Tables S1. Multivariable risk for hospitalizations within 28 days, stratified by groups of age, body mass index, and treatment received

|  |  |  |
| --- | --- | --- |
| **28-day hospital admission, n (%)** | **All patients (pre-matched cohort)** | **Propensity score matched cohort** |
| **Total** | **No infusion** | **Infusion** | **aRR** | **p-value**  | **Total** | **No infusion** | **Infusion** | **aRR** | **p-value**  |
| **n/N (%)** | **n (%)** | **n (%)** | **(95% CI)** | **n/N (%)** | **n (%)** | **n (%)** | **(95% CI)** |
| **Stratified by age group** |  |  |  |  |  |  |  |  |  |  |
| Age <55 | 416/6761 (6.2) | 354 (6.4) | 62 (5.0) | 0.42 (0.30, 0.58) | <0.001 | 160/2015 (7.9) | 104 (10.6) | 56 (5.4) | 0.47 (0.30, 0.74) | 0.001 |
| Age 55-64 | 185/2487 (7.4) | 124 (8.8) | 61 (5.6) | 0.53 (0.35, 0.79) | 0.002 | 128/1513 (8.5) | 84 (10.8) | 44 (6.0) | 0.55 (0.36, 0.83) | 0.004 |
| Age ≥65 | 328/3334 (9.8) | 225 (14.1) | 103 (5.9) | 0.41 (0.31, 0.55) | <0.001 | 247/2230 (11.1) | 179 (15.9) | 68 (6.1) | 0.39 (0.28, 0.56) | <0.001 |
| **Stratified by body mass index (BMI) group** |  |  |  |  |  |  |  |  |  |  |
| BMI <25 | 147/2141 (6.9) | 109 (7.0) | 38 (6.5) | 0.60 (0.38, 0.95) | 0.03 | 66/772 (8.5) | 47 (12.0) | 19 (5.0) | 0.42 (0.21, 0.81) | 0.01 |
| BMI 25-34 | 501/6041 (8.3) | 382 (9.2) | 119 (6.3) | 0.41 (0.31, 0.53) | <0.001 | 284/3177 (8.9) | 186 (11.8) | 98 (6.1) | 0.48 (0.35, 0.65) | <0.001 |
| BMI ≥35 | 2814400 (6.4) | 212 (7.5) | 69 (4.4) | 0.40 (0.28, 0.56) | <0.001 | 185/1809 (10.2) | 134 (14.6) | 51 (5.7) | 0.41 (0.27, 0.62) | <0.001 |

n, number of outcome events; N, total number of patients in individual category; BMI, body mass index. Values are in number and %. aRR, adjusted risk ratio. Adjusted risk ratios (comparing infusion group to the no infusion group) obtained from the multivariable generalized linear models (GLM) which were adjusted for age, gender, race/ethnicity, quartiles of median income by zip code, body mass index, and comorbidities (chronic lung disease, chronic kidney disease, chronic heart disease, hypertension, diabetes)

Tables S2. Patient characteristics in infusion cohort, stratified by treatment received

|  |  |  |
| --- | --- | --- |
|  | **All patients (pre-matched cohort)**  | **Propensity score matched cohort** |
| **Bam alone** | **Bam/Ete** | **Cas/Imd** | **p-value**  | **Bam alone** | **Bam/Ete** | **Cas/Imd** | **p-value**  |
| **(N=2427)** | **(n=473)** | **(n=1148)** | **(N=1718)** | **(n=346)** | **(n=815)** |
| Age (years), median (IQR) | 63.0 (52.0, 70.0) | 55.0 (43.0, 64.0) | 62.0 (52.0, 71.0) | <0.001 | 61.0 (49.0, 70.0) | 53.0 (42.0, 62.0) | 60.0 (49.0, 69.0) | <0.001 |
| Age (years) |   |   |   | <0.001 |   |   |   | <0.001 |
| <55 | 679 (28.0) | 227 (48.0) | 322 (28.0) |   | 567 (33.0) | 189 (54.6) | 280 (34.4) |   |
| 55-64 | 650 (26.8) | 130 (27.5) | 305 (26.6) |   | 437 (25.4) | 87 (25.1) | 212 (26.0) |   |
| ≥65 | 1098 (45.2) | 116 (24.5) | 521 (45.4) |   | 714 (41.6) | 70 (20.2) | 323 (39.6) |   |
| Gender |   |   |   | 0.09 |   |   |   | 0.21 |
| Female | 1295 (53.4) | 262 (55.4) | 575 (50.1) |   | 939 (54.7) | 193 (55.8) | 418 (51.3) |   |
| Male | 1132 (46.6) | 211 (44.6) | 573 (49.9) |   | 779 (45.3) | 153 (44.2) | 397 (48.7) |   |
| Ethnicity |   |   |   | <0.001 |   |   |   | <0.001 |
| Caucasian | 1479 (60.9) | 267 (56.4) | 676 (58.9) |   | 1013 (59.0) | 185 (53.5) | 464 (56.9) |   |
| Black | 207 (8.5) | 77 (16.3) | 130 (11.3) |   | 176 (10.2) | 70 (20.2) | 111 (13.6) |   |
| Hispanic or Latino | 513 (21.1) | 85 (18.0) | 189 (16.5) |   | 403 (23.5) | 64 (18.5) | 149 (18.3) |   |
| Asian | 107 (4.4) | 19 (4.0) | 89 (7.8) |   | 64 (3.7) | 13 (3.8) | 53 (6.5) |   |
| Other | 7 (0.3) | 2 (0.4) | 8 (0.7) |   | 4 (0.2) | 2 (0.6) | 7 (0.9) |   |
| Unavailable | 114 (4.7) | 23 (4.9) | 56 (4.9) |   | 58 (3.4) | 12 (3.5) | 31 (3.8) |   |
| Median income by zip code, by quartiles |   |   |   | 0.002 |   |   |   | 0.04 |
| <56000 | 559 (23.3) | 127 (27.0) | 235 (20.6) |   | 403 (23.5) | 98 (28.3) | 183 (22.5) |   |
| 56000-72999 | 529 (22.1) | 118 (25.1) | 244 (21.4) |   | 398 (23.2) | 84 (24.3) | 186 (22.8) |   |
| 73000-99999 | 591 (24.6) | 120 (25.5) | 286 (25.1) |   | 422 (24.6) | 93 (26.9) | 201 (24.7) |   |
| ≥100000 | 719 (30.0) | 105 (22.3) | 376 (33.0) |   | 495 (28.8) | 71 (20.5) | 245 (30.1) |   |
| Body mass index (kg/m2), median (IQR) | 30.6 (26.3, 36.6) | 33.6 (28.3, 38.6) | 30.8 (26.5, 36.6) | <0.001 | 30.7 (26.7, 36.5) | 33.0 (28.3, 37.9) | 31.1 (27.0, 36.5) | <0.001 |
| Body mass index (kg/m2) |   |   |   | <0.001 |   |   |   | 0.02 |
| <25 | 266 (12.8) | 34 (8.4) | 137 (13.1) |   | 236 (13.7) | 33 (9.5) | 110 (13.5) |   |
| 25-34 | 1133 (54.7) | 193 (47.8) | 569 (54.3) |   | 972 (56.6) | 181 (52.3) | 453 (55.6) |   |
| ≥35 | 674 (32.5) | 177 (43.8) | 342 (32.6) |   | 510 (29.7) | 132 (38.2) | 252 (30.9) |   |
| Chronic lung disease | 397 (16.4) | 63 (13.3) | 166 (14.5) | 0.13 | 261 (15.2) | 41 (11.8) | 106 (13.0) | 0.14 |
| Chronic kidney disease | 238 (9.8) | 39 (8.2) | 110 (9.6) | 0.57 | 175 (10.2) | 25 (7.2) | 67 (8.2) | 0.11 |
| Chronic heart disease | 1408 (58.0) | 220 (46.5) | 639 (55.7) | <0.001 | 994 (57.9) | 149 (43.1) | 423 (51.9) | <0.001 |
| Hypertension | 1342 (55.3) | 218 (46.1) | 624 (54.4) | 0.001 | 949 (55.2) | 143 (41.3) | 412 (50.6) | <0.001 |
| Diabetes | 676 (27.9) | 130 (27.5) | 332 (28.9) | 0.76 | 442 (25.7) | 83 (24.0) | 215 (26.4) | 0.69 |
| Time from PCR to infusion (days), median (IQR), *n*=1235 (all patients) and *n*=952 (PS matched) | 2.0 (1.0, 3.0) | 1.0 (1.0, 3.0) | 2.0 (1.0, 3.0) | <0.001 | 2.0 (1.0, 3.0) | 1.0 (1.0, 2.0) | 2.0 (1.0, 3.0) | <0.001 |

Values are in median (interquartile range, IQR) for continuous variables and number and % for categorical variables

Difference between groups was compared using the Kruskal Wallis test for continuous variables and

Chi-square or Fisher's exact tests for categorical variables, as appropriate.

Propensity score (PS) matching between infused vs. not infused was based on: (i) patient age (continuous, per years), (ii) race/ethnicity, (iii) quartiles of median income by zip code, (iv) body mass index (BMI, categorical, <24, 25-34 and ≥35 kg/m2), (v) comorbidities (chronic lung disease, chronic kidney disease, chronic heart disease, hypertension, diabetes), and (vi) positive PCR date (+/- 7 days).

Table S3. Multivariable sub-distribution hazard (competing-risks regression) model for hospitalization within 28 days.

|  |  |  |
| --- | --- | --- |
|  | **Pre-matched cohort (N=10724)** | **Propensity score-matched cohort (N=5687)** |
| **SHR** | **p-value**  | **SHR** | **p-value**  |
| **(95% CI)** | **(95% CI)** |
| Monoclonal antibody infusion |   |   |   |   |
| No infusion | (reference) |   | (reference) |   |
| Infusion | 0.37 (0.29, 0.46) | <0.001 | 0.37 (0.29, 0.48) | <0.001 |
| Age (years), median (IQR) | 1.01 (1.01, 1.02) | <0.001 | 1.01 (1.00, 1.02) | 0.02 |
| Gender |   |   |   |   |
| Female | (reference) |   | (reference) |   |
| Male | 1.14 (1.00, 1.31) | 0.06 | 1.13 (0.94, 1.35) | 0.20 |
| Ethnicity |   |   |   |   |
| Caucasian | (reference) |   | (reference) |   |
| Black | 1.02 (0.83, 1.25) | 0.87 | 1.18 (0.90, 1.56) | 0.23 |
| Hispanic or Latino | 1.49 (1.26, 1.76) | <0.001 | 1.28 (1.01, 1.61) | 0.04 |
| Asian | 1.81 (1.33, 2.46) | <0.001 | 1.95 (1.34, 2.85) | 0.001 |
| Other | 2.04 (1.03, 4.04) | 0.04 | 2.02 (0.74, 5.57) | 0.17 |
| Unavailable | 0.50 (0.26, 0.97) | 0.04 | 0.54 (0.24, 1.21) | 0.13 |
| Median income by zip code, by quartiles |   |   |   |   |
| <56000 | (reference) |   | (reference) |   |
| 56000-72999 | 1.01 (0.84, 1.22) | 0.89 | 1.11 (0.86, 1.43) | 0.42 |
| 73000-99999 | 0.92 (0.76, 1.13) | 0.43 | 1.01 (0.78, 1.32) | 0.93 |
| ≥100000 | 0.91 (0.74, 1.11) | 0.33 | 0.90 (0.69, 1.18) | 0.46 |
| Body mass index (kg/m2) | 1.02 (1.01, 1.03) | <0.001 | 1.01 (1.00, 1.03) | 0.03 |
| Chronic lung disease | 1.43 (1.18, 1.72) | <0.001 | 1.43 (1.13, 1.80) | 0.003 |
| Chronic kidney disease | 1.59 (1.27, 1.99) | <0.001 | 1.47 (1.12, 1.94) | 0.01 |
| Chronic heart disease | 1.32 (1.07, 1.61) | 0.01 | 1.26 (0.97, 1.63) | 0.08 |
| Hypertension | 1.06 (0.86, 1.30) | 0.60 | 1.07 (0.83, 1.39) | 0.59 |
| Diabetes | 1.58 (1.33, 1.89) | <0.001 | 1.42 (1.14, 1.75) | 0.001 |
| Variant Type |   |   |   |   |
| B.1.1.7 | 1.46 (1.19, 1.80) | <0.001 | 1.46 (1.10, 1.93) | 0.01 |
| B.1.429 | 1.33 (0.78, 2.25) | 0.30 | 1.50 (0.83, 2.72) | 0.18 |
| P.1 | 3.59 (1.59, 8.09) | 0.002 | 2.25 (0.30, 16.95) | 0.43 |
| P.2 | 1.42 (0.46, 4.37) | 0.54 | 1.91 (0.51, 7.12) | 0.34 |
| B.1.427 | -- | -- | -- | -- |
| B.1.617.2 or B.1.617.1 | -- | -- | -- | -- |
| B.1.526 or B.1.526.1 | 1.60 (0.41, 6.33) | 0.50 | -- | -- |
| B.1.525 | -- | -- | -- | -- |
| Other | (reference) |   | (reference) |   |
| Unknown | 1.27 (1.03, 1.55) | 0.02 | 1.22 (0.94, 1.60) | 0.14 |

SHR, sub-distribution hazard ratio; CI, confidence interval

Tables S4. Patient characteristics, stratified by hospitalization within 28 days, ICU admission, and mortality within 28 days

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Hospitalization within 28 days** | **ICU admission** | **Mortality within 28 days** |
| **No** | **Yes** | **p-value**  | **No** | **Yes** | **p-value**  | **No** | **Yes** | **p-value**  |
| **(n=11653)** | **(n=929)** | **(n=12467)** | **(n=115)** | **(n=12536)** | **(n=46)** |
| Age (years), median (IQR) [range] | 52.0 (38.0, 65.0) | 57.0 (42.0, 69.0) | <0.001 | 52.0 (38.0, 65.0) | 64.0 (51.0, 74.0) | <0.001 | 52.0 (38.0, 65.0) | 70.5 (63.0, 78.0) | <0.001 |
| Age (years) |   |   | <0.001 |   |   | <0.001 |   |   | <0.001 |
| <55 | 6345 (54.4) | 416 (44.8) |   | 6725 (53.9) | 36 (31.3) |   | 6754 (53.9) | 7 (15.2) |   |
| 55-64 | 2302 (19.8) | 185 (19.9) |   | 2463 (19.8) | 24 (20.9) |   | 2480 (19.8) | 7 (15.2) |   |
| ≥65 | 3006 (25.8) | 328 (35.3) |   | 3279 (26.3) | 55 (47.8) |   | 3302 (26.3) | 32 (69.6) |   |
| Gender |   |   | 0.01 |   |   | <0.001 |   |   | 0.12 |
| Female | 6433 (55.2) | 473 (50.9) |   | 6863 (55.0) | 43 (37.4) |   | 6886 (54.9) | 20 (43.5) |   |
| Male | 5220 (44.8) | 456 (49.1) |   | 5604 (45.0) | 72 (62.6) |   | 5650 (45.1) | 26 (56.5) |   |
| Ethnicity |   |   | <0.001 |   |   | 0.37 |   |   | 0.95 |
| Caucasian | 5738 (49.2) | 412 (44.3) |   | 6101 (48.9) | 49 (42.6) |   | 6125 (48.9) | 25 (54.3) |   |
| Black | 1881 (16.1) | 164 (17.7) |   | 2020 (16.2) | 25 (21.7) |   | 2037 (16.2) | 8 (17.4) |   |
| Hispanic or Latino | 2874 (24.7) | 279 (30.0) |   | 3124 (25.1) | 29 (25.2) |   | 3144 (25.1) | 9 (19.6) |   |
| Asian | 549 (4.7) | 53 (5.7) |   | 594 (4.8) | 8 (7.0) |   | 600 (4.8) | 2 (4.3) |   |
| Other | 57 (0.5) | 8 (0.9) |   | 64 (0.5) | 1 (0.9) |   | 65 (0.5) | 0 (0.0) |   |
| Unavailable | 554 (4.8) | 13 (1.4) |   | 564 (4.5) | 3 (2.6) |   | 565 (4.5) | 2 (4.3) |   |
| Median income by zip code, by quartiles |   |   | 0.001 |   |   | 0.53 |   |   | 0.01 |
| <56000 | 2816 (24.5) | 260 (28.3) |   | 3041 (24.7) | 35 (30.7) |   | 3058 (24.7) | 18 (39.1) |   |
| 56000-72999 | 2883 (25.0) | 254 (27.7) |   | 3111 (25.3) | 26 (22.8) |   | 3120 (25.2) | 17 (37.0) |   |
| 73000-99999 | 2731 (23.7) | 200 (21.8) |   | 2906 (23.6) | 25 (21.9) |   | 2927 (23.6) | 4 (8.7) |   |
| ≥100000 | 3085 (26.8) | 204 (22.2) |   | 3261 (26.5) | 28 (24.6) |   | 3282 (26.5) | 7 (15.2) |   |
| Body mass index (kg/m2), median (IQR) | 29.8 (25.8, 35.0) | 30.8 (26.8, 36.4) | <0.001 | 29.8 (25.8, 35.1) | 29.7 (26.2, 35.2) | 0.88 | 29.8 (25.8, 35.1) | 28.8 (24.6, 33.0) | 0.09 |
| Body mass index (kg/m2) |   |   | <0.001 |   |   | 0.97 |   |   | 0.23 |
| <25 | 1517 (15.9) | 103 (11.7) |   | 1603 (15.5) | 17 (15.6) |   | 1612 (15.5) | 8 (20.0) |   |
| 25-34 | 5540 (58.0) | 501 (57.1) |   | 5979 (57.9) | 62 (56.9) |   | 6015 (57.9) | 26 (65.0) |   |
| ≥35 | 2502 (26.2) | 274 (31.2) |   | 2746 (26.6) | 30 (27.5) |   | 2770 (26.6) | 6 (15.0) |   |
| Chronic lung disease | 1248 (10.7) | 159 (17.1) | <0.001 | 1382 (11.1) | 25 (21.7) | <0.001 | 1402 (11.2) | 5 (10.9) | 0.95 |
| Chronic kidney disease | 655 (5.6) | 132 (14.2) | <0.001 | 755 (6.1) | 32 (27.8) | <0.001 | 771 (6.2) | 16 (34.8) | <0.001 |
| Chronic heart disease | 4595 (39.4) | 531 (57.2) | <0.001 | 5040 (40.4) | 86 (74.8) | <0.001 | 5091 (40.6) | 35 (76.1) | <0.001 |
| Hypertension | 4280 (36.7) | 507 (54.6) | <0.001 | 4707 (37.8) | 80 (69.6) | <0.001 | 4755 (37.9) | 32 (69.6) | <0.001 |
| Diabetes | 1988 (17.1) | 319 (34.3) | <0.001 | 2257 (18.1) | 50 (43.5) | <0.001 | 2288 (18.3) | 19 (41.3) | <0.001 |
| Monoclonal antibody infusion |   |   | <0.001 |   |   | 0.16 |   |   | 0.57 |
| No infusion | 7831 (67.2) | 703 (75.7) |   | 8449 (67.8) | 85 (73.9) |   | 8501 (67.8) | 33 (71.7) |   |
| Infusion | 3822 (32.8) | 226 (24.3) |   | 4018 (32.2) | 30 (26.1) |   | 4035 (32.2) | 13 (28.3) |   |
| Treatment Received |   |   | 0.004 |   |   | 0.32 |   |   | 0.18 |
| Bam alone | 2283 (59.7) | 144 (63.7) |   | 2405 (59.9) | 22 (73.3) |   | 2416 (59.9) | 11 (84.6) |   |
| Bam/ete | 436 (11.4) | 37 (16.4) |   | 471 (11.7) | 2 (6.7) |   | 472 (11.7) | 1 (7.7) |   |
| Cas/imd | 1103 (28.9) | 45 (19.9) |   | 1142 (28.4) | 6 (20.0) |   | 1147 (28.4) | 1 (7.7) |   |
| Time from PCR to infusion (days), median (IQR), n with available data | 2.0 (1.0, 3.0) | 2.0 (1.0, 3.0) | 0.59 | 2.0 (1.0, 3.0) | 2.0 (1.0, 3.0) | 0.69 | 2.0 (1.0, 3.0) | 2.0 (1.0, 3.0) | 0.97 |

BMI, body mass index; Bam, bamlanivimab; Ete, etesevimab; Cas, casirivimab; Imd, imdevimab; Values are in median (interquartile range, IQR) for continuous variables and number and % for categorical variables; Difference between groups in the pre-matched cohort was compared using the Wilcoxon rank-sum test for continuous variables and Chi-square or Fisher's exact tests for categorical variables, as appropriate.

Tables S5. Patient characteristics and outcomes, matched vs. unmatched patients

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Unmatched** | **Matched** | **p-value**  |
| **(n=6824)** | **(n=5758)** |
| **Patient characteristics** |  |  |  |
| Age (years), median (IQR)  | 44.0 (32.0, 58.0) | 60.0 (48.0, 69.0) | <0.001 |
| Age (years) |   |   | <0.001 |
| >65 | 4746 (69.5) | 2015 (35.0) |   |
| 55-64 | 974 (14.3) | 1513 (26.3) |   |
| <55 | 1104 (16.2) | 2230 (38.7) |   |
| Gender |   |   | 0.96 |
| Female | 3747 (54.9) | 3159 (54.9) |   |
| Male | 3077 (45.1) | 2599 (45.1) |   |
| Ethnicity |   |   | <0.001 |
| Caucasian | 2842 (41.6) | 3308 (57.5) |   |
| Black | 1298 (19.0) | 747 (13.0) |   |
| Hispanic or Latino | 1937 (28.4) | 1216 (21.1) |   |
| Asian | 331 (4.9) | 271 (4.7) |   |
| Other | 37 (0.5) | 28 (0.5) |   |
| Unavailable | 379 (5.6) | 188 (3.3) |   |
| Median income by zip code, by quartiles |   |   | <0.001 |
| <56000 | 1688 (25.3) | 1388 (24.1) |   |
| 56000-72999 | 1781 (26.7) | 1356 (23.5) |   |
| 73000-99999 | 1529 (22.9) | 1402 (24.3) |   |
| ≥100000 | 1677 (25.1) | 1612 (28.0) |   |
| Body mass index (kg/m2), median (IQR) | 28.8 (24.9, 33.4) | 30.9 (26.8, 36.6) | <0.001 |
| Body mass index (kg/m2) |   |   | <0.001 |
| <25 | 848 (18.1) | 772 (13.4) |   |
| 25-34 | 2864 (61.2) | 3177 (55.2) |   |
| ≥35 | 967 (20.7) | 1809 (31.4) |   |
| Chronic lung disease | 596 (8.7) | 811 (14.1) | <0.001 |
| Chronic kidney disease | 248 (3.6) | 539 (9.4) | <0.001 |
| Chronic heart disease | 1938 (28.4) | 3188 (55.4) | <0.001 |
| Hypertension | 1733 (25.4) | 3054 (53.0) | <0.001 |
| Diabetes | 798 (11.7) | 1509 (26.2) | <0.001 |
| Monoclonal antibody infusion | 1169 (17.1) | 2879 (50.0) | <0.001 |
| No infusion | 5655 (82.9) | 2879 (50.0) |   |
| Infusion | 1169 (17.1) | 2879 (50.0) |   |
| Treatment Received |   |   | 0.58 |
| Bamlanivimab alone | 709 (60.7) | 1718 (59.7) |   |
| Bamlanivimab/etesevimab | 127 (10.9) | 346 (12.0) |   |
| Casirivimab/imdevimab | 333 (28.5) | 815 (28.3) |   |
| Time from PCR to infusion (days), median (IQR) | 2.0 (1.0, 3.0) | 2.0 (1.0, 3.0) | 0.29 |
| **Outcomes** |  |  |  |
| 28-day hospital admission | 394 (5.8) | 535 (9.3) | <0.001 |
| 14-day hospital admission | 360 (5.3) | 499 (8.7) | <0.001 |
| 28-day mortality | 19 (0.3) | 27 (0.5) | 0.08 |
| ICU admission | 42 (0.6) | 73 (1.3) | <0.001 |

BMI, body mass index; Bam, bamlanivimab; Ete, etesevimab; Cas, casirivimab; Imd, imdevimab.

Values are in median (interquartile range, IQR) for continuous variables and number and % for categorical variables