient ward, newborn nursery, post-anesthesia care unit, same-day surgical area, telemetry/step-down unit, other, general inpatient including telemetry/pre-patient management tool)

*b*Total cohort of 2561 patients who received cardiopulmonary resuscitation with initial pulse (other rhythm etiologies include: accelerated idioventricular rhythm, pacemaker rhythm, supraventricular tachycardia, sinus rhythm, ventricular tachycardia with pulse, unknown)

*c*Hospital length of stay data truncated at 365 days

**Supplemental Digital Content 11:** Prearrest and Arrest Characteristics in Medical and Surgical Cardiac Cohorts Less Than 1 Year of Age, Calcium vs No Calcium

Data presented as number (percentage) for categorical variables and median (interquartile range) or mean (standard deviation) for continuous variables

p-value for categorical variables calculated using Pearson Chi-Square analysis, p-value for continuous variables calculated using Wilcoxon rank sum test

PMT – pre-patient management tool; PEA – pulseless electrical activity; E-CPR – extracorporeal cardiopulmonary resuscitation; CPR – cardiopulmonary resuscitation; PCPC – Pediatric Cerebral Performance Category

*a*Newborn <1 day old; Neonate/Infant 1 day to < 1 year old; Pediatric 1 year to < 18 years old

*b*For event location, Emergency Department arrests only included if documented not to be an out-of-hospital cardiac arrest

*c*Pre-PMT – pre-patient management tool

*d*Total cohort of 875 patients in MC group and 1024 patients in SC group who received cardiopulmonary resuscitation with initial pulse (other rhythm etiologies include: accelerated idioventricular rhythm, pacemaker rhythm, supraventricular tachycardia, sinus rhythm, ventricular tachycardia with pulse, unknown)

*e*Hospital length of stay data truncated at 365 days