

eTable 1. Hazard ratios with 95% confidence intervals (CI) of adverse events of interest generated from Cox proportional hazard models (sub-categories of the AESI as outcomes)

Auto-immune diseases	Hazard ratios with 95% CI		
	Model 1	Model 2	Model 3
Vaccination status			
Unvaccinated	Ref	Ref	Ref
Comirnaty	0.84 (0.58, 1.19)	0.84 (0.59, 1.19)	0.82 (0.54, 1.24)
CoronaVac	0.55 (0.39, 0.79) **	0.55 (0.39, 0.79) **	0.49 (0.31, 0.77) **
Multimorbidity status			
One chronic condition	-	Ref	Ref
Multimorbid	-	1.22 (0.96, 1.57)	1.16 (0.88, 1.55)
Interaction			
Comirnaty X multimorbidity	-	-	1.08 (0.52, 2.24)
CoronaVac X multimorbidity	-	-	1.36 (0.65, 2.85)
Cardiovascular system diseases	Hazard ratios with 95% CI		
	Model 1	Model 2	Model 3
Vaccination status			
Unvaccinated	Ref	Ref	Ref
Comirnaty	0.58 (0.45, 0.75) ***	0.59 (0.45, 0.76) ***	0.59 (0.42, 0.82) **
CoronaVac	0.65 (0.54, 0.79) ***	0.66 (0.54, 0.80) ***	0.67 (0.53, 0.86) **
Multimorbidity status			
One chronic condition	-	Ref	Ref
Multimorbid	-	1.66 (1.44, 1.90) ***	1.67 (1.43, 1.97) ***
Interaction			
Comirnaty X multimorbidity	-	-	0.99 (0.59, 1.66)
CoronaVac X multimorbidity	-	-	0.95 (0.64, 1.41)
Circulatory system diseases	Hazard ratios with 95% CI		
	Model 1	Model 2	Model 3
Vaccination status			
Unvaccinated	Ref	Ref	Ref
Comirnaty	0.77 (0.58, 1.01)	0.77 (0.59, 1.02)	0.82 (0.59, 1.15)
CoronaVac	0.58 (0.46, 0.73) ***	0.58 (0.46, 0.74) ***	0.50 (0.36, 0.69) ***
Multimorbidity status			
One chronic condition	-	Ref	Ref
Multimorbid	-	1.81 (1.54, 2.13) ***	1.77 (1.47, 2.12) ***
Interaction			

Comirnaty X multimorbidity	-	-	0.87 (0.49, 1.53)
CoronaVac X multimorbidity	-	-	1.36 (0.86, 2.16)
Hepato-renal system diseases			
Hazard ratios with 95% CI			
	Model 1	Model 2	Model 3
Vaccination status			
Unvaccinated	Ref	Ref	Ref
Comirnaty	0.58 (0.44, 0.76) ***	0.58 (0.44, 0.77) ***	0.62 (0.44, 0.86) **
CoronaVac	0.89 (0.74, 1.08)	0.90 (0.74, 1.08)	0.86 (0.67, 1.10)
Multimorbidity status			
One chronic condition	-	Ref	Ref
Multimorbid	-	1.54 (1.32, 1.79) ***	1.53 (1.28, 1.83) ***
Interaction			
Comirnaty X multimorbidity	-	-	0.87 (0.50, 1.54)
CoronaVac X multimorbidity	-	-	1.11 (0.75, 1.62)
Nerves and central nervous system diseases			
Hazard ratios with 95% CI			
	Model 1	Model 2	Model 3
Vaccination status			
Unvaccinated	Ref	Ref	Ref
Comirnaty	0.73 (0.36, 1.46)	0.73 (0.36, 1.47)	0.91 (0.39, 2.14)
CoronaVac	0.71 (0.39, 1.28)	0.71 (0.39, 1.29)	0.76 (0.36, 1.61)
Multimorbidity status			
One chronic condition	-	Ref	Ref
Multimorbid	-	1.59 (1.03, 2.46) *	1.74 (1.05, 2.91) *
Interaction			
Comirnaty X multimorbidity	-	-	0.57 (0.13, 2.57)
CoronaVac X multimorbidity	-	-	0.86 (0.25, 2.89)
Other system diseases			
Hazard ratios with 95% CI			
	Model 1	Model 2	Model 3
Vaccination status			
Unvaccinated	Ref	Ref	Ref
Comirnaty	0.97 (0.63, 1.50)	0.97 (0.63, 1.51)	1.13 (0.66, 1.94)
CoronaVac	1.24 (0.85, 1.79)	1.24 (0.85, 1.80)	1.27 (0.79, 2.05)
Multimorbidity status			
One chronic condition	-	Ref	Ref
Multimorbid	-	1.37 (1.01, 1.87) *	1.47 (1.00, 2.17)
Interaction			

Comirnaty X multimorbidity	-	-	0.66 (0.26, 1.69)
CoronaVac X multimorbidity	-	-	0.94 (0.44, 2.03)
Hazard ratios with 95% CI			
Respiratory system disease	Model 1	Model 2	Model 3
Vaccination status			
Unvaccinated	Ref	Ref	Ref
Comirnaty	0.21 (0.08, 0.61) **	0.22 (0.08, 0.61) **	0.21 (0.06, 0.81) *
CoronaVac	0.31 (0.17, 0.57) ***	0.32 (0.17, 0.58) ***	0.56 (0.27, 1.14)
Multimorbidity status			
One chronic condition	-	Ref	Ref
Multimorbid	-	2.61 (1.85, 3.68) ***	2.93 (2.01, 4.24) ***
Interaction			
Comirnaty X multimorbidity	-	-	1.03 (0.14, 7.46)
CoronaVac X multimorbidity	-	-	0.27 (0.07, 1.08)
Hazard ratios with 95% CI			
Skin and mucous membrane, bone and joints system disease	Model 1	Model 2	Model 3
Vaccination status			
Unvaccinated	Ref	Ref	Ref
Comirnaty	4.71 (0.25, 89.38)	4.74 (0.25, 98.87)	3.28 (0.15, 73.5)
CoronaVac	1.92 (0.17, 21.26)	1.93 (0.18, 21.13)	4.11 (0.26, 66.2)
Multimorbidity status			
One chronic condition	-	Ref	Ref
Multimorbid	-	1.65 (0.27, 10.22)	2.32 (0.01, 37.2)
Interaction			
Comirnaty X multimorbidity	-	-	1.84 (0.04, 94.1)
CoronaVac X multimorbidity	-	-	1.26e-08 (4.18e-10, 3.79e-07) ***

\*\*\* P < 0.001; \*\* P < 0.01; \* P < 0.05

Included independent variable in Model 1: vaccination status only; Model 2: Model 1 + multimorbidity status; Model 3: Model 2 + interaction between vaccination status and multimorbidity

eTable 2. Hazard ratios with 95% confidence intervals (CI) of adverse events of interest generated from Cox proportional hazard models (multimorbidity status replaced by the Charlson Comorbidity Index score)

	Hazard ratios with 95% CI		
	Model 1	Model 2	Model 3
Vaccination status			
Unvaccinated	Ref	Ref	Ref
Comirnaty	0.64 (0.56, 0.73) ***	0.65 (0.57, 0.74) ***	0.77 (0.66, 0.90) ***
CoronaVac	0.68 (0.61, 0.75) ***	0.69 (0.62, 0.76) ***	0.69 (0.60, 0.80) ***
Multimorbidity status			
Charlson Comorbidity Index score	-	1.17 (1.13, 1.21) ***	1.19 (1.15, 1.23) ***
Interaction			
Comirnaty X Charlson Comorbidity Index score	-	-	0.72 (0.59, 0.88) **
CoronaVac X Charlson Comorbidity Index score	-	-	0.99 (0.84, 1.16)

\*\*\* P < 0.001; \*\* P < 0.01; \* P < 0.05

Included independent variable in Model 1: vaccination status only; Model 2: Model 1 + Charlson Comorbidity Index score; Model 3: Model 2 + interaction between vaccination status and Charlson Comorbidity Index score

eTable 3. Hazard ratios with 95% confidence intervals (CI) of adverse events of interest generated from Cox proportional hazard models (date of second dose omitted as observation endpoints)

	Hazard ratios with 95% CI		
	Model 1	Model 2	Model 3
Vaccination status			
Unvaccinated	Ref	Ref	Ref
Comirnaty	0.70 (0.62, 0.79) ***	0.70 (0.63, 0.79) ***	0.76 (0.66, 0.88) ***
CoronaVac	0.70 (0.63, 0.78) ***	0.71 (0.64, 0.78) ***	0.70 (0.61, 0.80) ***
Multimorbidity status			
One chronic condition	-	Ref	Ref
Multimorbid	-	1.61 (1.49, 1.73) ***	1.64 (1.50, 1.79) ***
Interaction			
Comirnaty X multimorbidity	-	-	0.84 (0.66, 1.07)
CoronaVac X multimorbidity	-	-	1.02 (0.83, 1.25)

\*\*\* P < 0.001; \*\* P < 0.01; \* P < 0.05

Included independent variable in Model 1: vaccination status only; Model 2: Model 1 + multimorbidity status; Model 3: Model 2 + interaction between vaccination status and multimorbidity

eTable 4. Hazard ratios with 95% confidence intervals (CI) of adverse events of interest generated from Cox proportional hazard models (including only patients who were vaccinated on or before July 3, 2021)

	Hazard ratios with 95% CI		
	Model 1	Model 2	Model 3
Vaccination status			
Unvaccinated	Ref	Ref	Ref
Comirnaty	0.68 (0.58, 0.78) ***	0.68 (0.59, 0.79) ***	0.70 (0.58, 0.84) ***
CoronaVac	0.70 (0.63, 0.79) ***	0.71 (0.63, 0.79) ***	0.69 (0.60, 0.80) ***
Multimorbidity status			
One chronic condition	-	Ref	Ref
Multimorbid	-	1.64 (1.51, 1.79) ***	1.65 (1.50, 1.81) ***
Interaction			
Comirnaty X multimorbidity	-	-	0.93 (0.69, 1.25)
CoronaVac X multimorbidity	-	-	1.03 (0.82, 1.30)

\*\*\* P < 0.001; \*\* P < 0.01; \* P < 0.05

Included independent variable in Model 1: vaccination status only; Model 2: Model 1 + multimorbidity status; Model 3: Model 2 + interaction between vaccination status and multimorbidity

eTable 5. Hazard ratios with 95% confidence intervals (CI) of adverse events of interest generated from Cox proportional hazard models (AESI defined by inpatient records only)

	Hazard ratios with 95% CI		
	Model 1	Model 2	Model 3
Vaccination status			
Unvaccinated	Ref	Ref	Ref
Comirnaty	0.58 (0.48, 0.70) ***	0.58 (0.48, 0.70) ***	0.66 (0.52, 0.84) ***
CoronaVac	0.52 (0.44, 0.62) ***	0.52 (0.44, 0.62) ***	0.53 (0.43, 0.66) ***
Multimorbidity status			
One chronic condition	-	Ref	Ref
Multimorbid	-	1.76 (1.57, 1.97) ***	1.82 (1.61, 2.06) ***
Interaction			
Comirnaty X multimorbidity	-	-	0.75 (0.50, 1.12)
CoronaVac X multimorbidity	-	-	0.98 (0.69, 1.38)

\*\*\* P < 0.001; \*\* P < 0.01; \* P < 0.05

Included independent variable in Model 1: vaccination status only; Model 2: Model 1 + multimorbidity status; Model 3: Model 2 + interaction between vaccination status and multimorbidity

eTable 6. Hazard ratios with 95% confidence intervals (CI) of adverse events of interest generated from Cox proportional hazard models (excluding patients with a hospitalization record in the past six months)

	Hazard ratios with 95% CI		
	Model 1	Model 2	Model 3
<b>Vaccination status</b>			
Unvaccinated	Ref	Ref	Ref
Comirnaty	0.69 (0.58, 0.83) ***	0.70 (0.58, 0.83) ***	0.73 (0.59, 0.91) **
CoronaVac	0.85 (0.75, 0.98) *	0.86 (0.75, 0.98) *	0.82 (0.69, 0.97) *
<b>Multimorbidity status</b>			
One chronic condition	-	Ref	Ref
Multimorbid	-	1.63 (1.48, 1.79) ***	1.62 (1.45, 1.81) ***
<b>Interaction</b>			
Comirnaty X multimorbidity	-	-	0.88 (0.60, 1.27)
CoronaVac X multimorbidity	-	-	1.10 (0.84, 1.44)

\*\*\* P < 0.001; \*\* P < 0.01; \* P < 0.05

Included independent variable in Model 1: vaccination status only; Model 2: Model 1 + multimorbidity status; Model 3: Model 2 + interaction between vaccination status and multimorbidity



eTable 7. List of included chronic conditions and corresponding diagnosis codes

Disease	ICD-9 codes	ICPC codes
Dementia	290, 294.1, 331.2	P70
Hypertension	401-405	K86, K87
Irritable bowel syndrome	564.1	D93
Peripheral vascular disease	440.2	-
Schizophrenia	295	P72
Alcohol misuse	265.2, 291.1–291.3, 291.5– 291.9, 303.0, 303.9, 305.0, 357.5, 425.5, 535.3, 571.0– 571.3, 980, V11.3	P15
Chronic pain	307.80, 307.89, 338.0, 338.2, 338.4, 719.41, 719.45 - 719.47, 719.49, 720.0, 720.2, 720.9, 721.0 - 721.4, 721.6, 721.8, 721.9, 722, 723.0, 723.1, 723.3 - 723.9, 724.0 - 724.6, 724.70, 724.79, 724.8, 724.9, 729.0 - 729.2, 729.4, 729.5	-
Depression	296.2, 296.3, 296.5, 300.4, 309, 311	P76
Hypothyroidism	240.9, 243, 244, 246.1, 246.8	T86
Parkinson's disease	332	N87
Psoriasis	696.1	S91
Severe constipation	560.1, 560.30, 560.39, 560.9, 564.0, 569.83, 569.89	D12
Asthma	493	R96
Chronic pulmonary disease	416.8, 416.9, 490–492, 494-505, 506.4, 508.1, 508.8	R95
Inflammatory bowel disease	555, 556	-
Peptic ulcer disease	440.2	D86
Rheumatoid arthritis	446.5, 710.0–710.4, 714.0– 714.2, 714.8, 725	L88
Diabetes (Type 2)	250.00, 250.02, 250.10, 250.12, 250.20, 250.22, 250.30, 250.32, 250.40, 250.42, 250.50, 250.52, 250.60, 250.62, 250.70, 250.72, 250.80, 250.82, 250.90, 250.92	-
Cancer	200–202, 203.0, 238.6, 196–199, 153-154, 162-163, 174, 180, 185, 230.3-230.6, 231.2, 233.0-233.1, 233.4	B72, B74, D74, D75, D76, D77, L71, N74, R84, S77, T71, U75, U76, U77, W72, X75, X76, X77, Y77, Y78
Cirrhosis	571.2, 571.5, 571.6, 456.0, 456.1, 456.20, 456.21, 567.0, 567.2, 567.21, 567.29, 567.8, 567.9, 572.2, 572.4, 789.5	-

eTable 8. List of AESI and corresponding diagnosis codes

AESI	ICD-9 codes	ICPC codes
Auto-immune diseases		
Guillain-Barré Syndrome	357.0, 357.8x, 357.9	N94, N94005
Acute disseminated encephalomyelitis (ADEM)	323.6x, 323.8x	
Narcolepsy	347.xx, 89.17, 89.18, 307.4, 780.5	
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, 250.91, 250.93	T89
(Idiopathic) Thrombocytopenia	287.3x, 287.4x, 287.5, 279.12, 283.11, 284.1x, 446.6, 776.1	
Subacute thyroiditis	245.1	
Cardiovascular system diseases		
Microangiopathy	446.6	
Heart failure	428.xx, 398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93	K77
Stress cardiomyopathy	429.83	
Coronary artery disease	410.xx-414.xx, V45.81, 36.0x, 36.1x, 36.2x, 36.3x	K74, K75, K76
Arrhythmia	427.xx, 426.7, 624.x, 794.3x, 785.0	K79, K80
Myocarditis	422.xx, 429.0, 420.9, 423.9	K84, K84010
Circulatory system diseases		
	415.1x, 453.xx, 443.xx, 444.xx, 445.xx, 433.xx, 434.xx, 435.xx, 436, 437.0, 437.1, 437.6, 437.8, 437.9, 451.x, 452.x, 325, 286.6x, 459.9, 434.01, 557.0, 557.9, 453.40, 453.41, 453.42, 410.x	K74, K75, K76, K89, K90, K91, K93, K94
Thromboembolism	286.5x, 286.7, 287x, 430, 431, 432.0, 432.9	K90, K91
Hemorrhagic disease	709.1, 446.2x, 287.0	B83, K99, B83019, K99016
Single Organ Cutaneous Vasculitis		
Hepato-renal system diseases		
Acute liver injury	570.xx, 573.3	D80, D97
Acute kidney injury	584.xx, 586.xx	U99, U99005
Acute pancreatitis	577.0	

Nerves and central nervous system diseases		
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, 337.73, 046.3, 049.8, 036.1, 056.01, 136.2, 130, 054.3, 049.0, 094.1, 072.2, 013.0, 062.4, 049.9, 045.0, 062	N71, N70
Transverse myelitis	323.0x, 323.4x, 323.5x, 323.6x, 323.8x, 341.2x	
Bell's Palsy	351.0, 351.8, 351.9	N91
Respiratory system disease		
Acute respiratory distress syndrome	518.8x, 518.5x, 96.7x	R99, R99004
Skin, bone, and joints system diseases		
Erythema multiforme	695.1x	
Chilblain – like lesions	991.5	A88, A88001
Other system diseases		
Anosmia, ageusia	781.1	N16
Anaphylaxis	995.0, 995.1, 995.3, 995.4, 999.4x, 708.9, 519.11, 786.1, 458.9, 519.1x	A12, A99, A84, A85
Multisystem inflammatory syndrome in children	446.1	B99, B99022
Rhabdomyolysis	728.88, 728.89, 791.3	