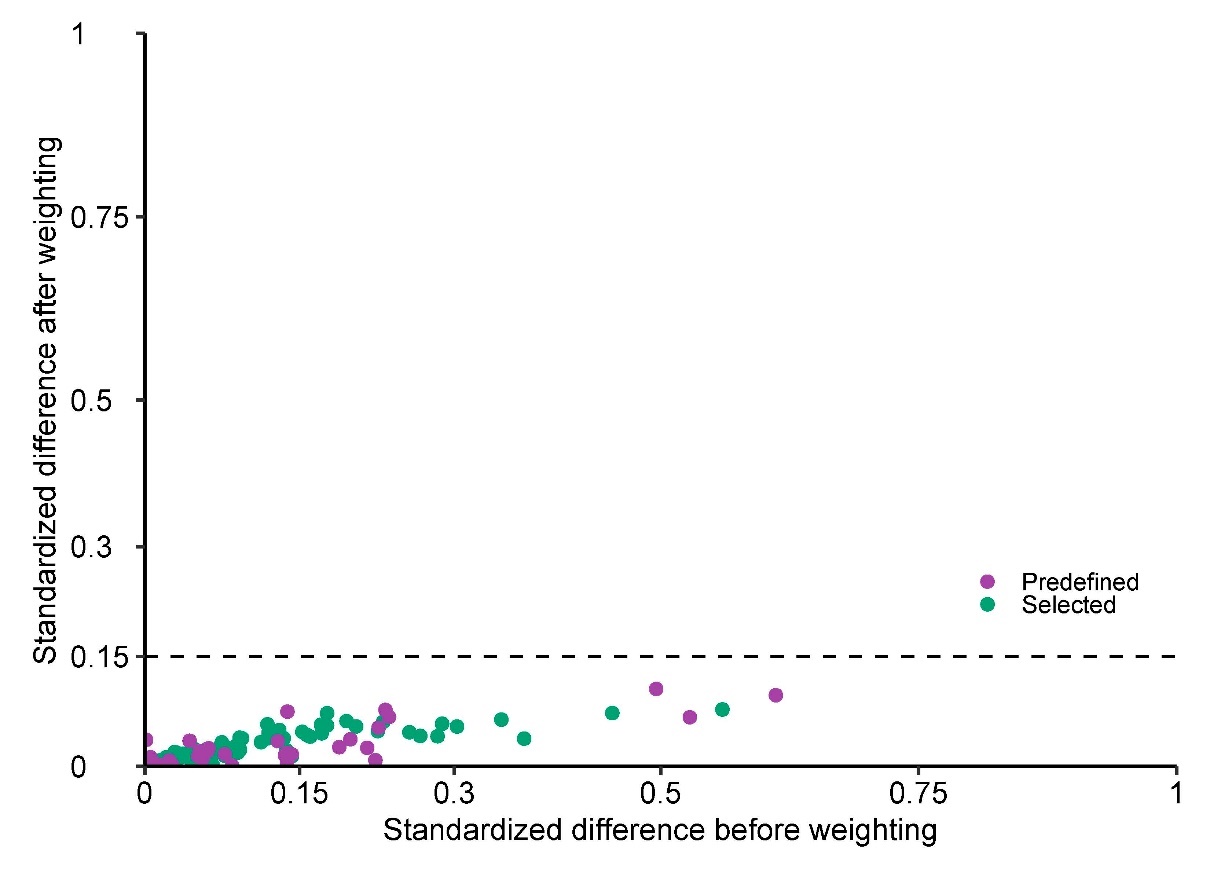
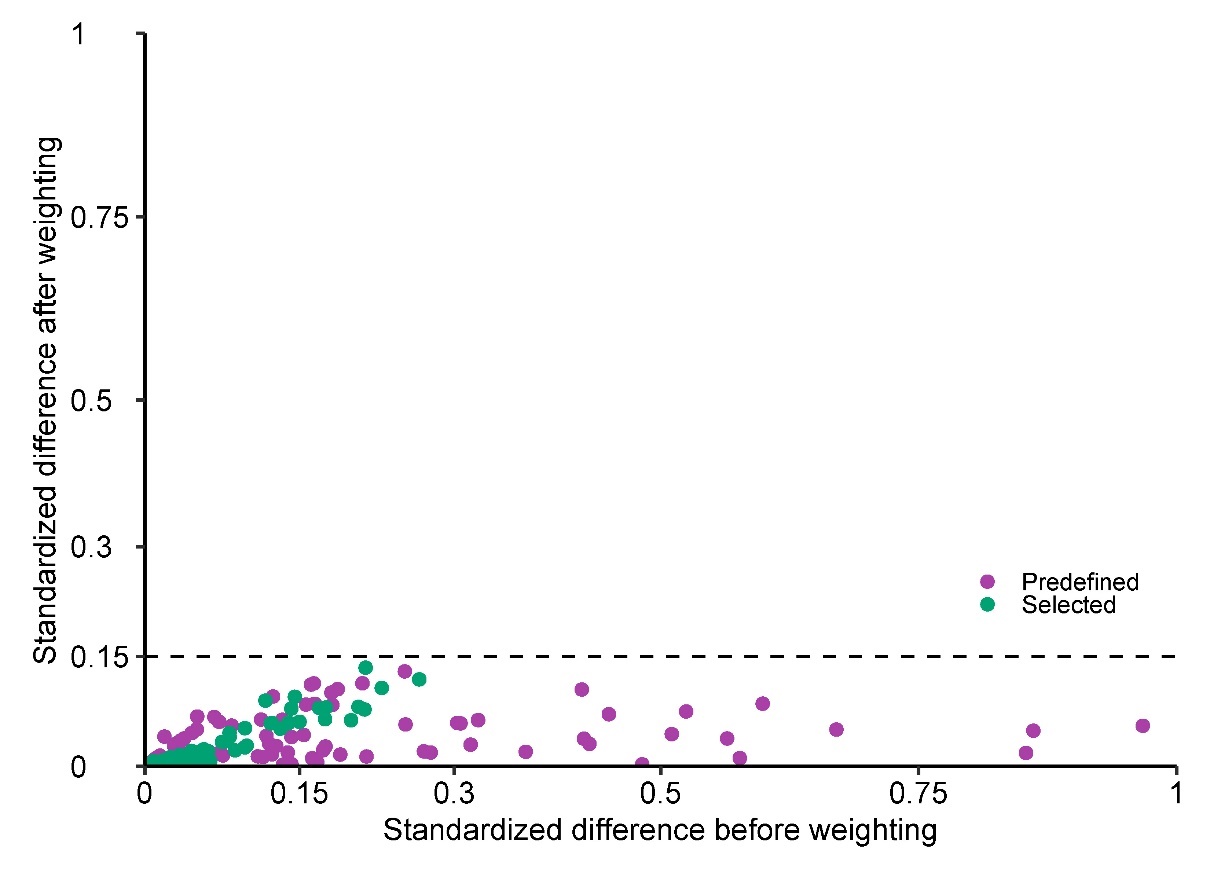
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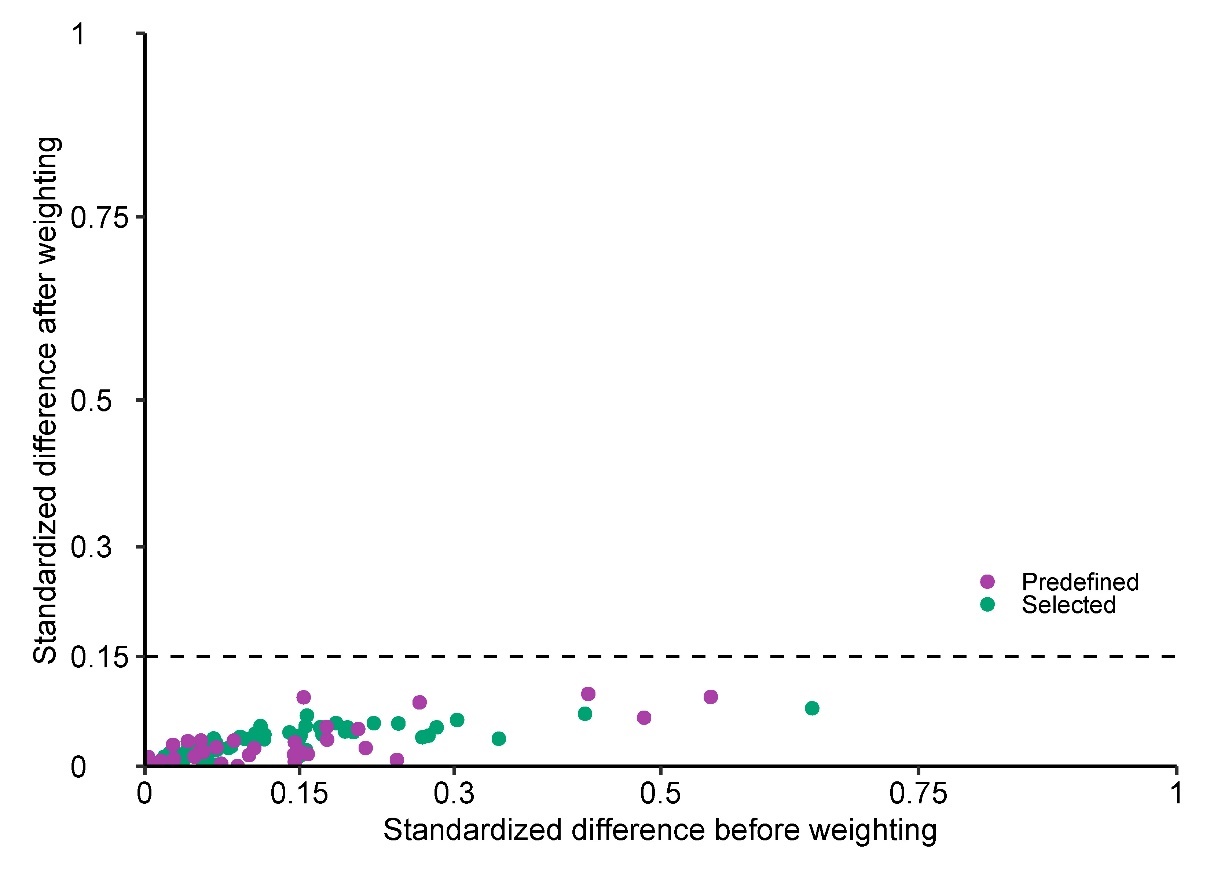
**Supplementary Figure 1. Standardized mean difference of predefined and algorithmically selected high dimensional variables between COVID-19 and contemporary control**



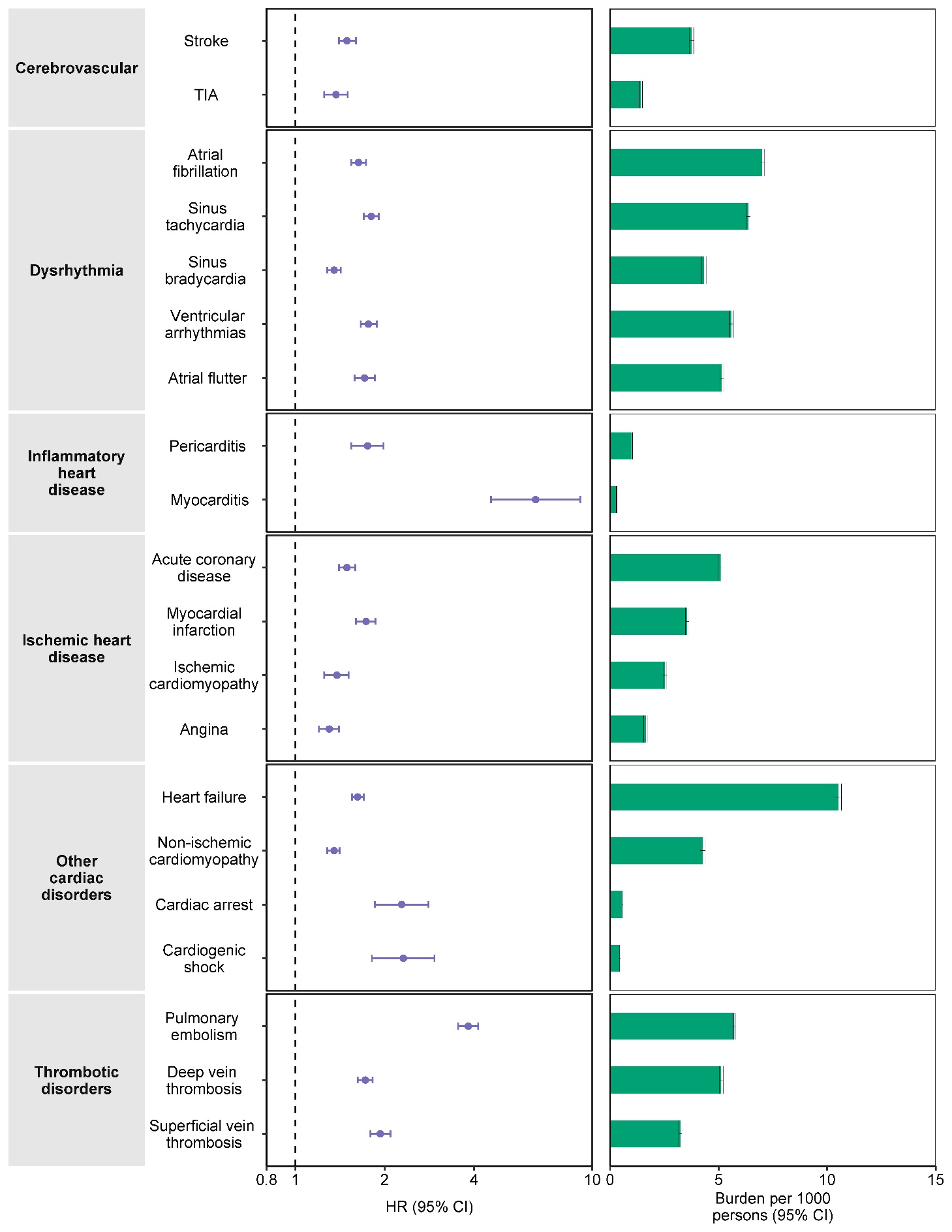
**Supplementary Figure 2. Standardized mean difference of predefined and algorithmically selected high dimensional variables by care setting of the acute infection between COVID-19 and contemporary control**

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**Supplementary Figure 3. Standardized mean difference of predefined and algorithmically selected high dimensional variables between COVID-19 and historical control**



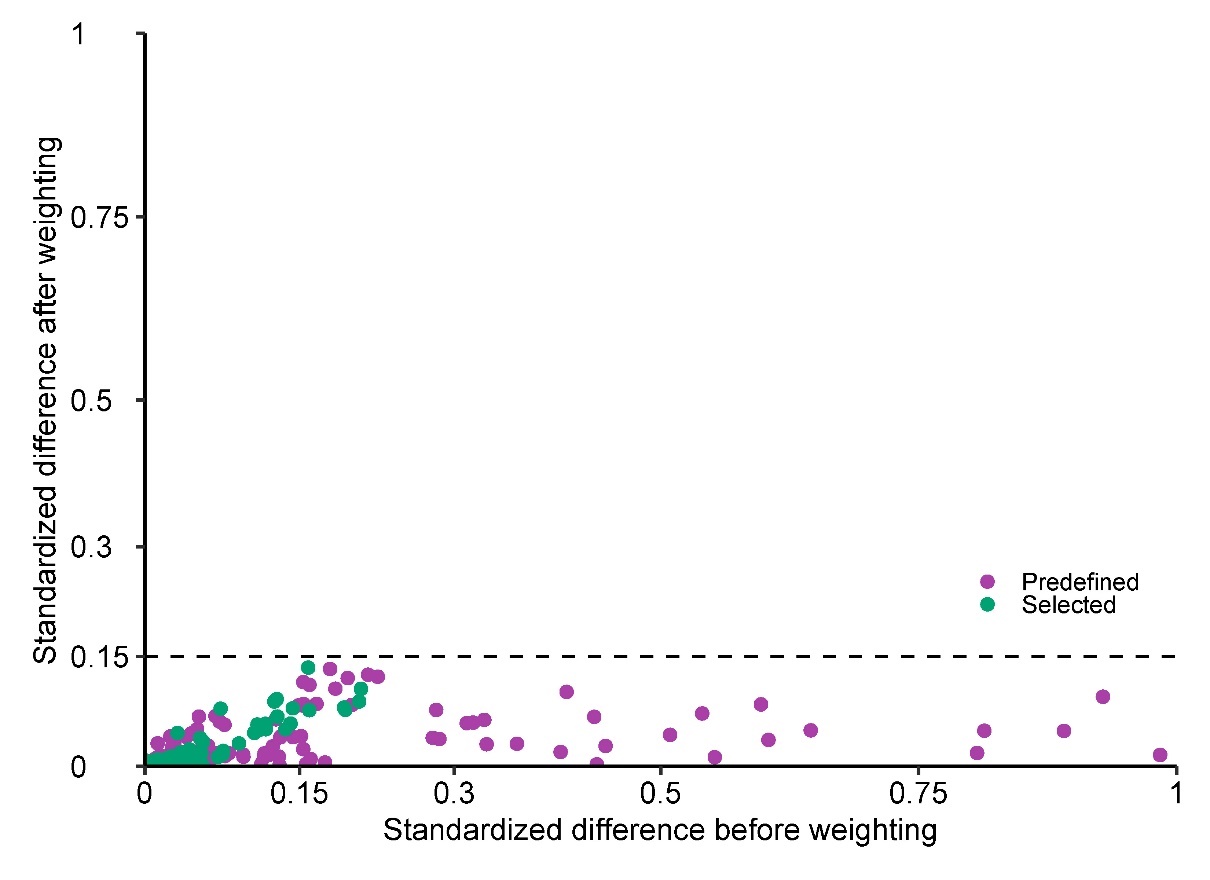
**Supplementary Figure 4. Risks and 12-month burdens of post-acute COVID-19 cardiovascular outcomes compared to historical control**



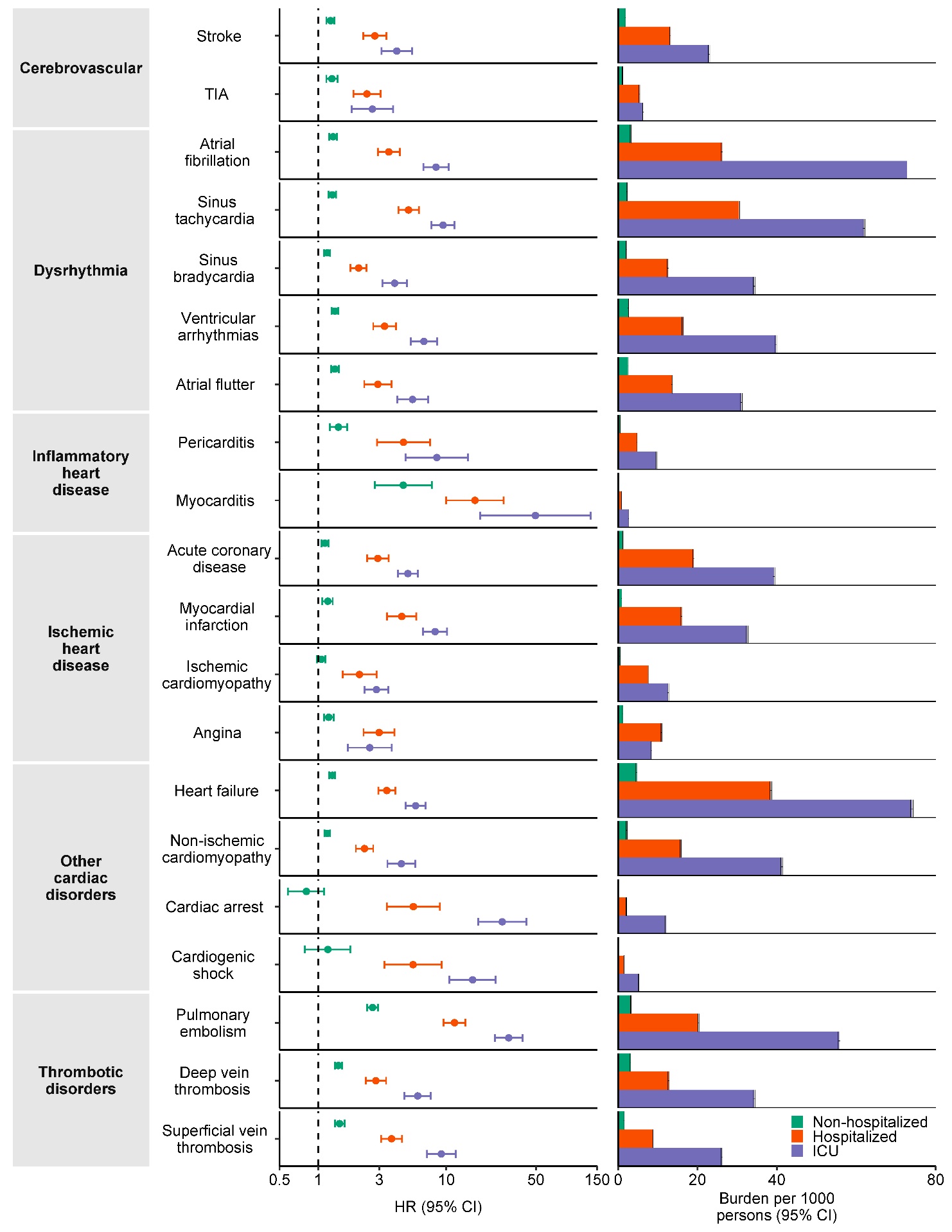
**Supplementary Figure 5. Risks and 12-month burdens of post-acute COVID-19 composite cardiovascular outcomes compared to historical control.**



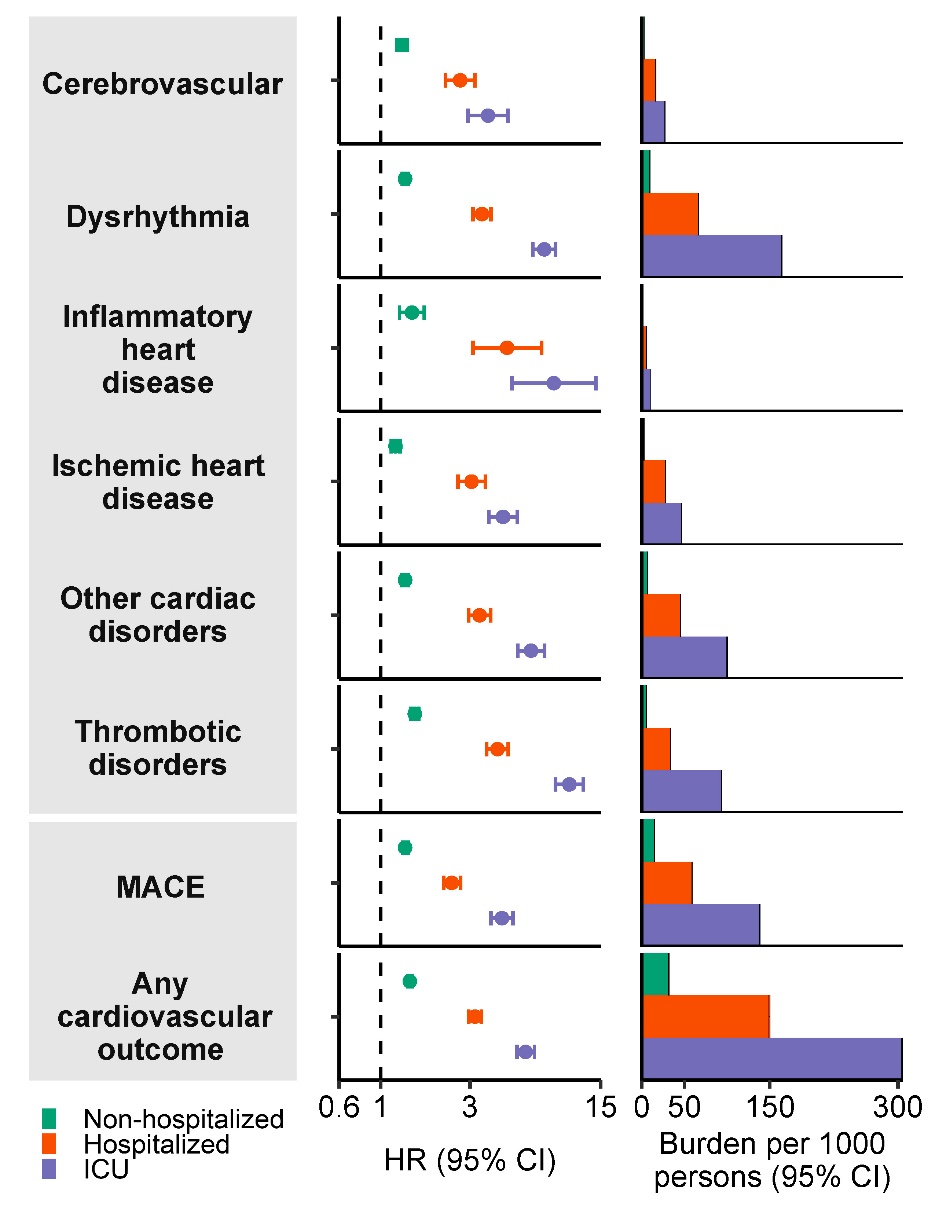
**Supplementary Figure 6. Standardized mean difference of predefined and algorithmically selected high dimensional variables by care setting of the acute infection between COVID-19 and historical control**

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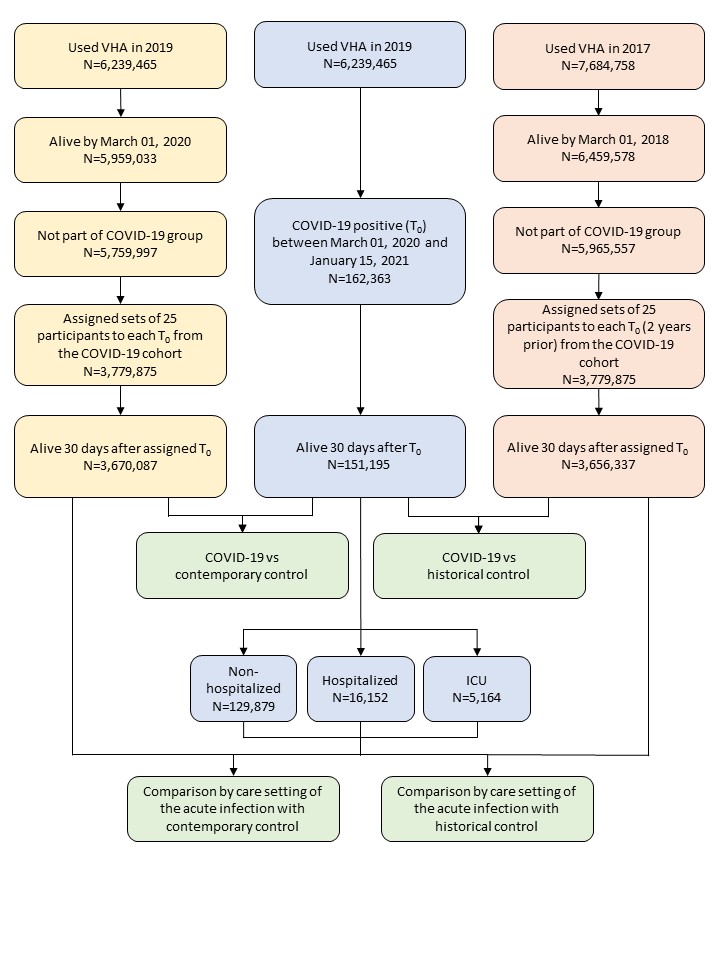
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**Supplementary Figure 8. Risks and 12-month burdens of post-acute COVID-19 composite cardiovascular outcomes by care setting of the acute infection compared to historical control.**



**Supplementary Figure 9. Cohort construction flowchart**



**Supplementary Table 1. Demographic and health characteristics of COVID-19, contemporary, and historical cohorts before weighting**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Baseline Characteristics** | **COVID-19 (N=151,195)** | **Contemporary control (N=3,670,087)** | **Historical control (N=3,656,337)** | **Absolute standardized difference – COVID-19 and Contemporary**  **control** | **Absolute standardized difference – COVID-19 and Historical**  **control** |
| **Age, mean (std), yr** | 61.31 (15.62) | 63.48 (16.23) | 62.94 (16.49) | 0.14 | 0.10 |
| **Race, no. (%)** | | | | | |
| White | 106,988 (70.77) | 2,820,388 (76.85) | 2,829,639 (77.39) | 0.14 | 0.14 |
| Black | 36,669 (24.26) | 676,176 (18.43) | 654,484 (17.90) | 0.14 | 0.16 |
| Other | 7,535 (4.99) | 173,521 (4.73) | 172,213 (4.70) | 0.01 | 0.01 |
| **Sex, no. (%)** | | | | | |
| Male | 134,565 (89.01) | 3,315,042 (90.33) | 3,313,007 (90.61) | 0.04 | 0.04 |
| Female | 16,629 (11.00) | 355,044 (9.68) | 341,904 (9.39) | 0.04 | 0.05 |
| **BMI category, no. (%), kg/m2** | | | | | |
| Underweight/Normal | 21,728 (14.38) | 716,914 (19.54) | 730,536 (19.98) | 0.14 | 0.15 |
| Overweight | 47,989 (31.74) | 1,406,487 (38.33) | 1,434,381 (39.23) | 0.14 | 0.15 |
| Obese | 81,477 (53.89) | 1,546,684 (42.15) | 1,493,979 (40.86) | 0.24 | 0.27 |
| **Smoking status, no. (%)** | | | | | |
| Never | 81,628 (53.99) | 1,867,927 (50.90) | 1,787,218 (48.88) | 0.06 | 0.11 |
| Former | 42,668 (28.23) | 944,533 (25.74) | 989,770 (27.07) | 0.06 | 0.03 |
| Current | 26,899 (17.80) | 857,589 (23.37) | 879,715 (24.06) | 0.14 | 0.15 |
| **Area Deprivation Indexa, mean (std)** | 52.52 (15.22) | 51.69 (15.89) | 51.68 (15.97) | 0.05 | 0.05 |
| Clinical Characteristics | | | | | |
| **Outpatient encounter\*, no. (%)** | | | | | |
| Zero | 29,224 (19.33) | 1,577,696 (42.99) | 1,501,658 (41.07) | 0.53 | 0.48 |
| One | 43,276 (28.63) | 1,048,213 (28.57) | 989,770 (27.49) | 0.00 | 0.03 |
| Two or more | 78,693 (52.05) | 1,044,176 (28.46) | 1,145,530 (31.44) | 0.50 | 0.43 |
| **Long-term care, no. (%)** | 5,961 (3.95) | 21,690 (0.60) | 29,579 (0.81) | 0.23 | 0.21 |
| **eGFR, mean (std), ml/min/1.73m2** | 77.71 (22.22) | 78.27 (19.63) | 79.27 (19.90) | 0.03 | 0.07 |
| **Systolic blood pressure, mean (std), mmHg** | 132.65 (12.30) | 132.58 (12.79) | 132.61 (12.66) | 0.01 | 0.00 |
| **Diastolic blood pressure, mean (std), mmHg** | 78.19 (7.66) | 77.54 (7.74) | 77.49 (7.93) | 0.08 | 0.09 |
| **Cancer, no. (%)** | 11,906 (7.88) | 216,865 (5.91) | 208,447 (5.71) | 0.08 | 0.09 |
| **Chronic kidney disease, no. (%)** | 15,290 (10.12) | 240,574 (6.56) | 224,718 (6.15) | 0.13 | 0.15 |
| **Chronic lung disease, no. (%)** | 338 (0.23) | 4,587 (0.13) | 5,703 (0.16) | 0.02 | 0.02 |
| **Dementia, no. (%)** | 622 (0.42) | 3,816 (0.11) | 4,387 (0.12) | 0.06 | 0.06 |
| **Diabetes mellitus type 2, no. (%)** | 48,471 (32.06) | 826,026 (22.51) | 828,526 (22.66) | 0.22 | 0.21 |
| **Dysautonomia, no. (%)** | 2,756 (1.83) | 43,784 (1.20) | 45,082 (1.24) | 0.05 | 0.05 |
| **Hyperlipidemia, no. (%)** | 51,403 (34.00) | 932,826 (25.42) | 1,128,711 (30.87) | 0.19 | 0.07 |
| **Hypertension, no. (%)** | 82,392 (54.50) | 1,635,941 (44.58) | 1,676,796 (45.86) | 0.20 | 0.18 |
| aArea Deprivation Index is a measure of socioeconomic disadvantage, with a range from low to high disadvantage of 0 to 100.  \*.Data collected within one year of cohort enrollment  std, standard deviation; BMI, body mass index; eGFR, estimated glomerular filtration rate. | | | | | |

**Supplementary Table 2. Demographic and health characteristics of COVID-19, contemporary, and historical cohorts after weighting**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Baseline Characteristics** | **COVID-19 (N=151,195)** | **Contemporary control (N=3,670,087)** | **Historical control (N=3,656,337)** | **Absolute standardized difference - COVID-19 and Contemporary control** | **Absolute standardized difference -COVID-19 and Historical control** |
| **Age, mean (std), yr** | 63.14 (16.15) | 63.39 (16.22) | 63.40 (16.45) | 0.02 | 0.02 |
| **Race, no. (%)** | | | | | |
| White | 114,764 (75.91) | 2,811,837 (76.62) | 2,800,827 (76.61) | 0.02 | 0.02 |
| Black | 29,173 (19.30) | 684,397 (18.65) | 681,285 (18.64) | 0.02 | 0.02 |
| Other | 7,257 (4.80) | 173,852 (4.74) | 173,090 (4.74) | 0.00 | 0.00 |
| **Sex, no. (%)** | | | | | |
| Male | 134,876 (89.21) | 3,313,060 (90.28) | 3,299,917 (90.26) | 0.04 | 0.03 |
| Female | 16,318 (10.80) | 357,026 (9.73) | 355,286 (9.72) | 0.04 | 0.04 |
| **BMI category, no. (%), kg/m2** | | | | | |
| Underweight/Normal | 29,611 (19.59) | 709,978 (19.35) | 707,245 (19.35) | 0.01 | 0.01 |
| Overweight | 52,195 (34.53) | 1,398,927 (38.12) | 1,428,384 (39.07) | 0.07 | 0.09 |
| Obese | 69,386 (45.90) | 1,561,181 (42.54) | 1,519,573 (41.56) | 0.07 | 0.09 |
| **Smoking status, no. (%)** | | | | | |
| Never | 75,243 (49.77) | 1,872,074 (51.01) | 1,864,987 (51.01) | 0.02 | 0.02 |
| Former | 39,752 (26.30) | 948,130 (25.84) | 944,651 (25.84) | 0.01 | 0.01 |
| Current | 36,199 (23.95) | 849,882 (23.16) | 845,564 (23.13) | 0.02 | 0.02 |
| **Area Deprivation Indexa, mean (std)** | 52.06 (15.72) | 51.72 (15.87) | 51.72 (15.85) | 0.02 | 0.02 |
| Clinical Characteristics | | | | | |
| **Outpatient encounter\*, no. (%)** | | | | | |
| Zero | 58,610 (38.77) | 1,543,565 (42.06) | 1,536,795 (42.04) | 0.07 | 0.07 |
| One | 40,775 (26.97) | 1,049,461 (28.6) | 1,034,158 (28.29) | 0.04 | 0.03 |
| Two or more | 51,808 (34.27) | 1,077,060 (29.35) | 1,084,250 (29.66) | 0.11 | 0.10 |
| **Long-term care, no. (%)** | 1,886 (1.25) | 26,644 (0.73) | 27,130 (0.75) | 0.05 | 0.05 |
| **eGFR, mean (std), ml/min/1.73m2** | 78.30 (20.34) | 78.25 (19.73) | 78.23 (19.89) | 0.00 | 0.00 |
| **Systolic blood pressure, mean (std), mmHg** | 132.42 (12.77) | 132.58 (12.77) | 132.59 (12.83) | 0.01 | 0.01 |
| **Diastolic blood pressure, mean (std), mmHg** | 77.56 (7.76) | 77.57 (7.74) | 77.56 (7.77) | 0.00 | 0.00 |
| **Cancer, no. (%)** | 9,700 (6.42) | 220,608 (6.02) | 203,913 (5.58) | 0.02 | 0.04 |
| **Chronic kidney disease, no. (%)** | 11,474 (7.59) | 245,822 (6.70) | 246,437 (6.74) | 0.01 | 0.03 |
| **Chronic lung disease, no. (%)** | 241 (0.16) | 4,734 (0.13) | 4,789 (0.14) | 0.03 | 0.01 |
| **Dementia, no. (%)** | 302 (0.20) | 4,294 (0.12) | 4,424 (0.13) | 0.02 | 0.02 |
| **Diabetes mellitus type 2, no. (%)** | 36,226 (23.96) | 839,789 (22.89) | 837,154 (22.90) | 0.03 | 0.03 |
| **Dysautonomia, no. (%)** | 2,078 (1.38) | 44,738 (1.22) | 44,717 (1.23) | 0.01 | 0.01 |
| **Hyperlipidemia, no. (%)** | 40,689 (26.92) | 945,194 (25.76) | 942,018 (25.77) | 0.03 | 0.03 |
| **Hypertension, no. (%)** | 70,783 (46.82) | 1,650,401 (44.97) | 1,645,095 (45.00) | 0.04 | 0.04 |
| aArea Deprivation Index is a measure of socioeconomic disadvantage, with a range from low to high disadvantage of 0 to 100.  \*.Data collected within one year before cohort enrollment  std, standard deviation; BMI, body mass index; eGFR, estimated glomerular filtration rate. | | | | | |

**Supplementary Table 3. Risks and 12-month burdens of post-acute COVID-19 cardiovascular outcomes compared to contemporary control**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Outcome\*** | **Hazard Ratio (95% CI)†** | **COVID-19 burden per 1000 persons at 12 months (95% CI) †** | **Contemporary control burden per 1000 persons at 12 months (95% CI) †** | **Absolute burden difference per 1000 persons at 12 months (95% CI) †** |
| **COVID-19 vs Contemporary control** |
| **Cerebrovascular** | 1.48 (1.40, 1.57) | 15.36 (15.21, 15.51) | 10.40 (10.29, 10.52) | 4.95 (4.84, 5.07) |
| Stroke | 1.48 (1.38, 1.58) | 11.42 (11.29, 11.54) | 7.73 (7.63, 7.83) | 3.69 (3.59, 3.78) |
| TIA | 1.40 (1.27, 1.53) | 5.21 (5.13, 5.30) | 3.74 (3.67, 3.81) | 1.48 (1.41, 1.54) |
| **Dysrhythmia** | 1.66 (1.60, 1.72) | 49.49 (49.22, 49.75) | 30.17 (29.98, 30.37) | 19.31 (19.12, 19.51) |
| Atrial fibrillation | 1.79 (1.69, 1.90) | 18.18 (18.01, 18.34) | 10.19 (10.07, 10.31) | 7.99 (7.87, 8.10) |
| Sinus tachycardia | 1.82 (1.72, 1.93) | 14.38 (14.23, 14.52) | 7.92 (7.82, 8.01) | 6.46 (6.36, 6.56) |
| Sinus bradycardia | 1.49 (1.42, 1.57) | 16.75 (16.60, 16.90) | 11.27 (11.15, 11.39) | 5.48 (5.36, 5.60) |
| Ventricular arrhythmia | 1.56 (1.47, 1.66) | 12.91 (12.78, 13.05) | 8.30 (8.20, 8.40) | 4.61 (4.51, 4.71) |
| Atrial flutter | 1.57 (1.45, 1.70) | 12.39 (12.27, 12.52) | 7.90 (7.80, 8.00) | 4.49 (4.40, 4.59) |
| **Inflammatory heart disease** | 1.77 (1.57, 1.99) | 2.65 (2.59, 2.71) | 1.50 (1.46, 1.54) | 1.15 (1.10, 1.19) |
| Pericarditis | 1.62 (1.43, 1.83) | 2.34 (2.28, 2.39) | 1.45 (1.40, 1.49) | 0.89 (0.85, 0.93) |
| Myocarditis | 5.22 (3.71, 7.35) | 0.35 (0.33, 0.38) | 0.07 (0.06, 0.08) | 0.29 (0.28, 0.29) |
| **Ischemic heart disease** | 1.47 (1.40, 1.56) | 20.89 (20.72, 21.06) | 14.22 (14.09, 14.35) | 6.67 (6.54, 6.80) |
| Acute coronary disease | 1.48 (1.38, 1.58) | 15.53 (15.38, 15.67) | 10.54 (10.43, 10.65) | 4.99 (4.87, 5.10) |
| Myocardial infarction | 1.61 (1.49, 1.73) | 8.46 (8.35, 8.57) | 5.27 (5.19, 5.35) | 3.19 (3.11, 3.27) |
| Ischemic cardiomyopathy | 1.41 (1.28, 1.55) | 9.27 (9.16, 9.38) | 6.58 (6.49, 6.67) | 2.69 (2.60, 2.78) |
| Angina | 1.48 (1.37, 1.60) | 7.20 (7.10, 7.30) | 4.87 (4.79, 4.95) | 2.33 (2.25, 2.41) |
| **Other cardiac disorders** | 1.64 (1.58, 1.71) | 34.28 (34.07, 34.50) | 21.01 (20.85, 21.17) | 13.28 (13.11, 13.44) |
| Heart failure | 1.73 (1.65, 1.81) | 27.61 (27.41, 27.81) | 16.04 (15.90, 16.18) | 11.57 (11.43, 11.72) |
| Non-ischemic cardiomyopathy | 1.35 (1.28, 1.41) | 16.66 (16.51, 16.80) | 12.39 (12.27, 12.51) | 4.26 (4.14, 4.38) |
| Cardiac arrest | 2.15 (1.75, 2.65) | 1.03 (0.99, 1.07) | 0.48 (0.45, 0.50) | 0.55 (0.53, 0.58) |
| Cardiogenic shock | 2.17 (1.70, 2.77) | 0.82 (0.78, 0.85) | 0.38 (0.35, 0.40) | 0.44 (0.42, 0.46) |
| **Thrombotic disorders** | 1.92 (1.84, 2.01) | 21.73 (21.56, 21.90) | 11.37 (11.25, 11.48) | 10.36 (10.25, 10.48) |
| Pulmonary embolism | 3.06 (2.83, 3.31) | 7.75 (7.64, 7.85) | 2.54 (2.48, 2.59) | 5.21 (5.15, 5.26) |
| Deep vein thrombosis | 1.62 (1.53, 1.71) | 12.32 (12.19, 12.44) | 7.63 (7.54, 7.72) | 4.69 (4.59, 4.78) |
| Superficial vein thrombosis | 1.73 (1.61, 1.87) | 6.74 (6.64, 6.83) | 3.89 (3.83, 3.96) | 2.84 (2.77, 2.91) |
| **MACE** | 1.55 (1.50, 1.60) | 70.65 (70.35, 70.95) | 46.26 (46.03, 46.50) | 24.39 (24.15, 24.62) |
| **Any cardiac outcome** | 1.64 (1.60, 1.68) | 129.87 (129.45, 130.28) | 81.55 (81.23, 81.87) | 48.32 (48.00, 48.64) |
| \*. Outcomes were ascertained from day 30 after the initial positive COVID-19 test result until end of follow up  †. Adjustment through inverse probability weighting using predefined and algorithmically selected high-dimensional variables.  CI, confidence interval; TIA, transient ischemic attack; MACE, major adverse cardiac events. | | | | |

**Supplementary Table 4. Demographic and health characteristics of the COVID-19 and contemporary cohorts by care setting of the acute infection before weighting**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Baseline Characteristics** | **Non-hospitalized (N=129,879)** | **Hospitalized (N=16,152)** | **Admitted to intensive care (N=5,164)** | **Contemporary control (N=3,670,087)** | **Absolute standardized difference - Non-hospitalized and Contemporary control** | **Absolute standardized difference - Hospitalized and Contemporary control** | **Absolute standardized difference - Admitted to intensive care and Contemporary control** |
| **Age, mean (std), yr** | 60.14 (15.70) | 68.32 (13.34) | 68.75 (12.00) | 63.48 (16.23) | 0.21 | 0.33 | 0.37 |
| **Race, no. (%)** | | | | | | | |
| White | 93,607 (72.08) | 11,966 (74.09) | 3,815 (73.89) | 2,820,388 (76.85) | 0.11 | 0.31 | 0.32 |
| Black | 29,951 (23.07) | 3,394 (21.02) | 1,023 (19.82) | 676,176 (18.43) | 0.11 | 0.30 | 0.32 |
| Other | 6,319 (4.87) | 791 (4.91) | 324 (6.29) | 173,521 (4.73) | 0.01 | 0.04 | 0.05 |
| **Sex, no. (%)** | | | | | | | |
| Male | 114,474 (88.14) | 14,767 (91.43) | 4,785 (92.67) | 3,315,042 (90.33) | 0.07 | 0.14 | 0.16 |
| Female | 15,404 (11.87) | 1,384 (8.57) | 378 (7.34) | 355,044 (9.68) | 0.07 | 0.14 | 0.16 |
| **BMI category, no. (%), kg/m2** | | | | | | | |
| Underweight/ Normal | 17,346 (13.36) | 3,232 (20.02) | 977 (18.94) | 716,914 (19.54) | 0.17 | 0.04 | 0.02 |
| Overweight | 41,514 (31.97) | 5,282 (32.71) | 1,719 (33.30) | 1,406,487 (38.33) | 0.13 | 0.16 | 0.18 |
| Obese | 71,016 (54.68) | 7,636 (47.28) | 2,467 (47.78) | 1,546,684 (42.15) | 0.25 | 0.12 | 0.19 |
| **Smoking status, no. (%)** | | | | | | | |
| Never | 71,015 (54.68) | 7,909 (48.98) | 2,716 (52.60) | 1,867,927 (50.90) | 0.08 | 0.02 | 0.03 |
| Former | 35,955 (27.69) | 4,057 (25.12) | 1,341 (25.98) | 944,533 (25.74) | 0.04 | 0.12 | 0.14 |
| Current | 22,908 (17.64) | 4,184 (25.91) | 1,106 (21.43) | 857,589 (23.37) | 0.14 | 0.11 | 0.12 |
| **Area Deprivation Indexa, mean (std)** | 52.59 (15.26) | 51.81 (15.00) | 52.80 (14.91) | 51.69 (15.89) | 0.06 | 0.01 | 0.07 |
| Clinical Characteristics | | | | | | | |
| **Outpatient encounter\*, no. (%)** | | | | | | | |
| Zero | 27,420 (21.12) | 7,183 (44.48) | 2,219 (42.98) | 1,577,696 (42.99) | 0.48 | 0.86 | 0.85 |
| One | 39,183 (30.17) | 3,814 (23.62) | 1,184 (22.93) | 1,048,213 (28.57) | 0.04 | 0.21 | 0.25 |
| Two or more | 63,275 (48.72) | 5,153 (31.91) | 1,760 (34.10) | 1,044,176 (28.46) | 0.43 | 0.97 | 1.01 |
| **Long-term care, no. (%)** | 3,723 (2.87) | 236 (1.47) | 99 (1.93) | 21,690 (0.60) | 0.18 | 0.45 | 0.42 |
| **eGFR, mean (std), ml/min/1.73m2** | 79.37 (21.05) | 68.42 (25.94) | 65.07 (26.62) | 78.27 (19.63) | 0.05 | 0.43 | 0.56 |
| **Systolic blood pressure, mean (std), mmHg** | 132.34 (12.22) | 134.49 (12.55) | 134.65 (12.83) | 132.58 (12.79) | 0.02 | 0.15 | 0.16 |
| **Diastolic blood pressure, mean (std), mmHg** | 78.39 (7.61) | 77.06 (7.84) | 76.88 (7.99) | 77.54 (7.74) | 0.11 | 0.06 | 0.08 |
| **Cancer, no. (%)** | 8,926 (6.88) | 1,051 (6.52) | 334 (6.48) | 216,865 (5.91) | 0.04 | 0.27 | 0.28 |
| **Chronic kidney disease, no. (%)** | 10,586 (8.16) | 1,209 (7.49) | 449 (8.70) | 240,574 (6.56) | 0.06 | 0.43 | 0.52 |
| **Chronic lung disease, no. (%)** | 267 (0.21) | 24 (0.15) | 7 (0.15) | 4,587 (0.13) | 0.02 | 0.04 | 0.04 |
| **Dementia, no. (%)** | 310 (0.24) | 51 (0.32) | 32 (0.64) | 3,816 (0.11) | 0.03 | 0.15 | 0.16 |
| **Diabetes mellitus type 2, no. (%)** | 38,455 (29.61) | 3,999 (24.77) | 1,372 (26.58) | 826,026 (22.51) | 0.16 | 0.51 | 0.60 |
| **Dysautonomia, no. (%)** | 2,093 (1.62) | 200 (1.25) | 79 (1.55) | 43,784 (1.20) | 0.04 | 0.13 | 0.13 |
| **Hyperlipidemia, no. (%)** | 44,212 (34.05) | 4,004 (24.80) | 1,360 (26.35) | 932,826 (25.42) | 0.19 | 0.58 | 0.22 |
| **Hypertension, no. (%)** | 66,869 (51.49) | 7,171 (44.40) | 2,451 (47.48) | 1,635,941 (44.58) | 0.14 | 0.17 | 0.67 |
| aArea Deprivation Index is a measure of socioeconomic disadvantage, with a range from low to high disadvantage of 0 to 100.  \*.Data collected within one year before cohort enrollment  std, standard deviation; BMI, body mass index; eGFR, estimated glomerular filtration rate. | | | | | | | |

**Supplementary Table 5. Demographic and health characteristics of the COVID-19 and contemporary cohorts by care setting of the acute infection after weighting**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Baseline Characteristics** | **Non-hospitalized (N=129,879)** | **Hospitalized (N=16,152)** | **Admitted to intensive care (N=5,164)** | **Contemporary control (N=3,670,087)** | **Absolute standardized difference - Non-hospitalized and Contemporary control** | **Absolute standardized difference - Hospitalized and Contemporary control** | **Absolute standardized difference - Admitted to intensive care and Contemporary control** |
| **Age, mean (std), yr** | 63.23 (16.32) | 63.21 (15.78) | 63.72 (15.81) | 63.39 (16.22) | 0.01 | 0.01 | 0.02 |
| **Race, no. (%)** | | | | | | | |
| White | 98,747 (76.03) | 11,966 (74.09) | 3,815 (73.89) | 2,811,837 (76.62) | 0.01 | 0.06 | 0.06 |
| Black | 24,873 (19.16) | 3,394 (21.02) | 1,023 (19.82) | 684,397 (18.65) | 0.01 | 0.06 | 0.03 |
| Other | 6,257 (4.82) | 791 (4.91) | 324 (6.29) | 173,852 (4.74) | 0.00 | 0.01 | 0.07 |
| **Sex, no. (%)** | | | | | | | |
| Male | 116,556 (89.75) | 14,767 (91.43) | 4,785 (92.67) | 3,313,060 (90.28) | 0.02 | 0.04 | 0.09 |
| Female | 13,322 (10.26) | 1,384 (8.57) | 378 (7.34) | 357,026 (9.73) | 0.02 | 0.04 | 0.09 |
| **BMI category, no. (%), kg/m2** | | | | | | | |
| Underweight/ Normal | 25,413 (19.57) | 3,232 (20.02) | 977 (18.94) | 709,978 (19.35) | 0.01 | 0.02 | 0.01 |
| Overweight | 45,522 (35.05) | 5,282 (32.71) | 1,719 (33.30) | 1,398,927 (38.12) | 0.06 | 0.11 | 0.10 |
| Obese | 58,942 (45.39) | 7,636 (47.28) | 2,467 (47.78) | 1,561,181 (42.54) | 0.06 | 0.10 | 0.11 |
| **Smoking status, no. (%)** | | | | | | | |
| Never | 65,270 (50.26) | 7,909 (48.98) | 2,716 (52.60) | 1,872,074 (51.01) | 0.02 | 0.04 | 0.03 |
| Former | 34,364 (26.46) | 4,057 (25.12) | 1,341 (25.98) | 948,130 (25.84) | 0.01 | 0.02 | 0.00 |
| Current | 30,243 (23.29) | 4,184 (25.91) | 1,106 (21.43) | 849,882 (23.16) | 0.00 | 0.06 | 0.04 |
| **Area Deprivation Indexa, mean (std)** | 51.96 (15.73) | 52.17 (15.86) | 52.69 (15.75) | 51.72 (15.87) | 0.01 | 0.03 | 0.06 |
| Clinical Characteristics | | | | | | | |
| **Outpatient encounter\*, no. (%)** | | | | | | | |
| Zero | 54,440 (41.92) | 7,183 (44.48) | 2,219 (42.98) | 1,543,565 (42.06) | 0.00 | 0.05 | 0.02 |
| One | 35,060 (27.00) | 3,814 (23.62) | 1,184 (22.93) | 1,049,461 (28.6) | 0.04 | 0.11 | 0.13 |
| Two or more | 40,378 (31.09) | 5,153 (31.91) | 1,760 (34.10) | 1,077,060 (29.35) | 0.04 | 0.06 | 0.10 |
| **Long-term care, no. (%)** | 1,267 (0.98) | 236 (1.47) | 99 (1.93) | 26,644 (0.73) | 0.03 | 0.07 | 0.10 |
| **eGFR, mean (std), ml/min/1.73m2** | 78.16 (20.14) | 78.01 (21.05) | 77.46 (21.60) | 78.25 (19.73) | 0.00 | 0.01 | 0.04 |
| **Systolic blood pressure, mean (std), mmHg** | 132.51 (12.82) | 133.16 (12.80) | 134.03 (13.12) | 132.58 (12.77) | 0.01 | 0.05 | 0.11 |
| **Diastolic blood pressure, mean (std), mmHg** | 77.56 (7.80) | 78.10 (8.03) | 78.00 (7.80) | 77.57 (7.74) | 0.00 | 0.07 | 0.06 |
| **Cancer, no. (%)** | 7,674 (5.91) | 1,051 (6.52) | 334 (6.48) | 220,608 (6.02) | 0.00 | 0.02 | 0.02 |
| **Chronic kidney disease, no. (%)** | 9,260 (7.13) | 1,209 (7.49) | 449 (8.70) | 245,822 (6.70) | 0.02 | 0.03 | 0.08 |
| **Chronic lung disease, no. (%)** | 167 (0.13) | 24 (0.15) | 7 (0.15) | 4,734 (0.13) | 0.00 | 0.01 | 0.00 |
| **Dementia, no. (%)** | 183 (0.15) | 51 (0.32) | 32 (0.64) | 4,294 (0.12) | 0.01 | 0.04 | 0.08 |
| **Diabetes mellitus type 2, no. (%)** | 30,335 (23.36) | 3,999 (24.77) | 1,372 (26.58) | 839,789 (22.89) | 0.01 | 0.04 | 0.09 |
| **Dysautonomia, no. (%)** | 1,654 (1.28) | 200 (1.25) | 79 (1.55) | 44,738 (1.22) | 0.00 | 0.00 | 0.03 |
| **Hyperlipidemia, no. (%)** | 34,376 (26.47) | 4,004 (24.80) | 1,360 (26.35) | 945,194 (25.76) | 0.02 | 0.01 | 0.01 |
| **Hypertension, no. (%)** | 59,637 (45.92) | 7,171 (44.40) | 2,451 (47.48) | 1,650,401 (44.97) | 0.02 | 0.02 | 0.05 |
| aArea Deprivation Index is a measure of socioeconomic disadvantage, with a range from low to high disadvantage of 0 to 100.  \*.Data collected within one year before cohort enrollment  std, standard deviation; BMI, body mass index; eGFR, estimated glomerular filtration rate. | | | | | | | |

**Supplementary Table 6. Risks and 12-month burdens of post-acute COVID-19 cardiovascular outcomes by care setting of the acute infection compared to contemporary control**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Outcome\*** | **Care setting†** | **Hazard ratio (95% CI)** ‡ | **COVID-19 burden per 1000 persons at 12 months (95% CI)** ‡ | **Contemporary control burden per 1000 persons at 12 months (95% CI)** ‡ | **Burden difference per 1000 persons at 12 months (95% CI)** ‡ |
|
|
| **Cerebrovascular** | Non-hospitalized | 1.30 (1.22, 1.38) | 13.14 (13.02, 13.27) | 10.12 (10.02, 10.23) | 3.02 (2.89, 3.14) |
| Hospitalized | 2.66 (2.22, 3.19) | 26.74 (26.56, 26.92) | 16.62 (16.43, 16.80) |
| Admitted to intensive care | 3.75 (2.93, 4.79) | 37.42 (37.20, 37.64) | 27.29 (27.07, 27.52) |
| Stroke | Non-hospitalized | 1.24 (1.16, 1.34) | 9.33 (9.23, 9.44) | 7.50 (7.41, 7.59) | 1.83 (1.72, 1.93) |
| Hospitalized | 2.77 (2.24, 3.42) | 20.61 (20.45, 20.77) | 13.11 (12.95, 13.27) |
| Admitted to intensive care | 4.10 (3.11, 5.41) | 30.40 (30.20, 30.61) | 22.90 (22.70, 23.10) |
| TIA | Non-hospitalized | 1.32 (1.19, 1.45) | 4.93 (4.85, 5.01) | 3.75 (3.68, 3.81) | 1.18 (1.11, 1.26) |
| Hospitalized | 2.47 (1.92, 3.17) | 9.22 (9.11, 9.32) | 5.47 (5.36, 5.58) |
| Admitted to intensive care | 2.72 (1.86, 3.96) | 10.14 (10.02, 10.26) | 6.39 (6.27, 6.51) |
| **Dysrhythmia** | Non-hospitalized | 1.35 (1.30, 1.40) | 37.80 (37.59, 38.01) | 28.10 (27.92, 28.27) | 9.70 (9.50, 9.91) |
| Hospitalized | 3.48 (3.12, 3.89) | 94.43 (94.10, 94.76) | 66.33 (66.00, 66.66) |
| Admitted to intensive care | 7.49 (6.50, 8.62) | 192.12 (191.65, 192.58) | 164.02 (163.56, 164.49) |
| Atrial fibrillation | Non-hospitalized | 1.45 (1.36, 1.55) | 13.53 (13.41, 13.66) | 9.34 (9.24, 9.44) | 4.19 (4.07, 4.32) |
| Hospitalized | 3.96 (3.25, 4.83) | 36.50 (36.29, 36.71) | 27.16 (26.95, 27.37) |
| Admitted to intensive care | 9.25 (7.35, 11.64) | 83.14 (82.82, 83.46) | 73.80 (73.48, 74.12) |
| Sinus tachycardia | Non-hospitalized | 1.33 (1.25, 1.42) | 9.83 (9.73, 9.94) | 7.41 (7.32, 7.50) | 2.43 (2.32, 2.53) |
| Hospitalized | 5.22 (4.34, 6.28) | 38.05 (37.84, 38.26) | 30.65 (30.44, 30.86) |
| Admitted to intensive care | 9.70 (7.88, 11.93) | 69.54 (69.25, 69.83) | 62.13 (61.84, 62.42) |
| Sinus bradycardia | Non-hospitalized | 1.31 (1.24, 1.38) | 13.99 (13.86, 14.12) | 10.69 (10.58, 10.80) | 3.30 (3.17, 3.43) |
| Hospitalized | 2.30 (1.99, 2.66) | 24.44 (24.27, 24.61) | 13.75 (13.58, 13.92) |
| Admitted to intensive care | 4.40 (3.52, 5.50) | 46.19 (45.95, 46.44) | 35.50 (35.26, 35.74) |
| Ventricular arrhythmia | Non-hospitalized | 1.22 (1.14, 1.30) | 9.67 (9.56, 9.77) | 7.17 (7.08, 7.25) | 1.70 (1.60, 1.81) |
| Hospitalized | 2.96 (2.42, 3.64) | 23.42 (23.26, 23.59) | 15.46 (15.30, 15.63) |
| Admitted to intensive care | 6.01 (4.74, 7.62) | 46.89 (46.65, 47.13) | 38.93 (38.68, 39.17) |
| Atrial flutter | Non-hospitalized | 1.26 (1.18, 1.35) | 9.59 (9.48, 9.69) | 7.61 (7.52, 7.70) | 1.98 (1.87, 2.08) |
| Hospitalized | 2.73 (2.14, 3.49) | 20.63 (20.48, 20.78) | 13.02 (12.87, 13.17) |
| Admitted to intensive care | 5.09 (3.86, 6.72) | 38.13 (37.91, 38.35) | 30.52 (30.30, 30.74) |
| **Inflammatory heart disease** | Non-hospitalized | 1.47 (1.26, 1.71) | 2.12 (2.08, 2.17) | 1.45 (1.41, 1.49) | 0.68 (0.63, 0.73) |
| Hospitalized | 4.74 (3.11, 7.25) | 6.84 (6.75, 6.93) | 5.39 (5.30, 5.49) |
| Admitted to intensive care | 8.43 (5.02, 14.16) | 12.12 (11.99, 12.25) | 10.67 (10.55, 10.80) |
| Pericarditis | Non-hospitalized | 1.36 (1.16, 1.59) | 1.89 (1.85, 1.94) | 1.39 (1.35, 1.43) | 0.50 (0.45, 0.54) |
| Hospitalized | 4.37 (2.72, 7.02) | 6.08 (5.99, 6.17) | 4.68 (4.60, 4.77) |
| Admitted to intensive care | 7.96 (4.52, 14.01) | 11.04 (10.92, 11.16) | 9.65 (9.52, 9.77) |
| Myocarditis | Non-hospitalized | 3.77 (2.27, 6.25) | 0.25 (0.23, 0.27) | 0.07 (0.06, 0.08) | 0.18 (0.17, 0.20) |
| Hospitalized | 13.64 (8.19, 22.71) | 0.91 (0.88, 0.94) | 0.84 (0.81, 0.87) |
| Admitted to intensive care | 40.40 (15.00, 108.8) | 2.69 (2.63, 2.75) | 2.62 (2.57, 2.68) |
| **Ischemic heart disease** | Non-hospitalized | 1.20 (1.14, 1.27) | 16.41 (16.27, 16.54) | 13.66 (13.53, 13.78) | 2.75 (2.61, 2.89) |
| Hospitalized | 3.06 (2.59, 3.63) | 41.26 (41.04, 41.48) | 27.60 (27.38, 27.82) |
| Admitted to intensive care | 4.51 (3.79, 5.37) | 60.15 (59.87, 60.42) | 46.49 (46.22, 46.77) |
| Acute coronary disease | Non-hospitalized | 1.13 (1.06, 1.20) | 11.30 (11.19, 11.41) | 10.04 (9.93, 10.14) | 1.26 (1.15, 1.37) |
| Hospitalized | 2.92 (2.41, 3.55) | 29.06 (28.88, 29.24) | 19.02 (18.84, 19.20) |
| Admitted to intensive care | 5.00 (4.19, 5.98) | 49.24 (48.99, 49.49) | 39.20 (38.95, 39.45) |
| Myocardial infarction | Non-hospitalized | 1.12 (1.03, 1.23) | 5.48 (5.40, 5.56) | 4.88 (4.80, 4.95) | 0.60 (0.52, 0.68) |
| Hospitalized | 4.25 (3.27, 5.53) | 20.56 (20.41, 20.72) | 15.68 (15.53, 15.84) |
| Admitted to intensive care | 7.74 (6.22, 9.62) | 37.12 (36.90, 37.34) | 32.24 (32.03, 32.46) |
| Ischemic cardiomyopathy | Non-hospitalized | 1.11 (1.03, 1.19) | 7.29 (7.19, 7.38) | 6.59 (6.50, 6.67) | 0.70 (0.61, 0.79) |
| Hospitalized | 2.20 (1.62, 2.98) | 14.43 (14.3, 14.56) | 7.85 (7.71, 7.98) |
| Admitted to intensive care | 2.98 (2.41, 3.69) | 19.52 (19.36, 19.68) | 12.93 (12.77, 13.09) |
| Angina | Non-hospitalized | 1.40 (1.28, 1.52) | 6.71 (6.61, 6.80) | 4.81 (4.73, 4.89) | 1.90 (1.80, 1.99) |
| Hospitalized | 3.44 (2.60, 4.54) | 16.44 (16.29, 16.59) | 11.63 (11.48, 11.78) |
| Admitted to intensive care | 2.91 (1.95, 4.34) | 13.94 (13.80, 14.08) | 9.13 (8.99, 9.27) |
| **Other cardiac disorders** | Non-hospitalized | 1.35 (1.29, 1.41) | 26.64 (26.46, 26.81) | 19.85 (19.70, 20.00) | 6.79 (6.61, 6.96) |
| Hospitalized | 3.38 (2.95, 3.87) | 65.49 (65.21, 65.76) | 45.64 (45.36, 45.91) |
| Admitted to intensive care | 6.37 (5.40, 7.53) | 119.94 (119.56, 120.31) | 100.09 (99.71, 100.47) |
| Heart failure | Non-hospitalized | 1.39 (1.32, 1.46) | 20.91 (20.75, 21.06) | 15.10 (14.97, 15.23) | 5.81 (5.65, 5.96) |
| Hospitalized | 3.70 (3.18, 4.31) | 54.78 (54.52, 55.03) | 39.68 (39.42, 39.93) |
| Admitted to intensive care | 6.22 (5.20, 7.44) | 90.28 (89.94, 90.61) | 75.17 (74.84, 75.51) |
| Non-ischemic cardiomyopathy | Non-hospitalized | 1.19 (1.13, 1.25) | 14.42 (14.30, 14.55) | 12.15 (12.03, 12.26) | 2.28 (2.15, 2.40) |
| Hospitalized | 2.33 (1.99, 2.72) | 28.03 (27.85, 28.21) | 15.88 (15.70, 16.07) |
| Admitted to intensive care | 4.50 (3.50, 5.78) | 53.52 (53.26, 53.78) | 41.37 (41.11, 41.63) |
| Cardiac arrest | Non-hospitalized | 0.85 (0.63, 1.14) | 0.37 (0.35, 0.39) | 0.44 (0.41, 0.46) | 0.00 (0.00, 0.00) |
| Hospitalized | 5.82 (3.68, 9.22) | 2.54 (2.48, 2.59) | 2.10 (2.05, 2.16) |
| Admitted to intensive care | 28.74 (19.00, 43.47) | 12.46 (12.34, 12.59) | 12.03 (11.90, 12.15) |
| Cardiogenic shock | Non-hospitalized | 1.15 (0.77, 1.72) | 0.40 (0.38, 0.43) | 0.35 (0.33, 0.37) | 0.05 (0.03, 0.08) |
| Hospitalized | 5.34 (3.20, 8.91) | 1.87 (1.82, 1.92) | 1.52 (1.47, 1.57) |
| Admitted to intensive care | 15.59 (10.29, 23.62) | 5.45 (5.36, 5.53) | 5.10 (5.01, 5.18) |
| **Thrombotic disorders** | Non-hospitalized | 1.52 (1.45, 1.60) | 16.27 (16.14, 16.40) | 10.70 (10.59, 10.81) | 5.57 (5.44, 5.70) |
| Hospitalized | 4.21 (3.69, 4.80) | 44.30 (44.08, 44.52) | 33.60 (33.38, 33.82) |
| Admitted to intensive care | 10.21 (8.59, 12.13) | 104.04 (103.70, 104.38) | 93.34 (93.00, 93.68) |
| Pulmonary embolism | Non-hospitalized | 2.19 (1.99, 2.41) | 5.13 (5.06, 5.21) | 2.35 (2.30, 2.40) | 2.79 (2.71, 2.86) |
| Hospitalized | 9.55 (7.85, 11.61) | 22.18 (22.02, 22.33) | 19.83 (19.67, 19.98) |
| Admitted to intensive care | 25.26 (19.68, 32.43) | 57.62 (57.36, 57.88) | 55.27 (55.02, 55.53) |
| Deep vein thrombosis | Non-hospitalized | 1.38 (1.29, 1.47) | 10.14 (10.04, 10.25) | 7.38 (7.29, 7.47) | 2.77 (2.66, 2.87) |
| Hospitalized | 2.70 (2.24, 3.24) | 19.76 (19.61, 19.91) | 12.38 (12.23, 12.53) |
| Admitted to intensive care | 5.71 (4.50, 7.23) | 41.36 (41.13, 41.58) | 33.98 (33.76, 34.21) |
| Superficial vein thrombosis | Non-hospitalized | 1.33 (1.21, 1.45) | 4.80 (4.73, 4.87) | 3.61 (3.55, 3.68) | 1.18 (1.11, 1.26) |
| Hospitalized | 3.37 (2.79, 4.08) | 12.14 (12.02, 12.25) | 8.52 (8.40, 8.64) |
| Admitted to intensive care | 8.24 (6.38, 10.64) | 29.41 (29.22, 29.60) | 25.79 (25.60, 25.98) |
| **MACE** | Non-hospitalized | 1.35 (1.31, 1.40) | 59.47 (59.22, 59.73) | 44.31 (44.09, 44.53) | 15.16 (14.91, 15.42) |
| Hospitalized | 2.40 (2.17, 2.67) | 103.22 (102.88, 103.55) | 58.91 (58.58, 59.25) |
| Admitted to intensive care | 4.45 (3.89, 5.10) | 182.64 (182.20, 183.08) | 138.33 (137.89, 138.77) |
| **Any cardiovascular outcome** | Non-hospitalized | 1.43 (1.40, 1.47) | 109.29 (108.94, 109.64) | 77.55 (77.26, 77.85) | 31.74 (31.39, 32.09) |
| Hospitalized | 3.19 (2.95, 3.45) | 227.16 (226.68, 227.65) | 149.61 (149.13, 150.09) |
| Admitted to intensive care | 5.96 (5.36, 6.64) | 382.03 (381.46, 382.61) | 304.48 (303.90, 305.06) |
| \*. Outcomes were ascertained from day 30 after the initial positive COVID-19 test result until end of follow up.  †. Based on care received within the first 30 days after a positive COVID-19 test result.  ‡. Adjustment through inverse probability weighting using predefined variables and algorithmically selected high-dimensional variables.  CI, confidence interval; TIA, transient ischemic attack; MACE, major adverse cardiac events. | | | | | |

**Supplementary Table 7. Risks and 12-month burdens of post-acute COVID-19 cardiovascular outcomes compared to historical control**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Outcome\*** | **Hazard Ratio (95% CI)†** | **COVID-19 burden per 1000 persons at 12 months (95% CI) †** | **Contemporary control burden per 1000 persons at 12 months (95% CI) †** | **Burden difference per 1000 persons at 12 months (95% CI) †** |
| **COVID-19 vs Historical control** |
| **Cerebrovascular** | 1.49 (1.41, 1.58) | 15.36 (15.21, 15.51) | 10.33 (10.21, 10.44) | 5.03 (4.92, 5.15) |
| Stroke | 1.49 (1.40, 1.60) | 11.42 (11.29, 11.54) | 7.65 (7.56, 7.75) | 3.76 (3.66, 3.86) |
| TIA | 1.37 (1.25, 1.50) | 5.21 (5.13, 5.30) | 3.80 (3.73, 3.87) | 1.41 (1.34, 1.48) |
| **Dysrhythmia** | 1.57 (1.51, 1.62) | 49.49 (49.22, 49.75) | 31.90 (31.70, 32.10) | 17.58 (17.38, 17.78) |
| Atrial fibrillation | 1.63 (1.54, 1.73) | 18.18 (18.01, 18.34) | 11.18 (11.06, 11.30) | 7.00 (6.88, 7.12) |
| Sinus tachycardia | 1.80 (1.70, 1.91) | 14.38 (14.23, 14.52) | 8.01 (7.91, 8.11) | 6.36 (6.27, 6.46) |
| Sinus bradycardia | 1.35 (1.28, 1.42) | 16.75 (16.60, 16.90) | 12.43 (12.31, 12.56) | 4.32 (4.19, 4.44) |
| Ventricular arrhythmia | 1.76 (1.66, 1.88) | 12.91 (12.78, 13.05) | 7.34 (7.25, 7.44) | 5.57 (5.48, 5.66) |
| Atrial flutter | 1.71 (1.58, 1.85) | 12.39 (12.27, 12.52) | 7.26 (7.16, 7.35) | 5.14 (5.05, 5.23) |
| **Inflammatory heart disease** | 1.92 (1.71, 2.16) | 2.65 (2.59, 2.71) | 1.38 (1.34, 1.42) | 1.27 (1.23, 1.31) |
| Pericarditis | 1.75 (1.54, 1.98) | 2.34 (2.28, 2.39) | 1.34 (1.30, 1.38) | 1.00 (0.96, 1.04) |
| Myocarditis | 6.44 (4.56, 9.10) | 0.35 (0.33, 0.38) | 0.05 (0.05, 0.06) | 0.30 (0.29, 0.31) |
| **Ischemic heart disease** | 1.42 (1.35, 1.50) | 20.89 (20.72, 21.06) | 14.74 (14.60, 14.87) | 6.15 (6.02, 6.29) |
| Acute coronary disease | 1.49 (1.40, 1.59) | 15.53 (15.38, 15.67) | 10.43 (10.32, 10.54) | 5.09 (4.98, 5.20) |
| Myocardial infarction | 1.73 (1.60, 1.86) | 8.46 (8.35, 8.57) | 4.91 (4.83, 4.99) | 3.55 (3.47, 3.63) |
| Ischemic cardiomyopathy | 1.38 (1.25, 1.51) | 9.27 (9.16, 9.38) | 6.75 (6.66, 6.84) | 2.52 (2.44, 2.61) |
| Angina | 1.30 (1.20, 1.40) | 7.20 (7.10, 7.30) | 5.56 (5.48, 5.64) | 1.64 (1.55, 1.72) |
| **Other cardiac disorders** | 1.56 (1.50, 1.63) | 34.28 (34.07, 34.50) | 22.06 (21.90, 22.22) | 12.22 (12.06, 12.39) |
| Heart failure | 1.62 (1.55, 1.70) | 27.61 (27.41, 27.81) | 17.10 (16.95, 17.24) | 10.52 (10.37, 10.66) |
| Non-ischemic cardiomyopathy | 1.35 (1.28, 1.41) | 16.66 (16.51, 16.80) | 12.38 (12.26, 12.50) | 4.27 (4.15, 4.39) |
| Cardiac arrest | 2.28 (1.85, 2.81) | 1.03 (0.99, 1.07) | 0.45 (0.43, 0.48) | 0.58 (0.56, 0.60) |
| Cardiogenic shock | 2.31 (1.81, 2.94) | 0.82 (0.78, 0.85) | 0.35 (0.33, 0.37) | 0.46 (0.44, 0.48) |
| **Thrombotic disorders** | 2.11 (2.02, 2.21) | 21.73 (21.56, 21.90) | 10.35 (10.25, 10.46) | 11.38 (11.27, 11.48) |
| Pulmonary embolism | 3.82 (3.53, 4.13) | 7.75 (7.64, 7.85) | 2.03 (1.98, 2.08) | 5.71 (5.66, 5.76) |
| Deep vein thrombosis | 1.72 (1.62, 1.82) | 12.32 (12.19, 12.44) | 7.20 (7.11, 7.29) | 5.12 (5.03, 5.21) |
| Superficial vein thrombosis | 1.93 (1.79, 2.09) | 6.74 (6.64, 6.83) | 3.49 (3.43, 3.55) | 3.25 (3.18, 3.31) |
| **MACE** | 1.51 (1.46, 1.56) | 70.65 (70.35, 70.95) | 47.27 (47.03, 47.50) | 23.38 (23.15, 23.62) |
| **Any cardiac outcome** | 1.57 (1.53, 1.61) | 129.87 (129.45, 130.28) | 84.67 (84.35, 85.00) | 45.19 (44.87, 45.51) |
| \*. Outcomes were ascertained from day 30 after the initial positive COVID-19 test result until end of follow up  †. Adjustment through inverse probability weighting using predefined and algorithmically selected high-dimensional variables.  CI, confidence interval; TIA, transient ischemic attack; MACE, major adverse cardiac events. | | | | |

**Supplementary Table 8. Demographic and health characteristics of the COVID-19 and historical cohorts by care setting of the acute infection before weighting**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Baseline Characteristics** | **Non-hospitalized (N=129,879)** | **Hospitalized (N=16,152)** | **Admitted to intensive care (N=5,164)** | **Historical control (N=3,656,337)** | **Absolute standardized difference - Non-hospitalized and Historical control** | **Absolute standardized difference - Hospitalized and Historical control** | **Absolute standardized difference - Admitted to intensive care and Historical control** |
| **Age, mean (std), yr** | 60.14 (15.70) | 68.32 (13.34) | 68.75 (12.00) | 62.94 (16.49) | 0.17 | 0.36 | 0.40 |
| **Race, no. (%)** | | | | | | | |
| White | 93,607 (72.08) | 11,966 (74.09) | 3,815 (73.89) | 2,829,639 (77.39) | 0.12 | 0.31 | 0.33 |
| Black | 29,951 (23.07) | 3,394 (21.02) | 1,023 (19.82) | 654,484 (17.90) | 0.13 | 0.32 | 0.33 |
| Other | 6,319 (4.87) | 791 (4.91) | 324 (6.29) | 172,213 (4.70) | 0.01 | 0.04 | 0.05 |
| **Sex, no. (%)** | | | | | | | |
| Male | 11,4474 (88.14) | 14,767 (91.43) | 4,785 (92.67) | 3,313,007 (90.61) | 0.07 | 0.14 | 0.17 |
| Female | 15,404 (11.87) | 1,384 (8.57) | 378 (7.34) | 341,904 (9.39) | 0.08 | 0.13 | 0.15 |
| **BMI category, no. (%), kg/m2** | | | | | | | |
| Underweight/Normal | 17,346 (13.36) | 3,232 (20.02) | 977 (18.94) | 730,536 (19.98) | 0.17 | 0.03 | 0.03 |
| Overweight | 41,514 (31.97) | 5,282 (32.71) | 1,719 (33.30) | 1,434,381 (39.23) | 0.15 | 0.18 | 0.20 |
| Obese | 71,016 (54.68) | 7,636 (47.28) | 2,467 (47.78) | 1,493,979 (40.86) | 0.28 | 0.15 | 0.22 |
| **Smoking status, no. (%)** | | | | | | | |
| Never | 71,015 (54.68) | 7,909 (48.98) | 2,716 (52.60) | 1,787,218 (48.88) | 0.12 | 0.02 | 0.01 |
| Former | 35,955 (27.69) | 4,057 (25.12) | 1,341 (25.98) | 989,770 (27.07) | 0.02 | 0.10 | 0.11 |
| Current | 22,908 (17.64) | 4,184 (25.91) | 1,106 (21.43) | 879,715 (24.06) | 0.16 | 0.13 | 0.13 |
| **Area Deprivation Indexa, mean (std)** | 52.59 (15.26) | 51.81 (15.00) | 52.80 (14.91) | 51.68 (15.97) | 0.06 | 0.01 | 0.07 |
| Clinical Characteristics | | | | | | | |
| **Outpatient encounter\*, no. (%)** | | | | | | | |
| Zero | 27,420 (21.12) | 7,183 (44.48) | 2,219 (42.98) | 1,501,658 (41.07) | 0.44 | 0.81 | 0.81 |
| One | 39,183 (30.17) | 3,814 (23.62) | 1,184 (22.93) | 989,770 (27.49) | 0.06 | 0.18 | 0.23 |
| Two or more | 63,275 (48.72) | 5,153 (31.91) | 1,760 (34.10) | 1,145,530 (31.44) | 0.36 | 0.89 | 0.93 |
| **Long-term care, no. (%)** | 3,723 (2.87) | 236 (1.47) | 99 (1.93) | 29,579 (0.81) | 0.15 | 0.44 | 0.41 |
| **eGFR, mean (std), ml/min/1.73m2** | 79.37 (21.05) | 68.42 (25.94) | 65.07 (26.62) | 79.27 (19.90) | 0.00 | 0.47 | 0.60 |
| **Systolic blood pressure, mean (std), mmHg** | 132.34 (12.22) | 134.49 (12.55) | 134.65 (12.83) | 132.61 (12.66) | 0.02 | 0.15 | 0.16 |
| **Diastolic blood pressure, mean (std), mmHg** | 78.39 (7.61) | 77.06 (7.84) | 76.88 (7.99) | 77.49 (7.93) | 0.12 | 0.05 | 0.08 |
| **Cancer, no. (%)** | 8,926 (6.88) | 1,051 (6.52) | 334 (6.48) | 208,447 (5.71) | 0.05 | 0.28 | 0.29 |
| **Chronic kidney disease, no. (%)** | 10,586 (8.16) | 1,209 (7.49) | 449 (8.70) | 224,718 (6.15) | 0.08 | 0.45 | 0.54 |
| **Chronic lung disease, no. (%)** | 267 (0.21) | 24 (0.15) | 7 (0.15) | 5,703 (0.16) | 0.01 | 0.04 | 0.04 |
| **Dementia, no. (%)** | 310 (0.24) | 51 (0.32) | 32 (0.64) | 4,387 (0.12) | 0.03 | 0.15 | 0.15 |
| **Diabetes mellitus type 2, no. (%)** | 38,455 (29.61) | 3,999 (24.77) | 1,372 (26.58) | 828,526 (22.66) | 0.16 | 0.51 | 0.60 |
| **Dysautonomia, no. (%)** | 2,093 (1.62) | 200 (1.25) | 79 (1.55) | 45,082 (1.24) | 0.03 | 0.13 | 0.12 |
| **Hyperlipidemia, no. (%)** | 44,212 (34.05) | 4,004 (24.80) | 1,360 (26.35) | 1,128,711 (30.87) | 0.07 | 0.55 | 0.10 |
| **Hypertension, no. (%)** | 66,869 (51.49) | 7,171 (44.40) | 2,451 (47.48) | 1,676,796 (45.86) | 0.12 | 0.05 | 0.65 |
| aArea Deprivation Index is a measure of socioeconomic disadvantage, with a range from low to high disadvantage of 0 to 100.  \*.Data collected within one year before cohort enrollment  std, standard deviation; BMI, body mass index; eGFR, estimated glomerular filtration rate. | | | | | | | |

**Supplementary Table 9. Demographic and health characteristics of the COVID-19 and historical cohorts by care setting of the acute infection after weighting**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Baseline Characteristics** | **Non-hospitalized (N=129,879)** | **Hospitalized (N=16,152)** | **Admitted to intensive care (N=5,164)** | **Historical control (N=3,656,337)** | **Absolute standardized difference - Non-hospitalized and Historical control** | **Absolute standardized difference - Hospitalized and Historical control** | **Absolute standardized difference - Admitted to intensive care and Historical control** |
| **Age, mean (std), yr** | 63.23 (16.32) | 63.21 (15.78) | 63.72 (15.81) | 63.40 (16.45) | 0.01 | 0.01 | 0.02 |
| **Race, no. (%)** | | | | | | | |
| White | 98,747 (76.03) | 11,966 (74.09) | 3,815 (73.89) | 2,800,827 (76.61) | 0.01 | 0.06 | 0.06 |
| Black | 24,873 (19.16) | 3,394 (21.02) | 1,023 (19.82) | 681,285 (18.64) | 0.01 | 0.06 | 0.03 |
| Other | 6,257 (4.82) | 791 (4.91) | 324 (6.29) | 173,090 (4.74) | 0.00 | 0.01 | 0.07 |
| **Sex, no. (%)** | | | | | | | |
| Male | 116,556 (89.75) | 14,767 (91.43) | 4,785 (92.67) | 3,299,917 (90.26) | 0.02 | 0.04 | 0.09 |
| Female | 13,322 (10.26) | 1,384 (8.57) | 378 (7.34) | 355,286 (9.72) | 0.02 | 0.04 | 0.09 |
| **BMI category, no. (%), kg/m2** | | | | | | | |
| Underweight/Normal | 25,413 (19.57) | 3,232 (20.02) | 977 (18.94) | 707,245 (19.35) | 0.01 | 0.02 | 0.01 |
| Overweight | 45,522 (35.05) | 5,282 (32.71) | 1,719 (33.30) | 1,428,384 (39.07) | 0.08 | 0.13 | 0.12 |
| Obese | 58,942 (45.39) | 7,636 (47.28) | 2,467 (47.78) | 1,519,573 (41.56) | 0.08 | 0.12 | 0.13 |
| **Smoking status, no. (%)** | | | | | | | |
| Never | 65,270 (50.26) | 7,909 (48.98) | 2,716 (52.60) | 1,864,987 (51.01) | 0.02 | 0.04 | 0.03 |
| Former | 34,364 (26.46) | 4,057 (25.12) | 1,341 (25.98) | 944,651 (25.84) | 0.01 | 0.02 | 0.00 |
| Current | 30,243 (23.29) | 4,184 (25.91) | 1,106 (21.43) | 845,564 (23.13) | 0.00 | 0.06 | 0.04 |
| **Area Deprivation Indexa, mean (std)** | 51.96 (15.73) | 52.17 (15.86) | 52.69 (15.75) | 51.72 (15.85) | 0.02 | 0.03 | 0.06 |
| Clinical Characteristics | | | | | | | |
| **Outpatient encounter\*, no. (%)** | | | | | | | |
| Zero | 54,440 (41.92) | 7,183 (44.48) | 2,219 (42.98) | 1,536,795 (42.04) | 0.00 | 0.05 | 0.02 |
| One | 35,060 (27.00) | 3,814 (23.62) | 1,184 (22.93) | 1,034,158 (28.29) | 0.03 | 0.11 | 0.12 |
| Two or more | 40,378 (31.09) | 5,153 (31.91) | 1,760 (34.10) | 1,084,250 (29.66) | 0.03 | 0.05 | 0.10 |
| **Long-term care, no. (%)** | 1,267 (0.98) | 236 (1.47) | 99 (1.93) | 27,130 (0.75) | 0.02 | 0.07 | 0.10 |
| **eGFR, mean (std), ml/min/1.73m2** | 78.16 (20.14) | 78.01 (21.05) | 77.46 (21.60) | 78.23 (19.89) | 0.00 | 0.01 | 0.04 |
| **Systolic blood pressure, mean (std), mmHg** | 132.51 (12.82) | 133.16 (12.80) | 134.03 (13.12) | 132.59 (12.83) | 0.01 | 0.05 | 0.11 |
| **Diastolic blood pressure, mean (std), mmHg** | 77.56 (7.80) | 78.10 (8.03) | 78.00 (7.80) | 77.56 (7.77) | 0.00 | 0.07 | 0.06 |
| **Cancer, no. (%)** | 7,674 (5.91) | 1,051 (6.52) | 334 (6.48) | 203,913 (5.58) | 0.01 | 0.04 | 0.04 |
| **Chronic kidney disease, no. (%)** | 9,260 (7.13) | 1,209 (7.49) | 449 (8.70) | 246,437 (6.74) | 0.01 | 0.03 | 0.07 |
| **Chronic lung disease, no. (%)** | 167 (0.13) | 24 (0.15) | 7 (0.15) | 4,789 (0.14) | 0.00 | 0.00 | 0.00 |
| **Dementia, no. (%)** | 183 (0.15) | 51 (0.32) | 32 (0.64) | 4,424 (0.13) | 0.00 | 0.04 | 0.08 |
| **Diabetes mellitus type 2, no. (%)** | 30,335 (23.36) | 3,999 (24.77) | 1,372 (26.58) | 837,154 (22.90) | 0.01 | 0.04 | 0.08 |
| **Dysautonomia, no. (%)** | 1,654 (1.28) | 200 (1.25) | 79 (1.55) | 44,717 (1.23) | 0.00 | 0.00 | 0.03 |
| **Hyperlipidemia, no. (%)** | 34,376 (26.47) | 4,004 (24.8) | 1,360 (26.35) | 942,018 (25.77) | 0.02 | 0.01 | 0.01 |
| **Hypertension, no. (%)** | 59,637 (45.92) | 7,171 (44.4) | 2,451 (47.48) | 1,645,095 (45.00) | 0.02 | 0.02 | 0.05 |
| aArea Deprivation Index is a measure of socioeconomic disadvantage, with a range from low to high disadvantage of 0 to 100.  \*.Data collected within one year before cohort enrollment  std, standard deviation; BMI, body mass index; eGFR, estimated glomerular filtration rate. | | | | | | | |

**Supplementary Table 10. Risks and 12-month burdens of post-acute COVID-19 cardiovascular outcomes by care setting of the acute infection compared to historical control**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Outcome\*** | **Care setting†** | **Hazard ratio (95% CI)** ‡ | **COVID-19 burden per 1000 persons at 12 months (95% CI)** ‡ | **Historical control burden per 1000 persons at 12 months (95% CI)** ‡ | **Burden difference per 1000 persons at 12 months (95% CI)** ‡ |
|
|
| **Cerebrovascular** | Non-hospitalized | 1.30 (1.22, 1.38) | 13.14 (13.02, 13.27) | 10.16 (10.05, 10.27) | 2.98 (2.86, 3.11) |
| Hospitalized | 2.65 (2.21, 3.18) | 26.74 (26.56, 26.92) | 16.58 (16.40, 16.76) |
| Admitted to intensive care | 3.73 (2.93, 4.76) | 37.42 (37.20, 37.64) | 27.26 (27.04, 27.48) |
| Stroke | Non-hospitalized | 1.25 (1.16, 1.34) | 9.33 (9.23, 9.44) | 7.50 (7.41, 7.59) | 1.83 (1.72, 1.94) |
| Hospitalized | 2.77 (2.24, 3.42) | 20.61 (20.45, 20.77) | 13.11 (12.95, 13.27) |
| Admitted to intensive care | 4.10 (3.12, 5.40) | 30.40 (30.20, 30.61) | 22.90 (22.70, 23.11) |
| TIA | Non-hospitalized | 1.28 (1.16, 1.42) | 4.93 (4.85, 5.01) | 3.84 (3.78, 3.91) | 1.09 (1.01, 1.16) |
| Hospitalized | 2.40 (1.88, 3.08) | 9.22 (9.11, 9.32) | 5.37 (5.26, 5.48) |
| Admitted to intensive care | 2.65 (1.82, 3.85) | 10.14 (10.02, 10.26) | 6.30 (6.18, 6.41) |
| **Dysrhythmia** | Non-hospitalized | 1.27 (1.22, 1.31) | 37.80 (37.59, 38.01) | 29.99 (29.81, 30.17) | 7.81 (7.60, 8.02) |
| Hospitalized | 3.26 (2.92, 3.64) | 94.43 (94.10, 94.76) | 64.44 (64.11, 64.77) |
| Admitted to intensive care | 7.01 (6.09, 8.06) | 192.12 (191.65, 192.58) | 162.13 (161.66, 162.59) |
| Atrial fibrillation | Non-hospitalized | 1.31 (1.22, 1.40) | 13.53 (13.41, 13.66) | 10.39 (10.28, 10.49) | 3.15 (3.02, 3.27) |
| Hospitalized | 3.56 (2.92, 4.34) | 36.50 (36.29, 36.71) | 26.11 (25.90, 26.32) |
| Admitted to intensive care | 8.31 (6.61, 10.45) | 83.14 (82.82, 83.46) | 72.75 (72.43, 73.08) |
| Sinus tachycardia | Non-hospitalized | 1.29 (1.21, 1.38) | 9.83 (9.73, 9.94) | 7.62 (7.53, 7.71) | 2.21 (2.11, 2.32) |
| Hospitalized | 5.07 (4.22, 6.10) | 38.05 (37.84, 38.26) | 30.43 (30.23, 30.64) |
| Admitted to intensive care | 9.42 (7.67, 11.58) | 69.54 (69.25, 69.83) | 61.92 (61.63, 62.21) |
| Sinus bradycardia | Non-hospitalized | 1.18 (1.11, 1.24) | 13.99 (13.86, 14.12) | 11.90 (11.78, 12.01) | 2.10 (1.97, 2.22) |
| Hospitalized | 2.07 (1.79, 2.39) | 24.44 (24.27, 24.61) | 12.54 (12.37, 12.72) |
| Admitted to intensive care | 3.95 (3.17, 4.93) | 46.19 (45.95, 46.44) | 34.30 (34.05, 34.54) |
| Ventricular arrhythmia | Non-hospitalized | 1.35 (1.27, 1.44) | 9.67 (9.56, 9.77) | 7.96 (7.87, 8.06) | 2.50 (2.40, 2.60) |
| Hospitalized | 3.30 (2.69, 4.04) | 23.42 (23.26, 23.59) | 16.26 (16.09, 16.42) |
| Admitted to intensive care | 6.68 (5.27, 8.46) | 46.89 (46.65, 47.13) | 39.72 (39.48, 39.97) |
| Atrial flutter | Non-hospitalized | 1.35 (1.26, 1.45) | 9.59 (9.48, 9.69) | 7.10 (7.02, 7.19) | 2.48 (2.38, 2.58) |
| Hospitalized | 2.92 (2.29, 3.73) | 20.63 (20.48, 20.78) | 13.52 (13.37, 13.68) |
| Admitted to intensive care | 5.45 (4.14, 7.19) | 38.13 (37.91, 38.35) | 31.02 (30.81, 31.24) |
| **Inflammatory heart disease** | Non-hospitalized | 1.57 (1.35, 1.83) | 2.12 (2.08, 2.17) | 1.36 (1.32, 1.39) | 0.77 (0.72, 0.82) |
| Hospitalized | 5.06 (3.31, 7.73) | 6.84 (6.75, 6.93) | 5.48 (5.39, 5.58) |
| Admitted to intensive care | 8.99 (5.36, 15.06) | 12.12 (11.99, 12.25) | 10.76 (10.64, 10.89) |
| Pericarditis | Non-hospitalized | 1.44 (1.23, 1.68) | 1.89 (1.85, 1.94) | 1.32 (1.28, 1.35) | 0.58 (0.53, 0.62) |
| Hospitalized | 4.63 (2.88, 7.43) | 6.08 (5.99, 6.17) | 4.76 (4.68, 4.85) |
| Admitted to intensive care | 8.43 (4.80, 14.80) | 11.04 (10.92, 11.16) | 9.72 (9.60, 9.85) |
| Myocarditis | Non-hospitalized | 4.61 (2.77, 7.70) | 0.25 (0.23, 0.27) | 0.05 (0.05, 0.06) | 0.20 (0.18, 0.21) |
| Hospitalized | 16.71 (9.99, 27.93) | 0.91 (0.88, 0.94) | 0.85 (0.82, 0.89) |
| Admitted to intensive care | 49.50 (18.38, 133.28) | 2.69 (2.63, 2.75) | 2.64 (2.58, 2.70) |
| **Ischemic heart disease** | Non-hospitalized | 1.15 (1.10, 1.22) | 16.41 (16.27, 16.54) | 14.23 (14.11, 14.36) | 2.17 (2.04, 2.31) |
| Hospitalized | 2.94 (2.48, 3.48) | 41.26 (41.04, 41.48) | 27.02 (26.80, 27.25) |
| Admitted to intensive care | 4.33 (3.64, 5.14) | 60.15 (59.87, 60.42) | 45.91 (45.64, 46.19) |
| Acute coronary disease | Non-hospitalized | 1.13 (1.06, 1.20) | 11.30 (11.19, 11.41) | 10.03 (9.93, 10.14) | 1.27 (1.15, 1.38) |
| Hospitalized | 2.92 (2.41, 3.55) | 29.06 (28.88, 29.24) | 19.03 (18.84, 19.21) |
| Admitted to intensive care | 5.01 (4.20, 5.98) | 49.24 (48.99, 49.49) | 39.21 (38.96, 39.46) |
| Myocardial infarction | Non-hospitalized | 1.19 (1.08, 1.30) | 5.48 (5.40, 5.56) | 4.62 (4.55, 4.69) | 0.86 (0.78, 0.94) |
| Hospitalized | 4.49 (3.45, 5.83) | 20.56 (20.41, 20.72) | 15.94 (15.78, 16.10) |
| Admitted to intensive care | 8.17 (6.58, 10.14) | 37.12 (36.90, 37.34) | 32.50 (32.28, 32.72) |
| Ischemic cardiomyopathy | Non-hospitalized | 1.06 (0.98, 1.14) | 7.29 (7.19, 7.38) | 6.88 (6.80, 6.97) | 0.40 (0.31, 0.50) |
| Hospitalized | 2.10 (1.55, 2.85) | 14.43 (14.30, 14.56) | 7.55 (7.41, 7.68) |
| Admitted to intensive care | 2.85 (2.31, 3.53) | 19.52 (19.36, 19.68) | 12.63 (12.47, 12.79) |
| Angina | Non-hospitalized | 1.21 (1.11, 1.32) | 6.71 (6.61, 6.80) | 5.54 (5.46, 5.62) | 1.17 (1.08, 1.26) |
| Hospitalized | 2.99 (2.26, 3.94) | 16.44 (16.29, 16.59) | 10.90 (10.76, 11.05) |
| Admitted to intensive care | 2.53 (1.70, 3.76) | 13.94 (13.80, 14.08) | 8.41 (8.27, 8.55) |
| **Other cardiac disorders** | Non-hospitalized | 1.27 (1.21, 1.32) | 26.64 (26.46, 26.81) | 21.07 (20.92, 21.22) | 5.57 (5.39, 5.74) |
| Hospitalized | 3.18 (2.77, 3.65) | 65.49 (65.21, 65.76) | 44.42 (44.14, 44.69) |
| Admitted to intensive care | 6.00 (5.08, 7.08) | 119.94 (119.56, 120.31) | 98.87 (98.49, 99.24) |
| Heart failure | Non-hospitalized | 1.29 (1.22, 1.35) | 20.91 (20.75, 21.06) | 16.29 (16.16, 16.42) | 4.62 (4.46, 4.77) |
| Hospitalized | 3.43 (2.95, 3.99) | 54.78 (54.52, 55.03) | 38.49 (38.23, 38.74) |
| Admitted to intensive care | 5.76 (4.82, 6.88) | 90.28 (89.94, 90.61) | 73.99 (73.65, 74.32) |
| Non-ischemic cardiomyopathy | Non-hospitalized | 1.18 (1.12, 1.24) | 14.42 (14.30, 14.55) | 12.27 (12.15, 12.38) | 2.16 (2.03, 2.28) |
| Hospitalized | 2.30 (1.97, 2.69) | 28.03 (27.85, 28.21) | 15.77 (15.59, 15.95) |
| Admitted to intensive care | 4.46 (3.47, 5.72) | 53.52 (53.26, 53.78) | 41.25 (40.99, 41.51) |
| Cardiac arrest | Non-hospitalized | 0.81 (0.58, 1.11) | 0.37 (0.35, 0.39) | 0.46 (0.44, 0.48) | 0.00 (0.00, 0.00) |
| Hospitalized | 5.53 (3.43, 8.92) | 2.54 (2.48, 2.59) | 2.08 (2.02, 2.13) |
| Admitted to intensive care | 27.29 (17.72, 42.04) | 12.46 (12.34, 12.59) | 12.00 (11.88, 12.13) |
| Cardiogenic shock | Non-hospitalized | 1.19 (0.79, 1.78) | 0.40 (0.38, 0.43) | 0.34 (0.32, 0.36) | 0.06 (0.04, 0.09) |
| Hospitalized | 5.50 (3.29, 9.18) | 1.87 (1.82, 1.92) | 1.53 (1.48, 1.58) |
| Admitted to intensive care | 16.03 (10.58, 24.28) | 5.45 (5.36, 5.53) | 5.11 (5.02, 5.19) |
| **Thrombotic disorders** | Non-hospitalized | 1.65 (1.57, 1.74) | 16.27 (16.14, 16.40) | 9.88 (9.78, 9.98) | 6.39 (6.26, 6.52) |
| Hospitalized | 4.56 (4.00, 5.20) | 44.30 (44.08, 44.52) | 34.42 (34.20, 34.64) |
| Admitted to intensive care | 11.06 (9.32, 13.14) | 104.04 (103.70, 104.38) | 94.16 (93.82, 94.50) |
| Pulmonary embolism | Non-hospitalized | 2.66 (2.41, 2.93) | 5.13 (5.06, 5.21) | 1.93 (1.89, 1.98) | 3.20 (3.13, 3.27) |
| Hospitalized | 11.58 (9.51, 14.10) | 22.18 (22.02, 22.33) | 20.24 (20.09, 20.40) |
| Admitted to intensive care | 30.65 (23.87, 39.34) | 57.62 (57.36, 57.88) | 55.69 (55.43, 55.94) |
| Deep vein thrombosis | Non-hospitalized | 1.44 (1.35, 1.54) | 10.14 (10.04, 10.25) | 7.04 (6.96, 7.13) | 3.10 (3.00, 3.21) |
| Hospitalized | 2.82 (2.35, 3.39) | 19.76 (19.61, 19.91) | 12.72 (12.56, 12.87) |
| Admitted to intensive care | 5.98 (4.72, 7.57) | 41.36 (41.13, 41.58) | 34.31 (34.09, 34.54) |
| Superficial vein thrombosis | Non-hospitalized | 1.47 (1.35, 1.61) | 4.80 (4.73, 4.87) | 3.26 (3.20, 3.32) | 1.54 (1.47, 1.61) |
| Hospitalized | 3.74 (3.09, 4.52) | 12.14 (12.02, 12.25) | 8.88 (8.76, 9.00) |
| Admitted to intensive care | 9.14 (7.08, 11.8) | 29.41 (29.22, 29.60) | 26.15 (25.96, 26.34) |
| **MACE** | Non-hospitalized | 1.31 (1.27, 1.36) | 59.47 (59.22, 59.73) | 45.65 (45.43, 45.87) | 13.83 (13.57, 14.08) |
| Hospitalized | 2.33 (2.10, 2.59) | 103.22 (102.88, 103.55) | 57.57 (57.24, 57.91) |
| Admitted to intensive care | 4.32 (3.77, 4.94) | 182.64 (182.20, 183.08) | 136.99 (136.56, 137.43) |
| **Any cardiovascular outcome** | Non-hospitalized | 1.37 (1.33, 1.40) | 109.29 (108.94, 109.64) | 81.25 (80.95, 81.55) | 28.04 (27.69, 28.39) |
| Hospitalized | 3.04 (2.81, 3.29) | 227.16 (226.68, 227.65) | 145.91 (145.43, 146.40) |
| Admitted to intensive care | 5.68 (5.10, 6.32) | 382.03 (381.46, 382.61) | 300.78 (300.21, 301.36) |
| \*. Outcomes were ascertained from day 30 after the initial positive COVID-19 test result until end of follow up.  †. Based on care received within the first 30 days after a positive COVID-19 test result.  ‡. Adjustment through inverse probability weighting using predefined variables and algorithmically selected high-dimensional variables.  CI, confidence interval; TIA, transient ischemic attack; MACE, major adverse cardiac events. | | | | | |

**Supplementary Table 11. Sensitivity analysis for MACE and any cardiovascular outcome compared to contemporary and historical controls**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Analysis** | **MACE Hazard ratio (95% CI)\*** | | **Any cardiovascular outcome Hazard ratio (95% CI)\*** | |
| **Contemporary** | **Historical** | **Contemporary** | **Historical** |
| Used 300 algorithmically selected high dimensional variables | 1.59 (1.53, 1.64) | 1.57 (1.52, 1.63) | 1.62 (1.58, 1.66) | 1.57 (1.53, 1.61) |
| Did not use any high dimensional variables | 1.54 (1.50, 1.59) | 1.55 (1.50, 1.59) | 1.66 (1.63, 1.70) | 1.64 (1.60, 1.67) |
| Doubly robust | 1.45 (1.41, 1.50) | 1.49 (1.45, 1.54) | 1.66 (1.63, 1.70) | 1.64 (1.60, 1.67) |
| \*. Outcomes were ascertained from day 30 after the initial positive COVID-19 test result until end of follow up.  CI, confidence interval. | | | | |

**Supplementary Table 12. Sensitivity analyses for MACE and any cardiovascular outcome by care setting of the acute infection compared to contemporary and historical controls**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Analysis** | **Care Setting**† | **MACE Hazard ratio (95% CI)\*** | | **Any cardiovascular outcome Hazard ratio (95% CI)\*** | |
| **Contemporary** | **Historical** | **Contemporary** | **Historical** |
| Used 300 algorithmically selected high dimensional variables | Non-hospitalized | 1.35 (1.31, 1.40) | 1.32 (1.27, 1.37) | 1.43 (1.40, 1.47) | 1.37 (1.34, 1.41) |
| Hospitalized | 2.40 (2.17, 2.67) | 2.34 (2.11, 2.60) | 3.19 (2.95, 3.45) | 3.06 (2.83, 3.30) |
| Admitted to intensive care | 4.45 (3.89, 5.10) | 4.34 (3.79, 4.97) | 5.96 (5.36, 6.64) | 5.71 (5.13, 6.35) |
| Did not use any high dimensional variables | Non-hospitalized | 1.36 (1.31, 1.41) | 1.35 (1.30, 1.40) | 1.44 (1.41, 1.48) | 1.41 (1.37, 1.44) |
| Hospitalized | 2.41 (2.17, 2.68) | 2.39 (2.16, 2.66) | 3.21 (2.97, 3.47) | 3.13 (2.89, 3.38) |
| Admitted to intensive care | 4.47 (3.90, 5.11) | 4.43 (3.87, 5.07) | 5.99 (5.39, 6.67) | 5.85 (5.25, 6.50) |
| Doubly robust | Non-hospitalized | 1.32 (1.27, 1.37) | 1.33 (1.28, 1.38) | 1.44 (1.40, 1.47) | 1.39 (1.35, 1.43) |
| Hospitalized | 2.33 (2.10, 2.58) | 2.34 (2.11, 2.59) | 3.17 (2.93, 3.42) | 3.06 (2.84, 3.31) |
| Admitted to intensive care | 4.41 (3.90, 4.99) | 4.44 (3.93, 5.02) | 5.99 (5.40, 6.64) | 5.79 (5.23, 6.42) |
| \*. Outcomes were ascertained from day 30 after the initial positive COVID-19 test result until end of follow up.  †. Based on care received within the first 30 days after a positive COVID-19 test result.  CI, confidence interval. | | | | | |

**Supplementary Table 13. Positive and negative outcome controls**

|  |  |  |
| --- | --- | --- |
| **Outcome\*** | **Hazard Ratio (95% CI)** | |
| **COVID-19 vs contemporary control (as the reference)** | **COVID-19 vs historical control (as the reference)** |
| **Positive outcome control** |  |  |
| Fatigue | 1.87 (1.81, 1.92) | 1.87 (1.82,1.92) |
| **Negative outcome controls** |  |  |
| Hypertrichosis | 0.90 (0.66, 1.21) | 0.84 (0.62, 1.14) |
| Melanoma in situ | 0.94 (0.76, 1.15) | 0.94 (0.76, 1.16) |
| Perforation of the tympanic membrane | 1.09 (0.87, 1.37) | 0.91 (0.73, 1.15) |
| Sickle cell disorder | 1.03 (0.82, 1.29) | 1.02 (0.81, 1.29) |
| \*. Outcomes were ascertained from day 30 after the initial positive COVID-19 test result until end of follow up.  CI, confidence interval | | |