

Supplementary Table 1. Definitions of adverse events of special interest (AESI)

AESI	ICD-9 codes	ICPC codes
Guillain-Barré Syndrome	357.0, 357.8x, 357.9	N94
Acute disseminated encephalomyelitis (ADEM)	323.6x, 323.8x	
Narcolepsy	347.xx, 307.4, 780.5, [Procedure codes: 89.17, 89.18]	
Acute aseptic arthritis	274.0x, 696.0, 716.5x, 716.6x, 716.9x, 712.xx, 711.5x	
Type 1 Diabetes	250.01, 250.03, 250.11, 250.13, 250.21, 250.23, 250.31, 250.33, 250.41, 250.43, 250.51, 250.53, 250.61, 250.63, 250.71, 250.73, 250.81, 250.83, 250.93	T89
(Idiopathic) Thrombocytopenia	287.3x, 287.4x, 287.5, 279.1x, 283.1x, 284.1x, 446.6, 776.1	
Subacute thyroiditis	245.1	
Microangiopathy	446.6	
Heart failure	428.x, 398.9x, 402.xx, 404.xx	K77
Stress cardiomyopathy	429.8x	
Coronary artery disease	410.x-414.x, V45.81, [Procedure codes: 36.0x, 36.1x, 36.2x, 36.3x]	K74, K75, K76
Arrhythmia	427.xx, 426.7, 794.3x, 785.0	K80, K79
Myocarditis	420.9, 422.xx, 423.9, 429.0	K84
Thromboembolism (DVT, PE, stroke, limb ischemia)	415.1x, 453.x, 443.x, 444.x, 445.x, 433.x, 434.x, 435.x, 436.x, 437.x, 451.x, 452.x, 325.x, 286.6x, 459.9, 557.0, 557.9, 453.40, 453.41, 453.42, 410.x, [Procedure codes: 36.0x, 36.1x, 36.2x, 36.3x]	K89, K90, K91, K93, K94, K74, K75, K76
Haemorrhagic disease	286.5x, 286.7, 287.xx, 430.x, 431.x, 432.x, [Procedure codes: 99.06]	K90, K91
Single Organ Cutaneous Vasculitis	709.1, 446.2x, 287.0	B83, K99
Acute liver injury	570.x, 573.3	D80, D97
Acute kidney injury	584.x, 586.xx	U99
Acute pancreatitis	577.0	
Generalized convulsion	345.xx, 780.3x, 779.0, 333.2, 649.4	N07, N88
Meningoencephalitis	322.9x, 323.0x, 323.4x, 323.5x, 323.6x, 323.8x, 323.9x, 323.7, 330.8, 377.7, 046.3, 049.8, 036.1, 056.0, 136.2, 130.xx, 054.3, 049.0, 094.1, 072.2, 013.0, 062.4, 049.9, 045.0, 062.xx	N71
Transverse myelitis	323.0x, 323.4x, 323.5x, 323.6x, 323.8x, 341.2x	
Bell's palsy	351.0, 351.8, 351.9	N91
Acute respiratory distress syndrome	518.8x, 518.5x, [Procedure codes: 96.7x]	R99
Erythema multiforme	695.1x	
Chilblain-like lesions	991.5	A88
Anosmia, ageusia	781.1	N16
Anaphylaxis	995.0, 995.1, 995.3, 995.4, 999.4x, 708.9, 519.1, 786.1, 458.9	A12, A99, A84, A85
Multisystem inflammatory syndrome in children	446.1	B99
Sudden death	798.x, 799	
Rhabdomyolysis	728.8, 791.3	

Supplementary Table 2. Baseline characteristics of levothyroxine users who were unvaccinated, received BNT162b2 or CoronaVac vaccine from February 23, 2021 to September 9, 2021 in Hong Kong SAR, China (after weighting)

Baseline characteristics	Levothyroxine users (N = 47,086)			
	After weighting			ASMD
	Unvaccinated (N = 23,423)	BNT162b2 (N = 12,310)	CoronaVac (N = 11,353)	
	Mean±SD / %	Mean±SD / %	Mean±SD / %	
Age, years	62.6±15.3	60.7±13.7	61.6±13.8	0.13
18-44	12.5%	12.6%	12.3%	0.03
45-64	43.4%	44.2%	42.9%	
≥65	44.0%	43.2%	44.9%	
Sex				0.01
Male	24.0%	24.3%	24.5%	
Female	76.0%	75.7%	75.5%	
COVID-19 survivor	0.2%	0.2%	0.2%	0.02
Received the second dose	NA	97.6%	94.5%	NA
Pre-existing comorbidities				
Charlson comorbidity index	3.1±1.9	3.1±1.9	3.1±2.0	0.02
0	7.8%	7.7%	7.7%	0.02
1-2	30.4%	30.0%	30.3%	
≥3	61.8%	62.3%	62.0%	
Levothyroxine daily dosage, mcg	78.3±26.5	80.0±25.4	79.7±24.8	0.07
Baseline TSH level, mIU/L	3.1±8.8	3.2±8.1	2.6±5.8	0.08
< 0.35	10.1%	9.9%	9.8%	
0.35-4.8	64.2%	68.4%	67.9%	
>4.8	12.0%	10.4%	10.1%	
Unknown	13.7%	11.3%	12.3%	
Graves' disease	1.9%	1.8%	1.8%	0.01
Comorbidities				
Myocardial infarction	0.8%	0.9%	0.9%	0.01
Peripheral vascular disease	0.4%	0.4%	0.2%	0.03
Cerebrovascular disease	5.3%	5.9%	5.5%	0.02
Chronic obstructive pulmonary disease	3.0%	2.9%	3.2%	0.02
Dementia	0.6%	0.5%	0.8%	0.03
Paralysis	0.3%	0.3%	0.3%	0.01
Diabetes without chronic complication	15.9%	15.8%	16.5%	0.02
Diabetes with chronic complication	1.1%	1.7%	1.3%	0.06
Chronic renal failure	2.9%	4.5%	3.3%	0.09
Mild liver disease	0.3%	0.2%	0.3%	0.02
Moderate-severe liver disease	0.2%	0.1%	0.2%	0.02
Ulcers	1.1%	0.9%	1.3%	0.04
Malignancy	5.7%	5.8%	5.4%	0.02
Metastatic solid tumour	1.2%	1.2%	1.1%	0.01
Health care utilizations				
Hospital admission	49.9%	45.2%	45.4%	0.09
ED visit	54.3%	48.0%	51.9%	0.13
Drugs				
Renin-angiotensin-system agents	23.1%	24.2%	23.6%	0.02
Beta blockers	15.8%	17.5%	16.9%	0.05
Calcium channel blockers	35.1%	36.4%	35.7%	0.03
Diuretics	7.5%	9.6%	7.8%	0.07
Nitrates	4.2%	4.7%	4.7%	0.02
Lipid lowering agents	36.4%	38.6%	36.3%	0.05
Antidiabetic drugs	16.9%	17.1%	17.3%	0.01
Antiplatelets	14.3%	15.9%	14.4%	0.05
Antidepressants	8.6%	9.1%	8.7%	0.01
NSAIDs	8.6%	8.3%	8.6%	0.01
Drugs for gout	3.6%	5.4%	3.5%	0.09
Antibacterial drugs	8.6%	8.6%	8.6%	0.00

Note: NSAID = non-steroidal anti-inflammatory drug; ASMD = Maximum absolute standardized mean difference

Supplementary Table 3. Number of cases, incidence rates of dosage reduction/escalation of LT4, emergency department visits and unscheduled hospitalization, and hazard ratio of events for BNT162b2 or CoronaVac in comparison with unvaccinated people by age, gender, and pre-vaccination thyroid status.

Subgroups	Before weighting				After weighting		
	Cumulative incidence (Events / 10,000 doses)		Crude incidence rate (Events / 10,000 person-years)		Vaccinated VS Unvaccinated		
	Cases with event	Rate	Estimate	95% CI	HR*	95% CI	P-value
Dosage reduction of							
Age < 65 years							
Unvaccinated	2289	2349.86	10,333.37	(9,914.34, 10,765.55)	-	-	-
BNT162b2	1871	2027.96	9,753.74	(9,316.74, 10,205.95)	0.921	(0.847, 1.001)	0.052
CoronaVac	1582	2151.80	9,466.72	(9,005.92, 9,944.98)	0.897	(0.837, 0.961)	0.002†
Age ≥ 65 years							
Unvaccinated	2243	1639.38	7,281.29	(6,983.05, 7,588.99)	-	-	-
BNT162b2	486	1575.88	7,328.14	(6,691.02, 8,009.56)	1.068	(0.895, 1.274)	0.464
CoronaVac	698	1744.56	7,464.89	(6,921.30, 8,039.83)	1.102	(0.962, 1.261)	0.160
Male							
Unvaccinated	1243	2179.94	9,281.28	(8,772.42, 9,811.96)	-	-	-
BNT162b2	689	2430.34	11,413.19	(10,576.78, 12,298.16)	1.030	(0.878, 1.209)	0.714
CoronaVac	678	2527.02	10,650.51	(9,863.81, 11,483.27)	1.005	(0.871, 1.159)	0.951
Female							
Unvaccinated	3289	1855.99	8,313.12	(8,031.41, 8,602.18)	-	-	-
BNT162b2	1668	1760.42	8,433.84	(8,033.91, 8,848.52)	0.948	(0.858, 1.048)	0.299
CoronaVac	1602	1847.75	8,133.74	(7,740.28, 8,542.03)	0.953	(0.882, 1.030)	0.228
TSH < 0.35 mIU/L							
Unvaccinated	671	2852.89	14,070.24	(13,025.63, 15,176.32)			
BNT162b2	329	2674.80	14,139.29	(12,652.56, 15,752.72)	0.903	(0.775, 1.053)	0.193
CoronaVac	300	2849.00	13,931.12	(12,399.13, 15,600.12)	1.038	(0.835, 1.291)	0.737
TSH 0.35-4.8 mIU/L							
Unvaccinated	2465	1664.53	7,546.33	(7,251.33, 7,850.24)			
BNT162b2	1444	1687.70	8,144.21	(7,729.52, 8,575.38)	0.964	(0.874, 1.062)	0.457
CoronaVac	1378	1769.16	7,913.27	(7,500.93, 8,342.39)	0.964	(0.891, 1.042)	0.355
TSH > 4.8 mIU/L							
Unvaccinated	758	2438.87	11,628.99	(10,815.76, 12,487.17)			
BNT162b2	252	2176.17	11,294.48	(9,942.92, 12,778.51)	1.065	(0.721, 1.574)	0.752
CoronaVac	234	2303.15	10,546.66	(9,238.53, 11,988.09)	0.961	(0.738, 1.251)	0.767
Dosage escalation of							
Age < 65 years							
Unvaccinated	216	221.74	837.14	(729.22, 956.54)	-	-	-
BNT162b2	109	118.14	502.44	(412.55, 606.09)	1.029	(0.603, 1.758)	0.916
CoronaVac	82	111.53	429.34	(341.46, 532.92)	0.573	(0.437, 0.752)	<0.001
Age ≥ 65 years							
Unvaccinated	329	240.46	955.20	(854.76, 1,064.19)	-	-	-
BNT162b2	29	94.03	389.93	(261.14, 560.01)	0.466	(0.303, 0.716)	<0.001
CoronaVac	52	129.97	494.72	(369.48, 648.76)	0.870	(0.454, 1.666)	0.674
Male							
Unvaccinated	169	296.39	1,082.49	(925.43, 1,258.56)	-	-	-
BNT162b2	33	116.40	464.38	(319.66, 652.17)	0.551	(0.326, 0.930)	0.026†
CoronaVac	45	167.72	593.20	(432.69, 793.75)	1.101	(0.498, 2.435)	0.812
Female							
Unvaccinated	376	212.18	842.42	(759.42, 932.03)	-	-	-
BNT162b2	105	110.82	476.72	(389.91, 577.10)	0.872	(0.532, 1.429)	0.585

CoronaVac	89	102.65	404.10	(324.52, 497.28)	0.550	(0.422, 0.717)	<0.001
TSH < 0.35 mIU/L							
Unvaccinated	39	165.82	653.40	(464.63, 893.22)			
BNT162b2	13	105.69	463.49	(246.79, 792.59)	0.825	(0.413, 1.650)	0.587
CoronaVac	9	85.47	345.92	(158.18, 656.66)	2.465	(0.566, 10.741)	0.229
TSH 0.35-4.8 mIU/L							
Unvaccinated	187	126.27	511.82	(441.09, 590.67)			
BNT162b2	53	61.94	270.13	(202.35, 353.34)	0.651	(0.439, 0.965)	0.033†
CoronaVac	50	64.19	257.54	(191.15, 339.54)	0.569	(0.394, 0.821)	0.003†
TSH > 4.8 mIU/L							
Unvaccinated	253	814.03	3,371.67	(2,968.97, 3,813.76)			
BNT162b2	59	509.50	2,345.04	(1,785.16, 3,024.93)	0.914	(0.450, 1.857)	0.803
CoronaVac	56	551.18	2,196.62	(1,659.30, 2,852.50)	0.628	(0.447, 0.882)	0.007†
ED visits							
Age < 65 years							
Unvaccinated	387	397.90	5,326.40	(4,808.88, 5,884.43)	-	-	-
BNT162b2	256	277.81	3,687.04	(3,249.18, 4,167.46)	1.180	(0.869, 1.601)	0.289
CoronaVac	168	228.76	3,032.94	(2,591.65, 3,527.84)	0.833	(0.676, 1.027)	0.087
Age ≥ 65 years							
Unvaccinated	838	614.68	8,359.89	(7,803.38, 8,945.61)	-	-	-
BNT162b2	70	227.13	3,014.22	(2,349.73, 3,808.28)	0.770	(0.447, 1.325)	0.345
CoronaVac	99	247.62	3,285.96	(2,670.66, 4,000.53)	0.855	(0.550, 1.327)	0.485
Male							
Unvaccinated	418	736.05	10,046.75	(9,106.59, 11,057.63)	-	-	-
BNT162b2	89	314.15	4,178.62	(3,355.77, 5,142.15)	0.972	(0.628, 1.504)	0.897
CoronaVac	61	227.53	3,014.61	(2,305.94, 3,872.39)	0.702	(0.409, 1.205)	0.200
Female							
Unvaccinated	807	456.45	6,146.60	(5,729.78, 6,585.73)	-	-	-
BNT162b2	237	250.42	3,321.34	(2,911.92, 3,772.21)	0.930	(0.628, 1.376)	0.715
CoronaVac	206	237.85	3,155.39	(2,739.18, 3,616.96)	0.920	(0.669, 1.266)	0.610
TSH < 0.35 mIU/L							
Unvaccinated	123	524.52	7,063.96	(5,870.84, 8,428.31)			
BNT162b2	35	284.78	3,775.90	(2,630.05, 5,251.36)	0.834	(0.534, 1.305)	0.427
CoronaVac	27	256.65	3,413.22	(2,249.34, 4,966.06)	0.683	(0.409, 1.139)	0.144
TSH 0.35-4.8 mIU/L							
Unvaccinated	741	501.59	6,771.31	(6,292.48, 7,276.91)			
BNT162b2	231	270.37	3,591.65	(3,143.38, 4,085.91)	0.872	(0.663, 1.148)	0.328
CoronaVac	189	242.84	3,222.80	(2,779.69, 3,716.46)	0.887	(0.642, 1.226)	0.468
TSH > 4.8 mIU/L							
Unvaccinated	264	854.37	11,829.12	(10,445.10, 13,345.50)			
BNT162b2	33	284.97	3,786.31	(2,606.32, 5,317.38)	1.316	(0.465, 3.720)	0.605
CoronaVac	25	246.06	3,273.89	(2,118.69, 4,832.91)	0.808	(0.302, 2.161)	0.670
Unscheduled hospitalization							
Age < 65 years							
Unvaccinated	197	202.42	2,682.24	(2,320.75, 3,084.08)	-	-	-
BNT162b2	61	66.15	869.13	(664.82, 1,116.44)	1.184	(0.615, 2.279)	0.613
CoronaVac	48	65.32	857.44	(632.21, 1,136.85)	0.684	(0.462, 1.013)	0.058
Age ≥ 65 years							
Unvaccinated	609	446.28	6,016.56	(5,548.14, 6,513.97)	-	-	-
BNT162b2	33	107.00	1,411.33	(971.49, 1,982.03)	0.781	(0.367, 1.664)	0.522
CoronaVac	41	102.50	1,349.13	(968.16, 1,830.25)	0.746	(0.380, 1.465)	0.395

Male

Unvaccinated	310	545.20	7,374.55	(6,576.39, 8,242.89)	-	-	-
BNT162b2	37	130.60	1,722.77	(1,212.99, 2,374.62)	0.934	(0.504, 1.729)	0.827
CoronaVac	29	108.13	1,423.44	(953.30, 2,044.30)	0.573	(0.260, 1.262)	0.167

Female

Unvaccinated	496	280.35	3,739.72	(3,417.81, 4,083.79)	-	-	-
BNT162b2	57	60.17	790.68	(598.85, 1,024.41)	0.885	(0.413, 1.893)	0.752
CoronaVac	60	69.23	909.13	(693.76, 1,170.23)	0.835	(0.447, 1.559)	0.570

TSH < 0.35 mIU/L

Unvaccinated	86	366.43	4,899.56	(3,919.01, 6,050.91)			
BNT162b2	9	73.23	962.75	(440.23, 1,827.60)	0.417	(0.196, 0.889)	0.023†
CoronaVac	8	76.05	999.52	(431.52, 1,969.45)	0.483	(0.197, 1.185)	0.112

TSH 0.35-4.8 mIU/L

Unvaccinated	467	315.88	4,221.65	(3,847.39, 4,622.48)			
BNT162b2	67	78.34	1,030.58	(798.69, 1,308.80)	0.841	(0.517, 1.368)	0.486
CoronaVac	64	82.20	1,080.53	(832.14, 1,379.81)	0.800	(0.448, 1.430)	0.452

TSH > 4.8 mIU/L

Unvaccinated	197	636.72	8,713.43	(7,539.09, 10,018.85)			
BNT162b2	10	86.36	1,137.39	(545.42, 2,091.70)	1.580	(0.450, 5.551)	0.476
CoronaVac	9	88.58	1,168.29	(534.22, 2,217.78)	0.817	(0.202, 3.299)	0.776

Note: * Unvaccinated group as reference category; † No association as it did not reach Bonferroni-corrected significance level