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Supplementary appendix

This appendix formed part of the original submission and has been peer reviewed. We post it as supplied by the authors.
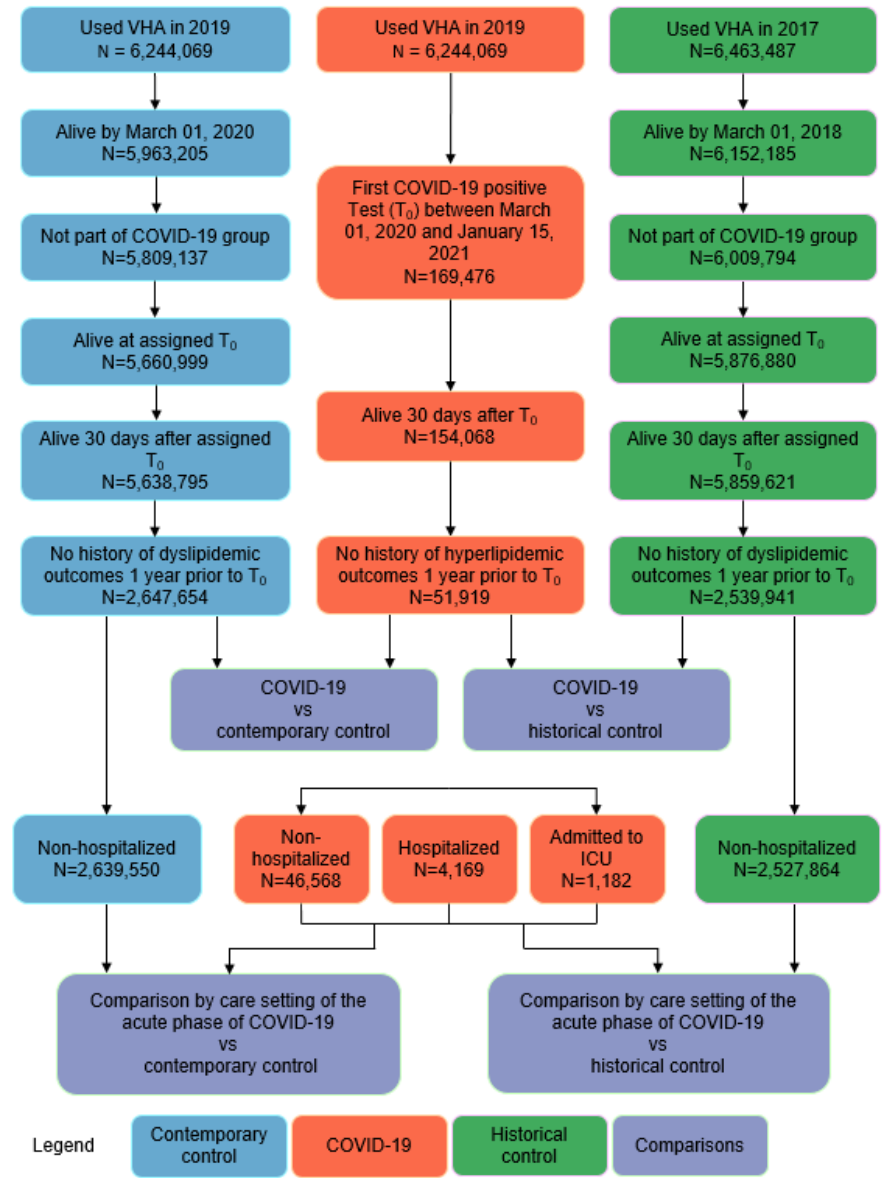
Risks and burdens of incident dyslipidemia in long COVID: a cohort study

Appendix figure 1. Cohort construction flow chart

Used VHA in 2019
N = 6,244,069

Alive by March 01, 2020
N=5,963,205

Not part of COVID-19 group
N=5,809,137

Alive at assigned T_0
N=5,660,999

Alive 30 days after assigned T_0
N=5,638,795

No history of dyslipidemic outcomes 1 year prior to T_0
N=2,647,654

Used VHA in 2019
N = 6,244,069

First COVID-19 positive Test (T_0) between March 01, 2020 and January 15, 2021
N=169,476

Alive 30 days after T_0
N=154,068

No history of hyperlipidemic outcomes 1 year prior to T_0
N=51,919

Used VHA in 2017
N=6,463,487

Alive by March 01, 2018
N=6,152,185

Not part of COVID-19 group
N=6,009,794

Alive at assigned T_0
N=5,876,880

Alive 30 days after assigned T_0
N=5,859,621

No history of dyslipidemic outcomes 1 year prior to T_0
N=2,539,941

COVID-19 vs contemporary control

COVID-19 vs historical control

Non-hospitalized
N=2,639,550

Non-hospitalized
N=46,568

Hospitalized
N=4,169

Admitted to ICU
N=1,182

Non-hospitalized
N=2,527,864

Comparison by care setting of the acute phase of COVID-19 vs contemporary control

Comparison by care setting of the acute phase of COVID-19 vs historical control

Legend

Contemporary control

COVID-19

Historical control

Comparisons

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Appendix figure 2. Standardized mean difference of predefined and algorithmically selected covariates. (a) between COVID-19 and contemporary control; (b) by care setting of the acute infection between COVID-19 and contemporary control; (c) between COVID-19 and historical control; (d) by care setting of the acute infection between COVID-19 and historical control.
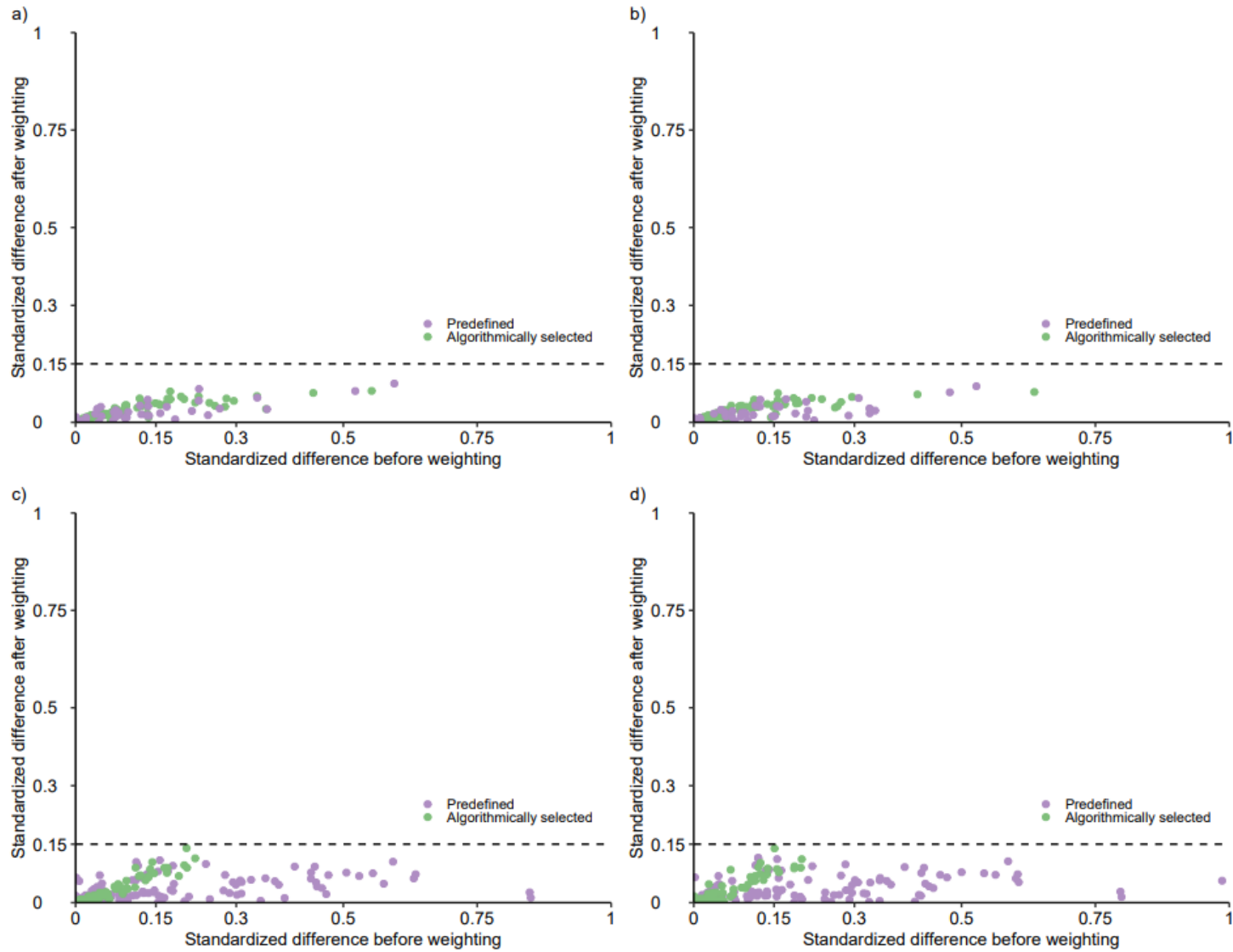
Appendix Figure 3. Risks and 12-month burdens of post-acute COVID-19 dyslipidemia outcomes compared to the historical control. Outcomes were ascertained 30 d after the COVID-19-positive test until the end of follow-up. COVID-19 cohort ($n = 51,919$) and historical control cohort ($n = 2,539,941$). Adjusted HRs and 95% CIs are presented. The length of the bar represents the excess burden per 1,000 persons at 1-year and associated 95% CIs are also shown. CI, confidence interval; LDL, low-density lipoprotein; HDL, high-density lipoprotein.
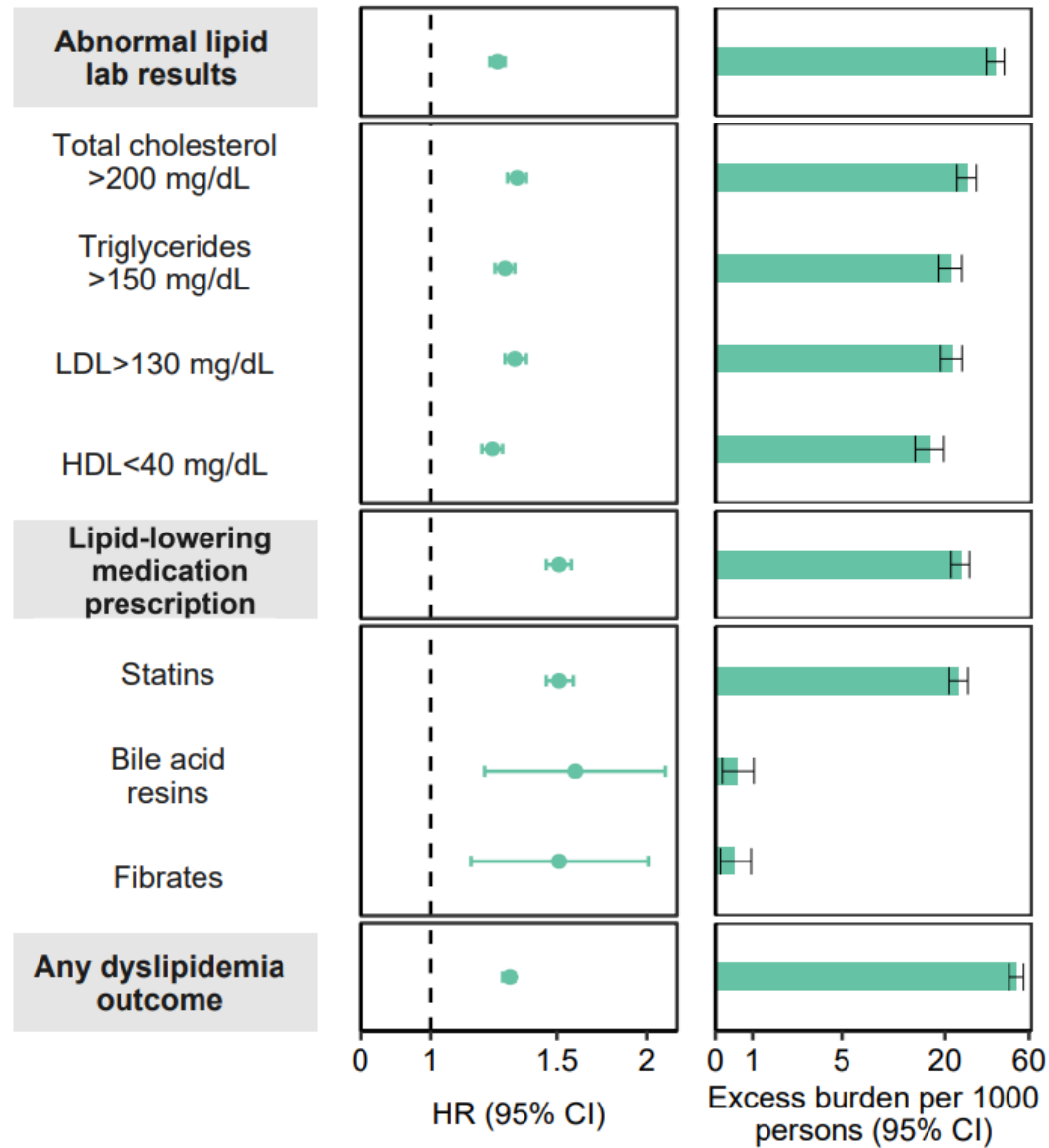
Appendix Figure 4. Subgroup analyses of the risks of incident post-acute COVID-19 dyslipidemia outcomes compared to the historical control.
Composite outcomes consisted of lipid lab abnormalities (total cholesterol>200mg/dL, triglycerides>150mg/dL, LDL>130mg/dL, and HDL<40mg/dL), lipid-lowering medication prescription (statins, bile acid resins, and fibrates), and any dyslipidemia outcome (incident occurrence of any dyslipidemia outcome studied). Outcomes were ascertained 30d after the COVID-19-positive test until the end of follow-up. COVID-19 cohort (n = 51,919) and historical control cohort (n = 2,539,941). Adjusted HRs and 95% CIs are presented. CI, confidence interval; LDL, low-density lipoprotein; HDL, high-density lipoprotein.
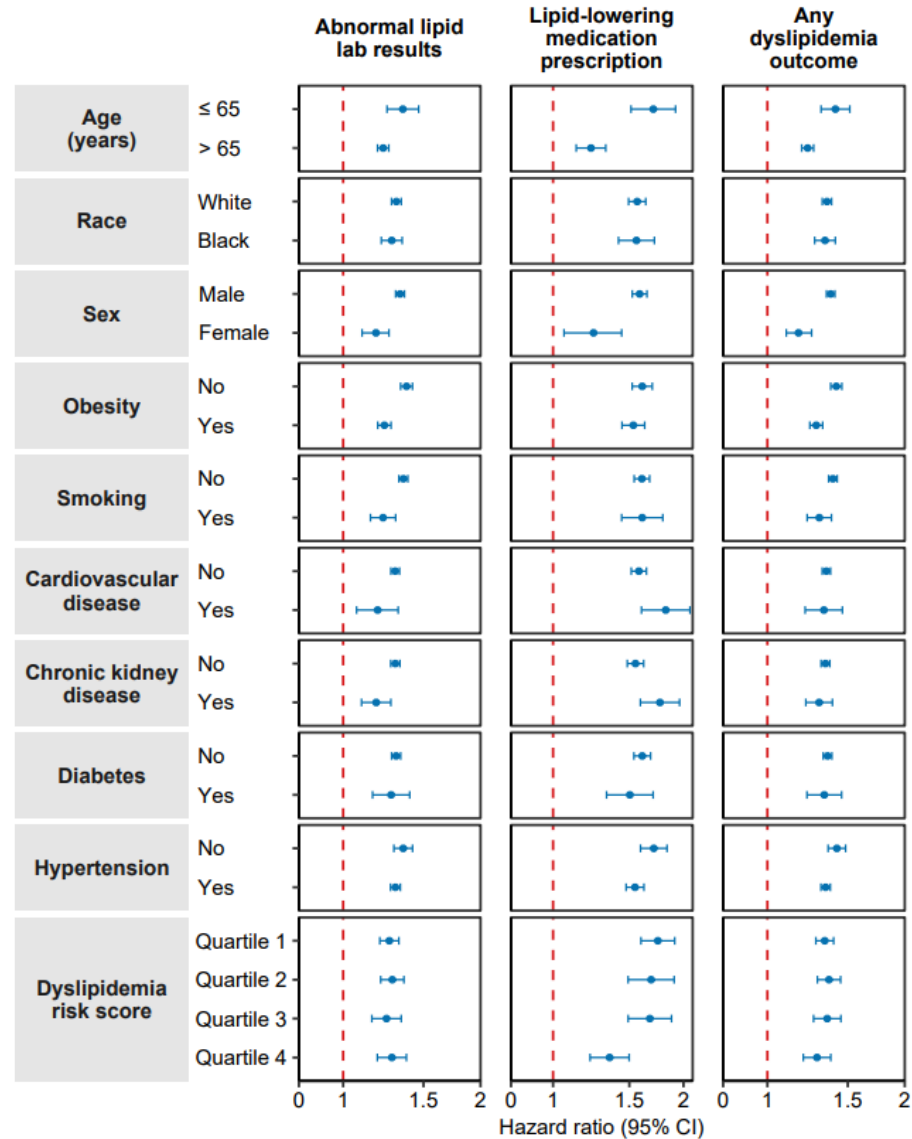
Appendix figure 5. Risks and 12-month burdens of post-acute COVID-19 dyslipidemia outcomes by severity of the acute infection compared to the historical control. Risks and burdens were assessed at 1-year in mutually exclusive groups comprising non-hospitalized individuals with COVID-19 (green), individuals hospitalized for COVID-19 (orange) and individuals admitted to intensive care for COVID-19 during the acute phase (first 30 d) of COVID-19 (blue). Outcomes were ascertained 30 d after the COVID-19-positive test until the end of follow-up. The contemporary control cohort served as the referent category. Within the COVID-19 cohort, non-hospitalized (n = 46,568), hospitalized (n = 4,169), admitted to intensive care (n = 1,182) and historical control cohort (n = 2,539,941). Adjusted HRs and 95% CIs are presented. The length of the bar represents the excess burden per 1,000 persons at 1-year and related 95% CIs were also presented. CI, confidence interval; LDL, low-density lipoprotein; HDL, high-density lipoprotein.

Appendix Table 1: Demographic and health characteristics of the COVID-19, contemporary control, and historical control groups before weighting

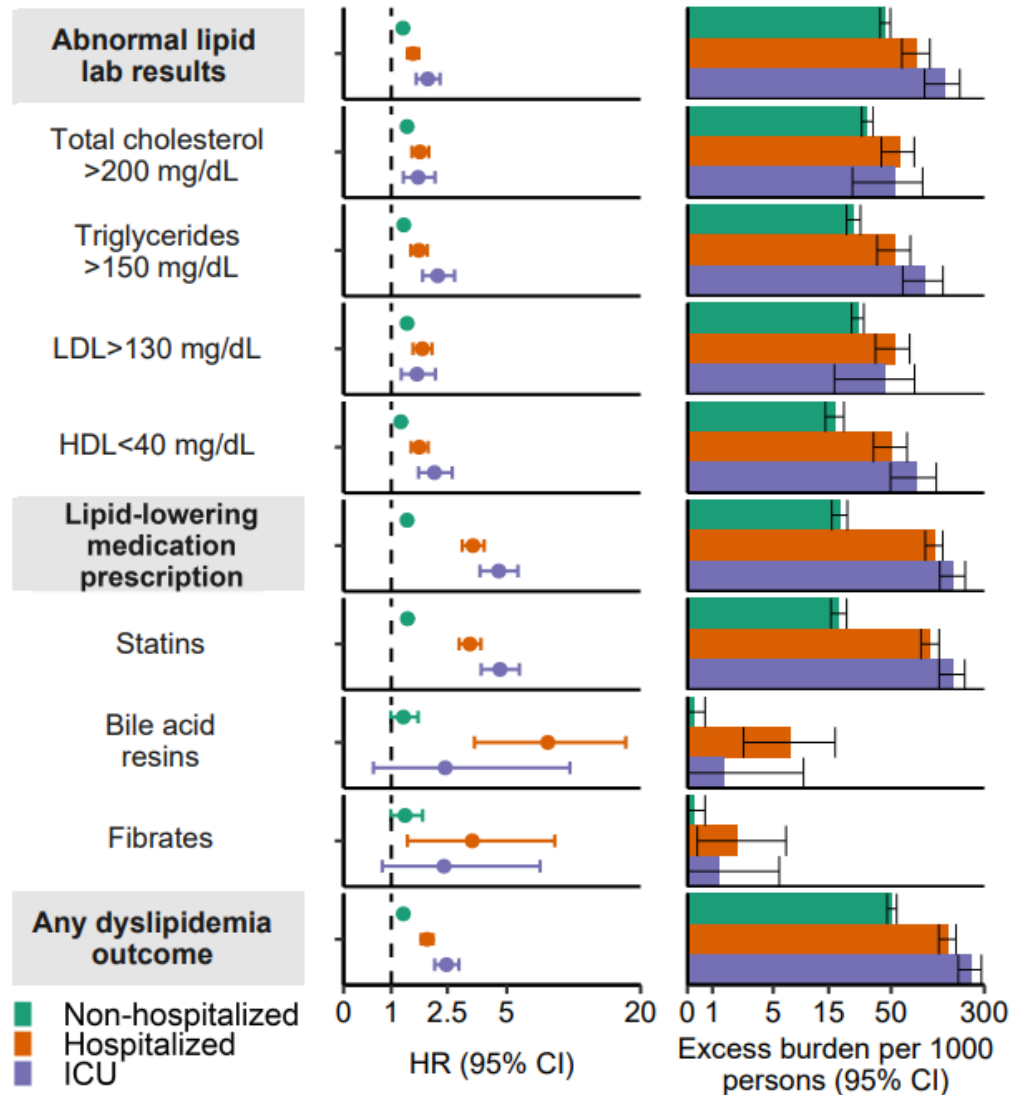| Baseline Characteristics	COVID-19 (N=51,919)	Contemporary control (N=2,647,654)	Historical control (N=2,539,941)	Absolute standardized difference[†]	
				COVID-19 and Contemporary control	COVID-19 and Historical control
Age, mean (std), yr	55.91 (17.66)	60.29 (18.26)	59.82 (18.68)	0.24	0.22
Race, no. (%)					
White	35,231 (67.86)	1,999,159 (75.51)	1,921,731 (75.66)	0.17	0.17
Black	14,005 (26.97)	522,436 (19.73)	496,416 (19.54)	0.17	0.18
Other	2,683 (5.17)	126,059 (4.76)	121,794 (4.80)	0.02	0.02
Sex, no. (%)					
Male	42,858 (82.55)	2,311,433 (87.30)	2,214,416 (87.18)	0.13	0.13
Female	9,061 (17.45)	336,221 (12.70)	325,525 (12.82)	0.13	0.13
BMI category, no. (%), kg/m^2					
Underweight/Normal	9,977 (19.22)	602,006 (22.74)	599,416 (23.60)	0.09	0.11
Overweight	17,600 (33.90)	1,120,074 (42.30)	1,129,388 (44.47)	0.17	0.22
Obese	24,342 (46.88)	925,574 (34.96)	811,137 (31.94)	0.24	0.31
Smoking status, no. (%)					
Never	26,370 (50.79)	1,315,705 (49.69)	1,543,775 (60.78)	0.02	0.20
Former	16,619 (32.01)	778,420 (29.40)	478,615 (18.84)	0.06	0.31
Current	8,930 (17.20)	553,529 (20.91)	517,551 (20.38)	0.09	0.08
Area Deprivation Index[‡], mean (std)	52.99 (18.61)	52.65 (19.15)	52.39 (19.26)	0.02	0.03
Clinical Characteristics					
Outpatient encounter [a], no. (%)					
Zero	3,797 (7.31)	571,207 (21.57)	537,355 (21.16)	0.41	0.40
One	14,614 (28.15)	1,107,202 (41.82)	1,059,654 (41.72)	0.29	0.29
Two or more	33,508 (64.54)	969,245 (36.61)	942,932 (37.12)	0.58	0.57
Long-term care, no. (%)	2,258 (4.35)	10,026 (0.38)	13,043 (0.51)	0.26	0.25
eGFR, mean (std), ml/min/1.73m^2	84.24 (21.24)	82.47 (19.08)	82.79 (18.27)	0.09	0.07

Baseline Characteristics	COVID-19 (N=51,919)	Contemporary control (N=2,647,654)	Historical control (N=2,539,941)	Absolute standardized difference[†]	
				COVID-19 and Contemporary control	COVID-19 and Historical control
Systolic blood pressure, mean (std), mmHg	130.52 (12.30)	131.35 (12.61)	131.42 (12.76)	0.07	0.07
Diastolic blood pressure, mean (std), mmHg	78.51 (7.70)	77.82 (7.65)	77.53 (7.91)	0.09	0.13
Comorbidities					
Cancer, no. (%)	2,716 (5.23)	97,733 (3.69)	90,270 (3.55)	0.07	0.08
Cardiovascular disease, no. (%)	3,025 (5.83)	126,843 (4.79)	123,262 (4.85)	0.05	0.04
Cerebrovascular disease, no. (%)	956 (1.84)	23,931 (0.90)	23,869 (0.94)	0.08	0.08
Chronic kidney disease, no. (%)	5,724 (11.02)	278,115 (10.50)	229,314 (9.03)	0.02	0.07
Chronic lung disease, no. (%)	5,326 (10.26)	170,081 (6.42)	165,960 (6.53)	0.14	0.13
Diabetes mellitus type 2, no. (%)	5,889 (11.34)	222,386 (8.40)	211,180 (8.31)	0.10	0.10
Hypertension, no. (%)	11,361 (21.88)	587,482 (22.19)	541,950 (21.34)	0.01	0.01
Prescription medications					
Anti-epileptics, no. (%)	183 (0.35)	5,927 (0.22)	6,043 (0.24)	0.02	0.02
Anti-psychotics, no. (%)	2,517 (4.85)	80,613 (3.04)	72,313 (2.85)	0.09	0.10
β-blockers, no. (%)	4,546 (8.76)	154,764 (5.85)	141,405 (5.57)	0.11	0.12
Corticosteroids, no. (%)	879 (1.69)	25,190 (0.95)	26,937 (1.06)	0.06	0.05
Diuretics, no. (%)	5,742 (11.06)	175,890 (6.64)	166,772 (6.57)	0.16	0.16
HIV protease inhibitors, no. (%)	42 (0.08)	938 (0.04)	1,307 (0.05)	0.02	0.01
Immunosuppressants, no. (%)	462 (0.89)	13,417 (0.51)	10,686 (0.42)	0.05	0.06
Hormone therapeutics, no. (%)	1,467 (2.83)	36,950 (1.40)	34,244 (1.35)	0.10	0.10
SGLT-2 inhibitors, no. (%)	178 (0.34)	5,276 (0.20)	1,087 (0.04)	0.03	0.07

†. Standardized difference less than 0.15 is considered good balance.
‡. Area Deprivation Index is a measure of socioeconomic disadvantage, with a range from low to high disadvantage of 0 to 100.
[a].Data collected within one year of cohort enrollment.
[b].Nursing homes and assisted-living centers.
std, standard deviation; BMI, body mass index; eGFR, estimated glomerular filtration rate; HIV, Human immunodeficiency virus; SGLT, sodium glucose cotransporter.

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

Baseline Characteristics	COVID-19 (N=51,919)	Contemporary control (N=2,647,654)	Historical control (N=2,539,941)	Absolute standardized difference[†]	
				COVID-19 and Contemporary control	COVID-19 and Historical control
Age, mean (std), yr	60.19 (18.28)	60.2 (18.26)	60.16 (18.35)	0.00	0.00
Race, no. (%)					
White	38476 (74.11)	1995325 (75.36)	1912728 (75.31)	0.03	0.03
Black	10970 (21.13)	526062 (19.87)	505651 (19.91)	0.03	0.03
Other	2473 (4.76)	126267 (4.77)	121587 (4.79)	0.00	0.00
Sex, no. (%)					
Male	44471 (85.65)	2309019 (87.21)	2213838 (87.16)	0.05	0.04
Female	7448 (14.35)	338635 (12.79)	326103 (12.84)	0.05	0.04
BMI category, no. (%), kg/m^2					
Underweight/Normal	12397 (23.88)	600488 (22.68)	578522 (22.78)	0.03	0.03
Overweight	18933 (36.47)	1116569 (42.17)	1081075 (42.56)	0.12	0.12
Obese	20590 (39.66)	930597 (35.15)	880344 (34.66)	0.09	0.10
Smoking status, no. (%)					
Never	24132 (46.48)	1316149 (49.71)	1261132 (49.65)	0.06	0.06
Former	16258 (31.32)	779761 (29.45)	747962 (29.45)	0.04	0.04
Current	11528 (22.2)	551745 (20.84)	530848 (20.9)	0.03	0.03
Area Deprivation Index[‡], mean (std)	53.15 (19.11)	52.66 (19.14)	52.65 (19.14)	0.03	0.03
Clinical Characteristics					
Outpatient encounter [a], no. (%)					
Zero	9951 (19.17)	563977 (21.3)	535394 (21.08)	0.05	0.05
One	19294 (37.16)	1100021 (41.55)	1055828 (41.57)	0.09	0.09
Two or more	22675 (43.67)	983683 (37.15)	948719 (37.35)	0.13	0.13
Long-term care, no. (%)	442 (0.85)	12047 (0.46)	12192 (0.48)	0.05	0.05
eGFR, mean (std), ml/min/1.73m^2	82.51 (19.94)	82.51 (19.12)	82.58 (19.39)	0.00	0.00

Baseline Characteristics	COVID-19 (N=51,919)	Contemporary control (N=2,647,654)	Historical control (N=2,539,941)	Absolute standardized difference[†]	
				COVID-19 and Contemporary control	COVID-19 and Historical control
Systolic blood pressure, mean (std), mmHg	131 (12.73)	131.33 (12.6)	131.28 (12.71)	0.03	0.02
Diastolic blood pressure, mean (std), mmHg	77.67 (7.72)	77.83 (7.66)	77.84 (7.72)	0.02	0.02
Diagnoses					
Cancer, no. (%)	2352 (4.53)	98546 (3.72)	94816 (3.73)	0.04	0.04
Cardiovascular disease, no. (%)	2852 (5.49)	127379 (4.81)	122679 (4.83)	0.03	0.03
Cerebrovascular disease, no. (%)	608 (1.17)	24411 (0.92)	23647 (0.93)	0.02	0.02
Chronic kidney disease, no. (%)	6035 (11.62)	278374 (10.51)	267126 (10.52)	0.04	0.04
Chronic lung disease, no. (%)	4464 (8.6)	172098 (6.5)	165960 (6.53)	0.08	0.08
Diabetes mellitus type 2, no. (%)	4919 (9.47)	223886 (8.46)	214981 (8.46)	0.04	0.04
Hypertension, no. (%)	11620 (22.38)	587329 (22.18)	564654 (22.23)	0.00	0.00
Prescription medications					
Anti-epileptics, no. (%)	159 (0.31)	5984 (0.23)	5867 (0.23)	0.02	0.01
Anti-psychotics, no. (%)	2063 (3.97)	81548 (3.08)	79322 (3.12)	0.05	0.05
β-blockers, no. (%)	3793 (7.31)	156265 (5.9)	151812 (5.98)	0.06	0.05
Corticosteroids, no. (%)	658 (1.27)	25576 (0.97)	24612 (0.97)	0.03	0.03
Diuretics, no. (%)	4323 (8.33)	178161 (6.73)	172614 (6.8)	0.06	0.06
HIV protease inhibitors, no. (%)	30 (0.06)	953 (0.04)	940 (0.04)	0.01	0.01
Immunosuppressants, no. (%)	339 (0.65)	13609 (0.51)	13157 (0.52)	0.02	0.02
Hormone therapeutics, no. (%)	904 (1.74)	37676 (1.42)	37261 (1.47)	0.03	0.02
SGLT-2 inhibitors, no. (%)	128 (0.25)	5348 (0.2)	5004 (0.2)	0.01	0.01

†. Standardized difference less than 0.15 is considered good balance.
‡. Area Deprivation Index is a measure of socioeconomic disadvantage, with a range from low to high disadvantage of 0 to 100.
a. Data collected within one year of cohort enrollment.
b. Nursing homes and assisted-living centers.
std, standard deviation; BMI, body mass index; eGFR, estimated glomerular filtration rate; HIV, Human immunodeficiency virus; SGLT, sodium glucose cotransporter.

Appendix Table 3. Risks and 12-month burdens of post-acute COVID-19 dyslipidemia 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			
Abnormal lipid lab results	1.24 (1.21, 1.27)	223.20 (218.72, 227.75)	184.01 (183.56, 184.46)	39.19 (34.71, 43.73)
Total cholesterol>200 mg/dL	1.26 (1.22, 1.29)	116.03 (112.72, 119.44)	93.57 (93.24, 93.91)	22.46 (19.14, 25.87)
Triglycerides>150 mg/dL	1.27 (1.23, 1.31)	107.83 (104.65, 111.10)	85.80 (85.48, 86.12)	22.03 (18.85, 25.30)
LDL>130 mg/dL	1.24 (1.20, 1.29)	95.94 (92.92, 99.05)	77.94 (77.63, 78.25)	18.00 (14.98, 21.11)
HDL<40 mg/dL	1.20 (1.16, 1.25)	96.01 (92.95, 99.16)	80.42 (80.11, 80.74)	15.58 (12.52, 18.73)
Lipid-lowering medication prescription	1.54 (1.48, 1.61)	74.37 (71.48, 77.36)	48.87 (48.62, 49.12)	25.50 (22.61, 28.50)
Statins	1.55 (1.48, 1.61)	72.27 (69.41, 75.23)	47.32 (47.08, 47.57)	24.94 (22.09, 27.91)
Bile acid resins	1.48 (1.11, 1.97)	1.48 (1.11, 1.97)	1.00 (0.97, 1.04)	0.48 (0.11, 0.97)
Fibrates	1.53 (1.15, 2.02)	1.44 (1.08, 1.91)	0.94 (0.91, 0.98)	0.50 (0.14, 0.96)
Any dyslipidemia outcome	1.31 (1.28, 1.34)	258.34 (253.53, 263.24)	204.32 (203.85, 204.78)	54.03 (49.21, 58.92)

*. 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. Burdens were computed based on the estimated survival probability at 12 month.
CI, confidence interval; LDL, low-density lipoprotein; HDL, high-density lipoprotein.

Appendix Table 4. Risks and 12-month burdens of post-acute COVID-19 abnormal lipid lab and BMI increased outcomes compared to contemporary control

Outcome*	Hazard Ratio (95% CI)† COVID-19 vs Contemporary control	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)†
Total cholesterol				
>210 mg/dL	1.25 (1.21, 1.3)	82.99 (80.2, 85.87)	66.71 (66.42, 66.99)	16.28 (13.49, 19.16)
>220 mg/dL	1.25 (1.20, 1.31)	59.16 (56.77, 61.64)	47.48 (47.24, 47.73)	11.67 (9.28, 14.16)
>230 mg/dL	1.26 (1.19, 1.32)	41.75 (39.74, 43.85)	33.37 (33.17, 33.58)	8.37 (6.37, 10.48)
Triglycerides				
>160 mg/dL	1.27 (1.23, 1.32)	93.27 (90.34, 96.29)	73.94 (73.64, 74.24)	19.33 (16.4, 22.35)
>170 mg/dL	1.28 (1.23, 1.32)	81.71 (78.97, 84.55)	64.67 (64.39, 64.95)	17.04 (14.3, 19.88)
>180 mg/dL	1.29 (1.24, 1.34)	72.53 (69.93, 75.23)	56.73 (56.46, 56.99)	15.81 (13.2, 18.51)
LDL				
>140 mg/dL	1.24 (1.19, 1.29)	64.29 (61.84, 66.84)	52.08 (51.83, 52.34)	12.21 (9.76, 14.76)
>150 mg/dL	1.23 (1.17, 1.29)	42.59 (40.59, 44.69)	34.73 (34.52, 34.94)	7.86 (5.86, 9.96)
>160 mg/dL	1.22 (1.15, 1.30)	27.77 (26.14, 29.51)	22.76 (22.59, 22.93)	5.02 (3.38, 6.75)
HDL				
<35 mg/dL	1.22 (1.16, 1.28)	43.13 (41.08, 45.27)	35.5 (35.29, 35.71)	7.63 (5.59, 9.77)
<30 mg/dL	1.14 (1.05, 1.24)	13.13 (12.05, 14.31)	11.52 (11.4, 11.64)	1.61 (0.53, 2.79)
<25 mg/dL	1.13 (0.94, 1.36)	3.01 (2.50, 3.62)	2.67 (2.61, 2.72)	0.34 (-0.17, 0.95)
BMI				
Increased >3%	1.16 (1.14, 1.19)	354.12 (347.07, 361.26)	312.96 (312.08, 313.85)	41.15 (34.11, 48.3)
Increased >5%	1.18 (1.14, 1.21)	254.06 (247.72, 260.54)	220.65 (219.86, 221.44)	33.41 (27.07, 39.89)
Increased >10%	1.14 (1.09, 1.19)	115.48 (110.79, 120.34)	101.81 (101.25, 102.37)	13.66 (8.98, 18.53)

*. 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. Burdens were computed based on the estimated survival probability at 12 month.
CI, confidence interval; LDL, low-density lipoprotein; HDL, high-density lipoprotein.

Appendix Table 5. Subgroup analyses of the risks of incident post-acute COVID-19 composite dyslipidemia outcomes compared to contemporary control

Risk Factors	Hazard ratio (95% CI)† - COVID-19 vs Contemporary control		
	Abnormal lipid lab results	Lipid-lowering medication prescription	Any dyslipidemia outcome
Age			
≤65	1.38 (1.29, 1.47)	1.75 (1.59, 1.94)	1.48 (1.39, 1.57)
>65	1.26 (1.22, 1.29)	1.30 (1.20, 1.40)	1.28 (1.24, 1.31)
Race			
White	1.31 (1.28, 1.35)	1.59 (1.52, 1.66)	1.37 (1.34, 1.40)
Black	1.27 (1.21, 1.34)	1.56 (1.42, 1.72)	1.36 (1.29, 1.43)
Sex			
Male	1.33 (1.30, 1.36)	1.61 (1.55, 1.67)	1.40 (1.37, 1.43)
Female	1.15 (1.08, 1.23)	1.17 (1.01, 1.36)	1.16 (1.09, 1.24)
Obesity			
No	1.38 (1.34, 1.42)	1.63 (1.54, 1.72)	1.44 (1.40, 1.48)
Yes	1.22 (1.18, 1.26)	1.54 (1.45, 1.64)	1.29 (1.25, 1.33)
Smoking			
No/former	1.31 (1.29, 1.35)	1.62 (1.55, 1.69)	1.37 (1.34, 1.40)
Yes	1.25 (1.17, 1.33)	1.55 (1.39, 1.73)	1.33 (1.26, 1.42)

Risk Factors	Hazard ratio (95% CI)[†] - COVID-19 vs Contemporary control		
	Abnormal lipid lab results	Lipid-lowering medication prescription	Coagulation studies
Cardiovascular disease			
No	1.30 (1.27, 1.32)	1.59 (1.52, 1.65)	1.36 (1.33, 1.39)
Yes	1.12 (1.01, 1.25)	1.75 (1.54, 2.00)	1.28 (1.17, 1.40)
Chronic kidney disease			
No	1.31 (1.28, 1.34)	1.57 (1.50, 1.64)	1.36 (1.33, 1.39)
Yes	1.16 (1.07, 1.24)	1.75 (1.57, 1.94)	1.30 (1.21, 1.39)
Diabetes			
No	1.30 (1.27, 1.33)	1.61 (1.54, 1.68)	1.37 (1.34, 1.40)
Yes	1.21 (1.10, 1.33)	1.57 (1.39, 1.77)	1.32 (1.21, 1.44)
Hypertension			
No	1.33 (1.27, 1.40)	1.65 (1.54, 1.78)	1.41 (1.35, 1.48)
Yes	1.29 (1.26, 1.33)	1.58 (1.50, 1.65)	1.35 (1.32, 1.39)
Dyslipidemia risk score[§]			
Quartile 1	1.27 (1.21, 1.33)	1.74 (1.59, 1.90)	1.36 (1.30, 1.42)
Quartile 2	1.26 (1.19, 1.34)	1.68 (1.49, 1.89)	1.37 (1.29, 1.45)
Quartile 3	1.23 (1.14, 1.32)	1.64 (1.46, 1.84)	1.35 (1.26, 1.44)
Quartile 4	1.26 (1.18, 1.36)	1.37 (1.23, 1.52)	1.30 (1.21, 1.39)

*. Adjustment through inverse probability weighting using predefined and algorithmically selected high-dimensional variables.

†. Obesity was defined based on baseline BMI>30kg/m^2

‡. Chronic kidney disease was defined based on baseline outpatient estimated Glomerular Filtration Rate< 60 mL/min/1.73 m^2

§. Dyslipidemia risk score as probability of having incident lipid-lowering medication use or abnormal lipid labs within 12 months based on age, race, sex, body mass index, cardiovascular disease, cerebrovascular disease, diabetes, and hypertension.

CI, confidence interval.

Appendix Table 6. 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=46,568)	Hospitalized (N=4,169)	Admitted to intensive care (N=1,182)	Contemporary control (N=2,639,550)	Absolute standardized difference[†]		
					Non-hospitalized and Contemporary control	Hospitalized and Contemporary control	Admitted to intensive care and Contemporary control
Age, mean (std), yr	54.76 (17.42)	65.61 (16.80)	66.93 (15.55)	60.28 (18.27)	0.31	0.30	0.39
Race, no. (%)							
White	32,057 (68.84)	2,490 (59.73)	684 (57.87)	1,993,654 (75.53)	0.15	0.34	0.38
Black	12,137 (26.06)	1,443 (34.61)	425 (35.96)	520,242 (19.71)	0.15	0.34	0.37
Other	2,374 (5.10)	236 (5.66)	73 (6.18)	125,654 (4.76)	0.02	0.04	0.06
Sex, no. (%)							
Male	37,988 (81.58)	3,785 (90.79)	1,085 (91.79)	2,304,052 (87.29)	0.16	0.11	0.15
Female	8,580 (18.43)	384 (9.21)	97 (8.21)	335,498 (12.71)	0.16	0.11	0.15
BMI category, no. (%), kg/m²							
Underweight/Normal	8,582 (18.43)	1,113 (26.70)	282 (23.86)	599,167 (22.70)	0.11	0.09	0.03
Overweight	15,877 (34.09)	1,348 (32.33)	375 (31.73)	1,117,303 (42.33)	0.17	0.21	0.22
Obese	22,109 (47.48)	1,708 (40.97)	525 (44.42)	923,080 (34.97)	0.26	0.12	0.19
Smoking status, no. (%)							
Never	23,918 (51.36)	1,920 (46.05)	532 (45.01)	1,313,271 (49.75)	0.03	0.07	0.10
Former	14,777 (31.73)	1,397 (33.51)	445 (37.65)	776,088 (29.40)	0.05	0.09	0.18
Current	7,873 (16.91)	852 (20.44)	205 (17.34)	550,191 (20.84)	0.10	0.01	0.09
Area Deprivation Index[‡], mean (std)	53.10 (18.60)	51.73 (18.64)	53.50 (18.86)	52.66 (19.15)	0.02	0.05	0.04
Clinical Characteristics							
Outpatient encounter [a], no. (%)							
Zero	3,564 (7.65)	174 (4.17)	59 (4.99)	571,046 (21.63)	0.40	0.54	0.51
One	13,746 (29.52)	687 (16.48)	181 (15.31)	1,106,024 (41.90)	0.26	0.58	0.62
Two or more	29,258 (62.83)	3,308 (79.35)	942 (79.70)	962,480 (36.46)	0.55	0.96	0.97
Long-term care, no. (%)	1,710 (3.67)	415 (9.95)	133 (11.25)	9,495 (0.36)	0.24	0.44	0.48

Baseline Characteristics	Non-hospitalized (N=46,568)	Hospitalized (N=4,169)	Admitted to intensive care (N=1,182)	Contemporary control (N=2,639,550)	Absolute standardized difference[†]		
					Non-hospitalized and Contemporary control	Hospitalized and Contemporary control	Admitted to intensive care and Contemporary control
eGFR, mean (std), ml/min/1.73m^2	85.34 (20.32)	75.31 (25.81)	72.43 (27.01)	82.47 (19.06)	0.15	0.32	0.43
Systolic blood pressure, mean (std), mmHg	130.20 (12.19)	133.04 (12.60)	134.24 (13.73)	131.35 (12.61)	0.09	0.14	0.22
Diastolic blood pressure, mean (std), mmHg	78.58 (7.66)	77.84 (7.88)	78.33 (8.50)	77.82 (7.65)	0.00	0.00	0.06
Comorbidities							
Cancer, no. (%)	2,070 (4.45)	479 (11.49)	167 (14.13)	96,402 (3.65)	0.04	0.30	0.37
Cardiovascular disease, no. (%)	2,268 (4.87)	554 (13.29)	203 (17.17)	125,667 (4.76)	0.01	0.30	0.41
Cerebrovascular disease, no. (%)	697 (1.50)	208 (4.99)	51 (4.32)	23,676 (0.90)	0.06	0.24	0.22
Chronic kidney disease, no. (%)	4,318 (9.27)	1,069 (25.64)	337 (28.51)	276,693 (10.48)	0.04	0.40	0.47
Chronic lung disease, no. (%)	4,267 (9.16)	789 (18.93)	270 (22.84)	168,381 (6.38)	0.10	0.38	0.48
Diabetes mellitus type 2, no. (%)	4,798 (10.30)	807 (19.36)	284 (24.03)	220,998 (8.37)	0.07	0.32	0.43
Hypertension, no. (%)	9,773 (20.99)	1,204 (28.88)	384 (32.49)	585,288 (22.17)	0.03	0.15	0.23
Prescription medications							
Anti-epileptics, no. (%)	162 (0.35)	18 (0.43)	3 (0.25)	5,839 (0.22)	0.02	0.04	0.01
Anti-psychotics, no. (%)	2,108 (4.53)	347 (8.32)	62 (5.25)	79,453 (3.01)	0.08	0.23	0.11
β-blockers, no. (%)	3,756 (8.07)	614 (14.73)	176 (14.89)	153,353 (5.81)	0.09	0.30	0.30
Corticosteroids, no. (%)	689 (1.48)	147 (3.53)	43 (3.64)	24,867 (0.94)	0.05	0.18	0.18
Diuretics, no. (%)	4,725 (10.15)	763 (18.30)	254 (21.49)	174,329 (6.60)	0.13	0.36	0.44

Baseline Characteristics	Non-hospitalized (N=46,568)	Hospitalized (N=4,169)	Admitted to intensive care (N=1,182)	Contemporary control (N=2,639,550)	Absolute standardized difference[†]		
					Non-hospitalized and Contemporary control	Hospitalized and Contemporary control	Admitted to intensive care and Contemporary control
HIV protease inhibitors, no. (%)	39 (0.08)	2 (0.05)	1 (0.09)	926 (0.04)	0.02	0.01	0.02
Immuno-suppressants, no. (%)	399 (0.86)	49 (1.18)	14 (1.18)	13,310 (0.50)	0.04	0.07	0.07
Hormone therapeutics, no. (%)	1,377 (2.96)	66 (1.58)	24 (2.03)	36,795 (1.39)	0.11	0.02	0.05
SGLT-2 inhibitors, no. (%)	147 (0.32)	20 (0.48)	11 (0.93)	5,250 (0.20)	0.02	0.05	0.10

†. Standardized difference less than 0.15 is considered good balance.
‡. Area Deprivation Index is a measure of socioeconomic disadvantage, with a range from low to high disadvantage of 0 to 100.
[a].Data collected within one year of cohort enrollment.
[b].Nursing homes and assisted-living centers.
std, standard deviation; BMI, body mass index; eGFR, estimated glomerular filtration rate; HIV, Human immunodeficiency virus; SGLT, sodium glucose cotransporter.

Appendix Table 7. 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=46,568)	Hospitalized (N=4,169)	Admitted to intensive care (N=1,182)	Contemporary control (N=2,639,550)	Absolute standardized difference[†]		
					Non-hospitalized and Contemporary control	Hospitalized and Contemporary control	Admitted to intensive care and Contemporary control
Age, mean (std), yr	59.75 (18.33)	60.13 (17.91)	59.95 (18.39)	60.20 (18.27)	0.02	0.00	0.01
Race, no. (%)							
White	34,445 (73.97)	3,060 (73.40)	840 (71.03)	1,989,851 (75.39)	0.03	0.05	0.10
Black	9,875 (21.21)	924 (22.16)	268 (22.65)	523,845 (19.85)	0.03	0.06	0.07
Other	2,248 (4.83)	185 (4.44)	75 (6.32)	125,854 (4.77)	0.00	0.02	0.07
Sex, no. (%)							
Male	40,168 (86.26)	3,691 (88.53)	1057 (89.42)	2,301,608 (87.20)	0.03	0.04	0.07
Female	6,400 (13.74)	478 (11.47)	125 (10.58)	337,942 (12.80)	0.03	0.04	0.07
BMI category, no. (%), kg/m²							
Underweight/Normal	10,760 (23.11)	982 (23.55)	265 (22.39)	597,594 (22.64)	0.01	0.02	0.01
Overweight	17,255 (37.05)	1,505 (36.09)	404 (34.18)	1,113,837 (42.20)	0.11	0.12	0.14
Obese	18,553 (39.84)	1,682 (40.35)	513 (43.43)	928,119 (35.16)	0.10	0.11	0.14
Smoking status, no. (%)							
Never	22,107 (47.47)	1,858 (44.58)	564 (47.68)	1,313,757 (49.77)	0.05	0.10	0.04
Former	14,409 (30.94)	1,248 (29.93)	342 (28.91)	777,400 (29.45)	0.03	0.01	0.01
Current	10,052 (21.59)	1,063 (25.50)	277 (23.41)	548,367 (20.78)	0.02	0.11	0.06
Area Deprivation Index[‡], mean (std)	53.06 (19.08)	53.21 (19.58)	54.67 (19.42)	52.66 (19.14)	0.02	0.03	0.10
Clinical Characteristics							
Outpatient encounter [a], no. (%)							
Zero	10,002 (21.48)	783 (18.77)	202 (17.09)	563,861 (21.36)	0.00	0.06	0.11
One	18,762 (40.29)	1,765 (42.33)	529 (44.76)	1,098,950 (41.63)	0.03	0.01	0.06
Two or more	17,804 (38.23)	1,621 (38.89)	451 (38.16)	976,739 (37.00)	0.03	0.04	0.02
Long-term care, no. (%)	285 (0.61)	40 (0.97)	13 (1.07)	11,403 (0.43)	0.02	0.06	0.07

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Baseline Characteristics	Non-hospitalized (N=46,568)	Hospitalized (N=4,169)	Admitted to intensive care (N=1,182)	Contemporary control (N=2,639,550)	Absolute standardized difference[†]		
					Non-hospitalized and Contemporary control	Hospitalized and Contemporary control	Admitted to intensive care and Contemporary control
eGFR, mean (std), ml/min/1.73m^2	82.59 (19.68)	82.07 (20.59)	82.22 (21.85)	82.51 (19.10)	0.00	0.02	0.01
Systolic blood pressure, mean (std), mmHg	131.22 (12.87)	131.74 (12.70)	132.24 (12.53)	131.33 (12.60)	0.01	0.03	0.07
Diastolic blood pressure, mean (std), mmHg	77.87 (7.79)	78.35 (7.78)	78.20 (7.94)	77.83 (7.65)	0.00	0.07	0.05
Comorbidities							
Cancer, no. (%)	1,798 (3.86)	173 (4.14)	47 (3.97)	97,162 (3.68)	0.01	0.02	0.02
Cardiovascular disease, no. (%)	2,310 (4.96)	242 (5.79)	72 (6.10)	126,144 (4.78)	0.01	0.05	0.06
Cerebrovascular disease, no. (%)	477 (1.02)	55 (1.32)	14 (1.22)	24,125 (0.91)	0.01	0.04	0.03
Chronic kidney disease, no. (%)	5,263 (11.30)	540 (12.96)	166 (14.01)	276,915 (10.49)	0.03	0.08	0.11
Chronic lung disease, no. (%)	3,250 (6.98)	322 (7.73)	86 (7.30)	170,304 (6.45)	0.02	0.05	0.03
Diabetes mellitus type 2, no. (%)	4,060 (8.72)	429 (10.29)	135 (11.41)	222,435 (8.43)	0.01	0.06	0.10
Hypertension, no. (%)	10,732 (23.05)	1,052 (25.23)	308 (26.02)	585,109 (22.17)	0.02	0.07	0.09
Prescription medications							
Anti-epileptics, no. (%)	129 (0.28)	7 (0.17)	1 (0.12)	5,913 (0.22)	0.01	0.01	0.03
Anti-psychotics, no. (%)	1,587 (3.41)	180 (4.32)	55 (4.70)	80,348 (3.04)	0.02	0.07	0.09
β-blockers, no. (%)	3,084 (6.62)	327 (7.83)	84 (7.09)	154,810 (5.87)	0.03	0.08	0.05
Corticosteroids, no. (%)	509 (1.09)	52 (1.26)	16 (1.32)	25,234 (0.96)	0.01	0.03	0.03
Diuretics, no. (%)	3,514 (7.55)	327 (7.84)	105 (8.85)	176,533 (6.69)	0.03	0.04	0.08

Baseline Characteristics	Non-hospitalized (N=46,568)	Hospitalized (N=4,169)	Admitted to intensive care (N=1,182)	Contemporary control (N=2,639,550)	Absolute standardized difference[†]		
					Non-hospitalized and Contemporary control	Hospitalized and Contemporary control	Admitted to intensive care and Contemporary control
HIV protease inhibitors, no. (%)	19 (0.04)	1 (0.03)	0 (0.00)	950 (0.04)	0.00	0.00	0.03
Immuno-suppressants, no. (%)	256 (0.55)	22 (0.53)	6 (0.52)	13,514 (0.51)	0.01	0.00	0.00
Hormone therapeutics, no. (%)	719 (1.55)	47 (1.14)	18 (1.49)	37,534 (1.42)	0.01	0.03	0.01
SGLT-2 inhibitors, no. (%)	104 (0.22)	9 (0.22)	3 (0.26)	5,332 (0.20)	0.00	0.00	0.01

†. Standardized difference less than 0.15 is considered good balance.
‡. Area Deprivation Index is a measure of socioeconomic disadvantage, with a range from low to high disadvantage of 0 to 100.
[a].Data collected within one year of cohort enrollment.
[b].Nursing homes and assisted-living centers.
std, standard deviation; BMI, body mass index; eGFR, estimated glomerular filtration rate; HIV, Human immunodeficiency virus; SGLT, sodium glucose cotransporter.

Appendix Table 8. Risks and 12-month burdens of post-acute COVID-19 dyslipidemia outcomes by care setting of the acute infection compared to contemporary control

Outcome*	Care setting†	Hazard ratio (95% CI)‡ COVID-19 vs Contemporary control	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)‡
Abnormal lipid lab results	Non-hospitalized	1.28 (1.25, 1.31)	231.46 (227.03, 235.96)	186.03 (185.59, 186.48)	45.43 (41.00, 49.92)
	Hospitalized	1.52 (1.39, 1.68)	269.32 (248.10, 291.98)		83.29 (62.06, 105.95)
	Admitted to intensive care	1.91 (1.61, 2.27)	325.34 (281.70, 373.80)		139.31 (95.67, 187.77)
Total cholesterol>200 mg/dL	Non-hospitalized	1.31 (1.27, 1.35)	122.30 (118.96, 125.72)	94.73 (94.4, 95.07)	27.56 (24.22, 30.99)
	Hospitalized	1.62 (1.42, 1.85)	149.27 (132.00, 168.56)		54.53 (37.27, 73.83)
	Admitted to intensive care	1.57 (1.22, 2.02)	144.71 (114.34, 182.27)		49.97 (19.61, 87.53)
Triglycerides>150 mg/dL	Non-hospitalized	1.30 (1.26, 1.34)	112.79 (109.58, 116.09)	87.85 (87.52, 88.17)	24.94 (21.73, 28.24)
	Hospitalized	1.68 (1.47, 1.91)	142.75 (126.54, 160.84)		54.90 (38.69, 72.99)
	Admitted to intensive care	2.21 (1.78, 2.76)	184.23 (150.95, 223.84)		96.39 (63.10, 135.99)
LDL>130 mg/dL	Non-hospitalized	1.30 (1.26, 1.35)	101.68 (98.64, 104.82)	78.92 (78.61, 79.23)	22.76 (19.72, 25.89)
	Hospitalized	1.67 (1.45, 1.93)	128.42 (112.26, 146.71)		49.50 (33.33, 67.79)
	Admitted to intensive care	1.54 (1.17, 2.03)	119.25 (92.03, 153.80)		40.33 (13.11, 74.88)
HDL<40 mg/dL	Non-hospitalized	1.21 (1.17, 1.25)	97.35 (94.36, 100.43)	81.11 (80.80, 81.42)	16.24 (13.25, 19.32)
	Hospitalized	1.66 (1.46, 1.90)	131.14 (115.89, 148.22)		50.03 (34.79, 67.11)
	Admitted to intensive care	2.08 (1.64, 2.63)	161.17 (129.72, 199.32)		80.06 (48.61, 118.22)
Lipid-lowering medication prescription	Non-hospitalized	1.41 (1.35, 1.47)	70.54 (67.79, 73.41)	50.66 (50.41, 50.91)	19.89 (17.13, 22.75)
	Hospitalized	3.50 (3.09, 3.98)	166.55 (148.22, 186.89)		115.89 (97.56, 136.23)
	Admitted to intensive care	4.69 (3.80, 5.78)	216.24 (179.28, 259.54)		165.58 (128.63, 208.88)
Statins	Non-hospitalized	1.41 (1.36, 1.47)	68.75 (66.01, 71.59)	49.12 (48.87, 49.37)	19.63 (16.90, 22.47)
	Hospitalized	3.38 (2.97, 3.85)	156.61 (139.09, 176.10)		107.49 (89.97, 126.98)
	Admitted to intensive care	4.75 (3.85, 5.88)	212.95 (176.17, 256.14)		163.84 (127.05, 207.03)
Bile acid resins	Non-hospitalized	1.30 (1.01, 1.69)	1.35 (1.04, 1.74)	1.04 (1.00, 1.07)	0.31 (0.01, 0.71)
	Hospitalized	7.90 (3.54, 17.62)	8.15 (3.66, 18.09)		7.11 (2.63, 17.06)
	Admitted to intensive care	2.48 (0.62, 9.95)	2.57 (0.64, 10.25)		1.53 (-0.39, 9.22)
Fibrates	Non-hospitalized	1.23 (0.92, 1.64)	1.21 (0.90, 1.61)	0.98 (0.95, 1.02)	0.22 (-0.08, 0.63)
	Hospitalized	3.16 (1.32, 7.58)	3.10 (1.29, 7.42)		2.12 (0.31, 6.44)
	Admitted to intensive care	2.22 (0.74, 6.71)	2.18 (0.72, 6.57)		1.20 (-0.26, 5.59)

Outcome*	Care setting†	Hazard ratio (95% CI)‡ COVID-19 vs Contemporary control	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)‡
Any dyslipidemia outcome	Non-hospitalized	1.31 (1.28, 1.33)	260.15 (255.51, 264.86)	206.00 (205.54, 206.46)	54.15 (49.51, 58.86)
	Hospitalized	1.92 (1.76, 2.09)	358.18 (334.31, 383.22)		152.18 (128.31, 177.22)
	Admitted to intensive care	2.52 (2.15, 2.94)	440.27 (391.06, 492.83)		234.27 (185.06, 286.83)

*. 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. Burdens were computed based on the estimated survival probability at 12 month.
CI, confidence interval; LDL, low-density lipoprotein HDL, high-density lipoprotein.

Appendix Table 9. 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=46,568)	Hospitalized (N=4,169)	Admitted to intensive care (N=1,182)	Historical control (N=2,527,864)	Absolute standardized difference[†]		
					Non-hospitalized and Historical control	Hospitalized and Historical control	Admitted to intensive care and Historical control
Age, mean (std), yr	54.76 (17.42)	65.61 (16.80)	66.93 (15.55)	59.82 (18.68)	0.28	0.33	0.41
Race, no. (%)							
White	32,057 (68.84)	2,490 (59.73)	684 (57.87)	1,913,622 (75.70)	0.15	0.35	0.39
Black	12,137 (26.06)	1,443 (34.61)	425 (35.96)	493,013 (19.50)	0.16	0.35	0.37
Other	2,374 (5.10)	236 (5.66)	73 (6.18)	121,229 (4.80)	0.01	0.04	0.06
Sex, no. (%)							
Male	37,988 (81.58)	3,785 (90.79)	1,085 (91.79)	2,203,499 (87.17)	0.15	0.12	0.15
Female	8,580 (18.43)	384 (9.21)	97 (8.21)	324,365 (12.83)	0.15	0.12	0.15
BMI category, no. (%), kg/m^2							
Underweight/Normal	8,582 (18.43)	1,113 (26.70)	282 (23.86)	594,926 (23.54)	0.13	0.07	0.01
Overweight	15,877 (34.09)	1,348 (32.33)	375 (31.73)	1,125,212 (44.51)	0.21	0.25	0.27
Obese	22,109 (47.48)	1,708 (40.97)	525 (44.42)	807,726 (31.95)	0.32	0.19	0.26
Smoking status, no. (%)							
Never	23,918 (51.36)	1,920 (46.05)	532 (45.01)	1,539,652 (60.91)	0.19	0.30	0.32
Former	14,777 (31.73)	1,397 (33.51)	445 (37.65)	476,117 (18.84)	0.30	0.34	0.43
Current	7,873 (16.91)	852 (20.44)	205 (17.34)	512,095 (20.26)	0.09	0.00	0.07
Area Deprivation Index[‡], mean (std)	53.10 (18.60)	51.73 (18.64)	53.50 (18.86)	52.39 (19.26)	0.04	0.03	0.06
Clinical Characteristics							
Outpatient encounter [a], no. (%)							
Zero	3,564 (7.65)	174 (4.17)	59 (4.99)	537,170 (21.25)	0.39	0.53	0.50
One	13,746 (29.52)	687 (16.48)	181 (15.31)	1,058,008 (41.85)	0.26	0.58	0.61
Two or more	29,258 (62.83)	3,308 (79.35)	942 (79.70)	932,686 (36.90)	0.54	0.95	0.96
Long-term care, no. (%)	1,710 (3.67)	415 (9.95)	133 (11.25)	12,077 (0.48)	0.23	0.44	0.47

Baseline Characteristics	Non-hospitalized (N=46,568)	Hospitalized (N=4,169)	Admitted to intensive care (N=1,182)	Historical control (N=2,527,864)	Absolute standardized difference[†]		
					Non-hospitalized and Historical control	Hospitalized and Historical control	Admitted to intensive care and Historical control
eGFR, mean (std), ml/min/1.73m^2	85.34 (20.32)	75.31 (25.81)	72.43 (27.01)	82.78 (18.24)	0.13	0.33	0.45
Systolic blood pressure, mean (std), mmHg	130.20 (12.19)	133.04 (12.60)	134.24 (13.73)	131.42 (12.75)	0.10	0.13	0.21
Diastolic blood pressure, mean (std), mmHg	78.58 (7.66)	77.84 (7.88)	78.33 (8.50)	77.53 (7.91)	0.13	0.04	0.10
Comorbidities							
Cancer, no. (%)	2,070 (4.45)	479 (11.49)	167 (14.13)	88,509 (3.50)	0.05	0.31	0.38
Cardiovascular disease, no. (%)	2,268 (4.87)	554 (13.29)	203 (17.17)	121,662 (4.81)	0.00	0.30	0.40
Cerebrovascular disease, no. (%)	697 (1.50)	208 (4.99)	51 (4.32)	23,513 (0.93)	0.05	0.24	0.21
Chronic kidney disease, no. (%)	4,318 (9.27)	1,069 (25.64)	337 (28.51)	227,455 (9.00)	0.01	0.45	0.52
Chronic lung disease, no. (%)	4,267 (9.16)	789 (18.93)	270 (22.84)	163,302 (6.46)	0.10	0.38	0.48
Diabetes mellitus type 2, no. (%)	4,798 (10.30)	807 (19.36)	284 (24.03)	209,339 (8.28)	0.07	0.33	0.44
Hypertension, no. (%)	9,773 (20.99)	1,204 (28.88)	384 (32.49)	538,947 (21.32)	0.01	0.18	0.25
Prescription medications							
Anti-epileptics, no. (%)	162 (0.35)	18 (0.43)	3 (0.25)	5,892 (0.23)	0.02	0.03	0.00
Anti-psychotics, no. (%)	2,108 (4.53)	347 (8.32)	62 (5.25)	70,528 (2.79)	0.09	0.24	0.13
β-blockers, no. (%)	3,756 (8.07)	614 (14.73)	176 (14.89)	139,436 (5.52)	0.10	0.31	0.31
Corticosteroids, no. (%)	689 (1.48)	147 (3.53)	43 (3.64)	26,456 (1.05)	0.04	0.17	0.17
Diuretics, no. (%)	4,725 (10.15)	763 (18.30)	254 (21.49)	164,524 (6.51)	0.13	0.36	0.44

Baseline Characteristics	Non-hospitalized (N=46,568)	Hospitalized (N=4,169)	Admitted to intensive care (N=1,182)	Historical control (N=2,527,864)	Absolute standardized difference[†]		
					Non-hospitalized and Historical control	Hospitalized and Historical control	Admitted to intensive care and Historical control
HIV protease inhibitors, no. (%)	39 (0.08)	2 (0.05)	1 (0.09)	1,266 (0.05)	0.01	0.00	0.01
Immuno-suppressants, no. (%)	399 (0.86)	49 (1.18)	14 (1.18)	10,571 (0.42)	0.06	0.09	0.09
Hormone therapeutics, no. (%)	1,377 (2.96)	66 (1.58)	24 (2.03)	33,996 (1.35)	0.11	0.02	0.05
SGLT-2 inhibitors, no. (%)	147 (0.32)	20 (0.48)	11 (0.93)	1,079 (0.04)	0.06	0.09	0.13

†. Standardized difference less than 0.15 is considered good balance.
‡. Area Deprivation Index is a measure of socioeconomic disadvantage, with a range from low to high disadvantage of 0 to 100.
[a].Data collected within one year of cohort enrollment.
[b].Nursing homes and assisted-living centers.
std, standard deviation; BMI, body mass index; eGFR, estimated glomerular filtration rate; HIV, Human immunodeficiency virus; SGLT, sodium glucose cotransporter.

Appendix Table 10. 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=46,568)	Hospitalized (N=4,169)	Admitted to intensive care (N=1,182)	Historical control (N=2,527,864)	Absolute standardized difference[†]		
					Non-hospitalized and Historical control	Hospitalized and Historical control	Admitted to intensive care and Historical control
Age, mean (std), yr	59.75 (18.33)	60.13 (17.91)	59.95 (18.39)	60.15 (18.35)	0.02	0.00	0.01
Race, no. (%)							
White	34,445 (73.97)	3,060 (73.40)	840 (71.03)	1,904,265 (75.33)	0.03	0.04	0.10
Black	9,875 (21.21)	924 (22.16)	268 (22.65)	502,615 (19.88)	0.03	0.06	0.07
Other	2,248 (4.83)	185 (4.44)	75 (6.32)	120,984 (4.79)	0.00	0.02	0.07
Sex, no. (%)							
Male	40,168 (86.26)	3,691 (88.53)	1057 (89.42)	2,203,135 (87.15)	0.03	0.04	0.07
Female	6,400 (13.74)	478 (11.47)	125 (10.58)	324,729 (12.85)	0.03	0.04	0.07
BMI category, no. (%), kg/m^2							
Underweight/Normal	10,760 (23.11)	982 (23.55)	265 (22.39)	574,027 (22.71)	0.01	0.02	0.01
Overweight	17,255 (37.05)	1,505 (36.09)	404 (34.18)	1,076,870 (42.60)	0.11	0.12	0.14
Obese	18,553 (39.84)	1,682 (40.35)	513 (43.43)	876,967 (34.69)	0.11	0.12	0.14
Smoking status, no. (%)							
Never	22,107 (47.47)	1,858 (44.58)	564 (47.68)	1,257,916 (49.76)	0.05	0.10	0.04
Former	14,409 (30.94)	1,248 (29.93)	342 (28.91)	744,001 (29.43)	0.03	0.01	0.01
Current	10,052 (21.59)	1,063 (25.50)	277 (23.41)	525,922 (20.81)	0.02	0.11	0.06
Area Deprivation Index[‡], mean (std)	53.06 (19.08)	53.21 (19.58)	54.67 (19.42)	52.65 (19.13)	0.02	0.03	0.10
Clinical Characteristics							
Outpatient encounter [a], no. (%)							
Zero	10,002 (21.48)	783 (18.77)	202 (17.09)	535,225 (21.17)	0.01	0.06	0.10
One	18,762 (40.29)	1,765 (42.33)	529 (44.76)	1,053,867 (41.69)	0.03	0.01	0.06
Two or more	17,804 (38.23)	1,621 (38.89)	451 (38.16)	938,773 (37.14)	0.02	0.04	0.02
Long-term care, no. (%)	285 (0.61)	40 (0.97)	13 (1.07)	11,198 (0.44)	0.02	0.06	0.07

Baseline Characteristics	Non-hospitalized (N=46,568)	Hospitalized (N=4,169)	Admitted to intensive care (N=1,182)	Historical control (N=2,527,864)	Absolute standardized difference[†]		
					Non-hospitalized and Historical control	Hospitalized and Historical control	Admitted to intensive care and Historical control
eGFR, mean (std), ml/min/1.73m^2	82.59 (19.68)	82.07 (20.59)	82.22 (21.85)	82.58 (19.35)	0.00	0.03	0.02
Systolic blood pressure, mean (std), mmHg	131.22 (12.87)	131.74 (12.70)	132.24 (12.53)	131.29 (12.72)	0.01	0.04	0.08
Diastolic blood pressure, mean (std), mmHg	77.87 (7.79)	78.35 (7.78)	78.20 (7.94)	77.84 (7.72)	0.00	0.07	0.05
Comorbidities							
Cancer, no. (%)	1,798 (3.86)	173 (4.14)	47 (3.97)	93,405 (3.70)	0.01	0.02	0.01
Cardiovascular disease, no. (%)	2,310 (4.96)	242 (5.79)	72 (6.10)	120,554 (4.77)	0.01	0.05	0.06
Cerebrovascular disease, no. (%)	477 (1.02)	55 (1.32)	14 (1.22)	23,357 (0.92)	0.01	0.04	0.03
Chronic kidney disease, no. (%)	5,263 (11.30)	540 (12.96)	166 (14.01)	265,173 (10.49)	0.03	0.08	0.11
Chronic lung disease, no. (%)	3,250 (6.98)	322 (7.73)	86 (7.30)	163,528 (6.47)	0.02	0.05	0.03
Diabetes mellitus type 2, no. (%)	4,060 (8.72)	429 (10.29)	135 (11.41)	213,149 (8.43)	0.01	0.06	0.10
Hypertension, no. (%)	10,732 (23.05)	1,052 (25.23)	308 (26.02)	561,742 (22.22)	0.02	0.07	0.09
Prescription medications							
Anti-epileptics, no. (%)	129 (0.28)	7 (0.17)	1 (0.12)	5,738 (0.23)	0.01	0.01	0.03
Anti-psychotics, no. (%)	1,587 (3.41)	180 (4.32)	55 (4.70)	77,757 (3.08)	0.02	0.07	0.08
β-blockers, no. (%)	3,084 (6.62)	327 (7.83)	84 (7.09)	149,371 (5.91)	0.03	0.08	0.05
Corticosteroids, no. (%)	509 (1.09)	52 (1.26)	16 (1.32)	24,318 (0.96)	0.01	0.03	0.03
Diuretics, no. (%)	3,514 (7.55)	327 (7.84)	105 (8.85)	170,580 (6.75)	0.03	0.04	0.08

Baseline Characteristics	Non-hospitalized (N=46,568)	Hospitalized (N=4,169)	Admitted to intensive care (N=1,182)	Historical control (N=2,527,864)	Absolute standardized difference[†]		
					Non-hospitalized and Historical control	Hospitalized and Historical control	Admitted to intensive care and Historical control
HIV protease inhibitors, no. (%)	19 (0.04)	1 (0.03)	0 (0.00)	910 (0.04)	0.00	0.00	0.03
Immuno-suppressants, no. (%)	256 (0.55)	22 (0.53)	6 (0.52)	13,069 (0.52)	0.00	0.00	0.00
Hormone therapeutics, no. (%)	719 (1.55)	47 (1.14)	18 (1.49)	36,578 (1.45)	0.01	0.03	0.00
SGLT-2 inhibitors, no. (%)	104 (0.22)	9 (0.22)	3 (0.26)	4,955 (0.20)	0.01	0.00	0.01

†. Standardized difference less than 0.15 is considered good balance.
‡. Area Deprivation Index is a measure of socioeconomic disadvantage, with a range from low to high disadvantage of 0 to 100.
[a].Data collected within one year of cohort enrollment.
[b].Nursing homes and assisted-living centers.
std, standard deviation; BMI, body mass index; eGFR, estimated glomerular filtration rate; HIV, Human immunodeficiency virus; SGLT, sodium glucose cotransporter.

Appendix Table 11. Risks and 12-month burdens of post-acute COVID-19 dyslipidemia outcomes compared to historical control

Outcome*	Hazard Ratio (95% CI)† COVID-19 vs Historical control	COVID-19 burden per 1000 persons at 12 months (95% CI) †	Historical control burden per 1000 persons at 12 months (95% CI) †	Absolute burden difference per 1000 persons at 12 months (95% CI) †
Abnormal lipid lab results	1.24 (1.21, 1.27)	223.20 (218.72, 227.75)	184.40 (183.96, 184.85)	38.79 (34.32, 43.34)
Total cholesterol>200 mg/dL	1.32 (1.28, 1.36)	116.03 (112.72, 119.44)	89.39 (89.07, 89.72)	26.64 (23.32, 30.04)
Triglycerides>150 mg/dL	1.27 (1.23, 1.31)	107.83 (104.65, 111.10)	86.24 (85.92, 86.57)	21.59 (18.41, 24.86)
LDL>130 mg/dL	1.31 (1.27, 1.36)	95.94 (92.92, 99.05)	74.08 (73.78, 74.38)	21.86 (18.84, 24.97)
HDL<40 mg/dL	1.22 (1.18, 1.26)	96.01 (92.95, 99.16)	79.51 (79.20, 79.82)	16.50 (13.44, 19.65)
Lipid-lowering medication prescription	1.51 (1.45, 1.57)	74.37 (71.48, 77.36)	49.88 (49.63, 50.13)	24.49 (21.60, 27.49)
Statins	1.51 (1.45, 1.58)	72.27 (69.41, 75.23)	48.35 (48.10, 48.59)	23.92 (21.07, 26.89)
Bile acid resins	1.59 (1.19, 2.12)	1.48 (1.11, 1.97)	0.93 (0.90, 0.97)	0.55 (0.18, 1.04)
Fibrates	1.51 (1.14, 2.01)	1.44 (1.08, 1.91)	0.95 (0.92, 0.99)	0.49 (0.13, 0.96)
Any dyslipidemia outcome	1.29 (1.26, 1.31)	258.34 (253.53, 263.24)	207.43 (206.97, 207.90)	50.91 (46.09, 55.81)

*. 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. Burdens were computed based on the estimated survival probability at 12 month.

CI, confidence interval; LDL, low-density lipoprotein HDL, high-density lipoprotein.

Appendix Table 12. Risks and 12-month burdens of post-acute COVID-19 abnormal lipid lab and BMI increased outcomes compared to historical control

Outcome*	Hazard Ratio (95% CI)† COVID-19 vs Historical control	COVID-19 burden per 1000 persons at 12 months (95% CI)†	Historical control burden per 1000 persons at 12 months (95% CI)†	Absolute burden difference per 1000 persons at 12 months (95% CI)†
Total cholesterol				
>210 mg/dL	1.37 (1.32, 1.42)	82.99 (80.2, 85.87)	61.45 (61.17, 61.72)	21.54 (18.75, 24.42)
>220 mg/dL	1.40 (1.34, 1.46)	59.16 (56.77, 61.64)	42.67 (42.44, 42.91)	16.48 (14.09, 18.97)
>230 mg/dL	1.43 (1.36, 1.50)	41.75 (39.74, 43.85)	29.4 (29.2, 29.59)	12.35 (10.35, 14.46)
Triglycerides				
>160 mg/dL	1.28 (1.24, 1.32)	93.27 (90.34, 96.29)	73.68 (73.38, 73.97)	19.6 (16.66, 22.62)
>170 mg/dL	1.29 (1.24, 1.34)	81.71 (78.97, 84.55)	63.98 (63.7, 64.26)	17.74 (14.99, 20.57)
>180 mg/dL	1.31 (1.26, 1.36)	72.53 (69.93, 75.23)	55.97 (55.7, 56.23)	16.57 (13.96, 19.27)
LDL				
>140 mg/dL	1.35 (1.30, 1.41)	64.29 (61.84, 66.84)	48 (47.76, 48.25)	16.29 (13.84, 18.84)
>150 mg/dL	1.37 (1.31, 1.44)	42.59 (40.59, 44.69)	31.21 (31.01, 31.41)	11.39 (9.38, 13.48)
>160 mg/dL	1.39 (1.31, 1.48)	27.77 (26.14, 29.51)	20.05 (19.89, 20.21)	7.72 (6.08, 9.46)
HDL				
<35 mg/dL	1.28 (1.22, 1.34)	43.13 (41.08, 45.27)	33.91 (33.7, 34.12)	9.22 (7.17, 11.36)
<30 mg/dL	1.18 (1.09, 1.29)	13.13 (12.05, 14.31)	11.1 (10.98, 11.22)	2.03 (0.95, 3.21)
<25 mg/dL	1.14 (0.95, 1.38)	3.01 (2.50, 3.62)	2.63 (2.57, 2.69)	0.38 (-0.13, 0.99)
BMI				
Increased >3%	1.07 (1.04, 1.10)	354.12 (347.07, 361.26)	335.79 (334.89, 336.69)	18.33 (11.28, 25.47)
Increased >5%	1.13 (1.10, 1.17)	254.06 (247.72, 260.54)	228.06 (227.25, 228.86)	26.01 (19.66, 32.49)
Increased >10%	1.22 (1.16, 1.27)	115.48 (110.79, 120.34)	95.98 (95.43, 96.53)	19.50 (14.82, 24.36)

*. 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. Burdens were computed based on the estimated survival probability at 12 month.
CI, confidence interval; LDL, low-density lipoprotein; HDL, high-density lipoprotein.

Appendix Table 13. Subgroup analyses of the risks of incident post-acute COVID-19 composite dyslipidemia outcomes compared to historical control

Risk Factors	Hazard ratio (95% CI)† - COVID-19 vs Historical control		
	Abnormal lipid lab results	**Lipid-lowering medication prescription**	**Any dyslipidemia outcome**
Age			
≤65	1.35 (1.25, 1.46)	1.70 (1.51, 1.92)	1.41 (1.31, 1.52)
>65	1.22 (1.19, 1.26)	1.22 (1.13, 1.32)	1.23 (1.19, 1.26)
Race			
White	1.31 (1.28, 1.34)	1.56 (1.49, 1.64)	1.35 (1.32, 1.38)
Black	1.28 (1.21, 1.35)	1.56 (1.42, 1.71)	1.34 (1.27, 1.41)
Sex			
Male	1.33 (1.30, 1.36)	1.58 (1.52, 1.65)	1.38 (1.35, 1.41)
Female	1.18 (1.10, 1.26)	1.24 (1.06, 1.44)	1.17 (1.10, 1.25)
Obesity			
No	1.38 (1.34, 1.42)	1.61 (1.52, 1.69)	1.42 (1.38, 1.46)
Yes	1.23 (1.19, 1.27)	1.53 (1.44, 1.63)	1.28 (1.24, 1.32)
Smoking			
No/former	1.36 (1.32, 1.39)	1.60 (1.54, 1.67)	1.39 (1.36, 1.42)
Yes	1.22 (1.15, 1.30)	1.61 (1.44, 1.79)	1.30 (1.22, 1.38)

Risk Factors	Hazard ratio (95% CI)[†] - COVID-19 vs Historical control		
	Abnormal lipid lab results	Lipid-lowering medication prescription	Coagulation studies
Cardiovascular disease			
No	1.30 (1.27, 1.33)	1.58 (1.52, 1.64)	1.35 (1.32, 1.38)
Yes	1.19 (1.07, 1.32)	1.82 (1.60, 2.07)	1.33 (1.21, 1.46)
Chronic kidney disease			
No	1.30 (1.27, 1.33)	1.55 (1.48, 1.62)	1.34 (1.31, 1.37)
Yes	1.18 (1.10, 1.27)	1.77 (1.59, 1.96)	1.30 (1.21, 1.39)
Diabetes			
No	1.31 (1.28, 1.34)	1.61 (1.54, 1.68)	1.35 (1.33, 1.38)
Yes	1.27 (1.16, 1.40)	1.50 (1.33, 1.70)	1.33 (1.22, 1.45)
Hypertension			
No	1.35 (1.29, 1.42)	1.71 (1.59, 1.83)	1.42 (1.36, 1.48)
Yes	1.30 (1.27, 1.33)	1.55 (1.47, 1.62)	1.34 (1.31, 1.37)
Dyslipidemia risk score[§]			
Quartile 1	1.26 (1.20, 1.32)	1.75 (1.60, 1.91)	1.34 (1.28, 1.40)
Quartile 2	1.28 (1.21, 1.36)	1.68 (1.49, 1.90)	1.36 (1.29, 1.45)
Quartile 3	1.24 (1.16, 1.34)	1.67 (1.49, 1.88)	1.35 (1.26, 1.45)
Quartile 4	1.28 (1.19, 1.38)	1.35 (1.22, 1.50)	1.28 (1.20, 1.38)

*. Adjustment through inverse probability weighting using predefined and algorithmically selected high-dimensional variables.

†. Obesity was defined based on baseline BMI>30kg/m^2

‡. Chronic kidney disease was defined based on baseline outpatient estimated Glomerular Filtration Rate< 60 mL/min/1.73 m^2

§. Dyslipidemia risk score as probability of having incident lipid-lowering medication use or abnormal lipid labs within 12 months based on age, race, sex, body mass index, cardiovascular disease, cerebrovascular disease, diabetes, and hypertension.

CI, confidence interval.

Appendix Table 14. Risks and 12-month burdens of post-acute COVID-19 dyslipidemia outcomes by care setting of the acute infection compared to historical control

Outcome*	Care setting†	Hazard ratio (95% CI)‡ COVID-19 vs Historical control	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)‡
Abnormal lipid lab results	Non-hospitalized	1.27 (1.25, 1.30)	231.46 (227.02, 235.97)	186.56 (186.12, 187.01)	44.89 (40.47, 49.39)
	Hospitalized	1.52 (1.38, 1.67)	269.32 (248.10, 291.98)		82.75 (61.53, 105.42)
	Admitted to intensive care	1.91 (1.60, 2.27)	325.34 (281.70, 373.80)		138.77 (95.13, 187.24)
Total cholesterol>200 mg/dL	Non-hospitalized	1.37 (1.33, 1.42)	122.30 (118.95, 125.73)	90.56 (90.24, 90.89)	31.73 (28.39, 35.15)
	Hospitalized	1.70 (1.49, 1.94)	149.27 (132.00, 168.56)		58.70 (41.43, 78.00)
	Admitted to intensive care	1.65 (1.28, 2.12)	144.71 (114.34, 182.27)		54.14 (23.78, 91.70)
Triglycerides>150 mg/dL	Non-hospitalized	1.29 (1.25, 1.33)	112.79 (109.57, 116.10)	88.35 (88.03, 88.68)	24.44 (21.23, 27.73)
	Hospitalized	1.67 (1.46, 1.90)	142.75 (126.54, 160.84)		54.39 (38.18, 72.48)
	Admitted to intensive care	2.20 (1.77, 2.74)	184.23 (150.95, 223.83)		95.88 (62.60, 135.49)
LDL>130 mg/dL	Non-hospitalized	1.37 (1.33, 1.42)	101.68 (98.63, 104.83)	75.24 (74.94, 75.55)	26.44 (23.39, 29.57)
	Hospitalized	1.76 (1.52, 2.03)	128.42 (112.26, 146.71)		53.17 (37.01, 71.46)
	Admitted to intensive care	1.62 (1.23, 2.13)	119.25 (92.04, 153.79)		44.00 (16.79, 78.56)
HDL<40 mg/dL	Non-hospitalized	1.22 (1.18, 1.26)	97.35 (94.35, 100.44)	80.28 (79.97, 80.59)	17.07 (14.08, 20.15)
	Hospitalized	1.68 (1.47, 1.92)	131.14 (115.89, 148.22)		50.86 (35.62, 67.94)
	Admitted to intensive care	2.10 (1.66, 2.66)	161.17 (129.73, 199.32)		80.89 (49.44, 119.05)
Lipid-lowering medication prescription	Non-hospitalized	1.37 (1.32, 1.43)	70.54 (67.70, 73.50)	51.86 (51.60, 52.11)	18.69 (15.94, 21.55)
	Hospitalized	3.42 (3.01, 3.89)	166.55 (148.14, 187.00)		114.70 (96.37, 135.03)
	Admitted to intensive care	4.58 (3.71, 5.64)	216.24 (179.41, 259.37)		164.39 (127.43, 207.68)
Statins	Non-hospitalized	1.38 (1.32, 1.44)	68.75 (65.92, 71.68)	50.33 (50.08, 50.58)	18.41 (15.68, 21.25)
	Hospitalized	3.30 (2.90, 3.75)	156.61 (139.00, 176.21)		106.27 (88.75, 125.77)
	Admitted to intensive care	4.64 (3.76, 5.73)	212.95 (176.30, 255.97)		162.62 (125.84, 205.81)
Bile acid resins	Non-hospitalized	1.28 (0.99, 1.65)	1.35 (1.04, 1.75)	1.06 (1.02, 1.10)	0.29 (-0.01, 0.69)
	Hospitalized	7.73 (3.48, 17.21)	8.15 (3.67, 18.04)		7.09 (2.60, 17.03)
	Admitted to intensive care	2.43 (0.61, 9.72)	2.57 (0.64, 10.23)		1.51 (-0.42, 9.19)
Fibrates	Non-hospitalized	1.32 (0.99, 1.77)	1.21 (0.90, 1.62)	0.91 (0.88, 0.95)	0.29 (-0.01, 0.69)
	Hospitalized	3.39 (1.38, 8.31)	3.10 (1.27, 7.57)		2.18 (0.38, 6.50)
	Admitted to intensive care	2.39 (0.80, 7.13)	2.18 (0.73, 6.50)		1.27 (-0.19, 5.66)

Outcome*	Care setting†	Hazard ratio (95% CI)‡ COVID-19 vs Historical control	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)‡
Any dyslipidemia outcome	Non-hospitalized	1.28 (1.26, 1.31)	260.15 (255.50, 264.87)	209.21 (208.74, 209.68)	50.94 (46.30, 55.65)
	Hospitalized	1.89 (1.73, 2.06)	358.18 (334.31, 383.22)		148.97 (125.10, 174.01)
	Admitted to intensive care	2.47 (2.11, 2.89)	440.27 (391.05, 492.83)		231.06 (181.84, 283.62)

*. 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. Burdens were computed based on the estimated survival probability at 12 month.
CI, confidence interval; PCSK9, proprotein convertase subtilisin/kexin type 9; LDL, low-density lipoprotein HDL, high-density lipoprotein.

Appendix Table 15. Sensitivity analysis for any dyslipidemia outcome compared to contemporary and historical controls

Analysis	Abnormal lipid lab result Hazard ratio (95% CI)*		Lipid-lowering medication prescription Hazard ratio (95% CI)*		Any dyslipidemia outcome Hazard ratio (95% CI)*	
	Contemporary	Historical	Contemporary	Historical	Contemporary	Historical
Used 300 algorithmically selected high dimensional variables	1.24 (1.21, 1.27)	1.23 (1.20, 1.26)	1.52 (1.46, 1.59)	1.48 (1.42, 1.55)	1.30 (1.27, 1.33)	1.28 (1.25, 1.31)
Did not use any high dimensional variables	1.31 (1.28, 1.33)	1.31 (1.28, 1.34)	1.60 (1.54, 1.66)	1.58 (1.52, 1.64)	1.37 (1.34, 1.40)	1.36 (1.33, 1.38)
Doubly robust	1.25 (1.22, 1.27)	1.23 (1.21, 1.26)	1.25 (1.22, 1.27)	1.23 (1.21, 1.26)	1.25 (1.22, 1.27)	1.23 (1.21, 1.26)

*. Outcomes were ascertained from day 30 after the initial positive COVID-19 test result until end of follow up.
CI, confidence interval.

Appendix Table 16. Sensitivity analysis for any dyslipidemia outcome by care setting of the acute infection compared to contemporary and historical controls

Analysis	Care Setting†	Abnormal lipid lab result Hazard ratio (95% CI)*		Lipid-lowering medication prescription Hazard ratio (95% CI)*		Any dyslipidemia outcome Hazard ratio (95% CI)*	
		Contemporary	Historical	Contemporary	Historical	Contemporary	Historical
Used 300 algorithmically selected high dimensional variables	Non-hospitalized	1.28 (1.25, 1.31)	1.27 (1.25, 1.30)	1.41 (1.35, 1.47)	1.37 (1.31, 1.43)	1.31 (1.28, 1.33)	1.28 (1.26, 1.31)
	Hospitalized	1.52 (1.39, 1.68)	1.52 (1.38, 1.67)	3.50 (3.09, 3.98)	3.40 (3.00, 3.87)	1.92 (1.76, 2.09)	1.89 (1.73, 2.06)
	Admitted to intensive care	1.91 (1.61, 2.27)	1.91 (1.60, 2.27)	4.69 (3.80, 5.78)	4.55 (3.69, 5.61)	2.52 (2.15, 2.94)	2.47 (2.11, 2.89)
Did not use any high dimensional variables	Non-hospitalized	1.28 (1.25, 1.31)	1.29 (1.26, 1.31)	1.41 (1.35, 1.47)	1.39 (1.33, 1.45)	1.31 (1.28, 1.34)	1.30 (1.27, 1.32)
	Hospitalized	1.53 (1.39, 1.68)	1.53 (1.39, 1.69)	3.51 (3.09, 3.98)	3.46 (3.05, 3.93)	1.92 (1.77, 2.10)	1.91 (1.75, 2.08)
	Admitted to intensive care	1.91 (1.61, 2.28)	1.92 (1.62, 2.29)	4.69 (3.80, 5.79)	4.63 (3.76, 5.70)	2.52 (2.15, 2.95)	2.49 (2.13, 2.92)
Doubly robust	Non-hospitalized	1.26 (1.24, 1.29)	1.26 (1.24, 1.29)	1.42 (1.36, 1.48)	1.41 (1.34, 1.47)	1.30 (1.27, 1.33)	1.29 (1.26, 1.31)
	Hospitalized	1.44 (1.31, 1.58)	1.44 (1.31, 1.59)	3.51 (3.08, 4.00)	3.47 (3.04, 3.96)	1.85 (1.70, 2.02)	1.83 (1.68, 1.99)
	Admitted to intensive care	1.80 (1.52, 2.14)	1.81 (1.53, 2.14)	4.83 (3.95, 5.90)	4.77 (3.91, 5.82)	2.46 (2.12, 2.86)	2.43 (2.09, 2.83)

*. 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.