**Supplement Table 1: List of ICD-10 Procedure Codes used to map severity of index COVID-19 hospitalization**

|  |  |
| --- | --- |
| **ICD 10-procedure codes**  | **ICD 10 DESCRIPTION** |
| **Mechanical ventilation invasive / non-invasive** |
| 09HN7BZ | Insert airway into nasopharyngeal via nat/art op |
| 09HN8BZ | Insert airway nasopharyngeal via nat/art op endo |
| 0BH13EZ | Insert endotracheal airway tract pa |
| 0BH17EZ | Insert endotracheal airway via nat/art op |
| 0BH18EZ | Insert endotracheal airway nat/art op endo |
| 0CHY7BZ | Insert airway mouth& throat via nat/art op |
| 0CHY8BZ | Insert airway mouth &throat nat/art op endo |
| 0DH57BZ | Insert airway esophageal nat/art op |
| 0DH58BZ | Insert airway esophageal via nat/art op endo |
| 0WHQ73Z | Insert device respiratory tract via nat/art op |
| 0WHQ7YZ | Insert other device respiratory tract via nat/art op |
| 5A09357 | Assisted with respiratory ventil<24  |
| 5A09457 | Assisted with respiratory ventil 24-96  |
| 5A09557 | Assisted with respiratory ventil >96  |
| 5A1935Z | Respiratory ventilation less than 24 consecutive hr |
| 5A1945Z | Respiratory ventilation 24-96 consecutive hr |
| 5A1955Z | Respiratory ventilation > 96 consecutive hr  |
| 93.9 | Non-invasive mechanical vent |
| 96.01 | Insert nasopharyngeal airway |
| 96.02 | Insert oropharyngeal airway |
| 96.03 | Insert esophageal obturator airway |
| 96.04 | Insert endotracheal tube |
| 96.05 | Respiratory tract intubation  |
| 96.7 | Continuous invasive mechanical ventilation unsupported  |
| 96.71 | Continuous invasive mechanical ventilation < 96hrs |
| 96.72 | Continuous invasive mechanical ventilation > 96 |
| **Extracorporeal Membrane Oxygenation (ECMO)** |
| 5A15223  | Extracorporeal Membrane Oxygenation, Continuous |
| 5A1522F | Extracorporeal Oxygenation, Membrane, Central |
| 5A1522G | Extracorporeal Oxygenation, Membrane, Peripheral Veno-arterial |
| 5A1522H | Extracorporeal Oxygenation, Membrane, Peripheral Veno- venous |
| 5A02210 | Assistance with Cardiac Output using Balloon Pump, Continuous |
| 02HA3QZ | Insertion of Implantable Heart Assist System into Heart, Percutaneous approach |
| 02HA3RJ | Insertion of Short-term External Heart Assist System into Heart, Intraoperative, Percutaneous approach |
| 02HA3RZ | Insertion of Short-term External Heart Assist System into Heart, Percutaneous approach |
| 02HA3RS | Insertion of Biventricular Short-term External Heart Assist System into Heart, Percutaneous approach |
| 02HA0RZ | Insertion of Short-term External Heart Assist System into Heart, Open approach |

**Supplemental Table 2: Characteristics among 331,166 COVID-19 hospitalized patients, stratified by all-cause 30-day readmission with COVID-19 as primary readmission diagnosis vs no readmission**

|  |  |
| --- | --- |
|  | **N (%)** |
| **Patient Characteristics** | **Index COVID-19 Cohort** **N=331,166** |  **Readmission\*\*****N=11,382** |  **No Readmission****N=319,784** |
| **Demographic Characteristics** |  |  |  |
| **Age, Mean (SD)** | 64 (17) | 71 (14.2) | 64 (16.5) |
| **Age decade of life (years)** |  |  |  |
| Less than 10 | 1428 (0.4) | 17 (0.2) | 1411 (0.4) |
| 10 – 19 | 1422 (0.4) | 8 (0.1) | 1414 (0.4) |
| 20 – 29 | 7459 (2.3) | 110 (0.9) | 7349 (2.3) |
| 30 – 39 | 17996 (5.4) | 225 (1.98) | 17771 (5.6) |
| 40 – 49 | 34349 (10.4) | 537 (4.7) | 33812 (10.6) |
| 50 – 59 | 58929 (17.8) | 1370 (12.0) | 57559 (18.0) |
| 60 – 69 | 75305 (22.7) | 2305 (20.3) | 73000 (22.8) |
| 70 – 79 | 72651 (21.9) | 3172 (27.9) | 69479 (21.7) |
| 80 and older | 61597 (18.6) | 3638 (31.9) | 57959 (18.1) |
| **Sex** |  |  |  |
| Female | 159989 (48.3) | 5164 (45.4) | 154825 (48.4) |
| Male  | 170933 (51.6) | 6216 (54.6) | 164717 (51.5) |
| Unknown |  214 (0.06) | 2 (0.02) | 212 (0.07) |
| **Race/Ethnicity** |  |  |  |
| Asian, non-Hispanic |  8372 (2.5) | 237 (2.1) | 8135 (2.5) |
| Black, non-Hispanic | 57481 (17.4) | 1732 (15.2) | 55749 (17.4) |
| Hispanic | 56944 (17.2) | 1507 (13.2) | 55437 (17.3) |
| White, non-Hispanic | 181609 (54.8) | 7285 (64.0) | 174324 (54.5) |
| Other, non-Hispanic, non-Hispanic |  26730 (8.1) | 621 (5.5) | 26109 (8.2) |
| **Marital Status** |  |  |  |
| Married | 143108 (43.2) | 4920 (43.3) | 138188 (43.2) |
| Single | 147524 (44.6) | 5312 (46.7) | 142212 (44.5) |
| Others (includes unknown) |  39367 (11.9) |  1116 (9.8) | 38251 (12.2) |
| **Hospital Characteristics** |  |  |  |
| Bed size |  |  |  |
|  000-099 | 23621 (7.1) | 950 (8.4) | 22671 (7.1) |
|  100-199 | 52184 (15.8) | 1706 (15.0) | 50478 (15.8) |
|  200-299 | 60189 (18.2) | 2062 (18.1) | 58127 (18.2) |
|  300-399 | 61073 (18.4) | 2169 (19.1) | 58904 (18.4) |
|  400-499 | 35794 (10.8) | 1302 (11.4) | 34492 (10.8) |
|  500+ | 98275 (29.7) | 3193 (28.1) | 95082 (29.7) |
| Urban | 255083 (86.6) | 9544 (83.8) | 277135 (86.7) |
| Teaching Hospital | 145992 (44.1) | 4903 (43.1) | 141089 (44.1) |
| **Discharge Quarter a** |  |  |  |
| Quarter 2, 2020 | 55067 (16.6) | 7041(14.9) | 53363 (16.7) |
| Quarter 3, 2020 | 59564 (18.0) | 2227 (19.6) | 57337 (17.9) |
| Quarter 4, 2020 | 117524 (35.5) | 4587 (40.3) | 112937 (35.3) |
| Quarter 1, 2021 | 98981 (29.9) | 2864 (25.2) | 96117 (30.1) |
| **US Census Division**  |  |  |  |
| East North Central | 53841 (16.3) | 2211 (19.4) | 51630 (16.2) |
| East South Central | 25026 (7.6) | 846 (7.4) | 24180 (7.6) |
| Middle Atlantic | 50329 (15.2) | 1530 (13.4) | 48799 (15.3) |
| Mountain | 24502 (7.4) | 760 (6.7) | 23742 (7.4) |
| New England | 6191 (1.9) | 219 (1.9) | 5972 (1.9) |
| Pacific | 19588 (5.9) | 539 (4.7) | 19049 (6.0) |
| South Atlantic | 94006 (28.4) | 3212 (28.2) | 90794 (28.4) |
| West North Central | 13985 (4.2) | 555 (4.9) | 13433 (4.2) |
| West South Central | 43668 (13.2) | 1513 (13.3) | 42155 (13.2) |
| **Discharge Disposition during first hospitalization** |  |  |  |
| Home or self-care | 199713 (60.3) | 6090 (53.5) | 193623 (60.5) |
| Skilled Nursing Facility (SNF) | 43256 (13.1) | 1387 (12.2) | 41869 (13.1) |
| Home health organization | 54524 (16.5) | 2391 (21.0) | 52133 (16.3) |
| Hospice b  | 10457 (3.2) | 665 (5.8) | 9792 (3.1) |
| Ongoing care c | 13694 (4.1) | 598 (5.3) | 13096 (4.1) |
| Others d | 9492 (2.9) | 251 (2.2) | 9241 (2.9) |
| **Clinical / Severity markers e** |  |  |  |
| Length of stay in days Median (IQR) | 5 (3-8) | 4 (2-6) | 5 (3-9) |
| Supplemental oxygen therapy | 155255 (47.0) | 4987 (43.8) | 150268 (46.9) |
| Intensive Care Unit stay | 43748 (13.2) | 5539 (15.0) | 38209 (13.0) |
| Mechanical Ventilation (invasive and non-invasive) | 20428 (6.2) | 441 (3.9) | 19987 (6.3) |
| Renal Replacement Therapy | 11889 (3.6) | 612 (5.4) | 11277 (3.5) |
| Vasopressors f | 13885 (4.2) | 246 (2.2) | 13639 (4.3) |
| Extracorporeal membrane oxygenation (ECMO) | 329 (0.1) |  2 (0.0) | 327 (0.1) |
| **Unweighted Elixhausers Score Median (IQR)g** | 3 (2-5) | 4 (3 -6) | 3 (2 – 4) |

**Abbreviation:** COVID-19: coronavirus disease 2019

**a Discharge Quarters** Quarter 2, 2020: April, May, June; Quarter 3, 2020: July, August, September; Quarter 4, 2020: October, November, and December; Quarter 1, 2021: January, February, March

**b Hospice** includes discharged to hospice-home or discharged to hospice-medical facility

**c Ongoing care categories** include discharge or transfer to a cancer center, admitted as an inpatient to this hospital, still a patient, discharged or transferred: to federal hospital, swing bed unit, another rehabilitation facility, long-term care hospitals that provide acute inpatient care with an average length of stay ≥25 days, a psychiatric hospital, and a critical access hospital.

**d Other categories includes** patients who were discharged to other facilities and readmitted from the discharged location noted in the column (after index hospitalization).

**e Clinical/ Severity markers were captured for first time COVID-19 hospitalization**

 **f Vasopressor therapy** was defined as receiving any of the following vasopressor agents during hospitalization: epinephrine, nor-epinephrine, phenyl epinephrine, dopamine, dobutamine, and vasopressin.

g **ICD-10 CM diagnoses discharge codes** were mapped to Elixhauser comorbidities using the standardized Agency for Healthcare Research and Quality methodology and software into 29 comorbidity categories.