**Supplemental Digital Content**

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**eFigure 1. Flow Diagram of Screening and Inclusion for Analysis**

N=5,761

Adults with critical care admission order within 12 hours of ED arrival

n=5,244

n=5,412

n=5,425

Excluded 336 for acute care hospital transfer

Excluded 13 for against medical advice (5) and admission order entry errors (8).

Excluded 168 neurosurgery patients.

Excluded 373 stroke patients.

n=4,871

Separated 2,621 for initial critical care admission orders to alternative ICU services (Alternative ICU cohort analyzed as a falsification test)

n=2,250

**eTable 1. Details of Exclusions**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Non-ECCP Hours | ECCP Hours  |
|  | TOTAL  | Pre-Intervention period  | Intervention period  | Pre-Intervention period | Intervention period |
| Starting number  | 5,761 | 1,800 | 1,799 | 1,054 | 1,108 |
| Acute care transfer exclusion |  | -111 | -112 | -50 | -63 |
|  | 5,425 | 1,689 | 1,687 | 1,004 | 1,045 |
| AMA and admission order error exclusion |  | -4 | -4 | -2 | -3 |
|  | 5,412 | 1,685 | 1,683 | 1,002 | 1,042 |
| Neurosurgery patient exclusion |  | -55 | -47 | -34 | -32 |
|  | 5,244 | 1,630 | 1,636 | 968 | 1,010 |
| Stroke patient exclusion |  | -105 | -133 | -67 | -68 |
|  | 4,871 | 1,525 | 1,503 | 901 | 942 |
| Alternative ICU cohort exclusion  |  | -775 | -872 | -471 | -503 |
| Final counts | 2,250 | 750 | 631 | 430 | 439 |

Abbreviation: ECCP = Emergency Critical Care Program; AMA = against medical advice; ICU = intensive care unit

ECCP hours: From 2pm to midnight, Monday through Friday

Non-ECCP hours: All other hours

Pre-Intervention Period: 8/14/2015-8/13/2017

Intervention Period: 8/14/2017-8/13/2019

**eTable 2: Bounce-up Proportion for Emergency Department Downgrade < 6 h by eccSOFA Category**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Non-ECCP hours** | **ECCP hours** | Difference in Differences(DiD) | *P* value |
|  | Pre-Intervention Period | Intervention Period | Pre-Intervention Period | Intervention Period |
|  | n (%) | n (%) | n (%) | n (%) | DiD % [95% CI] |  |
| **eccSOFA 0-3** | 1 (3.1) | 4 (7.4) | 0 (0.0) | 1 (2.2) |  -2.1 [-12.2, 8.1] | 0.692 |
| **eccSOFA 4-7** | 2 (10.0) | 8 (24.2) | 0 (0.0) | 1 (3.1) | -11.1 [-31.7, 9.4] | 0.289 |
| **eccSOFA 8+** | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | N/A |  N/A |

Abbreviation: eccSOFA = emergency critical care Sequential Organ Failure Assessment; DiD = Difference in Differences.

Study period and abbreviation definitions are explained in footnote to eTable 1.

Bounce-up is defined as re-entry of admission order to ICU within 24 hours of ED downgrade to non-ICU status.

**eTable 3: Sensitivity Analysis Using 12pm-10pm and 1pm-11pm as Alternative Cutoff Times to Define ECCP Hours**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Cutoff time for ECCP hours | Overall eccSOFA adjusted In-hospital mortality DiD (%) | P value  | Overall eccSOFA adjusted ED downgrade < 6h DiD (%) | P value |
| 12PM to 10PM, M-F | -2.4 | 0.410 | 14.5  | 0.000 |
| 1PM to 11PM, M-F | -2.4 | 0.410 | 9.7 | 0.000 |
| 2PM to 12 AM, M-F | -6.0 | 0.045 | 4.8 | 0.085 |

Abbreviation: M-F = Monday through Friday; eccSOFA = emergency critical care Sequential Organ Failure Assessment; DiD = Difference in Differences.

**eTable 4: Subgroup Analysis of Patient Distribution by eccSOFA Category and Primary Outcomes After Excluding Patients with Preceding Non-ICU Admission Orders Before Critical Care Admission Order Within 12 hours of ED Arrival**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Non-ECCP hours** | **ECCP hours** | Difference in Differences (DiD) | *P* value |
| Patient Distribution by eccSOFA Category and Primary Outcomes | Pre-Intervention Period | Intervention Period | Pre-Intervention Period | Intervention Period |
| **Study cohort** [Total=1,882] | 628 | 529 | 344 | 381 |  |  |
|  |  |  |  |  |  |  |
|  |  n (%) |  n (%) |  n (%) |  n (%) | DiD [95% CI] |  |
| **By eccSOFA category** |  |  |  |  |  |  |
|  eccSOFA 0-3 | 246 (39.2) | 235 (44.4) | 146 (42.4) | 174 (45.7) |  |  |
|  eccSOFA 4-7 | 229 (36.5) | 199 (37.6) | 138 (40.1) | 144 (37.8) |  |  |
|  eccSOFA 8+ | 153 (24.4) | 95 (18.0) | 60 (17.4) | 63 (16.5) |  |  |
|  eccSOFA score *mean* *(SD)* | *4.95 (3.80)* | *4.40 (3.44)* | *4.31 (3.13)* | *4.23 (3.27)* | *0.46 [-0.19, 1.11]* | *0.162* |
| **In-hospital death** |  |  |  |  | DiD % [95% CI] |  |
|  Overall unadjusted | 108 (17.2) | 101 (19.1) | 57 (16.6) | 52 (13.6) | -4.8 [-11.7, 0.21] | 0.170 |
|  Overall eccSOFA-adjusted | (15.2) | (19.6) | (18.2) | (14.8) | -7.7 [-14.1, -1.3] | **0.018** |
|  eccSOFA 0-3 | (4.5) | (6.3) | (5.6) | (5.1) | -2.2 [-8.6, 4.1] | 0.491 |
|  eccSOFA 4-7 | (15.7) | (22.6) | (22.4) | (13.2) | -16.1 [-27.7, -4.5] | **0.007** |
|  eccSOFA 8+ | (37.1) | (42.5) | (36.8) | (39.5) | -2.7 [-22.2, 16.9] | 0.787 |
| **ED downgrade < 6 ha** |  |  |  |  |  |  |
|  Overall unadjusted | 50 (8.0) | 82 (15.6) | 28 (8.1) | 80 (21.0) | 5.3 [-0.9, 11.6] | 0.095 |
|  Overall eccSOFA-adjusted | (8.3) | (15.2) | (8.1) | (20.4) | 5.3 [-0.8, 11.4] | 0.090 |
|  eccSOFA 0-3 | (11.3) | (20.5) | (12.9) | (24.8) | 2.7 [-7.9, 13.3] | 0.619 |
|  eccSOFA 4-7 | (7.8) | (14.5) | (4.4) | (21.5) | 10.4 [0.8, 19.9] | **0.034** |
|  eccSOFA 8+ | (2.6) | (5.3) | (5.4) | (9.2) | 1.1 [-9.4, 11.6] | 0.843 |

Abbreviations: CI = confidence interval; ECCP = Emergency Critical Care Program; eccSOFA = emergency critical care Sequential Organ Failure Assessment; DiD = Difference in Differences; ED = emergency department; ICU = intensive care unit.

Within each eccSOFA category, linear adjustment has been applied.

Study period definitions are explained in footnote to Table 1.

**a** Downgrade to non-ICU status within 6 hours of critical care admission order while still in ED.

**eTable 5: Falsification Test for Patients with Admission Orders to Alternative Intensive Care Units Within 12 Hours of Emergency Department Arrival**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Non-ECCP hours** | **ECCP hours** | Difference in Differences(DiD) | *P* value |
|  | Pre-Intervention Period | Intervention Period | Pre-Intervention Period | Intervention Period |
| **Alternative cohort** [N=2621] | 775 | 872 | 471 | 503 |  |  |
|  |  |  |  |  |  |  |
|  |  n (%) |  n (%) |  n (%) |  n (%) | DiD [95% CI] |  |
| **By eccSOFA category** |  |  |  |  |  |  |
|  eccSOFA 0-3 | 538 (69.4) | 646 (74.1) | 331 (70.3)  | 388 (77.1)  |  |  |
|  eccSOFA 4-7 | 185 (23.9) | 178 (20.4) | 111 (23.6) | 93 (18.5) |  |  |
|  eccSOFA 8+ | 52 (6.7) | 48 (5.5) | 29 (6.2) | 22 (4.4) |  |  |
|  eccSOFA score *mean* *(SD)* | *2.73 (2.69)* | *2.44 (2.50)* | *2.61 (2.69)* | *2.24 (2.38)* | *-0.09 [-0.50, 0.32]* | *0.666* |
| **In-hospital death** |  |  |  |  | DiD % [95% CI] |  |
|  Overall unadjusted | 77 (9.9) | 74 (8.5) | 45 (9.6) | 38 (7.6) | -0.6 [-5.0, 3.9] | 0.811 |
|  Overall eccSOFA-adjusted | (9.0) | (8.8) | (9.0) | (8.7) | -0.1 [-4.2, 4.0] | 0.963 |
|  eccSOFA 0-3 | (3) | (3.4) | (3.7) | (4.3) | 0.2 [-3.3, 3.6] | 0.927 |
|  eccSOFA 4-7 | (17) | (14.6) | (15.8) | (12.9) | -0.4 [-12.6, 11.7] | 0.947 |
|  eccSOFA 8+ | (53.9) | (55.4) | (52) | (46.8) | -6.7 [-40.0, 26.5] | 0.691 |
| **ED downgrade < 6 ha** |  |  |  |  |  |  |
|  Overall unadjusted | 68 (8.8) | 81 (9.3) | 34 (7.2) | 42 (8.3) | 0.6 [-3.7, 5.0] | 0.782 |
|  Overall eccSOFA-adjusted | (8.9) | (9.2) | (7.2) | (8.2) | 0.6 [-3.7, 5.0] | 0.780 |
|  eccSOFA 0-3 | (9.9) | (10.7) | (9.0) | (8.0) | -1.9 [-7.2, 3.5] | 0.492 |
|  eccSOFA 4-7 | (7.6) | (5.6) | (3.6) | (9.7) | 8.1 [-0.5, 16.7] | 0.066 |
|  eccSOFA 8+ | (1.6) | (4.7) | (0) | (10.3) | 7.2 [-6.6, 21.0] | 0.305 |

Abbreviations: CI = confidence interval; ECCP = Emergency Critical Care Program; eccSOFA = emergency critical care Sequential Organ Failure Assessment; DiD = Difference in Differences.

Alternative ICU cohort includes patients admitted to Surgical ICU, Cardiovascular ICU, or Coronary Care Unit.

Within each eccSOFA category, linear adjustment has been applied for in-hospital death.

Study period definitions are explained in footnote to Table S1.

**a** Downgrade to non-ICU status within 6 hours of critical care admission order while still in ED.

**eTable 6. Additional Details for Time-based Secondary Outcomes.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | **Non-ECCP hours** | **ECCP hours** | Difference in Differences[95% CI] | *P* value  |
|   | Pre-Intervention Period | Intervention Period | Pre-Intervention Period | Intervention Period |
| **ED arrival to admission order**, hours |  |  |  |  |  |  |
|  | mean (SD) | mean (SD) | mean (SD) | mean (SD) |  |   |
|  Overall unadjusted | 3.3 (1.8) | 3.5 (1.8) | 3.4 (1.9) | 3.3 (2) | -0.3 [-0.6, 0.1] | 0.105 |
|  Overall eccSOFA-adj | 3.3 (1.8) | 3.5 (1.8) | 3.4 (1.8) | 3.3 (1.8) | -0.2 [-0.6, 0.1] | 0.138 |
|   | median (IQR) | median (IQR) | median (IQR) | median (IQR) |  |   |
|  Overall unadjusted | 2.9 (2, 4.2) | 3.0 (2.2, 4.5) | 3.0 (2, 4.2) | 2.9 (1.8, 4.3) | -0.3 [-0.6, 0.1] | 0.145 |
|  Overall eccSOFA-adj | 2.9 (2, 4.2) | 3.0 (2.2, 4.5) | 3.0 (2, 4.2) | 2.9 (1.8, 4.3) | -0.3 [-0.6, 0.1] | 0.124 |
|  |  |  |  |  |  |  |
| **ED LOS**, hours |   |   |   |   |   |   |
|  | mean (SD) | mean (SD) | mean (SD) | mean (SD) |  |   |
|  Overall unadjusted | 10.7 (9) | 9.4 (6.3) | 12.3 (10.5) | 10.8 (9) | -0.2 [-1.7, 1.2] | 0.742 |
|  Overall eccSOFA-adj | 10.8 (8.61) | 9.4 (8.58) | 12.2 (8.6) | 10.7 (8.58) | -0.1 [-1.6, 1.4] | 0.883 |
|   | median (IQR) | median (IQR) | median (IQR) | median (IQR) |  |   |
|  Overall unadjusted | 8.2 (5.2, 12.8) | 7.8 (5.3, 11.9) | 8.4 (5.4, 17.6) | 7.7 (5.1, 13.5) | -0.3 [-1.4, 0.8] | 0.639 |
|  Overall eccSOFA-adj | 8.4 (5.3, 12.9) | 7.8 (5.3, 11.7) | 8.4 (5.4, 16.8) | 7.8 (5.1, 14.4) | -0.03 [-1.2, 1.1] | 0.953 |
|  |  |  |  |  |  |  |
| **Hospital LOS**, days |   |   |   |   |   |   |
|  | mean (SD) | mean (SD) | mean (SD) | mean (SD) |  |   |
|  Overall unadjusted | 8 (10.4) | 6.5 (7.7) | 7.4 (7.9) | 6.6 (8.1) | 0.8 [-0.7, 2.3] | 0.322 |
|  Overall eccSOFA-adj | 8 (8.7) | 6.5 (8.7) | 7.4 (8.7) | 6.7 (8.7) | 0.8 [-0.7, 2.3] | 0.277 |
|   | median (IQR) | median (IQR) | median (IQR) | median (IQR) |  |   |
|  Overall unadjusted | 4.9 (2.7, 9.2) | 4.3 (2.3, 7.7) | 4.8 (2.8, 9.5) | 4.7 (2.6, 7.8) | 0.5 [-0.4, 1.4] | 0.575 |
|  Overall eccSOFA-adj | 4.9 (2.8, 9.2) | 4.5 (2.5, 8) | 5.0 (2.7, 9.3) | 4.7 (2.6, 8.1) | 0.2 [-0.6, 1] | 0.588 |

Abbreviation: CI = confidence interval; adj= adjusted; SD = standard deviation; IQR = interquartile range; LOS = Length of stay.

Study period definitions are explained in footnote to Table S1.

DiD confidence intervals are based on minimum absolute difference regression.