

Supplementary Materials

Long-term post-acute sequelae of COVID-19 infection: a multi-database cohort study in Hong Kong and the United Kingdom

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Supplementary Table 1. Full disease diagnosis codes for disease outcomes

Disease	ICD-9-CM	ICD-10	ICD-10-WHO
Myocardial infarction	410	I21.x, I22.x, I23.x, I24.1, I25.2	I21.x, I22.x, I23.x, I24.1, I25.2
Heart failure	428,398.91,402.01,402.11,402.91,404.01,404.03,404.11,404.13,404.91,404.93	I50.x	I50.x
Stroke	430-438	I60.x, I61.x, I63.x, I64.x	I60.x, I61.x, I63.x, I64.x
Atrial fibrillation	427.3	I48.x	I48.x
Coronary artery disease	410-414, 36.0, 36.1	I20.x - I25.x, I46.x	I20-I25, I46.x
Deep vein thrombosis	453	I80-I81, I82.Ax, I82.Bx, I82.Cx	I81, I82,
Interstitial lung disease	515, 516.3, 517.2, 517.8, 714.81, 135, 495	M05.1, J84, J81, J82	M05.1, J84, J81, J82
Acute respiratory distress syndrome	518.8x, 518.51-518.53	J96.0, J96.10, J96.2, J80, R06.3, J98.4, J95.1, J95.2, J95.3, J95.821, J95.822	J96.x, P28.5, J95.1-J95.3, J95.8, J80, R06.3
Chronic pulmonary disease transient	490-496	J40-J47	J40-J47
Chronic pulmonary disease	490-496	J40.x-J47.x, J60.x-J67.x, J68.4, J70.1, J70.3	J40.x-J47.x, J60.x-J67.x, J68.4, J70.1, J70.3
Seizure	333.2, 345, 649.4, 780.3, 779.0, 780.3	G40-G41	G40-G41
Bell's Palsy	351.0, 351.1, 351.8, 351.9	G51.1,G51.2,G51.4,G51.8,G51.9	G51.0, G51.x
Encephalitis and Encephalopathy	323.0-323.9, 348.30, 348.31, 348.39	G05.3, G04.9, G04.91, G93.41, I67.83	G04.x, G05.x, G93.49
Anxiety	300.0	F40-F41	F40-F41
Post-traumatic stress disorder	308.x-309.x	F43.0, R45.7, F43.20, F43.21, F432.4, F43.25	F43.1, F43.2
Psychotic disorder	298.8, 298.9	F23, F29	F23, F29
Liver injury	570, 573.3	K72.00, K76.2, K71.6, K75.9	K72.00, K76.2, K71.6, K75.9

Disease	ICD-9-CM	ICD-10	ICD-10-WHO
Pancreatitis	577.0, 577.1	K85.0x, K85.8x, K85.9x	K85.0x, K85.8x, K85.9x
Acute kidney injury	584.5-584.9	N17, N19	N17, N19
End stage renal disease	585.6, 586	I12.0, I13.x, N18.5, N18.6, Z99.2, N19.x, Z94.0, Z49.0	I12.0, I13.x, N18.5, Z99.2, N19.x, Z94.0, Z49.0
Cancer	140-149, 150-159, 180-189, 170-172, 174-176, 179, 160-165, 190-195, 200-208	C00.x – C42.x, C45.x-C76.x, C80.x-C96.x	C00.x – C42.x, C45.x-C76.x, C80.x-C96.x
Chronic Kidney Disease	582, 585, 586, 588, 583.0-583.2, 583.4, 583.6, 583.7	N18	N18
Respiratory disease	416.8, 416.9, 490-496, 500-505, 506.4, 508.1, 508.8	I27.20, I27.21, I27.22, I27.23, I27.24, I27.29, I27.89, I27.81, I27.9, J40.x, J42.x, J43.9, J45.x, J47.x, J67.9, J44.9, J60.x, J61.x, J62.8, J63.x, J66.x, J64.x, J68.4, J70.1, J70.8	I27.x, J40.x, J42.x, J43.x, J45.x, J47.x, J44.9, J60.x, J61.x, J62.8, J63.x, J66.x, J64.x, J68.4, J70.1, J70.8
Diabetes	250	E08-E13	E10-E13
Cardiovascular disease	398.91, 401-405, 410-412, 425.4, 425.5, 425.7-425.9, 427.3, 428, 433, 434, 436-438, 453.8	I09.81, I21.x, I22.x, I24.x, I25.2, I42.5, I42.8, I42.6, I43, I42.7, I48.x, I50.x, I65- I69	I09.8, I21.x, I22.x, I24.x, I25.2, I42.5, I42.8, I42.6, I43, I42.7, I48.x, I50.x, I65- I69
Dementia	290	F00.x-F03.x, G30.x	F00.x-F03.x, G30.x
Congestive heart failure	398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 428	I11.0, I13.0, I13.2, I25.5, I42.0, I42.5-I43.x, I50.x, P29.0	I50.x, I11.0, I13.0, I13.2, I25.5, I42.0, I42.5-I43.x, I50.x, P29.0
Peripheral vascular disease	441, 443.9, 785.4	I70.x, I71.x, I73.1, I73.8, I73.9, I77.1, I79.0, I79.1, I79.8, K55.1, K55.8, K55.9, Z95.8, Z95.9	I70.x, I71.x, I73.1, I73.8, I73.9, I77.1, I79.0, I79.1, I79.8, K55.1, K55.8, K55.9
Cerebrovascular disease	430-438	G45.x, G46.x, H34.0x, H34.1x, H34.2x, I60.x-I68.x	G45.x, G46.x, H34.0x, H34.1x, H34.2x, I60-68
Rheumatoid arthritis and other inflammatory polyarthropathies	710.0, 710.1, 710.4, 714.0, 714.1, 714.2, 714.81, 725	M05.x, M06.x, M31.5, M32.x-M34.x, M35.1, M35.3, M36.0	M05.x, M06.x, M31.5, M32.x-M34.x, M35.1, M35.3, M36.0
Chronic pulmonary disease	490-496, 500-505, 506.4	J40.x-J47.x, J60.x-J67.x, J68.4, J70.1, J70.3	
Hemiplegia or paraplegia	342, 344.1	G04.1, G11.4, G80.0, G80.1, G80.2, G81.x - G83.x	G04.1, G11.4, G80.0, G80.1, G80.2, G81.x - G83.x
Chronic renal failure	582, 585, 586, 588, 583.0-583.2, 583.4, 583.6, 583.7	N03.x, N18.1- N18.9, N19, N25, N05.9, N05.2, N05.5, N17.1, N17.2	N18.1- N18.9, N19, N25, N05.9, N05.2, N05.5, N17.1, N17.2

Disease	ICD-9-CM	ICD-10	ICD-10-WHO
Liver disease, mild	571.2, 571.4-571.6	B18.x, K70.0-K70.3, K70.9, K71.3, K71.4, K71.5, K71.7, K73.x, k74.x, K76.0, K76.2, K76.3, K76.4, K76.8, K76.9, Z94.4	B18.x, K70.0-K70.3, K70.9, K71.3, K71.4, K71.5, K71.7, K73.x, k74.x, K76.0, K76.2, K76.3, K76.4, K76.8, K76.9, Z94.4
Diabetes without chronic complications	250.0-250.3, 250.7	E08.0x, E08.1x, E08.6x, E08.8x, E08.9x, E09.0x, E09.1x, E09.6x, E09.8x, E09.9x, E10.0x, E10.1x, E10.6x, E10.8x, E10.9x, E11.0x, E11.1x, E11.6x, E11.8x, E11.9x, E13.0x, E13.1x, E13.6x, E13.8x, E13.9x, E08.2, E08.3, E08.4, E08.5, E09.2, E09.3, E09.4, E09.5, E10.2, E10.3, E10.4, E10.5, E11.2, E11.3, E11.4, E11.5, E13.2, E13.3, E13.4, E13.5	E10.0x, E10.1x, E10.6x, E10.8x, E10.9x, E11.0x, E11.1x, E11.6x, E11.8x, E11.9x, E13.0x, E13.1x, E13.6x, E13.8x, E13.9x, E10.2, E10.3, E10.4, E10.5, E11.2, E11.3, E11.4, E11.5, E13.2, E13.3, E13.4, E13.5
Diabetes with chronic complications	250.4-250.6		
Ulcers	531-534	k25.x-k28.x	k25.x-k28.x
Metastatic solid tumour	196-199	C77.x - C79.x, C80.0, C80.2	C77.x - C79.x, C80.0
Malignancy	140-149, 150-159, 180-189, 170-172, 174, 175, 176, 179, 160-165, 190-195, 200-208	C00.x – C42.x, C45.x-C76.x, C80.x-C96.x	C00.x – C42.x, C45.x-C76.x, C80.x-C96.xI85
Liver disease, moderate to severe	456.0-456.2, 572.2-572.4, 572.8	I85.0x, I86.4, K70.4x, K71.1x, K72.1x, K72.9x, K76.5, K76.6, K76.7	I85.0x, I86.4, K70.4x, K71.1x, K72.1x, K72.9x, K76.5, K76.6, K76.7

Note: ICD-9-CM: International Classification of Diseases, Ninth Revision, clinical modification, ICD-10: International Classification of Diseases, Tenth Revision, ICD-10-WHO : International Classification of Diseases, Tenth Revision of World Health Organisation

Supplementary Table 2. Procedure definition in Hong Kong Hospital Authority dataset (ICD-9) and United Kingdom Biobank (OPCS-4)

ICD-9^a	Procedure
39.65	Extracorporeal Membrane Oxygenation (Ecmo)
89.18	Other Sleep Disorder Function Tests
93.90	Non-Invasive Mechanical Ventilation
93.95	Hyperbaric Oxygenation
93.96	Other Oxygen Enrichment
96.7x	Other Continuous Invasive Mechanical Ventilation
96.04	Insertion of Endotracheal Tube
<hr/>	
OPCS-4^b	
E85.1	Invasive ventilation
E85.6	Continuous positive airway pressure
E85.2	Non-invasive ventilation
X52.9	Unspecified oxygen therapy
X52.8	Other specified oxygen therapy
E85.8	Other specified ventilation support
E85.9	Unspecified ventilation support
E87.8	Other specified oxygen therapy support
E87.9	Unspecified oxygen therapy support

^aICD-9: International Classification of Diseases, Ninth Revision

^bOPCS-4: Office of Population Censuses and Surveys Classification of Surgical Operations and Procedures (4th revision)

Supplementary Table 3. Baseline characteristics of patients with COVID-19 and controls from the Hong Kong Hospital Authority and the UK Biobank Database before propensity-score weighting

Baseline characteristics	Hong Kong Hospital Authority (April 1 st , 2020 to August 15 th , 2022)					United Kingdom Biobank (16 th March, 2020 and 31 st May, 2021)				
	Controls (N=3,315,628)		COVID-19 patients (N=535,186)		SMD	Controls (N=392,767)		COVID-19 patients (N=16,400)		SMD
	N / Mean	% / SD	N / Mean	% / SD		N / Mean	% / SD	N / Mean	% / SD	
Age, years ^a	54.3	(18.1)	53.6	(17.8)	0.035	68.2	(8.0)	65.0	(8.5)	0.387
Sex, male	1,441,182	(43.5)	253,872	(47.4)	0.080	175,185	(44.6)	7,613	(46.4)	0.037
Charlson Comorbidity Index ^a	1.7	(1.8)	1.7	(1.9)	0.002	3.7	(2.3)	3.6	(2.7)	0.025
Pre-existing morbidities										
Cardiovascular disease	249,364	(7.5)	45,914	(8.6)	0.039	54,334	(13.8)	2,851	(17.4)	0.098
Myocardial Infarction	22,230	(0.7)	5,122	(1.0)	0.032	16,765	(4.3)	928	(5.7)	0.064
Chronic heart failure	30,543	(0.9)	7,670	(1.4)	0.047	5,782	(1.5)	315	(1.9)	0.035
Peripheral vascular disease	8,459	(0.3)	1,729	(0.3)	0.013	13,432	(3.4)	748	(4.6)	0.058
Cerebrovascular disease	114,502	(3.5)	21,936	(4.1)	0.034	25,156	(6.4)	1,445	(8.8)	0.091
Respiratory disease	61,945	(1.9)	13,150	(2.5)	0.040	68,953	(17.6)	3,425	(20.9)	0.085
COPD	61,739	(1.9)	13,103	(2.4)	0.040	70,254	(17.9)	3,489	(21.3)	0.085
Paralysis	6,639	(0.2)	1,482	(0.3)	0.016	5,897	(1.5)	468	(2.9)	0.093
Diabetes	379,996	(11.5)	69,036	(12.9)	0.044	43,382	(11.0)	2,470	(15.1)	0.119
Chronic Kidney Disease	36,796	(1.1)	8,529	(1.6)	0.042	33,925	(8.6)	1,534	(9.4)	0.025
Mild liver disease	3,182	(0.1)	680	(0.1)	0.009	17,535	(4.5)	1,098	(6.7)	0.097
Moderate-severe liver disease	2,928	(0.1)	785	(0.1)	0.017	838	(0.2)	71	(0.4)	0.039
Ulcers	31,814	(1.0)	6,731	(1.3)	0.028	15,921	(4.1)	773	(4.7)	0.032
Rheumatoid arthritis and other inflammatory polyarthropathies	13,825	(0.4)	2,416	(0.5)	0.005	19,948	(5.1)	903	(5.5)	0.019
Malignancy	93,993	(2.8)	16,879	(3.2)	0.019	59,311	(15.1)	2,254	(13.7)	0.039
Metastatic solid tumor	14,085	(0.4)	3,116	(0.6)	0.022	8,295	(2.1)	423	(2.6)	0.031

Baseline characteristics	Hong Kong Hospital Authority (April 1 st , 2020 to August 15 th , 2022)				United Kingdom Biobank (16th March, 2020 and 31st May, 2021)					
	Controls (N=3,315,628)		COVID-19 patients (N=535,186)		SMD	Controls (N=392,767)		COVID-19 patients (N=16,400)		SMD
	N / Mean	% / SD	N / Mean	% / SD		N / Mean	% / SD	N / Mean	% / SD	
Doses of COVID-19 vaccines received					0.319					0.216
0	508,347	(15.3)	72,860	(13.6)		345,538	(88.0)	15,416	(94.0)	
1	245,576	(7.4)	58,787	(11.0)		42,160	(10.7)	824	(5.0)	
2	1,324,995	(40.0)	274,016	(51.2)		5,069	(1.3)	160	(1.0)	
3 or above	1,236,713	(37.3)	129,523	(24.2)		-	-	-	-	

Note: SMD: Standard mean difference; COPD: Chronic Obstructive Pulmonary Disease

^a Age, and Charlson Comorbidity Index are presented in mean ± SD

Supplementary Table 4. Incidence rate of clinical sequelae in COVID-19 and non-COVID-19 cohort after weighting

Clinical sequelae	Hong Kong Hospital Authority				UK Biobank			
	COVID-19		Non-COVID-19 (REF)		COVID-19		Non-COVID-19 (REF)	
	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)
Major CVD	8635	5.86 (5.74, 5.99)	7767	5.25 (5.13, 5.36)	4808	21.34 (20.74,21.95)	3926	15.48 (15.00,15.97)
Stroke	4505	2.93 (2.85, 3.02)	4376	2.84 (2.75, 2.92)	1429	5.36 (5.09,5.65)	1063	3.66 (3.44,3.88)
Myocardial infarction	1915	1.21 (1.16, 1.27)	1705	1.07 (1.02, 1.13)	2032	7.70 (7.36,8.04)	1186	4.14 (3.91,4.38)
Heart Failure	2926	1.86 (1.79, 1.93)	1616	1.02 (0.97, 1.07)	3241	12.33 (11.91,12.76)	1984	6.87 (6.57,7.18)
Atrial fibrillation	1676	1.07 (1.02, 1.12)	1237	0.79 (0.74, 0.83)	2586	10.29 (9.89,10.69)	2427	8.71 (8.37,9.07)
Coronary Artery Disease	3746	2.44 (2.36, 2.52)	3127	2.03 (1.96, 2.10)	3322	13.79 (13.32,14.26)	2460	9.28 (8.92,9.65)
Deep vein thrombosis	419	0.26 (0.24, 0.29)	285	0.18 (0.16, 0.20)	1378	5.21 (4.94,5.49)	738	2.57 (2.39,2.77)
Cardiovascular mortality	3520	2.21 (2.13, 2.28)	1870	1.17 (1.12, 1.22)	3632	12.95 (12.54,13.38)	887	2.96 (2.76,3.16)
Chronic pulmonary disease	1180	0.76 (0.71, 0.80)	750	0.48 (0.44, 0.51)	2257	10.13 (9.72,10.56)	1518	6.17 (5.86,6.48)
Acute respiratory distress syndrome	1858	1.17 (1.12, 1.23)	1212	0.76 (0.72, 0.81)	180	0.65 (0.55,0.75)	63	0.21 (0.16,0.27)
Interstitial lung disease	60	0.04 (0.03, 0.05)	9	0.01 (0.00, 0.01)	1846	7.04 (6.72,7.36)	600	2.11 (1.95,2.29)
Seizure	1132	0.71 (0.67, 0.76)	696	0.44 (0.41, 0.47)	886	3.24 (3.03,3.47)	277	0.94 (0.83,1.06)
Bell's Palsy	225	0.14 (0.12, 0.16)	231	0.14 (0.13, 0.16)	257	0.93 (0.82,1.05)	149	0.50 (0.42,0.59)
Encephalopathy and Encephalitis	66	0.04 (0.03, 0.05)	35	0.02 (0.02, 0.03)	37	0.13 (0.09,0.18)	6	0.02 (0.01,0.04)
Anxiety	203	0.13 (0.11, 0.15)	152	0.10 (0.08, 0.11)	3246	14.47 (13.98,14.98)	2058	8.22 (7.87,8.58)
Post-traumatic stress disorder	550	0.35 (0.32, 0.38)	392	0.25 (0.22, 0.27)	834	3.30 (3.08,3.53)	518	1.89 (1.73,2.06)
Psychotic disorder	43	0.03 (0.02, 0.04)	37	0.02 (0.02, 0.03)	131	0.47 (0.40,0.56)	184	0.62 (0.53,0.71)
End-stage renal disease	221	0.14 (0.12, 0.16)	131	0.08 (0.07, 0.10)	480	1.75 (1.60,1.92)	292	0.99 (0.88,1.11)
Acute kidney injury	1001	0.63 (0.59, 0.67)	531	0.33 (0.31, 0.36)	4387	16.99 (16.49,17.50)	2073	7.13 (6.83,7.45)
Pancreatitis	477	0.30 (0.27, 0.33)	354	0.22 (0.20, 0.25)	254	0.91 (0.80,1.03)	146	0.49 (0.41,0.58)
Liver injury	130	0.08 (0.07, 0.10)	47	0.03 (0.02, 0.04)	0	NA	22	0.07 (0.05,0.11)
All-cause mortality	43336	27.16 (26.91, 27.42)	14758	9.23 (9.08, 9.38)	15670	55.89 (55.02,56.77)	2812	9.37 (9.03,9.73)

Note: CI: confidence interval, REF: Reference group; Major CVD: Major Cardiovascular Disease; Major Cardiovascular Disease; Composite outcome of stroke, heart failure and coronary artery disease; NA: Not applicable due to insufficient number

Supplementary Table 5. Incidence rate and hazard ratio of clinical sequelae in COVID-19 and non-COVID-19 cohort after weighting (index date defined as 30 days after first infection date)

Clinical sequelae	Hong Kong Hospital Authority					UK Biobank				
	COVID-19		Non-COVID-19 (REF)			COVID-19		Non-COVID-19 (REF)		
	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)
Major CVD	7903	5.71 (5.58,5.83)	7398	5.31 (5.19,5.43)	1.08 (1.01,1.15)	4455	20.29 (19.70,20.90)	3814	15.57 (15.08,16.07)	1.32 (1.11,1.57)
Stroke	4162	2.88 (2.80,2.97)	4146	2.86 (2.77,2.95)	1.01 (0.92,1.11)	1254	4.83 (4.56,5.10)	1033	3.68 (3.46,3.91)	1.32 (0.96,1.83)
Myocardial infarction	1814	1.22 (1.16,1.28)	1615	1.08 (1.03,1.14)	1.13 (0.98,1.30)	1986	7.71 (7.38,8.06)	1152	4.16 (3.93,4.41)	1.88 (1.44,2.45)
Heart Failure	2592	1.75 (1.68,1.82)	1533	1.03 (0.98,1.08)	1.70 (1.51,1.92)	3051	11.91 (11.49,12.34)	1931	6.92 (6.62,7.24)	1.75 (1.41,2.16)
Atrial fibrillation	1515	1.03 (0.98,1.08)	1177	0.79 (0.75,0.84)	1.29 (1.11,1.51)	2409	9.83 (9.44,10.23)	2365	8.79 (8.44,9.15)	1.12 (0.89,1.43)
Coronary Artery Disease	3491	2.42 (2.34,2.50)	2996	2.07 (2.00,2.14)	1.17 (1.06,1.29)	3195	13.61 (13.14,14.09)	2390	9.33 (8.96,9.72)	1.47 (1.20,1.80)
Deep vein thrombosis	384	0.26 (0.23,0.28)	282	0.19 (0.17,0.21)	1.37 (1.01,1.85)	1077	4.17 (3.93,4.43)	679	2.45 (2.27,2.64)	1.72 (1.25,2.36)
Cardiovascular mortality	2914	1.94 (1.87,2.01)	1638	1.09 (1.04,1.14)	1.78 (1.59,1.99)	3033	11.10 (10.70,11.50)	862	2.97 (2.78,3.18)	3.75 (3.05,4.60)
Chronic pulmonary disease	1049	0.71 (0.67,0.76)	721	0.49 (0.45,0.53)	1.47 (1.22,1.76)	1995	9.19 (8.79,9.60)	1484	6.24 (5.93,6.57)	1.48 (1.15,1.91)
Acute respiratory distress syndrome	1742	1.17 (1.12,1.23)	1150	0.77 (0.72,0.81)	1.52 (1.32,1.76)	1004	3.73 (3.50,3.96)	466	1.62 (1.48,1.77)	2.33 (1.61,3.36)
Interstitial lung disease	42	0.03 (0.02,0.04)	9	0.01 (0.00,0.01)	4.53 (1.56,13.20)	1622	6.34 (6.04,6.66)	581	2.12 (1.95,2.30)	3.11 (2.33,4.15)
Seizure	1051	0.71 (0.66,0.75)	667	0.45 (0.41,0.48)	1.58 (1.32,1.90)	906	3.40 (3.18,3.63)	268	0.94 (0.83,1.06)	3.57 (2.44,5.24)
Bell's Palsy	219	0.15 (0.13,0.17)	222	0.15 (0.13,0.17)	0.99 (0.66,1.49)	110	0.40 (0.33,0.49)	15	0.05 (0.03,0.09)	7.64 (1.47,39.68)
Encephalopathy and Encephalitis	53	0.04 (0.03,0.05)	31	0.02 (0.01,0.03)	1.72 (0.71,4.16)	38	0.14 (0.10,0.19)	6	0.02 (0.01,0.05)	8.97 (1.01,79.87)
Anxiety	198	0.13 (0.11,0.15)	148	0.10 (0.08,0.12)	1.33 (0.87,2.06)	3149	14.40 (13.90,14.91)	1996	8.25 (7.89,8.62)	1.76 (1.43,2.15)
Post-traumatic stress disorder	467	0.31 (0.29,0.34)	379	0.25 (0.23,0.28)	1.24 (0.94,1.63)	1185	4.78 (4.52,5.06)	611	2.28 (2.11,2.47)	2.10 (1.57,2.81)
Psychotic disorder	37	0.02 (0.02,0.03)	35	0.02 (0.02,0.03)	1.04 (0.35,3.11)	133	0.49 (0.41,0.58)	180	0.63 (0.54,0.72)	0.78 (0.32,1.93)
End-stage renal disease	193	0.13 (0.11,0.15)	123	0.08 (0.07,0.10)	1.58 (1.04,2.40)	478	1.79 (1.63,1.96)	284	1.00 (0.88,1.12)	1.90 (1.19,3.04)
Acute kidney injury	872	0.58 (0.55,0.63)	509	0.34 (0.31,0.37)	1.72 (1.40,2.12)	4568	19.50 (18.94,20.08)	3304	12.75 (12.32,13.19)	1.56 (1.31,1.86)
Pancreatitis	406	0.27 (0.25,0.30)	337	0.22 (0.20,0.25)	1.21 (0.90,1.62)	256	0.94 (0.83,1.07)	140	0.49 (0.41,0.57)	2.00 (1.03,3.89)
Liver injury	125	0.08 (0.07,0.10)	44	0.03 (0.02,0.04)	2.83 (1.58,5.08)	0	NA	27	0.09 (0.06,0.14)	NA
All-cause mortality	34757	23.17 (22.93,23.41)	13680	9.10 (8.94,9.25)	2.55 (2.46,2.64)	12195	44.61 (43.83,45.41)	2711	9.35 (9.00,9.71)	4.76 (4.28,5.30)

Note: CI: confidence interval, REF: Reference group; Major CVD: Major Cardiovascular Disease; Composite outcome of stroke, heart failure and coronary artery disease; NA: Not applicable due to insufficient number
^a Hazard Ratio (HR) was estimated by Cox proportional regression, HR >1 (or <1) indicates patients with COVID-19 had higher (lower) risk of clinical sequelae compared to the non-COVID-19 control cohort.

Supplementary Table 6. Incidence rate and hazard ratio of clinical sequelae in COVID-19 and non-COVID-19 cohort after weighting (index date defined as 3 months after first infection date)

Clinical sequelae	Hong Kong Hospital Authority					UK Biobank				
	COVID-19		Non-COVID-19 (REF)			COVID-19		Non-COVID-19 (REF)		
	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)
Major CVD	4180	5.16 (5.00,5.31)	4180	5.16 (5.00,5.31)	0.98 (0.88,1.09)	4808	21.34 (20.74,21.95)	3926	15.48 (15.00,15.97)	1.39 (1.17,1.65)
Stroke	2252	2.66 (2.56,2.78)	2252	2.66 (2.56,2.78)	0.93 (0.81,1.08)	1429	5.36 (5.09,5.65)	1063	3.66 (3.44,3.88)	1.47 (1.09,1.99)
Myocardial infarction	882	1.01 (0.95,1.08)	882	1.01 (0.95,1.08)	1.01 (0.81,1.27)	2032	7.70 (7.36,8.04)	1186	4.14 (3.91,4.38)	1.88 (1.45,2.45)
Heart Failure	1129	1.30 (1.23,1.38)	1129	1.30 (1.23,1.38)	1.40 (1.14,1.72)	3241	12.33 (11.91,12.76)	1984	6.87 (6.57,7.18)	1.82 (1.48,2.24)
Atrial fibrillation	780	0.90 (0.84,0.97)	780	0.90 (0.84,0.97)	1.12 (0.88,1.42)	2586	10.29 (9.89,10.69)	2427	8.71 (8.37,9.07)	1.19 (0.94,1.50)
Coronary Artery Disease	1846	2.18 (2.09,2.29)	1846	2.18 (2.09,2.29)	1.04 (0.89,1.22)	3322	13.79 (13.32,14.26)	2460	9.28 (8.92,9.65)	1.50 (1.23,1.82)
Deep vein thrombosis	158	0.18 (0.15,0.21)	158	0.18 (0.15,0.21)	0.89 (0.53,1.51)	1378	5.21 (4.94,5.49)	738	2.57 (2.39,2.77)	2.03 (1.53,2.71)
Cardiovascular mortality	714	0.81 (0.75,0.87)	714	0.81 (0.75,0.87)	1.41 (1.09,1.83)	3632	12.95 (12.54,13.38)	887	2.96 (2.76,3.16)	4.37 (3.62,5.27)
Chronic pulmonary disease	541	0.63 (0.58,0.69)	541	0.63 (0.58,0.69)	1.30 (0.97,1.74)	2257	10.13 (9.72,10.56)	1518	6.17 (5.86,6.48)	1.65 (1.30,2.10)
Acute respiratory distress syndrome	908	1.04 (0.98,1.11)	908	1.04 (0.98,1.11)	1.36 (1.09,1.71)	180	0.65 (0.55,0.75)	63	0.21 (0.16,0.27)	2.97 (1.33,6.64)
Interstitial lung disease	16	0.02 (0.01,0.03)	16	0.02 (0.01,0.03)	7.42 (1.14,48.43)	1846	7.04 (6.72,7.36)	600	2.11 (1.95,2.29)	3.43 (2.61,4.50)
Seizure	626	0.72 (0.66,0.78)	626	0.72 (0.66,0.78)	1.59 (1.21,2.09)	886	3.24 (3.03,3.47)	277	0.94 (0.83,1.06)	3.43 (2.33,5.03)
Bell's Palsy	165	0.19 (0.16,0.22)	165	0.19 (0.16,0.22)	1.24 (0.71,2.18)	257	0.93 (0.82,1.05)	149	0.50 (0.42,0.59)	1.82 (0.91,3.63)
Encephalopathy and Encephalitis	25	0.03 (0.02,0.04)	25	0.03 (0.02,0.04)	1.38 (0.29,6.50)	37	0.13 (0.09,0.18)	6	0.02 (0.01,0.04)	8.78 (0.98,78.26)
Anxiety	97	0.11 (0.09,0.14)	97	0.11 (0.09,0.14)	1.34 (0.69,2.59)	3246	14.47 (13.98,14.98)	2058	8.22 (7.87,8.58)	1.77 (1.46,2.15)
Post-traumatic stress disorder	248	0.28 (0.25,0.32)	248	0.28 (0.25,0.32)	1.12 (0.73,1.71)	834	3.30 (3.08,3.53)	518	1.89 (1.73,2.06)	1.76 (1.23,2.52)
Psychotic disorder	17	0.02 (0.01,0.03)	17	0.02 (0.01,0.03)	1.52 (0.24,9.74)	131	0.47 (0.40,0.56)	184	0.62 (0.53,0.71)	0.76 (0.31,1.88)
End-stage renal disease	76	0.09 (0.07,0.11)	76	0.09 (0.07,0.11)	1.23 (0.60,2.50)	480	1.75 (1.60,1.92)	292	0.99 (0.88,1.11)	1.87 (1.17,2.99)
Acute kidney injury	359	0.41 (0.37,0.46)	359	0.41 (0.37,0.46)	1.08 (0.76,1.54)	4387	16.99 (16.49,17.50)	2073	7.13 (6.83,7.45)	2.41 (2.02,2.88)
Pancreatitis	243	0.28 (0.24,0.31)	243	0.28 (0.24,0.31)	1.29 (0.82,2.03)	254	0.91 (0.80,1.03)	146	0.49 (0.41,0.58)	1.93 (0.99,3.75)
Liver injury	75	0.09 (0.07,0.11)	75	0.09 (0.07,0.11)	2.64 (1.19,5.88)	0	NA	22	0.07 (0.05,0.11)	NA
All-cause mortality	14559	16.57 (16.30,16.84)	14559	16.57 (16.30,16.84)	1.87 (1.77,1.99)	15670	55.89 (55.02,56.77)	2812	9.37 (9.03,9.73)	5.90 (5.36,6.49)

Note: CI: confidence interval, REF: Reference group; Major CVD: Composite outcome of stroke, heart failure and coronary artery disease; NA: Not applicable due to insufficient number

^a Hazard Ratio (HR) was estimated by Cox proportional regression, HR >1 (or <1) indicates patients with COVID-19 had higher (lower) risk of clinical sequelae compared to the non-COVID-19 control cohort.

Supplementary Table 7. Hazard ratio of clinical sequelae in COVID-19 and non-COVID-19 cohort after weighting (Adjusted for all-cause mortality as a competing risk)

Clinical sequelae	Hazard Ratio ^a (95% CI)	
	Hong Kong Hospital Authority	UK Biobank
Major CVD	1.12 (1.05,1.19)	1.37 (1.16,1.62)
Stroke	1.03 (0.95,1.12)	1.44 (1.06,1.95)
Myocardial infarction	1.12 (0.98,1.29)	1.84 (1.42,2.39)
Heart Failure	1.81 (1.62,2.03)	1.78 (1.44,2.19)
Atrial fibrillation	1.36 (1.17,1.57)	1.16 (0.92,1.47)
Coronary Artery Disease	1.20 (1.09,1.32)	1.47 (1.21,1.79)
Deep vein thrombosis	1.47 (1.10,1.96)	1.99 (1.49,2.65)
Cardiovascular mortality	1.88 (1.69,2.08)	4.29 (3.55,5.18)
Chronic pulmonary disease	1.58 (1.33,1.87)	1.61 (1.27,2.05)
Acute respiratory distress syndrome	1.54 (1.34,1.76)	2.92 (1.31,6.54)
Interstitial lung disease	6.44 (2.40,17.30)	3.34 (2.54,4.38)
Seizure	1.63 (1.36,1.94)	3.34 (2.28,4.91)
Bell's Palsy	0.97 (0.65,1.44)	1.77 (0.89,3.54)
Encephalopathy and Encephalitis	1.86 (0.87,4.01)	8.19 (0.93,72.44)
Anxiety	1.33 (0.87,2.04)	1.73 (1.42,2.09)
Post-traumatic stress disorder	1.40 (1.09,1.80)	1.71 (1.20,2.45)
Psychotic disorder	1.19 (0.45,3.15)	0.74 (0.30,1.83)
End-stage renal disease	1.68 (1.14,2.49)	1.81 (1.14,2.89)
Acute kidney injury	1.89 (1.56,2.29)	2.37 (1.99,2.83)
Pancreatitis	1.35 (1.03,1.76)	1.87 (0.96,3.63)
Liver injury	2.77 (1.58,4.88)	NA

Note: CI: confidence interval, Major CVD: Major Cardiovascular Disease; Composite outcome of stroke, heart failure and coronary artery disease; NA: Not applicable due to insufficient number

^a Hazard Ratio (HR) was estimated by Cox proportional regression, HR >1 (or <1) indicates patients with COVID-19 had higher (lower) risk of clinical sequelae compared to the non-COVID-19 control cohort.

Supplementary Table 8. Incidence rate and hazard ratio of clinical sequelae in COVID-19 and non-COVID-19 cohort after weighting (Excluding patients multiple records of COVID-19 infection at least 30 days apart)

Hong Kong Hospital Authority						
Clinical sequelae	COVID-19		Non-COVID-19 (REF)		Hazard Ratio ^a (95% CI)	
	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)		
Major CVD	8108	5.55 (5.43,5.67)	7612	5.19 (5.07,5.31)	1.07 (1.00,1.14)	
Stroke	4262	2.80 (2.72,2.89)	4272	2.80 (2.72,2.88)	1.00 (0.92,1.09)	
Myocardial infarction	1760	1.12 (1.07,1.18)	1675	1.07 (1.02,1.12)	1.06 (0.92,1.21)	
Heart Failure	2596	1.66 (1.60,1.73)	1566	1.00 (0.95,1.05)	1.67 (1.48,1.88)	
Atrial fibrillation	1600	1.03 (0.98,1.08)	1214	0.78 (0.74,0.82)	1.32 (1.14,1.54)	
Coronary Artery Disease	3535	2.32 (2.25,2.40)	3080	2.02 (1.95,2.09)	1.15 (1.04,1.27)	
Deep vein thrombosis	363	0.23 (0.21,0.25)	280	0.18 (0.16,0.20)	1.30 (0.96,1.77)	
Cardiovascular mortality	3139	1.99 (1.92,2.06)	1797	1.14 (1.08,1.19)	1.75 (1.56,1.95)	
Chronic pulmonary disease	1021	0.66 (0.62,0.70)	741	0.48 (0.44,0.51)	1.39 (1.16,1.67)	
Acute respiratory distress syndrome	1708	1.09 (1.04,1.14)	1187	0.75 (0.71,0.80)	1.45 (1.25,1.67)	
Interstitial lung disease	52	0.03 (0.02,0.04)	9	0.01 (0.00,0.01)	5.61 (2.02,15.62)	
Seizure	1061	0.68 (0.64,0.72)	682	0.43 (0.40,0.47)	1.56 (1.30,1.87)	
Bell's Palsy	209	0.13 (0.12,0.15)	226	0.14 (0.13,0.16)	0.93 (0.61,1.40)	
Encephalopathy and Encephalitis	66	0.04 (0.03,0.05)	35	0.02 (0.02,0.03)	1.88 (0.88,4.04)	
Anxiety	197	0.13 (0.11,0.14)	150	0.10 (0.08,0.11)	1.31 (0.85,2.03)	
Post-traumatic stress disorder	528	0.34 (0.31,0.37)	385	0.25 (0.22,0.27)	1.37 (1.06,1.78)	
Psychotic disorder	43	0.03 (0.02,0.04)	37	0.02 (0.02,0.03)	1.19 (0.45,3.16)	
End-stage renal disease	205	0.13 (0.11,0.15)	129	0.08 (0.07,0.10)	1.60 (1.06,2.40)	
Acute kidney injury	886	0.56 (0.53,0.60)	511	0.32 (0.30,0.35)	1.74 (1.42,2.14)	
Pancreatitis	435	0.28 (0.25,0.30)	351	0.22 (0.20,0.25)	1.24 (0.94,1.65)	
Liver injury	123	0.08 (0.06,0.09)	47	0.03 (0.02,0.04)	2.64 (1.48,4.70)	
All-cause mortality	37448	23.69 (23.45,23.93)	14242	9.00 (8.86,9.15)	2.64 (2.55,2.72)	

Note: CI: confidence interval, REF: Reference group; Major CVD: Major Cardiovascular Disease; Composite outcome of stroke, heart failure and coronary artery disease

^a Hazard Ratio (HR) was estimated by Cox proportional regression, HR >1 (or <1) indicates patients with COVID-19 had higher (lower) risk of clinical sequelae compared to the non-COVID-19 control cohort.

Supplementary Table 9. Incidence rate of clinical sequelae in COVID-19 and non-COVID-19 cohort after weighting and adjusting for characteristics with a standard mean difference greater than 0.1 after IPTW as covariates in the subsequent regression model

UK Biobank					
Clinical sequelae	COVID-19		Non-COVID-19 (REF)		Hazard Ratio ^a (95% CI)
	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	
Major CVD	4808	21.34 (20.74,21.95)	3926	15.48 (15.00,15.97)	1.33 (1.12,1.58)
Stroke	1429	5.36 (5.09,5.65)	1063	3.66 (3.44,3.88)	1.36 (1.01,1.84)
Myocardial infarction	2032	7.70 (7.36,8.04)	1186	4.14 (3.91,4.38)	1.73 (1.33,2.26)
Heart Failure	3241	12.33 (11.91,12.76)	1984	6.87 (6.57,7.18)	1.65 (1.34,2.04)
Atrial fibrillation	2586	10.29 (9.89,10.69)	2427	8.71 (8.37,9.07)	1.11 (0.88,1.41)
Coronary Artery Disease	3322	13.79 (13.32,14.26)	2460	9.28 (8.92,9.65)	1.40 (1.15,1.71)
Deep vein thrombosis	1378	5.21 (4.94,5.49)	738	2.57 (2.39,2.77)	1.97 (1.48,2.63)
Cardiovascular mortality	3632	12.95 (12.54,13.38)	887	2.96 (2.76,3.16)	3.47 (2.87,4.19)
Chronic pulmonary disease	2257	10.13 (9.72,10.56)	1518	6.17 (5.86,6.48)	1.58 (1.24,2.00)
Acute respiratory distress syndrome	180	0.65 (0.55,0.75)	63	0.21 (0.16,0.27)	2.88 (1.28,6.48)
Interstitial lung disease	1846	7.04 (6.72,7.36)	600	2.11 (1.95,2.29)	3.08 (2.35,4.05)
Seizure	886	3.24 (3.03,3.47)	277	0.94 (0.83,1.06)	3.25 (2.21,4.79)
Bell's Palsy	257	0.93 (0.82,1.05)	149	0.50 (0.42,0.59)	1.69 (0.84,3.39)
Encephalopathy and Encephalitis	37	0.13 (0.09,0.18)	6	0.02 (0.01,0.04)	9.70 (0.97,97.37)
Anxiety	3246	14.47 (13.98,14.98)	2058	8.22 (7.87,8.58)	1.72 (1.41,2.08)
Post-traumatic stress disorder	834	3.30 (3.08,3.53)	518	1.89 (1.73,2.06)	1.84 (1.28,2.65)
Psychotic disorder	131	0.47 (0.40,0.56)	184	0.62 (0.53,0.71)	0.72 (0.30,1.75)
End-stage renal disease	480	1.75 (1.60,1.92)	292	0.99 (0.88,1.11)	1.54 (0.99,2.39)
Acute kidney injury	4387	16.99 (16.49,17.50)	2073	7.13 (6.83,7.45)	2.19 (1.84,2.61)
Pancreatitis	254	0.91 (0.80,1.03)	146	0.49 (0.41,0.58)	1.91 (0.96,3.79)
Liver injury	0	A	22	0.07 (0.05,0.11)	NA
All-cause mortality	15670	55.89 (55.02,56.77)	2812	9.37 (9.03,9.73)	5.17 (4.69,5.70)

Note: The cox regression adjusted by cardiovascular disease and cerebrovascular disease; CI: confidence interval, REF: Reference group; Major CVD: Major Cardiovascular Disease; Composite outcome of stroke, heart failure and coronary artery disease; NA: Not applicable due to insufficient number

a Hazard Ratio (HR) was estimated by Cox proportional regression, HR >1 (or <1) indicates patients with COVID-19 had higher (lower) risk of clinical sequelae compared to the non-COVID-19 control cohort.

Supplementary Table 10a. Incidence rate and hazard ratio of clinical sequelae in COVID-19 and non-COVID-19 cohort after weighting (with severe COVID-19 infection)

Clinical sequelae	Hong Kong Hospital Authority					UK Biobank				
	COVID-19		Non-COVID-19 (REF)			COVID-19		Non-COVID-19 (REF)		
	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)
Major CVD	150	24.00 (20.31,28.16)	94	10.97 (8.87,13.43)	2.21 (1.09,4.47)	249	50.77 (44.66,57.49)	106	14.78 (12.10,17.88)	3.32 (1.64,6.75)
Stroke	26	3.63 (2.37,5.32)	46	4.88 (3.57,6.50)	0.76 (0.26,2.18)	58	8.81 (6.69,11.38)	34	4.03 (2.79,5.64)	2.05 (0.61,6.89)
Myocardial infarction	24	3.18 (2.03,4.72)	21	2.07 (1.28,3.17)	1.57 (0.20,12.22)	86	13.18 (10.55,16.28)	34	4.13 (2.86,5.77)	3.11 (1.27,7.64)
Heart Failure	49	6.53 (4.83,8.63)	36	3.60 (2.52,4.98)	1.78 (0.78,4.04)	167	26.92 (22.99,31.32)	63	7.53 (5.78,9.63)	3.47 (1.38,8.75)
Atrial fibrillation	9	1.23 (0.56,2.33)	17	1.73 (1.01,2.77)	0.71 (0.09,5.38)	85	15.18 (12.13,18.77)	78	9.72 (7.69,12.14)	1.53 (0.60,3.96)
Coronary Artery Disease	112	16.03 (13.20,19.29)	31	3.28 (2.23,4.66)	4.85 (1.93,12.20)	193	34.83 (30.09,40.11)	68	9.05 (7.02,11.47)	3.79 (1.64,8.79)
Deep vein thrombosis	4	0.52 (0.14,1.32)	1	0.10 (0.00,0.54)	4.19 (0.26,67.47)	96	14.89 (12.06,18.18)	20	2.38 (1.46,3.68)	6.31 (1.98,20.12)
Cardiovascular mortality	191	24.45 (21.11,28.18)	38	3.69 (2.61,5.07)	5.93 (3.07,11.45)	193	27.57 (23.82,31.74)	35	4.01 (2.79,5.57)	6.36 (3.06,13.21)
Chronic pulmonary disease	25	3.35 (2.17,4.95)	9	0.91 (0.42,1.73)	3.42 (0.88,13.29)	0	NA	34	4.77 (3.31,6.67)	NA
Acute respiratory distress syndrome	36	6.87 (4.81,9.51)	14	1.38 (0.75,2.31)	4.62 (1.74,12.29)	78	12.52 (9.90,15.63)	15	1.73 (0.97,2.86)	6.86 (2.33,20.15)
Interstitial lung disease	6	0.77 (0.28,1.68)	0	0.00 (0.00,0.36)	333,453,300.26 (46,960,216.97,2,367,772,353.49)	296	47.89 (42.59,53.67)	16	1.93 (1.11,3.14)	24.72 (10.94,55.84)
Seizure	13	1.70 (0.90,2.90)	10	0.98 (0.47,1.80)	1.74 (0.31,9.73)	80	11.78 (9.34,14.66)	10	1.17 (0.56,2.15)	9.44 (1.76,50.58)
Bell's Palsy	0	NA	1	NA	NA	0	NA	0	NA	NA
Encephalopathy and Encephalitis	0	NA	0	NA	NA	0	NA	0	NA	NA
Anxiety	0	NA	1	0.10 (0.00,0.55)	NA	238	43.12 (37.82,48.96)	70	9.51 (7.42,12.02)	4.39 (2.21,8.72)
Post-traumatic stress disorder	8	1.04 (0.45,2.05)	2	0.20 (0.02,0.71)	3.92 (0.39,39.41)	19	3.07 (1.85,4.79)	17	2.10 (1.22,3.36)	1.46 (0.20,10.90)
Psychotic disorder	0	NA	0	NA	NA	0	NA	3	0.35 (0.07,1.01)	NA
End-stage renal disease	0	NA	1	0.10 (0.00,0.54)	NA	37	5.43 (3.82,7.48)	6	0.70 (0.26,1.52)	7.36 (1.76,30.74)
Acute kidney injury	32	4.50 (3.08,6.35)	10	0.98 (0.47,1.80)	4.52 (1.31,15.59)	350	78.30 (70.31,86.95)	119	15.34 (12.71,18.36)	4.97 (2.67,9.24)
Pancreatitis	0	NA	7	0.68 (0.27,1.41)	NA	56	8.11 (6.13,10.53)	8	0.92 (0.40,1.82)	9.16 (1.88,44.56)
Liver injury	0	NA	0	NA	NA	0	NA	0	NA	NA
All-cause mortality	2572	329.28 (316.68,342.26)	325	31.60 (28.25,35.23)	9.54 (7.77,11.71)	1423	203.26 (192.83,214.10)	100	11.45 (9.31,13.92)	16.63 (11.76,23.51)

Note: CI: confidence interval, REF: Reference group; Major CVD: Major Cardiovascular Disease; Composite outcome of stroke, heart failure and coronary artery disease; NA: Not applicable due to insufficient number
^a Hazard Ratio (HR) was estimated by Cox proportional regression, HR >1 (or <1) indicates patients with COVID-19 had higher (lower) risk of clinical sequelae compared to the non-COVID-19 control cohort.

Supplementary Table 10b. Incidence rate and hazard ratio of clinical sequelae in COVID-19 and non-COVID-19 cohort after weighting (with non-severe COVID-19 infection)

Clinical sequelae	Hong Kong Hospital Authority					UK Biobank				
	COVID-19		Non-COVID-19 (REF)			COVID-19		Non-COVID-19 (REF)		
	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)
Major CVD	8500	5.80 (5.68,5.92)	7673	5.21 (5.10,5.33)	1.11 (1.05,1.19)	4159	19.90 (19.30,20.51)	3407	14.80 (14.31,15.30)	1.35 (1.14,1.61)
Stroke	4465	2.92 (2.84,3.01)	4330	2.83 (2.74,2.91)	1.04 (0.95,1.13)	1224	5.00 (4.72,5.29)	918	3.50 (3.28,3.74)	1.43 (1.05,1.95)
Myocardial infarction	1907	1.21 (1.16,1.27)	1684	1.07 (1.02,1.12)	1.14 (0.99,1.30)	1748	7.20 (6.87,7.54)	1035	4.00 (3.76,4.25)	1.82 (1.38,2.38)
Heart Failure	2865	1.83 (1.76,1.90)	1580	1.00 (0.96,1.05)	1.82 (1.63,2.04)	2799	11.57 (11.15,12.01)	1688	6.48 (6.18,6.80)	1.80 (1.45,2.23)
Atrial fibrillation	1665	1.07 (1.02,1.12)	1219	0.78 (0.74,0.82)	1.37 (1.19,1.59)	2249	9.68 (9.29,10.09)	2065	8.20 (7.85,8.56)	1.18 (0.93,1.50)
Coronary Artery Disease	3664	2.40 (2.32,2.48)	3095	2.02 (1.95,2.09)	1.19 (1.08,1.31)	2857	12.83 (12.37,13.31)	2143	8.92 (8.55,9.31)	1.45 (1.18,1.77)
Deep vein thrombosis	414	0.26 (0.24,0.29)	283	0.18 (0.16,0.20)	1.47 (1.10,1.96)	1060	4.36 (4.10,4.63)	609	2.36 (2.17,2.55)	1.85 (1.35,2.51)
Cardiovascular mortality	3375	2.13 (2.06,2.20)	1833	1.15 (1.10,1.21)	1.84 (1.66,2.05)	3036	11.81 (11.39,12.24)	725	2.68 (2.49,2.89)	4.39 (3.61,5.34)
Chronic pulmonary disease	1155	0.74 (0.70,0.79)	741	0.48 (0.44,0.51)	1.57 (1.32,1.87)	2091	10.18 (9.75,10.62)	1348	6.07 (5.75,6.41)	1.68 (1.33,2.13)
Acute respiratory distress syndrome	1807	1.15 (1.09,1.20)	1198	0.76 (0.72,0.80)	1.52 (1.32,1.74)	845	3.32 (3.10,3.56)	409	1.53 (1.38,1.68)	2.19 (1.50,3.20)
Interstitial lung disease	53	0.03 (0.03,0.04)	9	0.01 (0.00,0.01)	5.66 (2.03,15.76)	1418	5.88 (5.58,6.20)	524	2.05 (1.88,2.23)	2.91 (2.17,3.90)
Seizure	1112	0.71 (0.66,0.75)	690	0.44 (0.40,0.47)	1.62 (1.35,1.93)	758	3.03 (2.81,3.25)	237	0.90 (0.78,1.02)	3.37 (2.27,5.01)
Bell's Palsy	224	0.14 (0.12,0.16)	230	0.15 (0.13,0.17)	0.98 (0.66,1.46)	105	0.41 (0.33,0.49)	15	0.06 (0.03,0.09)	7.29 (1.39,38.41)
Encephalopathy and Encephalitis	66	0.04 (0.03,0.05)	35	0.02 (0.02,0.03)	1.87 (0.87,4.02)	32	0.12 (0.09,0.18)	5	0.02 (0.01,0.04)	7.29 (0.83,64.32)
Anxiety	203	0.13 (0.11,0.15)	151	0.10 (0.08,0.11)	1.35 (0.88,2.06)	2824	13.73 (13.23,14.25)	1858	8.26 (7.89,8.64)	1.67 (1.37,2.04)
Post-traumatic stress disorder	541	0.34 (0.32,0.37)	390	0.25 (0.22,0.27)	1.39 (1.08,1.80)	1249	5.37 (5.07,5.67)	603	2.42 (2.23,2.62)	2.22 (1.68,2.92)
Psychotic disorder	43	0.03 (0.02,0.04)	37	0.02 (0.02,0.03)	1.19 (0.45,3.16)	122	0.48 (0.40,0.57)	161	0.60 (0.51,0.70)	0.80 (0.32,1.96)
End-stage renal disease	222	0.14 (0.12,0.16)	130	0.08 (0.07,0.10)	1.71 (1.15,2.53)	390	1.55 (1.40,1.71)	255	0.96 (0.85,1.08)	1.67 (1.02,2.72)
Acute kidney injury	972	0.62 (0.58,0.66)	521	0.33 (0.30,0.36)	1.88 (1.54,2.28)	3982	17.87 (17.32,18.43)	2904	11.96 (11.53,12.40)	1.51 (1.27,1.81)
Pancreatitis	477	0.30 (0.27,0.33)	348	0.22 (0.20,0.24)	1.38 (1.05,1.81)	192	0.75 (0.65,0.87)	128	0.48 (0.40,0.57)	1.59 (0.77,3.29)
Liver injury	130	0.08 (0.07,0.10)	47	0.03 (0.02,0.04)	2.78 (1.58,4.90)	0	NA	24	0.09 (0.06,0.13)	NA
All-cause mortality	41173	25.95 (25.70,26.20)	14475	9.11 (8.96,9.26)	2.85 (2.76,2.94)	12596	49.00 (48.15,49.86)	2354	8.72 (8.37,9.08)	5.58 (5.04,6.18)

Note: CI: confidence interval, REF: Reference group; Major CVD: Major Cardiovascular Disease; Composite outcome of stroke, heart failure and coronary artery disease; NA: Not applicable due to insufficient number
^a Hazard Ratio (HR) was estimated by Cox proportional regression, HR >1 (or <1) indicates patients with COVID-19 had higher (lower) risk of clinical sequelae compared to the non-COVID-19 control cohort.

Supplementary Table 11a. Incidence rate and hazard ratio of clinical sequelae in COVID-19 and non-COVID-19 cohort after weighting (Age <40)

Hong Kong Hospital Authority						
Clinical sequelae	COVID-19			Non-COVID-19 (REF)		
	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)	
Major CVD	8791	8.50 (8.32,8.68)	7642	7.28 (7.11,7.44)	1.17 (1.09,1.24)	
Stroke	4525	4.12 (4.01,4.25)	4294	3.87 (3.75,3.98)	1.07 (0.98,1.16)	
Myocardial infarction	1943	1.70 (1.62,1.78)	1664	1.44 (1.37,1.51)	1.18 (1.03,1.35)	
Heart Failure	3084	2.71 (2.62,2.81)	1610	1.40 (1.33,1.47)	1.94 (1.73,2.17)	
Atrial fibrillation	1726	1.53 (1.46,1.60)	1237	1.08 (1.02,1.14)	1.41 (1.22,1.64)	
Coronary Artery Disease	3746	3.42 (3.31,3.53)	3095	2.79 (2.69,2.89)	1.22 (1.11,1.35)	
Deep vein thrombosis	395	0.34 (0.31,0.38)	283	0.24 (0.22,0.27)	1.41 (1.05,1.90)	
Cardiovascular mortality	3616	3.13 (3.03,3.23)	1795	1.54 (1.47,1.61)	2.03 (1.82,2.25)	
Chronic pulmonary disease	1099	0.98 (0.92,1.04)	663	0.58 (0.54,0.63)	1.68 (1.40,2.02)	
Acute respiratory distress syndrome	1818	1.59 (1.52,1.66)	1178	1.02 (0.96,1.08)	1.56 (1.36,1.80)	
Interstitial lung disease	61	0.05 (0.04,0.07)	10	0.01 (0.00,0.02)	6.51 (2.41,17.59)	
Seizure	912	0.79 (0.74,0.85)	520	0.18 (0.15,0.20)	1.77 (1.45,2.16)	
Bell's Palsy	218	0.19 (0.16,0.22)	204	0.03 (0.02,0.04)	1.09 (0.72,1.63)	
Encephalopathy and Encephalitis	58	0.05 (0.04,0.06)	26	0.02 (0.01,0.03)	2.27 (0.98,5.24)	
Anxiety	173	0.15 (0.13,0.17)	116	0.10 (0.08,0.12)	1.50 (0.95,2.37)	
Post-traumatic stress disorder	382	0.33 (0.30,0.37)	218	0.19 (0.16,0.21)	1.77 (1.30,2.42)	
Psychotic disorder	26	0.02 (0.01,0.03)	11	0.01 (0.00,0.02)	2.44 (0.63,9.47)	
End-stage renal disease	206	0.18 (0.15,0.20)	119	0.10 (0.08,0.12)	1.75 (1.16,2.63)	
Acute kidney injury	1021	0.89 (0.84,0.95)	541	0.47 (0.43,0.51)	1.91 (1.57,2.32)	
Pancreatitis	428	0.37 (0.34,0.41)	315	0.27 (0.24,0.30)	1.37 (1.03,1.83)	
Liver injury	118	0.10 (0.08,0.12)	43	0.04 (0.03,0.05)	2.81 (1.56,5.06)	
All-cause mortality	44235	38.27 (37.91,38.63)	14654	12.55 (12.35,12.76)	3.04 (2.95,3.14)	

Note: CI: confidence interval, REF: Reference group; Major CVD: Major Cardiovascular Disease; Composite outcome of stroke, heart failure and coronary artery disease

^a Hazard Ratio (HR) was estimated by Cox proportional regression, HR >1 (or <1) indicates patients with COVID-19 had higher (lower) risk of clinical sequelae compared to the non-COVID-19 control cohort.

Supplementary Table 11b. Incidence rate and hazard ratio of clinical sequelae in COVID-19 and non-COVID-19 cohort after weighting (Age <=65)

Clinical sequelae	Hong Kong Hospital Authority					UK Biobank				
	COVID-19		Non-COVID-19 (REF)			COVID-19		Non-COVID-19 (REF)		
	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)
Major CVD	2983	2.62 (2.53,2.72)	3133	2.80 (2.70,2.90)	0.94 (0.85,1.04)	971	10.53 (9.88,11.21)	790	8.30 (7.73,8.89)	1.27 (0.97,1.67)
Stroke	1503	1.30 (1.23,1.37)	1648	1.45 (1.38,1.52)	0.90 (0.78,1.04)	116	1.17 (0.97,1.41)	152	1.50 (1.27,1.76)	0.78 (0.36,1.67)
Myocardial infarction	584	0.50 (0.46,0.54)	730	0.64 (0.59,0.68)	0.79 (0.63,1.00)	274	2.80 (2.47,3.15)	221	2.20 (1.92,2.50)	1.28 (0.76,2.14)
Heart Failure	408	0.35 (0.32,0.38)	308	0.27 (0.24,0.30)	1.31 (0.98,1.73)	511	5.18 (4.74,5.65)	294	2.91 (2.59,3.27)	1.79 (1.22,2.61)
Atrial fibrillation	408	0.35 (0.32,0.38)	297	0.26 (0.23,0.29)	1.36 (1.02,1.82)	351	3.59 (3.22,3.98)	270	2.69 (2.38,3.03)	1.33 (0.87,2.04)
Coronary Artery Disease	1406	1.22 (1.16,1.28)	1394	1.23 (1.17,1.30)	1.00 (0.86,1.16)	655	6.93 (6.41,7.49)	511	5.24 (4.79,5.71)	1.33 (0.96,1.86)
Deep vein thrombosis	139	0.12 (0.10,0.14)	129	0.11 (0.09,0.13)	1.07 (0.66,1.76)	251	2.59 (2.28,2.93)	155	1.55 (1.32,1.82)	1.67 (1.00,2.79)
Cardiovascular mortality	397	0.34 (0.31,0.37)	340	0.29 (0.26,0.33)	1.13 (0.84,1.52)	158	1.57 (1.34,1.84)	70	0.68 (0.53,0.86)	2.34 (1.22,4.48)
Chronic pulmonary disease	435	0.38 (0.34,0.41)	295	0.26 (0.23,0.29)	1.46 (1.11,1.93)	517	6.17 (5.65,6.73)	390	4.52 (4.08,4.99)	1.37 (0.94,2.01)
Acute respiratory distress syndrome	592	0.51 (0.47,0.55)	417	0.36 (0.33,0.40)	1.41 (1.11,1.79)	67	0.67 (0.52,0.85)	72	0.70 (0.55,0.89)	0.95 (0.34,2.63)
Interstitial lung disease	30	0.03 (0.02,0.04)	1	NA	24.40 (2.71,219.60)	274	2.89 (2.55,3.25)	105	1.08 (0.88,1.31)	2.71 (1.62,4.54)
Seizure	599	0.51 (0.47,0.56)	431	0.38 (0.34,0.41)	1.37 (1.08,1.75)	168	1.71 (1.46,1.99)	64	0.64 (0.49,0.81)	2.70 (1.34,5.44)
Bell's Palsy	113	0.10 (0.08,0.12)	132	0.11 (0.10,0.14)	0.85 (0.49,1.47)	0	NA	5	0.05 (0.02,0.11)	NA
Encephalopathy and Encephalitis	28	0.02 (0.02,0.03)	24	0.02 (0.01,0.03)	1.18 (0.39,3.53)	0	NA	1	0.01 (0.00,0.05)	NA
Anxiety	142	0.12 (0.10,0.14)	105	0.09 (0.07,0.11)	1.33 (0.80,2.22)	965	11.93 (11.19,12.71)	745	8.84 (8.21,9.49)	1.34 (1.02,1.77)
Post-traumatic stress disorder	391	0.34 (0.30,0.37)	341	0.30 (0.27,0.33)	1.14 (0.84,1.53)	727	8.18 (7.60,8.80)	324	3.50 (3.13,3.90)	2.34 (1.70,3.22)
Psychotic disorder	46	0.04 (0.03,0.05)	34	0.03 (0.02,0.04)	1.33 (0.50,3.53)	38	0.38 (0.27,0.52)	32	0.31 (0.21,0.44)	1.22 (0.28,5.23)
End-stage renal disease	74	0.06 (0.05,0.08)	43	0.04 (0.03,0.05)	1.69 (0.85,3.34)	80	0.80 (0.64,1.00)	48	0.47 (0.35,0.63)	1.70 (0.72,4.00)
Acute kidney injury	206	0.18 (0.15,0.20)	118	0.10 (0.08,0.12)	1.74 (1.13,2.67)	514	5.41 (4.95,5.90)	422	4.28 (3.88,4.71)	1.27 (0.87,1.86)
Pancreatitis	205	0.18 (0.15,0.20)	184	0.16 (0.14,0.18)	1.10 (0.72,1.69)	104	1.04 (0.85,1.26)	34	0.33 (0.23,0.46)	3.11 (1.28,7.55)
Liver injury	69	0.06 (0.05,0.07)	36	0.03 (0.02,0.04)	1.89 (0.89,4.04)	0	NA	9	0.09 (0.04,0.17)	NA
All-cause mortality	5328	4.54 (4.42,4.67)	2881	2.50 (2.41,2.59)	1.83 (1.68,1.99)	919	9.14 (8.56,9.75)	275	2.68 (2.37,3.02)	3.39 (2.54,4.52)

Note: CI: confidence interval, REF: Reference group; Major CVD: Major Cardiovascular Disease; Composite outcome of stroke, heart failure and coronary artery disease; NA: Not applicable due to insufficient number

^a Hazard Ratio (HR) was estimated by Cox proportional regression, HR >1 (or <1) indicates patients with COVID-19 had higher (lower) risk of clinical sequelae compared to the non-COVID-19 control cohort.

Supplementary Table 11c. Incidence rate and hazard ratio of clinical sequelae in COVID-19 and non-COVID-19 cohort after weighting (Age >65)

Clinical sequelae	Hong Kong Hospital Authority					UK Biobank				
	COVID-19		Non-COVID-19 (REF)			COVID-19		Non-COVID-19 (REF)		
	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)
Major CVD	5791	16.68 (16.25,17.12)	4626	12.79 (12.43,13.17)	1.30 (1.20,1.41)	3771	27.93 (27.04,28.83)	3137	19.80 (19.11,20.51)	1.43 (1.17,1.74)
Stroke	3054	7.84 (7.57,8.12)	2724	6.76 (6.51,7.02)	1.16 (1.04,1.29)	1207	7.17 (6.78,7.59)	912	4.81 (4.50,5.13)	1.50 (1.09,2.07)
Myocardial infarction	1257	2.96 (2.80,3.13)	980	2.24 (2.10,2.38)	1.32 (1.11,1.56)	1710	10.25 (9.77,10.75)	966	5.20 (4.88,5.54)	2.01 (1.50,2.70)
Heart Failure	2529	6.07 (5.84,6.31)	1303	3.01 (2.85,3.18)	2.01 (1.77,2.27)	2585	15.66 (15.06,16.27)	1693	9.01 (8.59,9.45)	1.77 (1.39,2.26)
Atrial fibrillation	1273	3.11 (2.94,3.28)	932	2.19 (2.06,2.34)	1.42 (1.20,1.68)	2124	13.71 (13.13,14.30)	2159	12.12 (11.62,12.65)	1.14 (0.88,1.48)
Coronary Artery Disease	2259	5.77 (5.54,6.02)	1741	4.30 (4.10,4.51)	1.34 (1.18,1.53)	2655	17.97 (17.29,18.67)	1950	11.64 (11.13,12.17)	1.55 (1.23,1.96)
Deep vein thrombosis	274	0.64 (0.56,0.72)	157	0.35 (0.30,0.41)	1.79 (1.25,2.56)	1000	5.95 (5.59,6.33)	546	2.92 (2.68,3.17)	2.05 (1.45,2.91)
Cardiovascular mortality	2921	6.77 (6.52,7.02)	1548	3.48 (3.31,3.66)	1.93 (1.72,2.16)	3072	17.10 (16.50,17.71)	822	4.16 (3.88,4.46)	4.08 (3.36,4.97)
Chronic pulmonary disease	747	1.82 (1.69,1.95)	456	1.07 (0.97,1.17)	1.70 (1.36,2.12)	1714	12.27 (11.69,12.86)	1128	7.05 (6.65,7.48)	1.74 (1.30,2.34)
Acute respiratory distress syndrome	1244	2.93 (2.77,3.09)	797	1.81 (1.69,1.94)	1.61 (1.36,1.91)	938	5.31 (4.98,5.67)	409	2.09 (1.89,2.30)	2.58 (1.76,3.79)
Interstitial lung disease	30	0.07 (0.05,0.10)	8	0.02 (0.01,0.04)	3.80 (1.07,13.49)	1524	9.10 (8.65,9.57)	496	2.66 (2.43,2.90)	3.56 (2.61,4.87)
Seizure	523	1.22 (1.12,1.33)	266	0.60 (0.53,0.68)	2.03 (1.55,2.64)	671	3.84 (3.56,4.14)	213	1.10 (0.96,1.26)	3.43 (2.20,5.36)
Bell's Palsy	113	0.26 (0.22,0.32)	101	0.23 (0.19,0.28)	1.15 (0.64,2.05)	108	0.60 (0.49,0.73)	11	0.06 (0.03,0.10)	9.85 (1.87,51.93)
Encephalopathy and Encephalitis	38	0.09 (0.06,0.12)	12	0.03 (0.01,0.05)	3.27 (1.07,10.01)	27	0.15 (0.10,0.22)	5	0.03 (0.01,0.06)	8.59 (0.93,79.63)
Anxiety	62	0.14 (0.11,0.19)	47	0.11 (0.08,0.14)	1.35 (0.62,2.93)	2255	15.73 (15.09,16.40)	1313	7.90 (7.48,8.34)	2.03 (1.57,2.62)
Post-traumatic stress disorder	149	0.35 (0.29,0.41)	51	0.12 (0.09,0.15)	3.03 (1.79,5.11)	556	3.37 (3.09,3.66)	314	1.70 (1.52,1.90)	1.98 (1.20,3.25)
Psychotic disorder	0	NA	2	NA	NA	93	0.53 (0.42,0.64)	152	0.78 (0.66,0.91)	0.67 (0.21,2.10)
End-stage renal disease	140	0.32 (0.27,0.38)	89	0.20 (0.16,0.25)	1.61 (0.99,2.63)	360	2.06 (1.85,2.29)	245	1.27 (1.11,1.44)	1.80 (1.06,3.07)
Acute kidney injury	752	1.77 (1.64,1.90)	417	0.95 (0.86,1.04)	1.86 (1.49,2.32)	4100	27.88 (27.03,28.75)	2979	17.56 (16.93,18.20)	1.62 (1.34,1.95)
Pancreatitis	273	0.64 (0.56,0.72)	171	0.39 (0.33,0.45)	1.63 (1.14,2.34)	152	0.85 (0.72,1.00)	112	0.57 (0.47,0.69)	1.61 (0.60,4.29)
Liver injury	65	0.15 (0.12,0.19)	11	0.02 (0.01,0.04)	5.94 (2.39,14.79)	0	NA	19	0.10 (0.06,0.15)	NA
All-cause mortality	34604	80.15 (79.31,81.00)	12115	27.24 (26.76,27.73)	2.92 (2.82,3.02)	13343	74.25 (73.00,75.52)	2548	12.91 (12.41,13.42)	5.67 (5.12,6.27)

Note: CI: confidence interval, REF: Reference group; Major CVD: Major Cardiovascular Disease; Composite outcome of stroke, heart failure and coronary artery disease; NA: Not applicable due to insufficient number
^a Hazard Ratio (HR) was estimated by Cox proportional regression, HR >1 (or <1) indicates patients with COVID-19 had higher (lower) risk of clinical sequelae compared to the non-COVID-19 control cohort.

Supplementary Table 12a. Incidence rate and hazard ratio of clinical sequelae in COVID-19 and non-COVID-19 cohort after weighting (Charlson Comorbidity Index <4)

Clinical sequelae	Hong Kong Hospital Authority					UK Biobank				
	COVID-19		Non-COVID-19 (REF)			COVID-19		Non-COVID-19 (REF)		
	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)
Major CVD	5206	3.88 (3.78,3.99)	5027	3.81 (3.71,3.92)	1.02 (0.94,1.11)	1892	12.37 (11.82,12.94)	1561	9.60 (9.13,10.09)	1.29 (0.96,1.74)
Stroke	2523	1.84 (1.77,1.91)	2678	1.98 (1.91,2.06)	0.93 (0.83,1.04)	179	1.10 (0.94,1.27)	347	2.02 (1.81,2.24)	0.54 (0.24,1.24)
Myocardial infarction	878	0.63 (0.59,0.68)	1035	0.76 (0.71,0.81)	0.84 (0.69,1.02)	591	3.64 (3.35,3.95)	441	2.57 (2.34,2.82)	1.42 (0.85,2.36)
Heart Failure	733	0.53 (0.49,0.57)	532	0.39 (0.36,0.42)	1.36 (1.09,1.69)	790	4.89 (4.55,5.24)	472	2.76 (2.52,3.02)	1.80 (1.11,2.93)
Atrial fibrillation	655	0.47 (0.44,0.51)	594	0.44 (0.40,0.47)	1.09 (0.87,1.38)	898	5.71 (5.34,6.10)	763	4.56 (4.24,4.89)	1.24 (0.82,1.88)
Coronary Artery Disease	2340	1.72 (1.65,1.79)	2108	1.58 (1.51,1.65)	1.09 (0.96,1.24)	1192	7.67 (7.24,8.12)	989	6.00 (5.63,6.38)	1.28 (0.90,1.82)
Deep vein thrombosis	180	0.13 (0.11,0.15)	154	0.11 (0.10,0.13)	1.16 (0.74,1.82)	453	2.86 (2.60,3.13)	267	1.59 (1.41,1.79)	1.82 (1.07,3.09)
Cardiovascular mortality	360	0.26 (0.23,0.29)	481	0.35 (0.32,0.39)	0.73 (0.53,0.99)	307	1.87 (1.67,2.09)	110	0.64 (0.52,0.77)	2.93 (1.48,5.80)
Chronic pulmonary disease	633	0.46 (0.43,0.50)	452	0.33 (0.30,0.37)	1.39 (1.10,1.76)	1254	8.43 (7.97,8.91)	710	4.50 (4.18,4.85)	1.92 (1.36,2.70)
Acute respiratory distress syndrome	1015	0.73 (0.69,0.78)	701	0.51 (0.48,0.55)	1.43 (1.18,1.73)	113	0.69 (0.57,0.83)	106	0.61 (0.50,0.74)	1.12 (0.38,3.29)
Interstitial lung disease	25	0.02 (0.01,0.03)	6	NA	4.29 (0.99,18.54)	443	2.80 (2.54,3.07)	172	1.03 (0.88,1.19)	3.03 (1.66,5.52)
Seizure	731	0.53 (0.49,0.57)	458	0.34 (0.31,0.37)	1.57 (1.25,1.97)	247	1.53 (1.35,1.74)	95	0.56 (0.45,0.68)	2.74 (1.29,5.83)
Bell's Palsy	194	0.14 (0.12,0.16)	166	0.12 (0.10,0.14)	1.16 (0.74,1.81)	0	NA	5	0.03 (0.01,0.07)	NA
Encephalopathy and Encephalitis	52	0.04 (0.03,0.05)	27	0.02 (0.01,0.03)	1.91 (0.76,4.80)	0	NA	1	0.01 (0.00,0.03)	NA
Anxiety	179	0.13 (0.11,0.15)	121	0.09 (0.07,0.11)	1.46 (0.91,2.35)	1348	9.91 (9.39,10.45)	1032	7.02 (6.60,7.46)	1.42 (1.04,1.93)
Post-traumatic stress disorder	441	0.32 (0.29,0.35)	358	0.26 (0.24,0.29)	1.22 (0.92,1.62)	872	5.86 (5.48,6.27)	390	2.44 (2.21,2.70)	2.42 (1.74,3.37)
Psychotic disorder	45	0.03 (0.02,0.04)	37	0.03 (0.02,0.04)	1.22 (0.46,3.21)	74	0.46 (0.36,0.57)	87	0.51 (0.40,0.62)	0.90 (0.27,2.94)
End-stage renal disease	61	0.04 (0.03,0.06)	38	0.03 (0.02,0.04)	1.60 (0.73,3.51)	31	0.19 (0.13,0.27)	60	0.35 (0.27,0.45)	0.54 (0.13,2.18)
Acute kidney injury	264	0.19 (0.17,0.21)	151	0.11 (0.09,0.13)	1.71 (1.17,2.51)	1137	7.11 (6.71,7.54)	1044	6.11 (5.74,6.49)	1.19 (0.84,1.70)
Pancreatitis	263	0.19 (0.17,0.21)	225	0.16 (0.14,0.19)	1.16 (0.80,1.69)	126	0.77 (0.64,0.92)	46	0.27 (0.20,0.36)	2.87 (1.16,7.09)
Liver injury	91	0.07 (0.05,0.08)	41	0.03 (0.02,0.04)	2.17 (1.11,4.23)	0	NA	11	0.06 (0.03,0.11)	NA
All-cause mortality	5081	3.66 (3.56,3.76)	2920	2.14 (2.06,2.22)	1.71 (1.57,1.87)	2186	13.34 (12.78,13.91)	321	1.86 (1.66,2.07)	7.12 (5.28,9.60)

Note: CI: confidence interval, REF: Reference group; Major CVD: Major Cardiovascular Disease; Composite outcome of stroke, heart failure and coronary artery disease; NA: Not applicable due to insufficient number

^a Hazard Ratio (HR) was estimated by Cox proportional regression, HR >1 (or <1) indicates patients with COVID-19 had higher (lower) risk of clinical sequelae compared to the non-COVID-19 control cohort.

Supplementary Table 12b. Incidence rate and hazard ratio of clinical sequelae in COVID-19 and non-COVID-19 cohort after weighting (Charlson Comorbidity Index ≥ 4)

Clinical sequelae	Hong Kong Hospital Authority					UK Biobank				
	COVID-19		Non-COVID-19 (REF)			COVID-19		Non-COVID-19 (REF)		
	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)
Major CVD	3566	24.37 (23.58,25.18)	2731	17.03 (16.40,17.68)	1.43 (1.29,1.58)	2851	37.84 (36.47,39.26)	2367	26.02 (24.98,27.09)	1.46 (1.19,1.80)
Stroke	1962	11.07 (10.58,11.57)	1697	8.93 (8.51,9.36)	1.24 (1.08,1.41)	1111	10.62 (10.01,11.26)	718	6.04 (5.61,6.50)	1.76 (1.27,2.42)
Myocardial infarction	952	4.50 (4.22,4.80)	676	3.01 (2.78,3.24)	1.48 (1.22,1.79)	1364	13.25 (12.55,13.97)	746	6.50 (6.04,6.98)	2.06 (1.52,2.78)
Heart Failure	2103	10.31 (9.88,10.76)	1086	4.97 (4.67,5.27)	2.06 (1.80,2.36)	2306	22.49 (21.58,23.43)	1515	12.87 (12.23,13.54)	1.76 (1.40,2.21)
Atrial fibrillation	966	4.80 (4.50,5.11)	638	2.96 (2.74,3.20)	1.63 (1.35,1.97)	1623	16.94 (16.12,17.78)	1667	15.01 (14.30,15.75)	1.13 (0.85,1.51)
Coronary Artery Disease	1400	7.37 (6.99,7.77)	1025	5.05 (4.75,5.37)	1.45 (1.24,1.70)	2110	24.09 (23.08,25.14)	1472	14.70 (13.96,15.47)	1.65 (1.30,2.08)
Deep vein thrombosis	223	1.02 (0.89,1.17)	132	0.57 (0.48,0.68)	1.77 (1.21,2.60)	771	7.22 (6.72,7.75)	434	3.64 (3.31,4.00)	1.98 (1.39,2.83)
Cardiovascular mortality	2691	12.28 (11.82,12.75)	1424	6.15 (5.83,6.47)	1.97 (1.76,2.21)	2915	25.03 (24.13,25.95)	780	6.14 (5.71,6.58)	4.03 (3.32,4.89)
Chronic pulmonary disease	513	2.57 (2.35,2.80)	302	1.41 (1.25,1.57)	1.83 (1.42,2.37)	980	12.83 (12.04,13.66)	808	9.14 (8.52,9.79)	1.40 (0.99,1.98)
Acute respiratory distress syndrome	813	3.82 (3.56,4.09)	515	2.27 (2.08,2.47)	1.67 (1.36,2.06)	863	7.61 (7.11,8.13)	375	2.99 (2.70,3.31)	2.56 (1.75,3.73)
Interstitial lung disease	33	0.15 (0.10,0.21)	3	0.01 (0.00,0.04)	10.11 (2.28,44.78)	1323	12.66 (11.98,13.36)	429	3.67 (3.33,4.04)	3.45 (2.54,4.69)
Seizure	385	1.78 (1.61,1.97)	243	1.06 (0.93,1.20)	1.67 (1.24,2.24)	596	5.32 (4.90,5.77)	182	1.47 (1.27,1.70)	3.58 (2.29,5.59)
Bell's Palsy	30	0.14 (0.09,0.20)	68	0.29 (0.23,0.37)	0.46 (0.18,1.18)	104	0.89 (0.73,1.08)	12	0.09 (0.05,0.17)	9.34 (1.77,49.41)
Encephalopathy and Encephalitis	17	0.08 (0.05,0.12)	8	0.03 (0.01,0.07)	2.18 (0.56,8.48)	28	0.24 (0.16,0.35)	5	0.04 (0.01,0.09)	7.07 (0.80,62.41)
Anxiety	36	0.17 (0.12,0.23)	31	0.13 (0.09,0.19)	1.20 (0.45,3.19)	1845	20.78 (19.84,21.75)	1026	9.92 (9.32,10.54)	2.10 (1.63,2.70)
Post-traumatic stress disorder	100	0.46 (0.37,0.56)	35	0.15 (0.11,0.21)	3.11 (1.66,5.83)	421	4.00 (3.62,4.40)	248	2.11 (1.86,2.39)	1.88 (1.12,3.15)
Psychotic disorder	0	NA	0	NA	NA	56	0.49 (0.37,0.64)	98	0.78 (0.63,0.95)	0.63 (0.16,2.52)
End-stage renal disease	144	0.66 (0.56,0.78)	97	0.42 (0.34,0.51)	1.55 (0.97,2.47)	414	3.71 (3.36,4.08)	232	1.89 (1.65,2.15)	2.05 (1.28,3.28)
Acute kidney injury	674	3.17 (2.93,3.41)	386	1.70 (1.53,1.88)	1.84 (1.47,2.31)	3408	41.17 (39.80,42.58)	2358	24.23 (23.26,25.22)	1.71 (1.41,2.08)
Pancreatitis	207	0.95 (0.83,1.09)	132	0.57 (0.48,0.68)	1.66 (1.11,2.47)	131	1.14 (0.95,1.35)	100	0.79 (0.65,0.96)	1.51 (0.57,4.00)
Liver injury	34	0.16 (0.11,0.22)	6	0.03 (0.01,0.06)	5.93 (1.83,19.21)	0	NA	16	0.13 (0.07,0.21)	NA
All-cause mortality	31531	143.86 (142.27,145.45)	12341	53.26 (52.33,54.21)	2.67 (2.58,2.76)	12153	104.34 (102.50,106.22)	2498	19.65 (18.89,20.44)	5.21 (4.71,5.77)

Note: CI: confidence interval, REF: Reference group; Major CVD: Major Cardiovascular Disease; Composite outcome of stroke, heart failure and coronary artery disease; NA: Not applicable due to insufficient number

^a Hazard Ratio (HR) was estimated by Cox proportional regression, HR >1 (or <1) indicates patients with COVID-19 had higher (lower) risk of clinical sequelae compared to the non-COVID-19 control cohort.

Supplementary Table 13a. Incidence rate and hazard ratio of clinical sequelae in COVID-19 and non-COVID-19 cohort after weighting (Received 0-1 dose of COVID-19 vaccine)

Clinical sequelae	Hong Kong Hospital Authority					UK Biobank				
	COVID-19		Non-COVID-19 (REF)			COVID-19		Non-COVID-19 (REF)		
	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)
Major CVD	3660	9.25 (8.95,9.55)	2822	7.27 (7.01,7.55)	1.31 (1.19,1.44)	4805	21.43 (20.83,22.04)	3900	15.47 (14.99,15.97)	1.40 (1.18,1.65)
Stroke	1836	4.36 (4.16,4.56)	1665	4.05 (3.86,4.25)	1.10 (0.97,1.26)	1419	5.36 (5.08,5.64)	1057	3.66 (3.44,3.89)	1.47 (1.09,1.99)
Myocardial infarction	835	1.89 (1.76,2.02)	653	1.51 (1.40,1.63)	1.29 (1.06,1.56)	2034	7.74 (7.41,8.09)	1182	4.15 (3.92,4.40)	1.89 (1.45,2.46)
Heart Failure	1614	3.69 (3.51,3.87)	840	1.96 (1.83,2.10)	1.95 (1.69,2.25)	3230	12.36 (11.94,12.80)	1968	6.86 (6.56,7.17)	1.83 (1.48,2.25)
Atrial fibrillation	748	1.72 (1.60,1.85)	470	1.10 (1.01,1.21)	1.61 (1.30,1.98)	2564	10.26 (9.86,10.66)	2412	8.72 (8.37,9.07)	1.18 (0.93,1.50)
Coronary Artery Disease	1599	3.77 (3.58,3.96)	1114	2.68 (2.53,2.84)	1.44 (1.25,1.66)	3327	13.88 (13.41,14.36)	2443	9.28 (8.91,9.65)	1.51 (1.24,1.84)
Deep vein thrombosis	209	0.47 (0.41,0.54)	118	0.27 (0.22,0.32)	1.79 (1.21,2.66)	1248	4.74 (4.48,5.01)	698	2.45 (2.27,2.64)	1.94 (1.44,2.62)
Cardiovascular mortality	2053	4.58 (4.38,4.78)	1230	2.81 (2.66,2.97)	1.67 (1.48,1.89)	3609	12.95 (12.53,13.38)	884	2.97 (2.77,3.17)	4.35 (3.60,5.25)
Chronic pulmonary disease	570	1.31 (1.20,1.42)	298	0.70 (0.62,0.78)	1.94 (1.52,2.48)	2261	10.20 (9.78,10.63)	1506	6.16 (5.85,6.48)	1.66 (1.31,2.12)
Acute respiratory distress syndrome	761	1.72 (1.60,1.85)	462	1.07 (0.97,1.17)	1.66 (1.35,2.04)	1031	3.75 (3.53,3.99)	476	1.61 (1.47,1.76)	2.36 (1.65,3.36)
Interstitial lung disease	38	0.08 (0.06,0.12)	3	0.01 (0.00,0.02)	11.22 (2.75,45.69)	1845	7.08 (6.76,7.41)	593	2.10 (1.94,2.28)	3.47 (2.64,4.55)
Seizure	544	1.23 (1.13,1.34)	308	0.71 (0.63,0.79)	1.78 (1.38,2.28)	891	3.28 (3.07,3.51)	271	0.93 (0.82,1.04)	3.52 (2.40,5.17)
Bell's Palsy	78	0.17 (0.14,0.22)	73	0.17 (0.13,0.21)	1.07 (0.55,2.09)	122	0.44 (0.36,0.52)	17	0.06 (0.03,0.09)	7.47 (1.40,39.71)
Encephalopathy and Encephalitis	18	0.04 (0.02,0.06)	8	0.02 (0.01,0.04)	2.22 (0.56,8.77)	37	0.13 (0.09,0.18)	6	0.02 (0.01,0.04)	8.79 (0.99,78.38)
Anxiety	99	0.22 (0.18,0.27)	51	0.12 (0.09,0.15)	1.94 (1.03,3.63)	3251	14.57 (14.08,15.08)	2037	8.19 (7.84,8.55)	1.79 (1.47,2.17)
Post-traumatic stress disorder	136	0.31 (0.26,0.36)	104	0.24 (0.20,0.29)	1.29 (0.79,2.10)	1315	5.21 (4.93,5.49)	627	2.28 (2.10,2.46)	2.29 (1.74,3.01)
Psychotic disorder	24	0.05 (0.03,0.08)	9	0.02 (0.01,0.04)	2.58 (0.67,9.99)	132	0.48 (0.40,0.57)	183	0.62 (0.53,0.71)	0.77 (0.31,1.90)
End-stage renal disease	96	0.21 (0.17,0.26)	85	0.19 (0.16,0.24)	1.14 (0.67,1.92)	476	1.75 (1.59,1.91)	288	0.98 (0.87,1.10)	1.88 (1.17,3.01)
Acute kidney injury	517	1.17 (1.07,1.27)	289	0.67 (0.59,0.75)	1.81 (1.41,2.33)	4744	19.86 (19.30,20.43)	3374	12.65 (12.23,13.09)	1.59 (1.34,1.89)
Pancreatitis	232	0.52 (0.45,0.59)	131	0.30 (0.25,0.36)	1.78 (1.20,2.62)	256	0.92 (0.81,1.05)	144	0.49 (0.41,0.57)	1.96 (1.01,3.82)
Liver injury	44	0.10 (0.07,0.13)	10	0.02 (0.01,0.04)	4.10 (1.43,11.73)	0	NA	27	0.09 (0.06,0.13)	NA
All-cause mortality	27756	61.86 (61.13,62.59)	10279	23.50 (23.05,23.96)	2.73 (2.63,2.83)	15515	55.67 (54.80,56.56)	2798	9.39 (9.04,9.74)	5.87 (5.33,6.46)

Note: CI: confidence interval, REF: Reference group; Major CVD: Major Cardiovascular Disease; Composite outcome of stroke, heart failure and coronary artery disease; NA: Not applicable due to insufficient number

^a Hazard Ratio (HR) was estimated by Cox proportional regression, HR >1 (or <1) indicates patients with COVID-19 had higher (lower) risk of clinical sequelae compared to the non-COVID-19 control cohort.

Supplementary Table 13b. Incidence rate and hazard ratio of clinical sequelae in COVID-19 and non-COVID-19 cohort after weighting (Received 2 doses of COVID-19 vaccines)

Clinical sequelae	Hong Kong Hospital Authority					UK Biobank				
	COVID-19		Non-COVID-19 (REF)			COVID-19		Non-COVID-19 (REF)		
	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)
Major CVD	2650	4.50 (4.33,4.68)	2894	4.93 (4.75,5.11)	0.91 (0.82,1.01)	0	NA	26	15.83 (10.34,23.20)	NA
Stroke	1448	2.37 (2.25,2.50)	1624	2.66 (2.54,2.80)	0.89 (0.78,1.03)	0	NA	6	3.13 (1.15,6.81)	NA
Myocardial infarction	524	0.84 (0.77,0.91)	608	0.97 (0.90,1.05)	0.86 (0.68,1.09)	0	NA	4	2.12 (0.58,5.44)	NA
Heart Failure	837	1.34 (1.25,1.43)	587	0.94 (0.86,1.02)	1.43 (1.17,1.74)	0	NA	16	8.40 (4.80,13.65)	NA
Atrial fibrillation	526	0.85 (0.77,0.92)	449	0.72 (0.66,0.79)	0.92 (1.49,0.00)	17	10.15 (5.91,16.25)	14	7.73 (4.22,12.96)	1.26 (0.16,9.62)
Coronary Artery Disease	1033	1.69 (1.59,1.80)	1103	1.81 (1.71,1.92)	0.93 (0.79,1.10)	0	NA	17	9.93 (5.78,15.90)	NA
Deep vein thrombosis	129	0.20 (0.17,0.24)	108	0.17 (0.14,0.21)	1.20 (0.72,1.98)	0	NA	3	1.61 (0.33,4.69)	NA
Cardiovascular mortality	775	1.23 (1.14,1.32)	500	0.79 (0.73,0.87)	1.55 (1.25,1.93)	0	NA	3	1.51 (0.31,4.43)	NA
Chronic pulmonary disease	402	0.65 (0.59,0.72)	302	0.49 (0.43,0.55)	1.34 (1.02,1.76)	0	NA	12	7.63 (3.94,13.33)	NA
Acute respiratory distress syndrome	666	1.06 (0.98,1.15)	457	0.73 (0.66,0.80)	1.46 (1.17,1.81)	0	NA	4	2.04 (0.55,5.21)	NA
Interstitial lung disease	6	0.01 (0.00,0.02)	5	0.01 (0.00,0.02)	1.25 (0.14,11.21)	0	NA	7	3.61 (1.45,7.43)	NA
Seizure	382	0.61 (0.55,0.67)	259	0.41 (0.36,0.47)	1.47 (1.10,1.97)	0	NA	6	3.10 (1.14,6.75)	NA
Bell's Palsy	80	0.13 (0.10,0.16)	89	0.14 (0.11,0.17)	0.90 (0.50,1.63)	0	NA	0	NA	NA
Encephalopathy and Encephalitis	19	0.03 (0.02,0.05)	19	0.03 (0.02,0.05)	1.01 (0.29,3.48)	0	NA	0	0.00 (0.00,1.86)	NA
Anxiety	58	0.09 (0.07,0.12)	74	0.12 (0.09,0.15)	0.79 (0.39,1.60)	0	NA	21	13.23 (8.19,20.23)	NA
Post-traumatic stress disorder	256	0.41 (0.36,0.46)	177	0.28 (0.24,0.33)	1.44 (1.03,2.03)	0	NA	10	5.57 (2.67,10.25)	NA
Psychotic disorder	0	NA	22	0.03 (0.02,0.05)	NA	0	NA	1	0.51 (0.01,2.84)	NA
End-stage renal disease	94	0.15 (0.12,0.18)	39	0.06 (0.04,0.08)	2.44 (1.30,4.58)	0	NA	4	2.07 (0.56,5.30)	NA
Acute kidney injury	295	0.47 (0.42,0.53)	176	0.28 (0.24,0.32)	1.68 (1.18,2.39)	0	NA	25	14.57 (9.43,21.51)	NA
Pancreatitis	146	0.23 (0.20,0.27)	131	0.21 (0.17,0.25)	1.12 (0.70,1.79)	0	NA	2	1.02 (0.12,3.67)	NA
Liver injury	59	0.09 (0.07,0.12)	12	0.02 (0.01,0.03)	4.92 (1.99,12.20)	0	NA	0	NA	NA
All-cause mortality	7825	12.41 (12.14,12.69)	3715	5.90 (5.71,6.09)	2.11 (1.96,2.26)	58	31.52 (23.94,40.75)	16	8.08 (4.62,13.12)	4.05 (0.54,30.53)

Note: CI: confidence interval, REF: Reference group; Major CVD: Major Cardiovascular Disease; Composite outcome of stroke, heart failure and coronary artery disease; NA: Not applicable due to insufficient number
^a Hazard Ratio (HR) was estimated by Cox proportional regression, HR >1 (or <1) indicates patients with COVID-19 had higher (lower) risk of clinical sequelae compared to the non-COVID-19 control cohort.

Supplementary Table 13c. Incidence rate and hazard ratio of clinical sequelae in COVID-19 and non-COVID-19 cohort after weighting (Received ≥ 3 doses of COVID-19 vaccines)

Hong Kong Hospital Authority						
Clinical sequelae	COVID-19			Non-COVID-19 (REF)		Hazard Ratio ^a (95% CI)
	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)		
Major CVD	2208	4.41 (4.22,4.59)	2056	4.08 (3.90,4.26)	1.08 (0.93,1.25)	
Stroke	1141	2.21 (2.09,2.35)	1096	2.11 (1.99,2.24)	1.05 (0.86,1.28)	
Myocardial infarction	457	0.87 (0.79,0.95)	451	0.85 (0.78,0.94)	1.02 (0.74,1.40)	
Heart Failure	310	0.59 (0.53,0.66)	200	0.38 (0.33,0.43)	1.56 (1.04,2.35)	
Atrial fibrillation	324	0.62 (0.55,0.69)	318	0.60 (0.54,0.67)	1.03 (0.71,1.49)	
Coronary Artery Disease	1026	2.00 (1.88,2.13)	914	1.78 (1.66,1.89)	1.12 (0.91,1.39)	
Deep vein thrombosis	58	0.11 (0.08,0.14)	59	0.11 (0.08,0.14)	0.99 (0.42,2.30)	
Cardiovascular mortality	288	0.55 (0.49,0.61)	177	0.33 (0.29,0.39)	1.63 (1.05,2.52)	
Chronic pulmonary disease	177	0.34 (0.29,0.40)	152	0.29 (0.25,0.34)	1.17 (0.71,1.95)	
Acute respiratory distress syndrome	397	0.76 (0.68,0.83)	295	0.56 (0.50,0.63)	1.36 (0.95,1.93)	
Interstitial lung disease	11	0.02 (0.01,0.04)	1	NA	9.88 (0.62,157.99)	
Seizure	195	0.37 (0.32,0.43)	133	0.25 (0.21,0.30)	1.48 (0.89,2.45)	
Bell's Palsy	67	0.13 (0.10,0.16)	71	0.13 (0.10,0.17)	0.96 (0.41,2.22)	
Encephalopathy and Encephalitis	31	0.06 (0.04,0.08)	8	0.02 (0.01,0.03)	3.91 (1.01,15.14)	
Anxiety	55	0.10 (0.08,0.14)	28	0.05 (0.04,0.08)	2.01 (0.76,5.29)	
Post-traumatic stress disorder	147	0.28 (0.24,0.33)	111	0.21 (0.17,0.25)	1.33 (0.76,2.34)	
Psychotic disorder	21	0.04 (0.02,0.06)	6	0.01 (0.00,0.02)	3.92 (0.76,20.30)	
End-stage renal disease	9	0.02 (0.01,0.03)	10	0.02 (0.01,0.03)	0.93 (0.12,7.36)	
Acute kidney injury	141	0.27 (0.23,0.32)	74	0.14 (0.11,0.18)	1.93 (1.04,3.58)	
Pancreatitis	97	0.18 (0.15,0.22)	95	0.18 (0.15,0.22)	1.03 (0.52,2.06)	
Liver injury	30	0.06 (0.04,0.08)	24	0.05 (0.03,0.07)	1.25 (0.37,4.18)	
All-cause mortality	2410	4.58 (4.39,4.76)	1214	2.29 (2.16,2.42)	1.99 (1.70,2.33)	

Note: CI: confidence interval, REF: Reference group; Major CVD: Major Cardiovascular Disease; Composite outcome of stroke, heart failure and coronary artery disease

^a Hazard Ratio (HR) was estimated by Cox proportional regression, HR >1 (or <1) indicates patients with COVID-19 had higher (lower) risk of clinical sequelae compared to the non-COVID-19 control cohort.

Supplementary Table 14a. Incidence rate and hazard ratio of clinical sequelae in COVID-19 and non-COVID-19 cohort after weighting (Male patients)

Clinical sequelae	Hong Kong Hospital Authority					UK Biobank				
	COVID-19		Non-COVID-19 (REF)			COVID-19		Non-COVID-19 (REF)		
	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)
Major CVD	5113	8.08 (7.86,8.30)	4650	7.32 (7.12,7.54)	1.10 (1.02,1.20)	2509	26.20 (25.19,27.25)	2167	20.01 (19.18,20.88)	1.32 (1.05,1.65)
Stroke	2679	4.00 (3.85,4.15)	2403	3.57 (3.43,3.72)	1.12 (1.01,1.25)	892	7.51 (7.02,8.02)	564	4.30 (3.96,4.68)	1.75 (1.21,2.52)
Myocardial infarction	1147	1.66 (1.56,1.75)	1209	1.74 (1.64,1.84)	0.95 (0.81,1.13)	1021	8.83 (8.30,9.39)	772	6.11 (5.69,6.56)	1.48 (1.03,2.14)
Heart Failure	1396	2.02 (1.91,2.13)	782	1.12 (1.05,1.21)	1.80 (1.54,2.10)	1494	12.80 (12.16,13.47)	1147	8.84 (8.34,9.37)	1.47 (1.11,1.96)
Atrial fibrillation	892	1.30 (1.22,1.39)	636	0.92 (0.85,1.00)	1.41 (1.16,1.71)	1631	14.95 (14.23,15.69)	1434	11.69 (11.09,12.31)	1.29 (0.96,1.73)
Coronary Artery Disease	2435	3.66 (3.52,3.81)	2193	3.30 (3.16,3.44)	1.11 (0.99,1.25)	1784	17.37 (16.57,18.19)	1453	12.74 (12.10,13.42)	1.37 (1.05,1.79)
Deep vein thrombosis	177	0.25 (0.22,0.29)	116	0.17 (0.14,0.20)	1.53 (0.98,2.39)	765	6.39 (5.95,6.86)	335	2.56 (2.29,2.85)	2.52 (1.71,3.71)
Cardiovascular mortality	1584	2.26 (2.15,2.37)	1001	1.42 (1.34,1.52)	1.58 (1.37,1.83)	2388	18.93 (18.18,19.71)	608	4.46 (4.11,4.83)	4.21 (3.36,5.29)
Chronic pulmonary disease	738	1.08 (1.00,1.16)	459	0.67 (0.61,0.73)	1.62 (1.31,2.01)	1190	11.63 (10.98,12.31)	736	6.51 (6.05,6.99)	1.79 (1.29,2.49)
Acute respiratory distress syndrome	1037	1.49 (1.40,1.59)	720	1.03 (0.96,1.11)	1.45 (1.22,1.73)	495	3.98 (3.64,4.35)	264	1.95 (1.72,2.20)	2.10 (1.28,3.46)
Interstitial lung disease	38	0.05 (0.04,0.07)	6	0.01 (0.00,0.02)	6.44 (1.85,22.43)	907	7.63 (7.14,8.14)	298	2.30 (2.05,2.58)	3.39 (2.32,4.94)
Seizure	610	0.88 (0.81,0.95)	388	0.56 (0.50,0.61)	1.58 (1.25,1.99)	455	3.71 (3.38,4.07)	139	1.04 (0.88,1.23)	3.60 (2.18,5.96)
Bell's Palsy	74	0.11 (0.08,0.13)	110	0.16 (0.13,0.19)	0.67 (0.35,1.28)	93	0.74 (0.60,0.90)	7	0.05 (0.02,0.11)	12.93 (1.61,104.02)
Encephalopathy and Encephalitis	58	0.08 (0.06,0.11)	17	0.02 (0.01,0.04)	3.53 (1.45,8.58)	33	0.26 (0.18,0.37)	4	0.03 (0.01,0.08)	11.92 (1.24,114.69)
Anxiety	57	0.08 (0.06,0.11)	47	0.07 (0.05,0.09)	1.19 (0.55,2.61)	1084	10.02 (9.43,10.63)	703	5.88 (5.45,6.33)	1.69 (1.23,2.33)
Post-traumatic stress disorder	222	0.32 (0.28,0.36)	163	0.23 (0.20,0.27)	1.37 (0.93,2.01)	379	3.22 (2.90,3.56)	208	1.62 (1.40,1.85)	2.00 (1.26,3.17)
Psychotic disorder	7	0.01 (0.00,0.02)	8	0.01 (0.00,0.02)	0.88 (0.11,7.17)	100	0.81 (0.66,0.98)	97	0.72 (0.58,0.88)	1.12 (0.41,3.08)
End-stage renal disease	120	0.17 (0.14,0.20)	64	0.09 (0.07,0.12)	1.86 (1.11,3.12)	255	2.07 (1.82,2.34)	170	1.27 (1.09,1.48)	1.73 (0.90,3.33)
Acute kidney injury	516	0.74 (0.68,0.81)	290	0.41 (0.37,0.47)	1.79 (1.39,2.32)	2659	24.85 (23.91,25.81)	1754	14.47 (13.80,15.16)	1.76 (1.40,2.21)
Pancreatitis	228	0.33 (0.28,0.37)	189	0.27 (0.23,0.31)	1.21 (0.83,1.76)	48	0.38 (0.28,0.51)	77	0.57 (0.45,0.71)	0.67 (0.15,2.91)
Liver injury	74	0.11 (0.08,0.13)	18	0.03 (0.02,0.04)	4.13 (1.89,9.03)	0	NA	14	0.10 (0.06,0.17)	NA
All-cause mortality	22192	31.65 (31.24,32.07)	8162	11.61 (11.36,11.87)	2.73 (2.62,2.84)	8287	65.70 (64.30,67.13)	1654	12.13 (11.56,12.73)	5.34 (4.70,6.07)

Note: CI: confidence interval, REF: Reference group; Major CVD: Major Cardiovascular Disease; Composite outcome of stroke, heart failure and coronary artery disease; NA: Not applicable due to insufficient number

^a Hazard Ratio (HR) was estimated by Cox proportional regression, HR >1 (or <1) indicates patients with COVID-19 had higher (lower) risk of clinical sequelae compared to the non-COVID-19 control cohort.

Supplementary Table 14b. Incidence rate and hazard ratio of clinical sequelae in COVID-19 and non-COVID-19 cohort after weighting (Female patients)

Clinical sequelae	Hong Kong Hospital Authority					UK Biobank				
	COVID-19		Non-COVID-19 (REF)			COVID-19		Non-COVID-19 (REF)		
	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Event	Incidence per 1,000 person-years (95% CI)	Hazard Ratio ^a (95% CI)
Major CVD	3528	4.20 (4.06,4.34)	3119	3.69 (3.56,3.82)	1.14 (1.03,1.26)	2302	17.66 (16.95,18.40)	1758	12.09 (11.53,12.67)	1.47 (1.14,1.90)
Stroke	1817	2.10 (2.00,2.20)	1974	2.27 (2.17,2.37)	0.92 (0.80,1.06)	506	3.42 (3.13,3.73)	499	3.12 (2.86,3.41)	1.10 (0.65,1.87)
Myocardial infarction	771	0.87 (0.81,0.93)	497	0.56 (0.51,0.61)	1.56 (1.24,1.96)	1033	6.92 (6.51,7.36)	415	2.59 (2.35,2.85)	2.68 (1.84,3.90)
Heart Failure	1556	1.76 (1.67,1.85)	834	0.94 (0.88,1.00)	1.88 (1.60,2.21)	1759	11.99 (11.44,12.57)	838	5.27 (4.92,5.64)	2.29 (1.69,3.11)
Atrial fibrillation	795	0.90 (0.84,0.97)	600	0.68 (0.63,0.74)	1.33 (1.07,1.66)	943	6.60 (6.19,7.03)	993	6.37 (5.98,6.78)	1.04 (0.70,1.53)
Coronary Artery Disease	1307	1.50 (1.42,1.58)	935	1.07 (1.00,1.14)	1.40 (1.18,1.67)	1552	11.16 (10.62,11.73)	1008	6.67 (6.27,7.10)	1.69 (1.27,2.26)
Deep vein thrombosis	246	0.28 (0.24,0.31)	168	0.19 (0.16,0.22)	1.47 (1.01,2.15)	480	3.30 (3.01,3.61)	366	2.35 (2.11,2.60)	1.40 (0.88,2.23)
Cardiovascular mortality	1983	2.22 (2.12,2.32)	869	0.97 (0.91,1.04)	2.28 (1.97,2.65)	1139	7.37 (6.94,7.81)	281	1.72 (1.52,1.93)	4.31 (3.08,6.03)
Chronic pulmonary disease	437	0.50 (0.45,0.55)	293	0.33 (0.30,0.37)	1.50 (1.12,2.01)	1053	8.72 (8.21,9.27)	782	5.88 (5.47,6.30)	1.49 (1.05,2.12)
Acute respiratory distress syndrome	815	0.92 (0.85,0.98)	494	0.55 (0.51,0.60)	1.66 (1.33,2.06)	541	3.55 (3.26,3.86)	216	1.33 (1.16,1.52)	2.64 (1.60,4.38)
Interstitial lung disease	21	0.02 (0.01,0.04)	3	NA	6.01 (1.20,30.15)	932	6.48 (6.07,6.91)	303	1.96 (1.75,2.20)	3.46 (2.33,5.13)
Seizure	521	0.59 (0.54,0.64)	308	0.35 (0.31,0.39)	1.69 (1.29,2.22)	432	2.86 (2.60,3.15)	138	0.86 (0.72,1.01)	3.27 (1.81,5.89)
Bell's Palsy	153	0.17 (0.15,0.20)	121	0.14 (0.11,0.16)	1.27 (0.77,2.10)	27	0.17 (0.12,0.25)	9	0.06 (0.03,0.10)	2.91 (0.37,22.68)
Encephalopathy and Encephalitis	6	0.01 (0.00,0.01)	19	0.02 (0.01,0.03)	0.31 (0.04,2.35)	0	NA	2	0.01 (0.00,0.04)	NA
Anxiety	148	0.17 (0.14,0.20)	105	0.12 (0.10,0.14)	1.42 (0.85,2.36)	2186	18.81 (18.02,19.61)	1356	10.37 (9.82,10.94)	1.84 (1.44,2.36)
Post-traumatic stress disorder	324	0.37 (0.33,0.41)	230	0.26 (0.23,0.30)	1.42 (1.01,1.98)	933	6.82 (6.39,7.28)	430	2.90 (2.63,3.19)	2.36 (1.67,3.32)
Psychotic disorder	36	0.04 (0.03,0.06)	28	0.03 (0.02,0.05)	1.27 (0.43,3.80)	32	0.21 (0.14,0.30)	88	0.54 (0.43,0.67)	0.39 (0.05,2.75)
End-stage renal disease	102	0.11 (0.09,0.14)	67	0.07 (0.06,0.10)	1.53 (0.83,2.82)	229	1.51 (1.32,1.72)	123	0.76 (0.63,0.91)	2.09 (1.08,4.05)
Acute kidney injury	486	0.55 (0.50,0.60)	242	0.27 (0.24,0.31)	2.02 (1.51,2.71)	2075	15.54 (14.88,16.22)	1644	11.17 (10.64,11.73)	1.40 (1.08,1.81)
Pancreatitis	249	0.28 (0.25,0.32)	165	0.18 (0.16,0.21)	1.52 (1.03,2.24)	212	1.38 (1.20,1.58)	68	0.42 (0.32,0.53)	3.44 (1.61,7.35)
Liver injury	54	0.06 (0.05,0.08)	28	0.03 (0.02,0.05)	1.88 (0.80,4.44)	0	NA	14	0.09 (0.05,0.14)	NA
All-cause mortality	21275	23.78 (23.46,24.10)	6617	7.39 (7.21,7.57)	3.22 (3.07,3.38)	7217	46.68 (45.60,47.77)	1163	7.10 (6.70,7.52)	6.52 (5.63,7.55)

Note: CI: confidence interval, REF: Reference group; Major CVD: Major Cardiovascular Disease; Composite outcome of stroke, heart failure and coronary artery disease; NA: Not applicable due to insufficient number
^a Hazard Ratio (HR) was estimated by Cox proportional regression, HR >1 (or <1) indicates patients with COVID-19 had higher (lower) risk of clinical sequelae compared to the non-COVID-19 control cohort.