Supplementary Online Content

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eMethods

We performed three-level hierarchical logistic regression models for the analyses. The main model structure included admissions (level 1), hospital (level 2) and county (level 3). We treated admissions as independent and identically distributed in the model. Patient characteristics were included as level 1 predictors. Hospital was level 2, with admissions clustered into hospitals. Hospital characteristics were included as level 2 predictors. Hospitals were clustered into counties, for level 3.

The main three-level model (Table 1) included random intercepts at level 2 (hospitals) and level 3 (counties). Time period, admission diagnosis and all other patient’s characteristics were fixed effects at level 1, and all hospital characteristics were fixed effects in level 2. We chose the variance components (VC) for variance structure for both level 2 and level 3 random effects. Residual pseudo-likelihood estimation technique (RSPL) was used in the analysis.

The hierarchical structure included about 7M admissions, 4,600 hospitals and 2,500 counties. We chose the statistical estimation method based on the fit statistics, including Likelihood (-2 log Likelihood score); the ratio of Pearson or Generalized Chi–square; and the degree of freedom to examine the residual over-dispersion or under-dispersion. The computer time and memory capacity at the CMS Virtual Research Data Center were also considered in the analysis. At first, we tried to use the Maximum Likelihood Estimation based on the Adaptive Quadrature method, which reached the resource maximum limit at a small integration point (point=1,3,5). We abandoned this method because of insufficient resources for this procedure.

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After that, we tested the Residual Pseudolikelihood Estimation Technique (RSPL) and maximum likelihood estimation with Laplace approximation (LAPLACE) for the model. We chose VC for the variance structure for level 2 and level 3 random intercepts. These methods provide a closed form solution to estimate the parameters, which make the computation faster. Both methods have similar estimation and fit statistics. However, RSPL takes about 1 hour per model, while LAPLACE requires approximately 16 hours per model. We chose RSPL for the analysis.

We performed the same main three-level logistic regression analyses for different cohorts, including the cohort in 2019 and April 2020 to March 2021 in Table 1, and the 6 quarterly cohorts in Table 2. All models included the same fixed effects and the same random effects. We further included interaction terms between time period and patient/hospital characteristics into the models. For Table 3, we added an interaction term for each variable into the model for Table 1. We checked the F statistics for the type 3 test of fixed effects for the interaction term. If the p-value was <0.05, we considered that interaction term significant. For significant interaction terms, we further performed stratified analyses by stratifying the cohort into sub-cohorts by that stratification variable. We then re-performed the same main model and reported the odd ratios (95% CI) for each sub-cohort in Table 3. For Table 4, we stratified the 6 quarterly cohorts into sub-cohorts by hospital SARS-CoV-2 prevalence during that quarter. Hospital SARS-CoV-2 prevalence was categorized by quartiles as a hospital-level variable. However, if >25% of hospitals in a time period had prevalence, we categorized the prevalence into 3 groups. We performed the three-level logistic regression model for the sub-cohorts (high
prevalence vs. low prevalence) hospitals for each quarterly cohort separately and reported odd ratios (95% CI) in Table 4.

The SAS code for the main analysis is below (Table 1). We initially tried the quad method (QPOINTS=X). We abandoned this method because of insufficient memory capacity. We then compared the LAPLACE method and the default RSPL method; both introduced similar estimations. However, the LAPLACE approximation takes about 16 hours computing time and the RSPL takes about 1 hour, so we choose the RSPL technique for our analysis.

```
proc glimmix data=Bic_mns;
  class county_408 prvdr_num y_treat (ref="1") severity_gl(ref="1")
  age_g(ref="1") BENE_SEX_IDNT_CD(ref="1") RACE_CD_u(ref="1")
  medicaid(ref="0") hsh_g(ref="1") admit_from(ref="community")
  lod_g(ref="gl abs")
  Alcohol freq (ref="0") Arzhy_freq (ref="0") BIA_freq(ref="0")
  CHF_freq(ref="0") COPD_freq(ref="0")
  CCG_freq(ref="0") DA_freq(ref="0") Dep_freq(ref="0") Diab_C_freq(ref="0") Diab_DC_freq(ref="0")
  Drug_freq(ref="0") fluid_freq(ref="0") HIV_freq(ref="0") HPMN_C_freq(ref="0") HPMN_DC_freq(ref="0")
  Hptopathy_freq(ref="0") LD_freq(ref="0") lymcp_freq(ref="0") METS_freq(ref="0") Obesitry_freq(ref="0")
  OthN0D_freq(ref="0") FCD_freq(ref="0") FOG_NB_freq(ref="0") EVD_freq(ref="0") Para_freq(ref="0")
  Psycho_freq(ref="0") RF_freq(ref="0") WL_freq(ref="0")
  VD_freq(ref="0") Tumor_freq(ref="0") Rheum_A_freq(ref="0")
  OBRA_URBN_SCHL_IND(ref="R") gnzL_cd (ref="PROC")
  MED_G (ref="1") MBCL_SCHL_AFFIN_CD (ref="1")
  five_score(ref="1");
  model death30(event="1") = los y_treat age_g BENE_SEX_IDNT_CD RACE_CD_u
  medicaid hsh_g admit_from icd_g
  Alcohol_freq Arzhy_freq BIA_freq CHF_freq COPD_freq
  CCG_freq DA_freq Dep_freq Diab_C_freq Diab_DC_freq
  Drug_freq fluid_freq HIV_freq HPMN_C_freq HPMN_DC_freq
  Hptopathy_freq LD_freq lymcp_freq METS_freq Obesity_freq
  OthN0D_freq FCD_freq FOG_NB_freq EVD_freq Para_freq
  Psycho_freq RF_freq WL_freq VD_freq Tumor_freq Rheum_A_freq
  OBRA_URBN_SCHL_IND gnzL_cd
  MED_G MBCL_SCHL_AFFIN_CD
  five_score
    /dist=binary solution link= logit oddsratio DIMN=BN;
    random intercept/ subject=county_hos type=vc;
    random intercept/ subject=prvdr_num (county_hos) type=vc;
  run;
```

For the interaction term analysis in Table 3, we added one interaction term at a time into the main model. For example, for the interaction term of Medicaid and time in Table 3, the SAS command is below.

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We checked the F statistics using type 3 tests of fixed effects for the interaction term. If the p-value was <0.05, we considered the interaction term to be significant. The image representing this is below.
Since the F statistic was significant (p<0.001), we further performed stratified analyses. The stratified model was the same as the main model in Table 1; however, we performed two models for the two sub-cohorts (one for Medicaid cohort and the other for the non-Medicaid cohort). Medicaid was not in the model because it was used to stratify the cohort. We repeated the models to check for the interaction term between time and other patient characteristics, or for the cross-level interaction term between time and hospital characteristics one-by-one. If the
F statistic was significant, we performed stratified analysis for the sub-cohorts by each characteristics.

The models for Table 2 are the same as the main model in Table 1. The only difference was the cohort. Table 1 used the cohort of year 2019 and April 2020 to March 2021. Table 2 used 6 quarterly cohorts: Q2 2020 vs. Q2 2019; Q3 2020 vs. Q3 2019; Q4 2020 vs. Q4 2019; Q1 2021 vs. Q1 2019; Q2 2021 vs. Q2 2019; and Q3 2021 vs. Q3 2019. Since the model was the same, the SAS code is not included here again.

Table 4 used the same 6 quarterly cohorts as in Table 2. We further stratified each quarterly cohort by the hospital SARS-CoV-2 prevalence in that pandemic quarter. We then performed the same model as that used in Table 1 for the sub-cohorts with high prevalence and low prevalence (12 models total). The odds ratios between 2020/2021 and 2019 were obtained for each sub-cohort. Since the model was the same, the SAS code is not included here again.

Table e1 used the same model as Table 1. The difference was the outcome was hospital mortality. Tables e6-e9 included the stratified analysis for 6 pandemic cohorts (2020 Q2-Q4, 2021 Q1-Q3). We performed the same model as in Table 1 for each sub-cohort stratified by each covariate. The models included SARS-CoV-2 prevalence and all other patient and hospital characteristics, except for the time and stratification variable.

All analyses were performed with SAS Enterprise version 7.1 (SAS Institute, Cary, NC) at the CMS Virtual Research Data Center.
**eFigure 1. Cohort selection.**

- **Step 1.** Choose all acute hospitalizations from Jan 2019 through Sep 2021.
  
  - 2019: N=9,650,613 (100%), 2020: N=8,163,860 (100%), 2021: N=5,755,309 (100%)

- **Step 2.** Keep the patients who have part A and no HMO during hospitalization.
  
  - 2019: N=9,421,264 (97.62%), 2020: N=7,942,403 (97.29%), 2021: N=5,685,581 (98.79%)

- **Step 3.** Exclude patients who have COVID diagnosis in the admission diagnosis or the first two discharge diagnoses.
  
  - 2019: N=9,421,264 (100%), 2020: N=7,467,030 (94.01%), 2021: N=5,302,681 (93.27%)

- **Step 4.** Restrict to 20 common medical admissions, *(Table E-1).*
  
  - 2019: N=4,058,171 (43.07%), 2020: N=3,217,259 (43.09%), 2021: N=2,280,892 (43.01%)

- **Step 5.** Keep those with complete data for main analysis.
  
  - 2019 (Jan- Dec): N=3,983,950 (98.17%)
  - 2020 (Apr- Dec): N=2,224,204 (98.21%)
  - 2021 (Jan-Sep): N=2,240,604 (98.23%)
eFigure 2. Mortality rate in the 30 days after hospital admission from 12/1/19 to 9/30/21 for a non-SARS-CoV-2 medical diagnosis, stratified by census division.
**eFigure 3.** Number of hospital admissions and their mortality in the 30 days after admission, for 20 common medical diagnoses. The analysis are similar to those in **Figure 1**, except stratified by each admission diagnosis. There are peaks in mortality around April 2020, January 2021 and September 2021 that are apparent for all diagnoses except for hip fracture and panceatitis, which did not have the September 2021 increase.
eTable 1. Unadjusted and adjusted 30-day mortality rates from a 2018 cohort for each of then 20 common admission diagnoses. 

| Admission category                                      | N (% 30-day mortality) | Adjusted rate (95% CI) |
|--------------------------------------------------------|------------------------|------------------------|
| **Low severity diagnoses**                             |                        |                        |
| Pancreatitis                                           | 7,661 (3.33%)          | 3.53% (3.12%, 3.99%)   |
| UTI                                                    | 38,093 (5.68%)         | 3.59% (3.44%, 3.76%)   |
| Chest Pain                                             | 63,732 (3.82%)         | 3.97% (3.81%, 8.58%)   |
| Skin and soft tissue infection                         | 35,394 (3.98%)         | 4.06% (3.85%, 4.28%)   |
| Diabetes                                               | 17,902 (4.67%)         | 4.54% (4.23%, 4.86%)   |
| **Medium severity diagnoses**                          |                        |                        |
| Abdominal pain                                         | 100,645 (5.76%)        | 4.71% (4.59%, 4.84%)   |
| Seizure                                                | 11,016 (5.89%)         | 4.89% (4.51%, 5.29%)   |
| COPD                                                   | 36,670 (5.08%)         | 5.40% (5.16%, 5.65%)   |
| Stroke                                                 | 60,481 (8.43%)         | 5.67% (5.49%, 5.85%)   |
| Gastrointestinal bleeding                              | 44,453 (7.84%)         | 5.68% (5.48%, 5.88%)   |
| Hip fracture                                            | 15,827 (7.45%)         | 5.91% (5.58%, 6.26%)   |
| Dehydration                                             | 67,735 (10.53%)        | 5.93% (5.78%, 6.09%)   |
| CHF                                                    | 40,432 (10.30%)        | 6.13% (5.91%, 6.35%)   |
| Altered Mental status                                  | 10,923 (12.58%)        | 7.15% (6.75%, 7.56%)   |
| Arrythmia                                              | 54,910 (10.27%)        | 8.35% (8.13%, 8.58%)   |
| **High severity diagnoses**                            |                        |                        |
| Pneumonia                                              | 60,443 (12.23%)        | 8.40% (8.19%, 8.60%)   |
| AMI                                                    | 24,921 (11.03%)        | 9.83% (9.46%, 10.21%)  |
| Alcohol-related                                        | 9,363 (11.26%)         | 11.01% (10.33%, 11.70%)|
| Sepsis and sepsis shock                                | 87,438 (19.68%)        | 11.98% (11.77%, 12.19%)|
| Respiratory failure                                    | 31,804 (18.72%)        | 13.78% (13.41%, 14.15%)|

*For analyses exploring interactions between admission characteristics and hospital prevalence of SARS-CoV-2, (Tables e5-e10), we substituted a “disease severity” measure for the 20 individual admission diagnoses. In order to generate a measure of severity for the 20 admission diagnoses, we calculated the unadjusted and adjusted mortality in the 30 days post admission using 2018 fee for service Medicare data. In the adjusted analyses we controlled for all the admission characteristics used in the analyses in Table 1 including the comorbidities listed in Table e3. Thus, the mortality rate associated with each diagnosis is independent of other admission characteristics.

CI: confidence interval; UTI: urinary tract infection; COPD: Chronic obstructive pulmonary disease; CHF: congestive heart failure; AMI: acute myocardial Infarction.
eTable 2. Characteristics of non-COVID admissions in 2019 and April 2020-September 2021, along with 30-day mortality rates.

| Characteristic                                      | Jan 2019 - Dec 2019 | 30 day mortality N (%) | Apr 2020 - Sep 2021 | 30 day mortality N (%) |
|-----------------------------------------------------|----------------------|------------------------|----------------------|------------------------|
| All                                                 | 3,983,950 (100%)     | 375,605 (9.43%)        | 4,464,808 (100%)     | 496,229 (11.11%)       |
| Age (Per year)                                      |                      |                        |                      |                        |
| <=65                                                | 858,813 (21.56%)     | 45,494 (5.30%)         | 906,561 (20.30%)     | 58,944 (6.50%)         |
| 66-70                                               | 624,961 (15.69%)     | 44,298 (7.09%)         | 716,771 (16.05%)     | 60,582 (8.45%)         |
| 71-75                                               | 636,165 (15.97%)     | 52,213 (8.21%)         | 746,015 (16.71%)     | 73,319 (9.83%)         |
| 75-80                                               | 602,157 (15.11%)     | 57,239 (9.51%)         | 698,648 (15.65%)     | 79,218 (11.34%)        |
| 81-85                                               | 533,399 (13.39%)     | 60,577 (11.36%)        | 608,846 (13.64%)     | 80,724 (13.26%)        |
| 86+                                                 | 728,455 (18.28%)     | 115,784 (15.89%)       | 787,967 (17.65%)     | 143,442 (18.20%)       |
| Gender                                              |                      |                        |                      |                        |
| Male                                                | 1,869,002 (46.91%)   | 186,199 (9.96%)        | 2,117,523 (47.43%)   | 247,986 (11.71%)       |
| Female                                              | 2,114,948 (53.09%)   | 189,406 (8.96%)        | 2,347,285 (52.57%)   | 248,243 (10.58%)       |
| Race                                                |                      |                        |                      |                        |
| White                                               | 3,077,794 (77.25%)   | 299,064 (9.72%)        | 3,468,026 (77.67%)   | 391,035 (11.28%)       |
| Black                                               | 476,762 (11.97%)     | 39,479 (8.28%)         | 510,393 (11.43%)     | 510,393 (11.43%)       |
| Hispanic                                            | 256,040 (6.43%)      | 256,040 (6.42%)        | 278,330 (6.23%)      | 29,448 (10.58%)        |
| Other                                               | 173,354 (4.35%)      | 15,500 (8.94%)         | 208,059 (4.66%)      | 22,672 (10.90%)        |
| Medicaid                                            |                      |                        |                      |                        |
| No                                                  | 2,833,520 (71.12%)   | 279,451 (9.86%)        | 3,273,820 (73.32%)   | 373,172 (11.40%)       |
| Yes                                                 | 1,150,430 (28.88%)   | 96,154 (8.36%)         | 1,190,988 (26.68%)   | 123,057 (10.33%)       |
| Education (Percent of persons age 25+ in Zip area with high school education) (Per percent) | | | | |
| Q1                                                  | 1,048,242 (26.31%)   | 97,944 (9.34%)         | 1,112,379 (24.91%)   | 127,550 (11.47%)       |
| Q2                                                  | 1,016,381 (25.51%)   | 96,621 (9.51%)         | 1,126,069 (25.22%)   | 127,091 (11.29%)       |
| Q3                                                  | 1,001,517 (25.14%)   | 94,964 (9.48%)         | 1,144,198 (25.63%)   | 125,730 (10.99%)       |
| Q4                                                  | 917,810 (23.04%)     | 86,076 (9.38%)         | 1,082,162 (24.24%)   | 115,858 (10.71%)       |
| Residence prior to hospitalization                  |                      |                        |                      |                        |
| Community                                           | 3,502,381 (87.91%)   | 302,149 (8.63%)        | 3,890,813 (87.14%)   | 398,486 (10.24%)       |
| Nursing facility or other institutions              | 481,569 (12.09%)     | 73,456 (15.25%)        | 573,995 (12.86%)     | 97,743 (17.03%)        |
| Admission category                                  |                      |                        |                      |                        |
| g1-Abdominal pain                                   | 489,870 (12.30%)     | 28,211 (5.76%)         | 541,484 (12.13%)     | 35,283 (6.52%)         |
| g2-AMI                                              | 129,581 (3.25%)      | 13,448 (10.38%)        | 165,834 (3.71%)      | 18,518 (11.17%)        |
| g3-Alcohol-related                                  | 45,575 (1.14%)       | 4,545 (9.97%)          | 50,905 (1.14%)       | 5,111 (10.04%)         |
| g4-Altered Mental status                           | 55,781 (1.40%)       | 6,905 (12.38%)         | 74,845 (1.68%)       | 10,480 (14.00%)        |
| g5-Arrythmia                                        | 272,393 (6.84%)      | 27,557 (10.12%)        | 302,466 (6.77%)      | 35,030 (11.58%)        |
| g6-Chest Pain                                       | 300,849 (7.55%)      | 11,742 (3.90%)         | 310,078 (6.94%)      | 13,652 (4.40%)         |
| g7-CHF                                              | 190,264 (4.78%)      | 19,362 (10.18%)        | 203,195 (4.55%)      | 22,670 (11.16%)        |
| g8-COPD                                             | 167,997 (4.22%)      | 8,641 (5.14%)          | 109,569 (2.45%)      | 7,151 (6.53%)          |
| g9-Dehydration                                      | 329,931 (8.28%)      | 34,622 (10.49%)        | 418,391 (9.37%)      | 49,522 (11.84%)        |
| g10-Diabetes                                        | 89,028 (2.33%)       | 4,393 (4.93%)          | 105,940 (2.37%)      | 6,361 (6.00%)          |
| g11-                                                | 211,469 (5.31%)      | 15,904 (7.52%)         | 250,275 (5.61%)      | 21,763 (8.70%)         |

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| Condition                               | 2019 Cases (2019%) | 2020 Cases (2020%) | 2019-P2020 Cases (Change) |
|-----------------------------------------|--------------------|--------------------|---------------------------|
| Gastrointestinal bleeding              |                    |                    |                           |
| g12-Hip fracture                        | 78,713 (1.98%)     | 5,826 (7.40%)      | 109,316 (2.45%)           |
| g13-Pancreatitis                       | 36,201 (0.91%)     | 1,146 (3.17%)      | 41,107 (0.92%)            |
| g14-Pneumonia                          | 280,393 (7.04%)    | 33,669 (12.01%)    | 238,472 (7.34%)           |
| g15-Respiratory failure                | 160,736 (4.03%)    | 29,150 (18.14%)    | 185,821 (4.16%)           |
| g16-Seizure                            | 52,289 (1.31%)     | 3,356 (6.42%)      | 63,645 (1.42%)            |
| g17-Sepsis and sepsis shock            | 446,417 (11.21%)   | 85,161 (19.08%)    | 546,215 (12.23%)          |
| g18-Skin and soft tissue infection     | 170,649 (4.28%)    | 6,803 (3.99%)      | 190,525 (4.27%)           |
| g19-stroke                             | 289,497 (7.27%)    | 24,351 (8.41%)     | 341,848 (7.64%)           |
| g20-UTI                                | 186,317 (4.68%)    | 10,813 (5.80%)     | 215,611 (4.83%)           |
| Length of stay, Median (Q1, Q3)        | 5 (3, 7)           | -                  | 5 (3, 7)                  |
| Elixhauser Score, Median (Q1, Q3)      | 4 (3, 6)           | -                  | 4 (3, 6)                  |

AMI: acute myocardial infarction; CHF: congestive heart failure; COPD: Chronic obstructive pulmonary disease; UTI: urinary tract infection; STD: standard deviation.

Given the very large sample size, all differences in the characteristics in 4/1/20-3/3121 were statistically significant compared to those in 2019 at P < 0.05 level. Also, all differences in mortality rates between categories of characteristics were statistically significant at P<0.05.
eTable 3. Comorbidities included in the multilevel logistic regression model presented in Table 1 for 30 day mortality after admission, for non-SARS-CoV-2 medical admissions during January to December 2019 and April 2020 to March 2021, unadjusted rates and odds from three-level (admission, hospital, county) logistic regression analysis, comparing mortality in April 2020 to March 2021 to mortality in 2019.

| Elixhauser comorbidity                  | N (%)       | 30-day mortality after admission N (%) | Odds Ratio (95% confidence interval) |
|----------------------------------------|-------------|---------------------------------------|--------------------------------------|
| All                                    | 6,949,196   | 712,708 (10.30%)                      |                                      |
| Alcohol abuse                          |             |                                       |                                      |
| No                                     | 6,640,112 (95.97%) | 687,706 (10.36%)                      | Reference                            |
| Yes                                    | 279,084 (4.03%)  | 25,002 (8.96%)                        | 0.86 (0.85-0.88)                     |
| Cardiac Arrhythmia                     |             |                                       |                                      |
| No                                     | 4,639,899 (67.06%) | 404,515 (8.72%)                      | Reference                            |
| Yes                                    | 2,279,297 (32.94%) | 308,193 (13.52%)                     | 1.25 (1.24-1.26)                     |
| Blood Loss Anemia                      |             |                                       |                                      |
| No                                     | 6,849,839 (99.00%) | 705,003 (10.29%)                     | Reference                            |
| Yes                                    | 69,357 (1.00%)  | 7,705 (11.11%)                       | 0.96 (0.93-0.98)                     |
| Congestive Heart Failure               |             |                                       |                                      |
| No                                     | 4,597,810 (66.45%) | 393,520 (8.56%)                     | Reference                            |
| Yes                                    | 1,391,525 (33.55%) | 319,188 (13.75%)                     | 1.45 (1.44-1.46)                     |
| Chronic Obstructive Pulmonary Disease  |             |                                       |                                      |
| No                                     | 4,974,958 (71.90%) | 497,017 (9.99%)                     | Reference                            |
| Yes                                    | 1,944,238 (28.10%) | 215,691 (11.09%)                    | 1.06 (1.05-1.06)                     |
| Coagulopathy                           |             |                                       |                                      |
| No                                     | 6,409,331 (92.63%) | 617,902 (9.64%)                     | Reference                            |
| Yes                                    | 509,865 (7.37%)  | 94,806 (18.59%)                      | 1.57 (1.56-1.58)                     |
| Deficiency Anemia                      |             |                                       |                                      |
| No                                     | 6,519,998 (94.23%) | 670,156 (10.28%)                     | Reference                            |
| Yes                                    | 399,198 (5.77%)  | 42,552 (10.66%)                      | 0.83 (0.82-0.84)                     |
| Depression                             |             |                                       |                                      |
| No                                     | 5,851,878 (84.57%) | 626,668 (10.71%)                     | Reference                            |
| Yes                                    | 1,067,318 (15.49%) | 86,040 (8.06%)                      | 0.84 (0.83-0.84)                     |
| Diabetes Complicated                   |             |                                       |                                      |
| No                                     | 5,079,587 (73.41%) | 518,093 (10.20%)                     | Reference                            |
| Yes                                    | 1,839,609 (26.59%) | 194,615 (10.58%)                     | 1.06 (1.05-1.07)                     |
| Diabetes Uncomplicated                 |             |                                       |                                      |
| No                                     | 6,090,793 (88.03%) | 640,919 (10.52%)                     | Reference                            |
| Yes                                    | 828,403 (11.97%)  | 71,789 (8.67%)                       | 1.00 (0.99-1.01)                     |
| Drug Abuse                             |             |                                       |                                      |
| No                                     | 6,688,065 (96.66%) | 700,378 (10.47%)                     | Reference                            |
| Yes                                    | 231,131 (3.34%)  | 12,330 (5.33%)                       | 0.73 (0.72-0.74)                     |
| Fluid and Electrolyte Disorders        |             |                                       |                                      |
| No                                     | 4,095,997 (59.20%) | 295,668 (7.22%)                      | Reference                            |
| Yes                                    | 2,823,199 (40.80%) | 417,040 (14.77%)                     | 1.77 (1.76-1.78)                     |
| AIDS/HIV                               |             |                                       |                                      |
| No                                     | 6,903,438 (99.77%) | 711,413 (10.31%)                     | Reference                            |
| Yes                                    | 15,758 (0.23%)   | 1,295 (8.22%)                        | 1.02 (0.95-1.08)                     |

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| Condition                                      | Yes Cases                  | No Cases                  | Reference Cases | Odds Ratio |
|-----------------------------------------------|----------------------------|--------------------------|-----------------|------------|
| Hypertension Uncomplicated                    | 2,670,707 (38.60%)         | 4,429,887 (64.02%)       | 331,061 (12.40%) | 0.85 (0.84-0.86) |
| Hypothyroidism                                | 2,489,309 (35.98%)         | 5,529,087 (79.91%)       | 140,625 (10.12%) | 0.89 (0.88-0.90) |
| Liver Disease                                 | 412,245 (5.96%)            | 6,506,951 (94.04%)       | 70,956 (17.21%)  | 2.12 (2.10-2.14) |
| Lymphoma                                      | 86,881 (1.26%)             | 6,832,315 (98.74%)       | 14,483 (6.67%)   | 1.52 (1.49-1.55) |
| Metastatic Cancer                             | 238,657 (3.45%)            | 6,680,539 (96.55%)       | 77,925 (32.65%)  | 3.77 (3.72-3.81) |
| Obesity                                       | 1,129,994 (16.33%)         | 5,789,202 (83.67%)       | 73,445 (6.50%)   | 0.75 (0.75-0.75) |
| Other Neurological Disorders                  | 1,189,222 (17.19%)         | 5,729,974 (82.81%)       | 224,598 (18.89%) | 2.14 (2.12-2.15) |
| Pulmonary Circulation Disorders               | 499,464 (7.22%)            | 6,419,732 (92.78%)       | 77,086 (15.43%)  | 1.29 (1.27-1.30) |
| Peptic Ulcer Disease excluding bleeding       | 6,880,158 (99.00%)         | 69,038 (1.00%)           | 5,320 (7.71%)    | 0.79 (0.76-0.81) |
| Peripheral Vascular Disorders                 | 6,394,884 (92.42%)         | 6,341,923 (99.00%)       | 65,489 (12.49%)  | 1.18 (1.17-1.19) |
| Paralysis                                     | 524,312 (7.58%)            | 6,714,487 (97.04%)       | 682,302 (10.16%) | 1.90 (1.87-1.93) |
| Psychoses                                     | 204,709 (2.96%)            | 6,780,423 (97.99%)       | 30,406 (4.85%)   | 0.94 (0.92-0.96) |
| Renal Failure                                 | 138,773 (2.01%)            | 6,850,158 (99.00%)       | 11,044 (7.96%)   | 0.94 (0.92-0.96) |
| Weight Loss                                   | 52,432 (1.39%)             | 6,394,884 (92.42%)       | 65,489 (12.49%)  | 1.18 (1.17-1.19) |
| Valvular Disease                              | 204,709 (2.96%)            | 6,780,423 (97.99%)       | 30,406 (4.85%)   | 0.94 (0.92-0.96) |
| Solid Tumor without Metastasis                | 674,512 (9.75%)            | 6,244,684 (90.25%)       | 81,980 (12.15%)  | 0.92 (0.92-0.93) |
| Rheumatoid Arthritis/collagen                 | 406,986 (5.88%)            | 6,512,210 (94.12%)       | 95,485 (23.46%)  | 1.64 (1.62-1.65) |
| Rheumatoid Arthritis/collagen                 | 660,449 (95.51%)           | 6,608,449 (95.51%)       | 685,381 (10.37%) | Reference |

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Table 4. Hospital mortality for non-SARS-CoV-2 medical admissions during January to December 2019 and April 2020 to March 2021, unadjusted rates and odds from three-level (admission, hospital, county) logistic regression analysis.

| Characteristic                             | Admissions (%) | Hospital mortality N (%) | Odds Ratio (95% Confidence Interval) |
|--------------------------------------------|----------------|--------------------------|--------------------------------------|
| All                                        | 6,919,196      | 301,962 (4.36%)          |                                      |
| Year                                       |                |                          |                                      |
| Jan 2019- Dec 2019                         | 3,983,950 (57.58%) | 158,076 (3.97%)         | Reference                            |
| Apr 2020- Mar 2021                         | 2,935,246 (42.42%) | 143,886 (4.90%)         | 1.16 (1.15-1.17)                     |
| Length of Stay                             |                |                          |                                      |
| <=65                                       | 1,472,200 (21.28%) | 44,549 (3.03%)          | Reference                            |
| 66-70                                      | 1,096,723 (15.85%) | 41,503 (3.78%)          | 1.21 (1.19-1.23)                     |
| 71-75                                      | 1,121,875 (16.21%) | 46,897 (4.18%)          | 1.34 (1.32-1.36)                     |
| 75-80                                      | 1,055,721 (15.26%) | 48,092 (4.56%)          | 1.46 (1.44-1.48)                     |
| 81-85                                      | 930,264 (13.44%) | 46,092 (4.56%)          | 1.61 (1.59-1.63)                     |
| 86+                                        | 1,242,413 (17.96%) | 74,824 (6.02%)          | 2.05 (2.02-2.08)                     |
| Gender                                     |                |                          |                                      |
| Male                                       | 3,266,768 (47.21%) | 154,499 (4.73%)         | Reference                            |
| Female                                     | 3,652,428 (52.79%) | 147,463 (4.04%)         | 0.97 (0.96-0.97)                     |
| Race                                       |                |                          |                                      |
| White                                      | 5,351,956 (77.35%) | 229,928 (4.30%)         | Reference                            |
| Black                                      | 821,569 (11.87%) | 36,609 (4.46%)          | 0.99 (0.97-1.01)                     |
| Hispanic                                   | 438,453 (6.34%) | 20,185 (4.60%)          | 1.05 (1.03-1.07)                     |
| Other a                                    | 307,218 (4.44%) | 15,240 (4.96%)          | 1.07 (1.05-1.09)                     |
| Medicaid                                   |                |                          |                                      |
| No                                         | 4,973,602 (71.88%) | 221,573 (4.45%)         | Reference                            |
| Yes                                        | 1,945,594 (28.12%) | 80,389 (4.13%)          | 0.92 (0.91-0.93)                     |
| Education (Percent of persons age 25+ in Zip area with high school education) (Per percent) |            |                          |                                      |
| Q1                                         | 1,788,498 (25.85%) | 82,834 (4.63%)          | Reference                            |
| Q2                                         | 1,761,020 (25.45%) | 77,476 (4.40%)          | 0.98 (0.97-0.99)                     |
| Q3                                         | 1,750,825 (25.30%) | 74,737 (4.27%)          | 0.95 (0.94-0.96)                     |
| Q4                                         | 1,618,853 (23.40%) | 66,915 (4.13%)          | 0.92 (0.91-0.93)                     |
| Residence prior to hospitalization         |                |                          |                                      |
| Community                                  | 6,060,688 (87.59%) | 233,056 (3.85%)         | Reference                            |
| Nursing facility or other institutions     | 858,508 (12.41%) | 68,906 (8.03%)          | 1.76 (1.74-1.77)                     |
| Admission category                         |                |                          |                                      |
| Abdominal pain                             | 843,966 (12.20%) | 18,259 (2.16%)          | Reference                            |
| AMI                                        | 239,076 (3.46%) | 14,461 (6.05%)          | 2.94 (2.88-3.01)                     |
| Alcohol-related                            | 80,080 (1.16%) | 4,313 (5.39%)           | 2.43 (2.35-2.52)                     |
| Altered Mental status                      | 105,459 (1.52%) | 3,964 (3.76%)           | 1.10 (1.06-1.14)                     |
| Arrythmia                                  | 466,700 (6.75%) | 33,079 (7.09%)          | 3.26 (3.19-3.32)                     |
| Chest Pain                                 | 505,765 (7.31%) | 8,109 (1.60%)           | 0.91 (0.89-0.94)                     |
| CHF                                        | 323,536 (4.68%) | 11,131 (3.44%)          | 1.13 (1.10-1.16)                     |
| COPD                                       | 237,393 (3.43%) | 3,629 (1.53%)           | 0.92 (0.89-0.95)                     |
| Dehydration                                | 604,055 (8.73%) | 19,363 (3.21%)          | 0.97 (0.95-0.99)                     |

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| Condition                      | Cases        | Controls      | OR (95% CI)  |
|-------------------------------|--------------|---------------|--------------|
| Diabetes                      | 160,147 (2.31%) | 2,816 (1.76%) | 0.82 (0.79-0.85) |
| Gastrointestinal bleeding     | 378,139 (5.47%) | 11,058 (2.92%) | 1.14 (1.11-1.17) |
| Hip fracture                   | 152,156 (2.20%) | 3,342 (2.20%) | 1.09 (1.05-1.13) |
| Pancreatitis                   | 63,682 (3.53%) | 941 (1.48%)   | 0.83 (0.78-0.79) |
| Pneumonia                      | 439,673 (6.35%) | 21,246 (4.83%) | 1.91 (1.87-1.95) |
| Respiratory failure            | 284,115 (4.11%) | 28,683 (10.10%) | 3.94 (3.86-4.02) |
| Seizure                        | 94,404 (1.36%) | 2,107 (2.23%) | 0.84 (0.80-0.88) |
| Sepsis and sepsis shock        | 805,579 (11.64%) | 88,313 (10.96%) | 3.39 (3.33-3.45) |
| Skin and soft tissue infection | 295,468 (4.27%) | 4,578 (1.55%) | 0.86 (0.83-0.89) |
| Stroke                         | 514,512 (7.44%) | 18,427 (3.58%) | 1.37 (1.34-1.40) |
| UTI                            | 325,291 (4.70%) | 4,136 (1.27%) | 0.48 (0.46-0.50) |
| Hospital or county characteristics |          |               |              |
| Location                       |              |               |              |
| Rural                         | 907,417 (13.11%) | 33,004 (3.64%) | Reference   |
| Urban                         | 6,011,779 (86.89%) | 268,958 (4.47%) | 0.94 (0.90-0.98) |
| Type of provider               |              |               |              |
| For profit                     | 1,037,227 (14.99%) | 42,566 (4.10%) | Reference   |
| Government                     | 854,820 (12.35%) | 38,679 (4.52%) | 1.13 (1.08-1.18) |
| Non-profit                     | 5,027,149 (72.66%) | 220,717 (4.39%) | 0.99 (0.95-1.03) |
| Bed size                       |              |               |              |
| <=200                          | 1,820,950 (26.32%) | 64,493 (3.54%) | Reference   |
| 201-350                        | 1,835,572 (26.53%) | 79,637 (4.34%) | 1.19 (1.15-1.23) |
| 351-500                        | 1,226,921 (17.73%) | 58,013 (4.73%) | 1.28 (1.22-1.34) |
| >=501                          | 2,035,753 (29.42%) | 99,819 (4.90%) | 1.28 (1.22-1.34) |
| Medical school affiliation      |              |               |              |
| Major                          | 1,610,211 (23.27%) | 79,160 (4.92%) | Reference   |
| Limited                        | 1,503,721 (21.73%) | 67,579 (4.49%) | 0.98 (0.94-1.03) |
| Graduate                       | 345,069 (4.99%) | 17,283 (5.01%) | 1.04 (0.97-1.12) |
| No affiliation                 | 3,460,195 (50.01%) | 137,940 (3.99%) | 0.97 (0.92-1.01) |
| HCAHPS Summary Star            |              |               |              |
| 1                              | 156,679 (2.26%) | 8,411 (5.37%) | Reference   |
| 2                              | 896,157 (12.95%) | 41,614 (4.64%) | 0.92 (0.85-0.99) |
| 3                              | 3,460,499 (50.01%) | 152,760 (4.41%) | 0.86 (0.79-0.92) |
| 4                              | 1,984,041 (28.67%) | 83,748 (4.22%) | 0.81 (0.75-0.88) |
| 5                              | 237,628 (3.43%) | 8,943 (3.76%) | 0.75 (0.68-0.83) |
| Not available                  | 184,192 (2.66%) | 6,486 (3.52%) | 0.96 (0.88-1.04) |

*The models also include 31 comorbidities shown in Table e3.
AMI: acute myocardial Infarction; CHF: congestive heart failure; COPD: Chronic obstructive pulmonary disease; UTI: urinary tract infection; HCAHPS: Hospital Consumer Assessment of Healthcare Providers and Systems.
### eTable 5. Odds of mortality in the 30 days after hospital admission for patients with non-SARS-CoV-2 medical diagnoses from April through June of 2020 by quartile of prevalence of SARS-CoV-2 in the hospital, stratified by characteristics of the admission.\(^a\)

| Admission/hospital characteristic | SARS-CoV-2 prevalence 0 | SARS-CoV-2 prevalence 0.01-2.05% OR (95% CI) | SARS-CoV-2 prevalence >2.06% OR (95% CI) |
|----------------------------------|-------------------------|---------------------------------------------|------------------------------------------|
| **Disease severity**             |                         |                                             |                                          |
| Low                              | Ref 0.98 (0.90, 1.06)    | 0.98 (0.90, 1.07)                           |                                          |
| Medium                           | Ref 0.99 (0.95, 1.04)    | 1.01 (0.96, 1.07)                           |                                          |
| High                             | Ref 1.04 (0.99, 1.10)    | 1.21 (1.14, 1.28)                           |                                          |
| **Age**                          |                         |                                             |                                          |
| <=65                             | Ref 1.11 (1.03, 1.21)    | 1.20 (1.10, 1.31)                           |                                          |
| 66-70                            | Ref 1.06 (0.98, 1.15)    | 1.11 (1.12, 1.21)                           |                                          |
| 71-75                            | Ref 1.06 (0.99, 1.15)    | 1.10 (1.02, 1.20)                           |                                          |
| 75-80                            | Ref 1.03 (0.95, 1.11)    | 1.14 (1.06, 1.23)                           |                                          |
| 81-85                            | Ref 0.98 (0.91, 1.06)    | 1.03 (0.96, 1.11)                           |                                          |
| 86+                              | Ref 0.92 (0.87, 0.98)    | 1.02 (0.96, 1.09)                           |                                          |
| **Race**                         |                         |                                             |                                          |
| White                            | Ref 1.01 (0.98, 1.05)    | 1.08 (1.03, 1.13)                           |                                          |
| Black                            | Ref 1.04 (0.91, 1.19)    | 1.12 (0.99, 1.28)                           |                                          |
| Hispanic                         | Ref 0.95 (0.84, 1.08)    | 0.98 (0.86, 1.12)                           |                                          |
| Other                            | Ref 1.01 (0.88, 1.16)    | 1.21 (1.05, 1.39)                           |                                          |
| **Medicaid**                     |                         |                                             |                                          |
| No                               | Ref 0.99 (0.95, 1.03)    | 1.07 (1.02, 1.12)                           |                                          |
| Yes                              | Ref 1.07 (1.01, 1.14)    | 1.14 (1.07, 1.22)                           |                                          |
| **Residence prior to hospitalization** |         |                                             |                                          |
| Community                        | Ref 0.98 (0.94, 1.02)    | 1.05 (0.99, 1.09)                           |                                          |
| Nursing facility or other institutions | 1.18 (1.09, 1.28) | 1.35 (1.24, 1.47)                           |                                          |
| **Medical school affiliation**   |                         |                                             |                                          |
| Major                            | Ref 0.91 (0.77, 1.07)    | 0.95 (0.81, 1.12)                           |                                          |
| Limited                          | Ref 1.04 (0.94, 1.15)    | 1.19 (1.07, 1.33)                           |                                          |
| Graduate                         | Ref 0.98 (0.63, 1.53)    | 0.97 (0.61, 1.55)                           |                                          |
| No affiliation                   | Ref 1.02 (0.97, 1.07)    | 1.09 (1.04, 1.15)                           |                                          |
| **Location**                     |                         |                                             |                                          |
| Rural                            | Ref 0.94 (0.88, 1.01)    | 1.14 (1.06, 1.23)                           |                                          |
| Urban                            | Ref 1.03 (0.98, 1.08)    | 1.09 (1.03, 1.15)                           |                                          |
| **Type of hospital**             |                         |                                             |                                          |
| For profit                       | Ref 1.01 (0.91, 1.12)    | 1.08 (0.97, 1.20)                           |                                          |
| Government                       | Ref 0.97 (0.87, 1.09)    | 1.04 (0.93, 1.16)                           |                                          |
| Non-profit                       | Ref 1.02 (0.97, 1.07)    | 1.10 (1.04, 1.16)                           |                                          |
| **Hospital quality score**       |                         |                                             |                                          |
| 1                                | Ref 1.37 (0.88, 2.14)    | 1.30 (0.84, 2.02)                           |                                          |
| 2                                | Ref 1.00 (0.89, 1.12)    | 1.08 (0.96, 1.22)                           |                                          |
| 3                                | Ref 1.04 (0.98, 1.10)    | 1.13 (1.06, 1.20)                           |                                          |
| 4                                | Ref 0.99 (0.92, 1.08)    | 1.04 (0.95, 1.14)                           |                                          |
| 5                                | Ref 1.00 (0.79, 1.26)    | 1.12 (0.84, 1.49)                           |                                          |
In generating the data presented in Tables e5-e10, we first tested for interactions between admission or hospital characteristics and the percentages of SARS-CoV-2 admissions at each hospital (prevalence of SARS-CoV-2). Tables 5-10 present the stratified analyses based on those interactions. Each table presents analyses from a three-month period, because SARS-CoV-2 prevalence in hospitals changed over time. If an admission or hospital characteristic showed a significant interaction with hospital SARS-CoV-2 prevalence in any time period, then it was included in the stratified analyses for all the time periods. OR, odds ratio; CI, confidence interval.

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**Table 6. Odds of mortality in the 30 days after hospital admission for patients with non-SARS-CoV-2 medical diagnoses from July through September of 2020 by level of prevalence of SARS-CoV-2 in the hospital, stratified by characteristics of the admission.**

| Admission/hospital characteristic | SARS-CoV-2 prevalence | SARS-CoV-2 prevalence | SARS-CoV-2 prevalence |
|-----------------------------------|------------------------|------------------------|------------------------|
|                                   | 0                     | 0.01-3.93%             | >3.94%                 |
|                                   | OR (95% CI)            | OR (95% CI)            | OR (95% CI)            |
| Disease severity                  |                        |                        |                        |
| Low                               | Ref                    | 0.90 (0.83, 0.99)      | 1.05 (0.95, 1.16)      |
| Medium                            | Ref                    | 0.97 (0.92, 1.03)      | 1.09 (1.03, 1.16)      |
| High                              | Ref                    | 1.06 (0.99, 1.13)      | 1.23 (1.15, 1.31)      |
| Age                               |                        |                        |                        |
| <=65                              | Ref                    | 1.17 (1.06, 1.29)      | 1.38 (1.24, 1.53)      |
| 66-70                             | Ref                    | 1.00 (0.91, 1.10)      | 1.12 (1.01, 1.24)      |
| 71-75                             | Ref                    | 1.04 (0.95, 1.14)      | 1.15 (1.05, 1.27)      |
| 75-80                             | Ref                    | 1.01 (0.93, 1.10)      | 1.18 (1.07, 1.30)      |
| 81-85                             | Ref                    | 0.95 (0.87, 1.03)      | 1.13 (1.04, 1.24)      |
| 86+                               | Ref                    | 0.92 (0.86, 0.98)      | 1.03 (0.96, 1.10)      |
| Race                              |                        |                        |                        |
| White                             | Ref                    | 1.00 (0.95, 1.04)      | 1.12 (1.06, 1.18)      |
| Black                             | Ref                    | 1.07 (0.93, 1.22)      | 1.27 (1.10, 1.47)      |
| Hispanic                          | Ref                    | 0.87 (0.76, 1.01)      | 1.14 (1.98, 1.33)      |
| Other                             | Ref                    | 1.06 (0.90, 1.25)      | 1.14 (0.95, 1.37)      |
| Medicaid                          |                        |                        |                        |
| No                                | Ref                    | 0.97 (0.93, 1.02)      | 1.08 (1.02, 1.14)      |
| Yes                               | Ref                    | 1.06 (0.99, 1.13)      | 1.29 (1.19, 1.39)      |
| Residence prior to hospitalization|                        |                        |                        |
| Community                         | Ref                    | 0.97 (0.93, 1.02)      | 1.13 (1.07, 1.18)      |
| Nursing facility or other institutions | Ref            | 1.13 (1.03, 1.23)      | 1.16 (1.05, 1.28)      |
| Medical school affiliation        |                        |                        |                        |
| Major                             | Ref                    | 1.02 (0.89, 1.17)      | 1.30 (1.11, 1.52)      |
| Limited                           | Ref                    | 1.02 (0.93, 1.13)      | 1.15 (1.03, 1.29)      |
| Graduate                          | Ref                    | 0.67 (0.46, 0.97)      | 0.95 (0.64, 1.44)      |
| No affiliation                    | Ref                    | 0.99 (0.94, 1.04)      | 1.14 (1.08, 1.21)      |
| Location                          |                        |                        |                        |
| Rural                             | Ref                    | 0.95 (0.88, 1.02)      | 1.16 (1.08, 1.25)      |
| Urban                             | Ref                    | 1.01 (0.95, 1.06)      | 1.12 (1.05, 1.19)      |
| Type of hospital                  |                        |                        |                        |
| For profit                        | Ref                    | 1.10 (0.97, 1.24)      | 1.20 (1.06, 1.36)      |
| Government                        | Ref                    | 0.92 (0.82, 1.04)      | 1.09 (0.98, 1.23)      |
| Non-profit                        | Ref                    | 0.98 (0.93, 1.03)      | 1.14 (1.07, 1.21)      |
| Hospital quality score            |                        |                        |                        |
| 1                                 | Ref                    | 0.97 (0.71, 1.33)      | 1.25 (0.81, 1.92)      |
| 2                                 | Ref                    | 1.16 (1.02, 1.31)      | 1.32 (1.15, 1.52)      |
| 3                                 | Ref                    | 1.02 (0.95, 1.09)      | 1.18 (1.09, 1.27)      |
| 4                                 | Ref                    | 0.96 (0.87, 1.06)      | 1.12 (1.01, 1.24)      |
| 5                                 | Ref                    | 1.04 (0.85, 1.27)      | 1.20 (0.94, 1.53)      |

*aSee footnote to Table e5. OR, odds ratio; CI, confidence interval."
**eTable 7. Odds of mortality in the 30 days after hospital admission for patients with non-SARS-CoV-2 medical conditions from October through December of 2020 by quartile of prevalence of SARS-CoV-2 in the hospital, stratified by characteristics of the admission.**

| Admission/hospital characteristic | SARS-CoV-2 prevalence | SARS-CoV-2 prevalence | SARS-CoV-2 prevalence | SARS-CoV-2 prevalence |
|----------------------------------|------------------------|------------------------|------------------------|------------------------|
|                                  | 0-2.87% | 2.88-7.09% | 7.10-14.96% | >14.97% |
| Disease severity                 |          |          |          |          |
| Low                              | Ref      | 1.05 (1.01, 1.09) | 1.09 (1.04, 1.13) | 1.20 (1.13, 1.27) |
| Medium                           | Ref      | 1.07 (1.02, 1.12) | 1.12 (1.07, 1.17) | 1.19 (1.13, 1.27) |
| High                             | Ref      | 1.07 (1.02, 1.12) | 1.12 (1.07, 1.17) | 1.19 (1.13, 1.27) |
| Age (Per year)                   |          |          |          |          |
| <=65                             | Ref      | 1.01 (0.95, 1.08) | 1.05 (0.98, 1.13) | 1.00 (0.91, 1.11) |
| 66-70                            | Ref      | 1.04 (0.97, 1.11) | 1.07 (0.99, 1.14) | 1.06 (0.97, 1.17) |
| 71-75                            | Ref      | 1.02 (0.96, 1.08) | 1.08 (1.02, 1.16) | 1.16 (1.07, 1.27) |
| 75-80                            | Ref      | 1.10 (1.04, 1.17) | 1.11 (1.04, 1.18) | 1.24 (1.14, 1.35) |
| 81-85                            | Ref      | 1.03 (0.97, 1.10) | 1.14 (1.07, 1.21) | 1.27 (1.17, 1.38) |
| 86+                              | Ref      | 1.04 (0.99, 1.10) | 1.08 (1.02, 1.13) | 1.24 (1.16, 1.32) |
| Race                             |          |          |          |          |
| White                            | Ref      | 1.05 (1.01, 1.09) | 1.10 (1.06, 1.14) | 1.20 (1.14, 1.26) |
| Black                            | Ref      | 1.03 (0.96, 1.10) | 1.07 (0.99, 1.15) | 1.11 (0.98, 1.25) |
| Hispanic                         | Ref      | 0.98 (0.90, 1.07) | 0.99 (0.90, 1.09) | 1.18 (1.02, 1.35) |
| Other                            | Ref      | 1.07 (0.97, 1.18) | 1.09 (0.98, 1.21) | 1.10 (0.94, 1.29) |
| Medicaid                         |          |          |          |          |
| No                               | Ref      | 1.05 (1.01, 1.09) | 1.09 (1.05, 1.14) | 1.19 (1.13, 1.25) |
| Yes                              | Ref      | 1.03 (0.98, 1.10) | 1.08 (1.02, 1.14) | 1.15 (1.07, 1.23) |
| Residence prior to hospitalization |          |          |          |          |
| Community                        | Ref      | 1.04 (1.01, 1.08) | 1.10 (1.06, 1.14) | 1.20 (1.14, 1.26) |
| Nursing facility or other institutions | Ref   | 1.04 (0.98, 1.10) | 1.05 (0.99, 1.12) | 1.09 (0.99, 1.19) |
| Medical school affiliation       |          |          |          |          |
| Major                            | Ref      | 1.03 (0.96, 1.11) | 1.06 (0.97, 1.16) | 1.14 (0.95, 1.37) |
| Limited                          | Ref      | 1.06 (0.98, 1.15) | 1.12 (1.03, 1.21) | 1.25 (1.12, 1.41) |
| Graduate                         | Ref      | 1.07 (0.35, 3.38) | 1.13 (0.39, 3.38) | 1.18 (0.22, 6.28) |
| No affiliation                   | Ref      | 1.04 (0.99, 1.10) | 1.10 (1.04, 1.15) | 1.18 (1.11, 1.25) |
| Location                         |          |          |          |          |
| Rural                            | Ref      | 0.99 (0.89, 1.09) | 1.12 (1.03, 1.22) | 1.22 (1.12, 1.32) |
| Urban                            | Ref      | 1.05 (0.99, 1.10) | 1.08 (1.04, 1.12) | 1.15 (1.08, 1.22) |
| Type of hospital                 |          |          |          |          |
| For profit                       | Ref      | 1.07 (0.98, 1.16) | 1.14 (1.04, 1.24) | 1.24 (1.11, 1.38) |
| Government                       | Ref      | 0.92 (0.83, 1.01) | 1.09 (0.99, 1.21) | 1.20 (1.09, 1.33) |
| Non-profit                       | Ref      | 1.08 (1.03, 1.12) | 1.11 (1.06, 1.16) | 1.19 (1.12, 1.26) |
| Hospital quality score           |          |          |          |          |
| 1                                | Ref      | 0.92 (0.69, 1.22) | 0.88 (0.64, 1.21) | 0.80 (0.48, 1.34) |
| 2                                | Ref      | 1.03 (0.94, 1.14) | 1.12 (1.02, 1.24) | 1.26 (1.09, 1.45) |
| 3                                | Ref      | 1.07 (1.02, 1.12) | 1.10 (1.04, 1.15) | 1.20 (1.12, 1.29) |
| 4                                | Ref      | 1.01 (0.95, 1.07) | 1.08 (1.01, 1.15) | 1.14 (1.04, 1.25) |
| 5                                | Ref      | 1.25 (0.99, 1.58) | 1.58 (1.20, 2.08) | 1.39 (1.04, 1.86) |
eTable 8. Odds of mortality in the 30 days after hospital admission from January through March of 2021 by quartile of prevalence of SARS-CoV-2 in the hospital, stratified by characteristics of the admission.a

| Admission/hospital characteristic | SARS-CoV-2 prevalence | SARS-CoV-2 prevalence | SARS-CoV-2 prevalence | SARS-CoV-2 prevalence |
|----------------------------------|----------------------|----------------------|----------------------|----------------------|
|                                  | OR (95% CI)          | OR (95% CI)          | OR (95% CI)          | OR (95% CI)          |
| Disease severity                 |                      |                      |                      |                      |
| Low                              | Ref                  | 1.00 (0.92, 1.08)    | 0.99 (0.92, 1.08)    | 1.02 (0.92, 1.13)    |
| Medium                           | Ref                  | 1.02 (0.98, 1.07)    | 1.04 (0.99, 1.09)    | 1.10 (1.04, 1.16)    |
| High                             | Ref                  | 1.04 (0.98, 1.10)    | 1.08 (1.03, 1.15)    | 1.19 (1.12, 1.26)    |
| Age (Per year)                   |                      |                      |                      |                      |
| <=65                             | Ref                  | 1.02 (0.94, 1.10)    | 1.05 (0.97, 1.13)    | 1.05 (0.95, 1.15)    |
| 66-70                            | Ref                  | 1.02 (0.94, 1.10)    | 1.01 (0.94, 1.10)    | 1.11 (1.01, 1.22)    |
| 71-75                            | Ref                  | 1.06 (0.99, 1.14)    | 1.08 (1.01, 1.16)    | 1.18 (1.08, 1.29)    |
| 75-80                            | Ref                  | 1.02 (0.95, 1.09)    | 1.04 (0.97, 1.12)    | 1.09 (0.99, 1.18)    |
| 81-85                            | Ref                  | 1.04 (0.97, 1.11)    | 1.07 (0.99, 1.15)    | 1.18 (1.08, 1.28)    |
| 86+                              | Ref                  | 1.04 (0.99, 1.10)    | 1.08 (1.02, 1.13)    | 1.24 (1.16, 1.32)    |
| Race                             |                      |                      |                      |                      |
| White                            | Ref                  | 1.03 (0.99, 1.08)    | 1.06 (1.01, 1.10)    | 1.12 (1.07, 1.18)    |
| Black                            | Ref                  | 1.02 (0.92, 1.12)    | 1.07 (0.97, 1.17)    | 1.18 (1.06, 1.33)    |
| Hispanic                         | Ref                  | 0.92 (0.82, 1.03)    | 0.95 (0.85, 1.07)    | 1.04 (0.91, 1.19)    |
| Other                            | Ref                  | 1.07 (0.95, 1.20)    | 1.07 (0.95, 1.20)    | 1.14 (0.98, 1.31)    |
| Medicaid                         |                      |                      |                      |                      |
| No                               | Ref                  | 1.03 (0.98, 1.07)    | 1.04 (0.99, 1.09)    | 1.13 (1.08, 1.19)    |
| Yes                              | Ref                  | 1.01 (0.95, 1.08)    | 1.08 (1.02, 1.15)    | 1.10 (1.02, 1.18)    |
| Residence prior to hospitalization |                  |                      |                      |                      |
| Community                        | Ref                  | 1.01 (0.97, 1.06)    | 1.04 (0.99, 1.09)    | 1.13 (1.08, 1.19)    |
| Nursing facility or other institutions |              | 1.07 (1.01, 1.15)    | 1.09 (1.02, 1.17)    | 1.05 (0.96, 1.15)    |
| Medical school affiliation       |                      |                      |                      |                      |
| Major                            | Ref                  | 1.03 (0.94, 1.12)    | 1.08 (0.98, 1.19)    | 1.10 (0.94, 1.28)    |
| Limited                          | Ref                  | 1.06 (0.97, 1.17)    | 1.09 (0.99, 1.20)    | 1.14 (1.01, 1.28)    |
| Graduate                         | Ref                  | 1.21 (0.90, 1.62)    | 1.29 (0.96, 1.75)    | 1.21 (0.83, 1.77)    |
| No affiliation                   | Ref                  | 1.01 (0.95, 1.07)    | 1.03 (0.97, 1.09)    | 1.11 (1.05, 1.18)    |
| Location                         |                      |                      |                      |                      |
| Rural                            | Ref                  | 0.98 (0.89, 1.08)    | 0.97 (0.88, 1.06)    | 1.14 (1.04, 1.24)    |
| Urban                            | Ref                  | 1.03 (0.99, 1.08)    | 1.07 (1.02, 1.12)    | 1.10 (1.04, 1.16)    |
| Type of hospital                 |                      |                      |                      |                      |
| For profit                       | Ref                  | 1.03 (0.91, 1.16)    | 1.02 (0.91, 1.15)    | 1.06 (0.94, 1.21)    |
| Government                       | Ref                  | 0.95 (0.85, 1.06)    | 1.01 (0.90, 1.13)    | 1.06 (0.94, 1.18)    |
| Non-profit                       | Ref                  | 1.03 (0.99, 1.08)    | 1.06 (1.01, 1.11)    | 1.15 (1.08, 1.22)    |
| Hospital quality score           |                      |                      |                      |                      |
| 1                                | Ref                  | 0.98 (0.67, 1.44)    | 0.94 (0.64, 1.39)    | 0.89 (0.59, 1.33)    |
| 2                                | Ref                  | 0.97 (0.86, 1.08)    | 0.99 (0.89, 1.12)    | 1.09 (0.96, 1.24)    |

*aSee footnote to Table e5.

OR, odds ratio; CI, confidence interval.
eTable 9. Odds of mortality in the 30 days after hospital admission from April through June of 2021 by quartile of prevalence of SARS-CoV-2 in the hospital, stratified by characteristics of the admission.\textsuperscript{a}

| Admission/hospital characteristic | SARS-CoV-2 prevalence | SARS-CoV-2 prevalence | SARS-CoV-2 prevalence |
|-----------------------------------|-----------------------|-----------------------|-----------------------|
|                                   | 0% OR (95% CI)        | 0.01-2.12% OR (95% CI) | >=2.13% OR (95% CI)   |
| Disease severity                  |                       |                       |                       |
| Low                               | Ref 1.01 (0.95, 1.07) | 1.04 (0.98, 1.10)     | 1.16 (1.08, 1.24)     |
| Medium                            | Ref 1.08 (0.99, 1.17) | 1.10 (1.01, 1.19)     | 1.18 (1.07, 1.30)     |
| High                              | Ref 1.10 (0.86, 1.40) | 1.10 (0.84, 1.44)     | 1.15 (0.86, 1.53)     |
| Age (Per year)                    |                       |                       |                       |
| <=65                              | Ref 1.03 (0.93, 1.14) | 1.04 (0.93, 1.17)     |                       |
| 66-70                             | Ref 0.98 (0.89, 1.09) | 1.01 (0.90, 1.13)     |                       |
| 71-75                             | Ref 1.03 (0.94, 1.14) | 1.08 (0.96, 1.20)     |                       |
| 75-80                             | Ref 1.02 (0.93, 1.12) | 1.08 (0.98, 1.20)     |                       |
| 81-85                             | Ref 0.89 (0.81, 0.97) | 0.96 (0.87, 1.06)     |                       |
| 86+                               | Ref 0.93 (0.87, 1.01) | 1.03 (0.95, 1.11)     |                       |
| Race                              |                       |                       |                       |
| White                             | Ref 0.97 (0.92, 1.02) | 1.03 (0.98, 1.09)     |                       |
| Black                             | Ref 0.97 (0.85, 1.11) | 1.01 (0.86, 1.16)     |                       |
| Hispanic                          | Ref 0.85 (0.76, 0.95) | 1.01 (0.87, 1.16)     |                       |
| Other                             | Ref 1.14 (0.99, 1.31) | 1.07 (0.90, 1.28)     |                       |
| Medicaid                          |                       |                       |                       |
| No                                | Ref 0.97 (0.92, 1.02) | 1.04 (0.98, 1.10)     |                       |
| Yes                               | Ref 0.97 (0.91, 1.05) | 0.99 (0.92, 1.08)     |                       |
| Residence prior to hospitalization|                       |                       |                       |
| Community                         | Ref 0.94 (0.90, 0.99) | 1.01 (0.96, 1.07)     |                       |
| Nursing facility or other institutions | Ref 1.10 (0.99, 1.20) | 1.11 (1.00, 1.24)     |                       |
| Medical school affiliation        |                       |                       |                       |
| Major                             | Ref 0.96 (0.81, 1.14) | 1.01 (0.83, 1.21)     |                       |
| Limited                           | Ref 1.18 (1.04, 1.35) | 1.32 (1.15, 1.52)     |                       |
| Graduate                          | Ref 1.07 (0.69, 1.68) | 1.15 (0.70, 1.90)     |                       |
| No affiliation                    | Ref 0.95 (0.90, 1.01) | 1.01 (0.95, 1.07)     |                       |
| Location                          |                       |                       |                       |
| Rural                             | Ref 0.96 (0.89, 1.04) | 0.96 (0.89, 1.04)     |                       |
| Urban                             | Ref 0.98 (0.93, 1.04) | 1.08 (1.01, 1.15)     |                       |
| Type of hospital                  |                       |                       |                       |
| For profit                        | Ref 1.03 (0.92, 1.15) | 1.01 (0.88, 1.14)     |                       |
| Government                        | Ref 0.93 (0.83, 1.04) | 0.97 (0.87, 1.09)     |                       |
| Non-profit                        | Ref 0.96 (0.90, 1.02) | 1.05 (0.98, 1.12)     |                       |
| Hospital quality score            |                       |                       |                       |
| 1                                 | Ref 0.87 (0.58, 1.32) | 0.96 (0.62, 1.50)     |                       |

\textsuperscript{a} See footnote to Table e-5.

OR, odds ratio; CI, confidence interval.
### eTable 10. Odds of mortality in the 30 days after hospital admission from July through September of 2021 by quartile of prevalence of SARS-CoV-2 in the hospital, stratified by characteristics of the admission\(^a\)

| Admission/hospital characteristic | SARS-CoV-2 prevalence | SARS-CoV-2 prevalence | SARS-CoV-2 prevalence | SARS-CoV-2 prevalence |
|----------------------------------|------------------------|------------------------|------------------------|------------------------|
| 0-1.27%                          | OR (95% CI)            | OR (95% CI)            | OR (95% CI)            | OR (95% CI)            |
| OR (95% CI)                      |                        |                        |                        |                        |
| Low                              | Ref 1.04 (0.97, 1.13)  | 1.18 (1.09, 1.28)      | 1.22 (1.10, 1.35)      |                        |
| Medium                           | Ref 1.02 (0.97, 1.07)  | 1.11 (1.06, 1.17)      | 1.30 (1.22, 1.38)      |                        |
| High                             | Ref 1.03 (0.98, 1.09)  | 1.12 (1.06, 1.18)      | 1.24 (1.17, 1.33)      |                        |
| Age (Per year)                   |                        |                        |                        |                        |
| <=65                             | Ref 1.01 (0.93, 1.08)  | 1.17 (1.08, 1.26)      | 1.27 (1.15, 1.40)      |                        |
| 66-70                            | Ref 1.02 (0.94, 1.09)  | 1.17 (1.09, 1.27)      | 1.33 (1.20, 1.46)      |                        |
| 71-75                            | Ref 1.07 (0.99, 1.14)  | 1.18 (1.10, 1.27)      | 1.26 (1.15, 1.37)      |                        |
| 75-80                            | Ref 1.03 (0.97, 1.10)  | 1.09 (1.02, 1.17)      | 1.27 (1.17, 1.39)      |                        |
| 81-85                            | Ref 1.00 (0.93, 1.06)  | 1.09 (1.01, 1.17)      | 1.19 (1.09, 1.30)      |                        |
| 86+                              | Ref 1.03 (0.98, 1.09)  | 1.08 (1.02, 1.15)      | 1.28 (1.19, 1.37)      |                        |
| Race                             |                        |                        |                        |                        |
| White                            | Ref 1.03 (0.98, 1.07)  | 1.11 (1.06, 1.16)      | 1.26 (1.20, 1.34)      |                        |
| Black                            | Ref 1.00 (0.92, 1.08)  | 1.18 (1.08, 1.29)      | 1.36 (1.21, 1.52)      |                        |
| Hispanic                         | Ref 1.03 (0.93, 1.13)  | 1.14 (1.03, 1.27)      | 1.18 (1.02, 1.37)      |                        |
| Other                            | Ref 1.05 (0.95, 1.16)  | 1.26 (1.12, 1.42)      | 1.16 (0.98, 1.37)      |                        |
| Medicaid                         |                        |                        |                        |                        |
| No                               | Ref 1.01 (0.97, 1.06)  | 1.09 (1.04, 1.15)      | 1.21 (1.15, 1.28)      |                        |
| Yes                              | Ref 1.06 (1.01, 1.13)  | 1.21 (1.14, 1.29)      | 1.43 (1.32, 1.54)      |                        |
| Residence prior to hospitalization |                      |                        |                        |                        |
| Community                        | Ref 1.04 (0.99, 1.08)  | 1.15 (1.10, 1.21)      | 1.31 (1.24, 1.39)      |                        |
| Nursing facility or other institutions | 0.98 (0.92, 1.04)  | 1.00 (0.93, 1.07)      | 1.00 (0.91, 1.11)      |                        |
| Medical school affiliation       |                        |                        |                        |                        |
| Major                            | Ref 1.02 (0.95, 1.11)  | 1.26 (1.13, 1.41)      | 1.54 (1.19, 2.01)      |                        |
| Limited                          | Ref 1.07 (0.98, 1.17)  | 1.20 (1.10, 1.31)      | 1.49 (1.31, 1.69)      |                        |
| Graduate                         | Ref 1.10 (0.77, 1.58)  | 1.23 (0.83, 1.83)      | 1.28 (0.65, 2.53)      |                        |
| No affiliation                   | Ref 1.03 (0.97, 1.09)  | 1.10 (1.04, 1.17)      | 1.23 (1.16, 1.32)      |                        |
| Location                         |                        |                        |                        |                        |
| Rural                            | Ref 1.04 (0.92, 1.17)  | 1.12 (1.01, 1.25)      | 1.26 (1.14, 1.40)      |                        |
| Urban                            | Ref 1.02 (0.98, 1.07)  | 1.12 (1.07, 1.18)      | 1.27 (1.19, 1.36)      |                        |
| Type of hospital                 |                        |                        |                        |                        |
| For profit                       | Ref 1.19 (1.06, 1.34)  | 1.31 (1.16, 1.48)      | 1.37 (1.18, 1.58)      |                        |
| Government                       | Ref 1.02 (0.90, 1.16)  | 1.10 (0.97, 1.25)      | 1.15 (1.01, 1.31)      |                        |

\(^a\)See footnote to Table e-5.

OR, odds ratio; CI, confidence interval.
| Hospital quality score | Ref | Non-profit | Hospital quality score | Ref | Non-profit | Hospital quality score | Ref | Non-profit |
|------------------------|-----|------------|------------------------|-----|------------|------------------------|-----|------------|
| 1                      | Ref | 0.97 (0.73, 1.31) | 1                      | Ref | 1.11 (1.05, 1.17) | 1                  | Ref | 1.31 (1.23, 1.40) |
| 2                      | Ref | 1.12 (1.01, 1.24) | 2                      | Ref | 1.01 (0.95, 1.06) | 2                  | Ref | 1.01 (0.69, 1.50) |
| 3                      | Ref | 1.12 (1.02, 1.18) | 3                      | Ref | 1.01 (0.88, 1.43) | 3                  | Ref | 1.12 (0.88, 1.43) |
| 4                      | Ref | 1.10 (0.95, 1.06) | 4                      | Ref | 1.11 (1.05, 1.17) | 4                  | Ref | 1.12 (0.88, 1.43) |
| 5                      | Ref | 1.01 (0.95, 1.06) | 5                      | Ref | 1.12 (1.02, 1.18) | 5                  | Ref | 1.01 (0.95, 1.06) |

* See footnote to Table e-5.
OR, odds ratio; CI, confidence interval.

**eTable 11. Unadjusted rates and adjusted odds of mortality after hospitalization for non-SARS-CoV-2 medical admissions in 2020 vs. 2019, using different methods to exclude SARS-CoV-2 cases.**

| Step | Description | Unadjusted rate Q<sub>2</sub> 2020 vs. Q<sub>2</sub> 2019 | Mortality OR (95% CI) for Q<sub>2</sub> 2020 vs. Q<sub>2</sub> 2019 |
|------|-------------|----------------------------------------------------------|---------------------------------------------------------------|
| 1    | Excluding hospitalizations with a SARS-CoV-2 admission diagnosis or the first two discharge diagnoses. (Method used in our analyses) | 11.44% vs. 9.18% | 1.20 (1.19, 1.21) |
| 2    | Excluding hospitalizations with a SARS-CoV-2 admission diagnosis or any diagnosis of SARS-CoV-2 in any position in the discharge diagnoses. | 11.44% vs 9.18% | 1.20 (1.19-1.21) |
| 3    | Exclusion in #2 plus any SARS-CoV-2 diagnosis during hospitalization or prior to hospitalization. | 11.19% vs 9.18% | 1.19 (1.17, 1.20) |
| 4    | Exclusions in #2 and #3 plus any SARS-CoV-2 diagnosis in the 30 days after hospital discharge. | 11.18% vs 9.18% | 1.19 (1.17, 1.20) |

OR, odds ratio; CI, confidence interval.