# Treatment and Outcomes of Patients With Ischemic Stroke During COVID-19: An Analysis from Get With The Guidelines-Stroke

## SUPPLEMENTAL MATERIAL

Supplemental Table I. Missingness of the Cohort Stratified by Pre- and During Coronavirus Disease 2019 Time Period

| Time Period | Overall N=81,084 11/1/19-6/29/20 | Pre-COVID 19 N=39,113 11/1/19-2/3/20 | During COVID 19 N=41,971 2/4/20-6/29/20 |
|---|---|---|---|
| | Percent of Variable Missing | | |
| **Demographics** | | | |
| Age | 0.0 | 0.0 | 0.0 |
| Female | 0.0 | 0.0 | 0.0 |
| Race | 0.0 | 0.0 | 0.1 |
| Insurance | 12.3 | 11.4 | 13.2 |
| **Medical Comorbidities** | 0.6 | 0.2 | 0.9 |
| **Clinical Characteristics** | | | |
| NIH Stroke Scale | 5.7 | 5.6 | 5.8 |
| Large Vessel Occlusion Stroke | 9.0 | 8.6 | 9.3 |
| Time From Symptom Onset to Arrival, minutes† | 36.9 | 36.4 | 37.4 |
| **Medications Prior to Admission** | 0.0 | 0.0 | 0.0 |
| **Labs** | | | |
| Platelets | 87.2 | 87.3 | 87.1 |
| International Normalized Ratio | 36.3 | 36.9 | 35.8 |
| **Arrival Mode** | 0.0 | 0.0 | 0.0 |
| **Patient location when stroke symptoms discovered** | 0.6 | 0.2 | 1.0 |
| **Hospital Characteristics** | | | |

| | | | |
|---|---|---|---|
| Number of Beds in Hospital | 1.0 | 1.0 | 1.0 |
| Hospital Type Teaching or Academic | 0.8 | 0.8 | 0.9 |
| Hospital Location Rural | 0.0 | 0.0 | 0.0 |
| Hospital Region | 0.0 | 0.0 | 0.0 |
| Hospital Type | 0.0 | 0.0 | 0.0 |

†Symptom onset defined as last known well time.

Abbreviations: COVID 19, Coronavirus Disease 2019; NIH, National Institutes of Health

Supplemental Table II. Weekly Presentations of Acute Ischemic Stroke in the Get With The Guidelines-Stroke Registry Stratified By Year

| Time Period | Acute Ischemic Stroke Presentations 2019 | Acute Ischemic Stroke Presentations 2020 |
|---|---|---|
| February Week 1 | 2839 | 3011 |
| February Week 2 | 2904 | 2876 |
| February Week 3 | 2769 | 2874 |
| February Week 4 | 2822 | 2818 |
| March Week 1 | 2914 | 2860 |
| March Week 2 | 2794 | 2668 |
| March Week 3 | 2754 | 2253 |
| March Week 4 | 2782 | 2065 |
| April Week 1 | 2857 | 2045 |
| April Week 2 | 2867 | 2045 |
| April Week 3 | 2802 | 2164 |
| April Week 4 | 2672 | 2267 |
| May Week 1 | 2869 | 2122 |
| May Week 2 | 2815 | 2077 |
| May Week 3 | 2804 | 2048 |
| May Week 4 | 2785 | 1940 |
| May Week 5* | 2871 | 1614 |
| June Week 1* | 2904 | 1223 |
| June Week 2* | 2841 | 880 |
| June Week 3* | 2461 | 447 |
| June Week 4* | 3231 | 105 |

*Data incomplete due to lag in data entry during Coronavirus Disease 2019 pandemic.

Supplemental Table III. Reasons for Thrombolysis and Thrombectomy Delay Stratified by Pre- and During Coronavirus Disease 2019 Time Period

| **IV Alteplase Reasons for Delay When Reason Provided** | **Overall N=3,331** | **Pre-COVID 19 N=1,614** | **During COVID 19 N=1,717** | **P-Value*** |
|---|---|---|---|---|
| Need for Additional Personal Protective Equipment for Suspected/Confirmed Infectious Disease, n (%) | 110 (6.9) | Not Collected | 110 (13.1) | Not Applicable |
| Hypertension Requiring Aggressive Control with IV Medications, n (%) | 1,187 (74.6) | 603 (80.0) | 584 (69.8) | <.0001 |
| Management of Concomitant Conditions Such as Cardiopulmonary Arrest or Respiratory Failure Requiring Intubation, n (%) | 200 (12.6) | 94 (12.5) | 106 (12.7) | 0.91 |
| Care Team Unable to Determine Eligibility, n (%) | 1,376 (78.8) | 654 (76.1) | 722 (81.5) | 0.01 |
| Social/Religious, n (%) | 37 (2.1) | 20 (2.3) | 17 (1.9) | 0.56 |
| Initial Refusal, n (%) | 374 (21.4) | 210 (24.4) | 164 (18.5) | 0.003 |
| Investigational or Experimental Protocol for Thrombolysis, n (%) | 18 (1.1) | 9 (1.2) | 9 (1.1) | 0.82 |
| Hypoglycemia (Blood Glucose <50 mg/dl), Seizures or Major Metabolic Disorders, n (%) | 171 (10.8) | 86 (11.4) | 85 (10.2) | 0.42 |
| Delay in Stroke Diagnosis, n (%) | 35 (13.7) | 21 (17.8) | 14 (10.2) | 0.08 |
| In-Hospital Time Delay, n (%) | 154 (60.4) | 72 (61.0) | 82 (59.9) | 0.85 |
| Equipment-Related Delay, n (%) | 28 (11.0) | 12 (10.2) | 16 (11.7) | 0.70 |
| Other, n (%) | 66 (25.9) | 27 (22.9) | 39 (28.5) | 0.31 |

| **Mechanical Endovascular Reperfusion Reasons for Delay When Reason Provided** | **Overall N=1,355** | **Pre-COVID 19 N=588** | **During COVID 19 N=767** | **P-Value*** |
|---|---|---|---|---|
| Need for Additional Personal Protective Equipment for Suspected/Confirmed Infectious Disease, n (%) | 103 (7.6) | Not Collected | 103 (13.4) | Not Applicable |
| Management of Concomitant Conditions Such as Cardiopulmonary Arrest or Respiratory Failure Requiring Intubation, n (%) | 343 (25.3) | 152 (25.9) | 191 (24.9) | 0.69 |
| Care Team Unable to Determine Eligibility, n (%) | 417 (30.8) | 198 (33.7) | 219 (28.6) | 0.04 |
| Social/Religious, n (%) | 13 (1.0) | 5 (0.9) | 8 (1.0) | 0.72 |

| | | | | |
|---|---|---|---|---|
| Initial Refusal, n (%) | 54 (4.0) | 25 (4.3) | 29 (3.8) | 0.66 |
| Investigational or Experimental Protocol for Thrombolysis, n (%) | 17 (1.3) | 11 (1.9) | 6 (0.8) | 0.07 |
| Delay in Stroke Diagnosis, n (%) | 34 (2.5) | 18 (3.1) | 16 (2.1) | 0.26 |
| In-Hospital Time Delay, n (%) | 118 (8.7) | 53 (9.0) | 65 (8.5) | 0.73 |
| Equipment-Related Delay, n (%) | 37 (2.7) | 13 (2.2) | 24 (3.1) | 0.30 |
| Need for Additional Imaging, n (%) | 138 (10.2) | 56 (9.5) | 82 (10.7) | 0.48 |
| Catheter Lab Not Available, n (%) | 16 (1.2) | 8 (1.4) | 8 (1.0) | 0.59 |
| Additional Proximal Vascular Procedure Required Prior to First-Pass (Stent), n (%) | 146 (10.8) | 63 (10.7) | 83 (10.8) | 0.95 |
| Other, n (%) | 303 (22.4) | 132 (22.5) | 171 (22.3) | 0.95 |

*Total Ns may vary from column headers due to missingness. Differences between variables compared using Pearson Chi Squared tests. Significance threshold set to <0.01 to account for multiple comparisons.

Abbreviations: COVID 19, Coronavirus Disease 2019; IV, Intravenous

Supplemental Table IV. GWTG Achievement and Quality Measures of the Cohort Stratified by Pre- and During Coronavirus Disease 2019 Time Period

| **GWTG-Stroke Achievement and Quality Measures** | | | | |
|---|---|---|---|---|
| IV alteplase administered within 3 hours in those who arrived to the hospital within 2 hours of last known well time, % / total n | 89.7 / 6,526 | 90.5 / 3,120 | 88.9 / 3,406 | 0.03 |
| IV alteplase administered within 4.5 hours in those who arrived to the hospital within 3.5 hours of last known well time, % / total n | 88.9 / 8,927 | 89.8 / 4,288 | 88.0 / 4,639 | 0.009 |
| Time to IV thrombolytic therapy ≤ 60 minutes, % / total n | 89.1 / 6,738 | 89.1 / 3,247 | 89.0 / 3,491 | 0.90 |
| Door to CT time ≤25 minutes, % / total n | 47.4 / 52,361 | 47.4 / 24,958 | 47.5 / 27,403 | 0.74 |
| Administration of antithrombotics within 48 hours of arrival, % / total n | 96.7 / 46,552 | 96.8 / 22,988 | 96.5 / 23,564 | 0.06 |
| Administration of antithrombotics at discharge, % / total n | 98.9 / 66,430 | 99.4 / 32,086 | 98.5 / 34,344 | <.0001 |
| Administration of anticoagulation at discharge for those with atrial fibrillation/flutter, % / total n | 97.1 / 11,436 | 97.5 / 5,715 | 96.7 / 5,721 | 0.01 |
| Venous Thromboembolism Prophylaxis, % / total n | 99.2 / 60,208 | 99.2 / 29,577 | 99.3 / 30,631 | 0.51 |
| Dysphagia Screen, % / total n | 86.7 / 71,023 | 87.3 / 34,285 | 86.1 / 36,738 | <.0001 |
| Smoking cessation advice or counseling during hospitalization, % / total n | 97.4 / 12,245 | 98.1 / 5,766 | 96.8 / 6,479 | <.0001 |
| Stroke education given during hospitalization, % / total n | 95.4 / 38,956 | 96.4 / 18,287 | 94.5 / 20,669 | <.0001 |
| Rehabilitation considered, % / total n | 98.6 / 67,834 | 99.1 / 32,816 | 98.1 / 35,018 | <.0001 |
| Stroke Composite (GWTG/PAA Composite), mean (std) | 97.9 (10.5) | 98.3 (8.9) | 97.6 (11.8) | <.0001 |
| Stroke Defect-Free Care, % / total n | 94.8 / 75,098 | 95.3 / 36,274 | 94.3 / 38,824 | <.0001 |
| LDL documented, % / total n | 94.6 / 67,495 | 94.6 / 32,644 | 94.6 / 34,851 | 0.98 |
| Intensive Statin Therapy at discharge, % / total n | 85.4 / 31,078 | 85.6 / 14,962 | 85.2 / 16,116 | 0.40 |
| Patients with LDL ≥100 or LDL not measured or on cholesterol reducer prior to admission who are discharged on statin, % / total n | 98.1 / 52,470 | 98.7 / 25,343 | 97.6 / 27,127 | <.0001 |

| | | | | |
|---|---|---|---|---|
| NIH Stroke Scale Reported, % / total n | 94.8 / 73,435 | 95.0 / 35,249 | 94.6 / 38,186 | 0.01 |

*Differences between continuous and categorical variables compared using Kruskal Wallis and Pearson Chi Squared tests, respectively. Significance threshold set to <0.01 to account for multiple comparisons.

Abbreviations: COVID 19, Coronavirus Disease 2019; CT, Computed Tomography; GWTG, Get With the Guidelines; IV, Intravenous; LDL, Low Density Lipoprotein; NIH, National Institutes of Health; PAA, Performance Achievement Award; std, Standard Deviation

Supplemental Table V. Characteristics of the Cohort Stratified by Pre- (11/1/19-2/3/20) and During Coronavirus Disease 2019 (Later Time Period 4/1/20-6/29/20)

| Time Period | Overall N=59,543 | Pre-COVID 19 N=39,113 11/1/19-2/3/20 | During COVID 19 N=20,430 4/1/20-6/29/20 | Absolute Standardized Difference* |
|---|---|---|---|---|
| **Demographics** | | | | |
| Age, years | 71 (61-81) | 71 (61-81) | 70 (60-80) | 6.64 |
| Female, n (%) | 29,005 (48.7) | 19,161 (49.0) | 9,844 (48.2) | 1.61 |
| Race, n (%) | | | | |
| Asian | 2,029 (3.4) | 1,390 (3.6) | 639 (3.1) | 3.88 |
| Non-Hispanic Black | 13,199 (22.2) | 8,588 (22.0) | 4,611 (22.6) | |
| Hispanic | 4,356 (7.3) | 2,776 (7.1) | 1,580 (7.7) | |
| Non-Hispanic White | 36,809 (61.8) | 24,325 (62.2) | 12,484 (61.2) | |
| Other | 3,131 (5.3) | 2,033 (5.2) | 1,098 (5.4) | |
| Insurance, n (%) | | | | |
| Self-Pay/No Insurance | 2,338 (3.9) | 1,485 (3.8) | 853 (4.2) | 8.78 |
| Medicare | 21,864 (36.7) | 14,229 (36.4) | 7,635 (37.4) | |
| Medicaid | 7,553 (12.7) | 4,894 (12.5) | 2,659 (13.0) | |
| Private/Veterans Affairs/CHAMPUS/Other | 20,650 (34.7) | 14,065 (36.0) | 6,585 (32.2) | |
| Not Documented | 7,138 (12.0) | 4,440 (11.4) | 2,698 (13.2) | |
| **Medical Comorbidities** | | | | |
| Atrial Fibrillation/Flutter, n (%) | 10,913 (18.3) | 7,445 (19.0) | 3,468 (17.0) | 5.36 |
| Coronary Artery Disease, n (%) | 13,021 (21.9) | 8,672 (22.2) | 4,349 (21.3) | 2.14 |
| Diabetes Mellitus, n (%) | 21,187 (35.6) | 13,906 (35.6) | 7,281 (35.6) | 0.18 |
| Heart Failure, n (%) | 6,310 (10.6) | 4,247 (10.9) | 2,063 (10.1) | 2.48 |
| Hypertension, n (%) | 45,592 (76.6) | 30,325 (77.5) | 15,267 (74.7) | 6.58 |
| Peripheral Vascular Disease, n (%) | 2,425 (4.1) | 1,580 (4.0) | 845 (4.1) | 0.49 |
| Previous Stroke, n (%) | 15,048 (25.3) | 10,072 (25.8) | 4,976 (24.4) | 3.22 |

| | | | | |
|---|---|---|---|---|
| Previous Transient Ischemic Attack, n (%) | 4,453 (7.5) | 3,019 (7.7) | 1,434 (7.0) | 2.68 |
| Serum Creatinine > 2 mg/dl, n (%) | 6,712 (11.3) | 4,385 (11.2) | 2,327 (11.4) | 0.57 |
| **Clinical Characteristics** | | | | |
| NIH Stroke Scale | 4 (1-9) | 4 (1-9) | 4 (1-10) | 2.47 |
| Large Vessel Occlusion Stroke, n (%) | 12,373 (22.9) | 8,072 (22.6) | 4,301 (21.1) | 2.06 |
| Time From Symptom Onset to Arrival, minutes† | 321 (102.5-805) | 315 (101-794) | 330 (106-828) | 2.23 |
| **Medications Prior to Admission** | | | | |
| Prior Antiplatelet, n (%) | 24,700 (41.5) | 16,514 (42.2) | 8,186 (40.1) | 4.38 |
| Prior Anticoagulant, n (%) | 7,851 (13.2) | 5,334 (13.6) | 2,517 (12.3) | 3.92 |
| Prior Antihypertensive, n (%) | 34,790 (58.4) | 22,913 (58.6) | 11,877 (58.1) | 0.91 |
| Prior Cholesterol Lowering Medication, n (%) | 28,578 (48.0) | 18,988 (48.6) | 9,590 (46.9) | 3.22 |
| Prior Diabetic Medication, n (%) | 15,658 (26.3) | 10,278 (26.3) | 5,380 (26.3) | 0.13 |
| Prior Antidepressant Medication, n (%) | 7,617 (12.8) | 4,958 (12.7) | 2,659 (13.0) | 1.01 |
| **Labs** | | | | |
| Platelets, x10^9/L | 233 (188-295) | 232 (188-295) | 235 (189-297) | 4.79 |
| International Normalized Ratio | 1.0 (1.0-1.1) | 1.0 (1.0-1.1) | 1.0 (1.0-1.1) | 0.55 |
| **COVID-19 Positive, n (%)** | 918 (1.5) | N/A | 918 (4.5) | |
| **Arrival Mode** | | | | |
| Private transport/taxi/other from home/scene, n (%) | 17,540 (29.5) | 11,871 (30.4) | 5,669 (27.8) | 8.53 |
| EMS from home/scene, n (%) | 27,157 (45.6) | 17,325 (44.3) | 9,832 (48.1) | |
| Transfer from other hospital, n (%) | 11,840 (19.9) | 7,998 (20.5) | 3,842 (18.8) | |
| Mobile Stroke Unit, n (%) | 228 (0.4) | 151 (0.4) | 77 (0.4) | |
| Unknown, n (%) | 2,778 (4.7) | 1,768 (4.5) | 1,010 (4.9) | |
| **Patient Location When Stroke Symptoms Discovered** | | | | |
| Not in a healthcare setting, n (%) | 52,667 (89.1) | 34,640 (88.7) | 18,027 (89.8) | 4.73 |

| | | | | |
|---|---|---|---|---|
| Stroke occurred during hospitalization, n (%) | 2,082 (3.5) | 1,441 (3.7) | 641 (3.2) | |
| Outpatient healthcare setting, n (%) | 668 (1.1) | 483 (1.2) | 185 (0.9) | |
| Chronic health care facility, n (%) | 2,496 (4.2) | 1,702 (4.4) | 794 (4.0) | |
| Another acute care facility, n (%) | 992 (1.7) | 646 (1.7) | 346 (1.7) | |
| Cannot be determined, n (%) | 226 (0.4) | 144 (0.4) | 82 (0.4) | |
| **Hospital Characteristics** | | | | |
| Number of Beds in Hospital | 434 (290-668) | 439 (292-679) | 420 (285-660) | 6.25 |
| Hospital Type Teaching or Academic, n (%) | 49,567 (83.9) | 32,773 (84.5) | 16,794 (83.9) | 4.25 |
| Hospital Location Rural, n (%) | 961 (1.6) | 570 (1.5) | 391 (1.9) | 3.55 |
| Hospital Region, n (%) | | | | |
| West | 7,984 (13.4) | 5,125 (13.1) | 2,859 (14.0) | 4.08 |
| South | 21,854 (36.7) | 14,291 (36.5) | 7,563 (37.0) | |
| Midwest | 11,128 (18.7) | 7,264 (18.6) | 3,864 (18.9) | |
| Northeast | 18,577 (31.2) | 12,433 (31.8) | 6,144 (30.1) | |
| Hospital Type, n (%) | | | | |
| Primary Stroke Center | 29,030 (48.8) | 18,826 (48.1) | 10,204 (50.0) | 3.96 |
| Comprehensive Stroke Center | 14,012 (23.5) | 9,391 (24.0) | 4,621 (22.6) | |
| Neither | 16,501 (27.7) | 10,896 (27.9) | 5,605 (27.4) | |

*Continuous variables presented as median (25th-75th percentile). Missing rates of variables presented in Supplementary Table 1. Variables compared between pre- and during COVID-19 time periods using absolute standardized difference. Absolute standardized difference ≥10 indicates a significant difference.

†Symptom onset defined as last known well time.

Abbreviations: COVID 19, Coronavirus Disease 2019; EMS, Emergency Medical Services; N/A, Not Applicable; NIH, National Institutes of Health

Supplemental Table VI. Treatment Patterns and Process Measures of the Cohort Stratified by Pre- (11/1/19-2/3/20) and During Coronavirus Disease 2019 (Later Time Period 4/1/20-6/29/20)

| **Time Period** | **Overall N=59,543** | **Pre-COVID 19 N=39,113 11/1/19-2/3/20** | **During COVID 19 N=20,430 4/1/20-6/29/20** | **P-Value*** |
|---|---|---|---|---|
| **Treatment Patterns** | | | | |
| IV Alteplase Initiated at Hospital, n (%) | 6,771 (11.5) | 4,551 (11.7) | 2,220 (11.1) | 0.03 |
| IV Alteplase Initiated at Outside Hospital, n (%) | 2,892 (7.4) | 1,943 (7.7) | 949 (7.0) | 0.03 |
| Endovascular Therapy Initiated at Hospital, n (%) | 5,022 (10.0) | 3,347 (10.2) | 1,675 (9.7) | 0.09 |
| Endovascular Therapy Initiated at Outside Hospital, n (%) | 123 (0.3) | 81 (0.3) | 42 (0.3) | 0.93 |
| Venous Thromboembolism Prophylaxis, n (%) | 43,890 (99.2) | 29,340 (99.2) | 14,550 (99.2) | 0.62 |
| Telestroke Consult, n (%) | 3,900 (6.6) | 2,344 (6.0) | 1,556 (35.4) | <.0001 |
| **Process Measure** | | | | |
| Door to CT Time, minutes / n | 36 (14-105) / 48,009 | 37 (15-111) / 31,407 | 35 (14-95) / 16,602 | <.0001 |
| Door to Needle Time, minutes / n | 46 (33-65) / 6,356 | 46 (32-65) / 4,243 | 47 (34-65) / 2,113 | 0.13 |
| Door to Endovascular Treatment, minutes / n | 89 (54-133) / 4,848 | 86 (53-129) / 3,231 | 95 (58-140) / 1,617 | 0.001 |

*Continuous variables presented as median (25th-75th percentile). Differences between continuous and categorical variables compared using Kruskal Wallis and Pearson Chi Squared tests, respectively. Significance threshold set to <0.01 to account for multiple comparisons. Treatment pattern total Ns may vary from column headers due to missingness.

Abbreviations: COVID 19, Coronavirus Disease 2019; CT, Computed Tomography; IV, Intravenous

Supplemental Table VII. Association of Time Period [Pre- (11/1/19-2/3/20) vs During Coronavirus Disease 2019 (Later Time Period 4/1/20-6/29/20)] with Outcomes Among Patients Presenting With Acute Ischemic Stroke

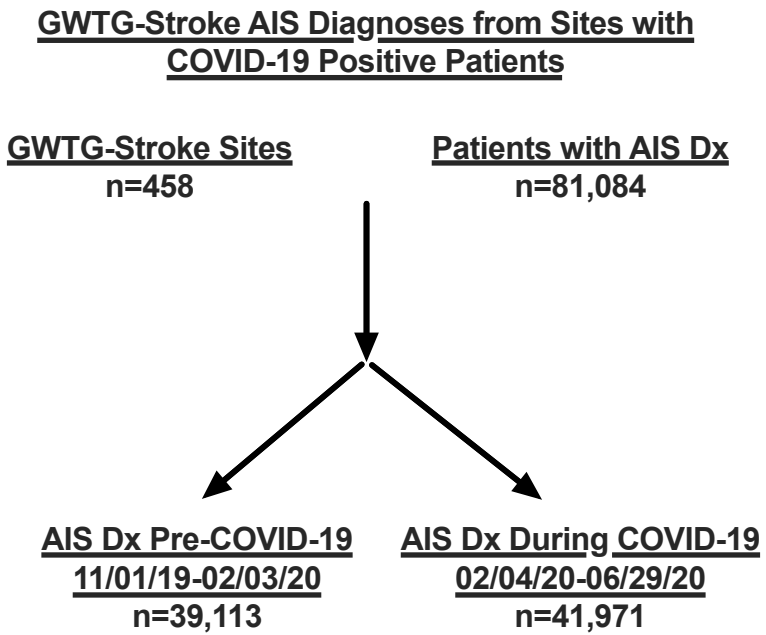
| | *Unadjusted* | | *Adjusted* | |
|---|---|---|---|---|
| **Outcome*** | **OR (95% CI)** | **P-value** | **OR (95% CI)** | **P-value** |
| In-hospital mortality | 1.17 (1.08,1.27) | 0.0001 | 1.11 (1.01,1.22) | 0.03 |
| Symptomatic intracranial hemorrhage among IV alteplase patients | 0.78 (0.63,0.97) | 0.03 | 0.75 (0.60,0.95) | 0.01 |
| VTE or PE during hospitalization | 0.96 (0.79,1.16) | 0.65 | 0.96 (0.80,1.15) | 0.65 |
| Discharge modified Rankin score 0-1† | 0.94 (0.88,0.99) | 0.03 | 0.95 (0.89,1.01) | 0.12 |
| Discharge modified Rankin score 0-2 | 0.96 (0.90,1.01) | 0.14 | 0.98 (0.91,1.04) | 0.47 |
| Length of stay ≥4 days | 0.79 (0.75,0.82) | <.0001 | 0.78 (0.75,0.81) | <.0001 |
| Discharge to inpatient rehabilitation facility | 1.01 (0.95,1.06) | 0.86 | 1.01 (0.96,1.07) | 0.61 |
| Discharge to skilled nursing facility | 0.64 (0.60,0.68) | <.0001 | 0.64 (0.60,0.69) | <.0001 |
| Discharge to hospice | 1.08 (1.00,1.17) | 0.06 | 1.10 (1.00,1.21) | 0.06 |
| Discharge to home | 1.18 (1.14,1.23) | <.0001 | 1.24 (1.18,1.29) | <.0001 |

*Regression models compare outcomes of patients admitted during the Coronavirus Disease 2019 (Later Time Period 4/1/20-6/29/20) to those admitted in the pre-Coronavirus Disease 2019 time period (11/1/19-2/3/20; reference group). Significance threshold set to <0.01 to account for multiple comparisons.

†Discharge modified Rankin population includes both patients who died and survived to discharge.

Models are adjusted for patient demographics, clinical characteristics, medical history, and hospital characteristics.

Abbreviations: CI, Confidence Interval; IV, Intravenous; OR, Odds Ratio; PE, Pulmonary Embolism; VTE, Venous Thromboembolism




Supplemental Figure I: Determination of the cohort.
Abbreviations: AIS, Acute Ischemic Stroke; COVID-19, Coronavirus Disease 2019; Dx, Diagnosis; GWTG-Stroke, Get With the Guidelines-Stroke.

| RECORD (reporting of studies conducted using observational routinely-collected data) Reporting Guideline | | | | | |
|---|---|---|---|---|---|
| | **Item No.** | **STROBE items** | **Location in manuscript where items are reported** | **RECORD items** | **Location in manuscript where items are reported** |
| **Title and abstract** | | | | | |
| | 1 | (a) Indicate the study's design with a commonly used term in the title or the abstract (b) Provide in the abstract an informative and balanced summary of what was done and what was found | Abstract | RECORD 1.1: The type of data used should be specified in the title or abstract. When possible, the name of the databases used should be included.<br><br>RECORD 1.2: If applicable, the geographic region and timeframe within which the study took place should be reported in the title or abstract.<br><br>RECORD 1.3: If linkage between databases was conducted for the study, this should be clearly stated in the title or abstract. | Abstract |
| **Introduction** | | | | | |
| Background rationale | 2 | Explain the scientific background and rationale for the investigation being reported | Introduction | | |
| Objectives | 3 | State specific objectives, including any prespecified hypotheses | Abstract, Introduction | | |
| **Methods** | | | | | |
| Study Design | 4 | Present key elements of study design early in the paper | Methods | | |
| Setting | 5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection | Methods | | |
| Participants | 6 | *(a) Cohort study* - Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up | Methods | RECORD 6.1: The methods of study population selection (such as codes or algorithms used to identify subjects) should be listed in detail. If this is not possible, an explanation should be | Methods |

| | | | | | |
|---|---|---|---|---|---|
| | | *Case-control study* - Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls<br>*Cross-sectional study* - Give the eligibility criteria, and the sources and methods of selection of participants<br><br>*(b) Cohort study* - For matched studies, give matching criteria and number of exposed and unexposed<br>*Case-control study* - For matched studies, give matching criteria and the number of controls per case | | provided.<br><br>RECORD 6.2: Any validation studies of the codes or algorithms used to select the population should be referenced. If validation was conducted for this study and not published elsewhere, detailed methods and results should be provided.<br><br>RECORD 6.3: If the study involved linkage of databases, consider use of a flow diagram or other graphical display to demonstrate the data linkage process, including the number of individuals with linked data at each stage. | |
| Variables | 7 | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable. | Methods | RECORD 7.1: A complete list of codes and algorithms used to classify exposures, outcomes, confounders, and effect modifiers should be provided. If these cannot be reported, an explanation should be provided. | Methods |
| Data sources/ measurement | 8 | For each variable of interest, give sources of data and details of methods of assessment (measurement).<br>Describe comparability of assessment methods if there is more than one group | Methods | | |
| Bias | 9 | Describe any efforts to address potential sources of bias | Methods, Limitations | | |
| Study size | 10 | Explain how the study size was arrived at | Methods | | |
| Quantitative variables | 11 | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen, and why | Methods | | |

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| Statistical methods | 12 | (a) Describe all statistical methods, including those used to control for confounding<br>(b) Describe any methods used to examine subgroups and interactions<br>(c) Explain how missing data were addressed<br>(d) *Cohort study* - If applicable, explain how loss to follow-up was addressed<br>*Case-control study* - If applicable, explain how matching of cases and controls was addressed<br>*Cross-sectional study* - If applicable, describe analytical methods taking account of sampling strategy<br>(e) Describe any sensitivity analyses | Methods | | |
| Data access and cleaning methods | | .. | | RECORD 12.1: Authors should describe the extent to which the investigators had access to the database population used to create the study population.<br><br>RECORD 12.2: Authors should provide information on the data cleaning methods used in the study. | Methods |
| Linkage | | .. | | RECORD 12.3: State whether the study included person-level, institutional-level, or other data linkage across two or more databases. The methods of linkage and methods of linkage quality evaluation should be provided. | N/A |
| **Results** | | | | | |
| Participants | 13 | (a) Report the numbers of individuals at each stage of the study (*e.g.*, numbers potentially eligible, examined for eligibility, confirmed eligible, included in the | Methods | RECORD 13.1: Describe in detail the selection of the persons included in the study (*i.e.,* study population selection) including filtering based on data quality, data availability and linkage. The selection | Methods, Supplemental Figure I |

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| | | study, completing follow-up, and analysed)<br>(b) Give reasons for non-participation at each stage.<br>(c) Consider use of a flow diagram | | of included persons can be described in the text and/or by means of the study flow diagram. | |
| Descriptive data | 14 | (a) Give characteristics of study participants (*e.g.*, demographic, clinical, social) and information on exposures and potential confounders<br>(b) Indicate the number of participants with missing data for each variable of interest<br>(c) *Cohort study* - summarise follow-up time (*e.g.*, average and total amount) | Results<br>Table 1<br>Supplemental Tables | | |
| Outcome data | 15 | *Cohort study* - Report numbers of outcome events or summary measures over time<br>*Case-control study* - Report numbers in each exposure category, or summary measures of exposure<br>*Cross-sectional study* - Report numbers of outcome events or summary measures | Results<br>Tables 2-3 | | |
| Main results | 16 | (a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included<br>(b) Report category boundaries when continuous variables were categorized<br>(c) If relevant, consider translating estimates of relative risk into | Table 3 | | |

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| | | absolute risk for a meaningful time period | | | |
| Other analyses | 17 | Report other analyses done—e.g., analyses of subgroups and interactions, and sensitivity analyses | Supplemental Tables 5-7 | | |
| **Discussion** | | | | | |
| Key results | 18 | Summarise key results with reference to study objectives | Results, Tables | | |
| Limitations | 19 | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias | Limitations | RECORD 19.1: Discuss the implications of using data that were not created or collected to answer the specific research question(s). Include discussion of misclassification bias, unmeasured confounding, missing data, and changing eligibility over time, as they pertain to the study being reported. | Limitations |
| Interpretation | 20 | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence | Discussion | | |
| Generalisability | 21 | Discuss the generalisability (external validity) of the study results | Limitations | | |
| **Other Information** | | | | | |
| Funding | 22 | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based | Funding | | |
| Accessibility of protocol, raw data, and programming code | | .. | | RECORD 22.1: Authors should provide information on how to access any supplemental information such as the study protocol, raw data, or programming code. | Methods |