

Supplementary information

Neurological complications after first dose of COVID-19 vaccines and SARS-CoV-2 infection

In the format provided by the authors and unedited

Supplementary table 1: Incidence rate ratios (IRR 95% CI) for Bell's palsy excluding patients who had a suspected concurrent diagnosis of cerebral infarction in pre-defined risk period (1-28 days) immediately before and after exposure to vaccination and before and after a Positive SARS-CoV-2 test result, adjusted for calendar time from 1 December 2020 until 31 May 2021 (cells with < 5 are suppressed).

	Time period	ChAdOx1nCoV-19 vaccine		BNT162b2 mRNA vaccine		Positive SARS-CoV-2 test	
		events	IRR (95% CI)	events	IRR (95% CI)	events	IRR (95% CI)
Bell's palsy	Baseline	1269	1.00	674	1.00	184	1.00
	-28 to -1 days	303	0.79 (0.70, 0.90)	160	0.78 (0.65, 0.94)	74	3.12 (2.29, 4.25)
	0 day	*	0.28 (0.11, 0.76)	*	0.39 (0.12, 1.20)	34	35.18 (23.70, 52.24)
	1-7 days	87	0.87 (0.70, 1.09)	51	0.92 (0.68, 1.23)	43	6.25 (4.35, 8.98)
	8-14 days	81	0.81 (0.64, 1.02)	53	0.93 (0.70, 1.24)	17	2.38 (1.42, 3.99)
	15-21 days	132	1.33 (1.10, 1.60)	61	1.04 (0.79, 1.37)	8	1.06 (0.51, 2.17)
	22-28 days	110	1.14 (0.93, 1.40)	70	1.22 (0.97, 1.57)	5	0.62 (0.25, 1.51)

Supplementary table 2: Incidence rate ratios (IRR 95% CI) of the combined occurrence of Guillain-Barre syndrome and Bell's palsy in pre-defined risk periods immediately before and after exposure to vaccination and before and after a positive SARS-CoV-2 test result, adjusted for calendar time from 1 December 2020 to 31 May 2021 (cells with < 5 are suppressed).

	Time period	ChAdOx1nCoV-19 vaccine		BNT162b2 mRNA vaccine		Positive SARS-CoV-2 test	
		events	IRR (95% CI)	events	IRR (95% CI)	events	IRR (95% CI)
Guillain-Barre and Bell's palsy	Baseline	12	1.00	34	1.00	31	1.00
	-28 to -1 days	*	0.76 (0.04, 16.09)	0	n/a	1	n/a
	0 day	*	n/a	0	n/a	0	n/a
	1-28 days	21	12.66 (2.70, 59.21)	0	n/a	2	n/a

Guillain-Barre and Bell's palsy	Baseline	12	1.00	34	1.00	31	1.00
	-28 to -1 days	*	0.70 (0.03, 14.93)	0	n/a	*	n/a
	0 day	*	n/a	0	n/a	0	n/a
	1-7 days	0	n/a	0	n/a	0	n/a
	8-14 days	0	n/a	0	n/a	0	n/a
	15-21 days	13	28.86 (5.45, 152.74)	0	n/a	*	n/a
	22-28 days	8	13.35 (2.48, 72.92)	0	n/a	*	n/a

Supplementary table 3a: Baseline demographic characteristics of people receiving either ChAdOx1nCoV-19 or BNT162b2 vaccines or testing positive to SARS-CoV-2 virus (in those vaccinated with either vaccine), in Scotland between 1 December 2020 until 31 May 2021. Figures are column % (counts).

	ChAdOx1nCoV-19 vaccine	BNT162b2 mRNA vaccine	Positive SARS-CoV-2 test (amongst vaccinated)
	<i>Col % (counts)</i>	<i>Col % (counts)</i>	<i>Col % (counts)</i>
Total number of people	1982678	1077626	117554
Sex			
Number of women	50.7 (1005836)	59.1 (637102)	58.6 (68941)
Number of men	49.3 (976842)	40.9 (440524)	41.4 (48613)
Age			
16-29 years	4.00 (79133)	10.9 (117779)	11.0 (12976)
30-39 years	7.5 (148417)	16.4 (177002)	14.2 (16709)
40-49 years	18.7 (371830)	17.3 (186315)	21.4 (25133)
50-59 years	29.0 (574910)	13.7 (148197)	26.3 (30939)
60-69 years	18.4 (364418)	22.0 (236708)	13.0 (15299)
70-79 years	13.1 (259069)	16.2 (175170)	7.0 (8187)
80-89 years	8.2 (163025)	2.6 (28396)	5.4 (6317)
90+ years	1.1 (21876)	0.7 (8059)	1.7 (1994)

Encephalitis meningitis and myelitis	Baseline	71	1.00	52	1.00	19	1.00	6	1.00
	-28 to -1 days	6	0.25 (0.10, 0.59)	6	0.36 (0.14, 0.87)	*	n/a	*	n/a
	0 day	*	n/a	*	n/a	*	n/a	*	n/a
	1-28 days	14	0.6 (0.32, 1.14)	9	0.61 (0.27, 1.35)	5	0.75 (0.22, 2.47)	*	0.63 (0.07, 5.35)
Guillain-Barre	Baseline	21	1.00	19	1.00	*	1.00	*	1.00
	-28 to -1 days	*	n/a	*	n/a	*	n/a	*	n/a
	0 day	*	n/a	*	n/a	*	n/a	*	n/a
	1-28 days	19	2.32 (1.08, 5.02)	17	2.31 (1.02, 5.24)	*	1.00 (0.02, 41.99)	*	n/a
Bell's palsy	Baseline	98	1.00	74	1.00	24	1.00	*	1.00
	-28 to -1 days	19	0.66 (0.39, 1.12)	14	0.63 (0.34, 1.17)	5	1.06 (0.35, 3.18)	*	3.07 (0.27, 34.37)
	0 day	*	0.91 (0.12, 6.57)	*	1.15 (0.16, 8.43)	*	n/a	*	65.77 (5.96, 725.58)
	1-28 days	35	1.13 (0.73, 1.75)	26	1.13 (0.68, 1.87)	9	1.17 (0.44, 3.09)	*	4.7 (0.66, 33.36)
Myasthenic disorder	Baseline	40	1.00	28	1.00	12	1.00	*	1.00
	-28 to -1 days	7	0.38 (0.14, 1.04)	*	0.24 (0.06, 0.91)	*	n/a	*	n/a
	0 day	*	n/a	*	n/a	*	n/a	*	n/a
	1-28 days	11	0.46 (0.19, 1.13)	10	0.52 (0.18, 1.52)	*	n/a	*	n/a
Haemorrhagic stroke	Baseline	258	1.00	206	1.00	52	1.00	16	1.00
	-28 to -1 days	27	0.23 (0.15, 0.35)	23	0.24 (0.15, 0.39)	*	0.16 (0.05, 0.48)	7	1.6 (0.64, 4.03)
	0 day	*	0.18 (0.03, 1.32)	*	0.24 (0.03, 1.74)	*	n/a	*	5.7 (0.75, 43.45)
	1-28 days	98	0.64 (0.48, 0.85)	73	0.63 (0.46, 0.87)	25	0.65 (0.35, 1.2)	*	0.7 (0.20, 2.41)
Subarachnoid haemorrhage	Baseline	159	1.00	118	1.00	41	1.00	12	1.00
	-28 to -1 days	17	0.22 (0.13, 0.37)	16	0.3 (0.17, 0.53)	*	0.05 (0.01, 0.4)	*	1.56 (0.49, 4.94)
	0 day	*	n/a	*	n/a	*	n/a	*	29.84 (8.25, 107.93)

	1-28 days	52	0.6 (0.42, 0.86)	39	0.78 (0.51, 1.19)	13	0.3 (0.13, 0.7)	*	n/a
--	-----------	----	------------------	----	-------------------	----	-----------------	---	-----

Supplementary table 3c: Incidence rate ratios (IRR 95% CI) for Guillain-Barre syndrome in pre-defined risk periods immediately before and after exposure to vaccination and before and after a Positive SARS-CoV-2 test result, adjusted for calendar time from 1 December 2020 until 31 May 2021 using Scottish national data (cells with < 5 are suppressed).

	Time period	Either vaccine		ChAdOx1nCoV-19 vaccine		BNT162b2 mRNA vaccine		Positive SARS-CoV-2 test	
		events	IRR (95% CI)	events	IRR (95% CI)	events	IRR (95% CI)	events	IRR (95% CI)
Guillain-Barre	Baseline	21	1.00	19	1.00	*	1.00	*	1.00
	-28 to -1 days	*	n/a	*	n/a	*	n/a	*	n/a
	0 day	*	n/a	*	n/a	*	n/a	*	n/a
	1-7 days	*	n/a	*	n/a	*	n/a	*	n/a
	8-14 days	*	1.91 (0.58, 6.27)	*	2.15 (0.63, 7.31)	*	n/a	*	n/a
	15-21 days	10	5.35 (2.09, 13.70)	8	4.79 (1.72, 13.38)	*	n/a	*	n/a
	22-28 days	5	3.40 (1.09, 10.65)	5	3.60 (1.11, 11.65)	*	n/a	*	n/a

Supplementary table 4a: Likelihood ratio test statistic and p-value to test interaction between vaccine type and age group or sex. Interaction term was tested only when the main exposure (vaccine) was found to be significant (cells with < 5 are suppressed).

	Likelihood ratio test (df = 6)	
	with ChAdOx1nCoV-19 vaccine	with BNT162b2 mRNA vaccine
Interaction with age group (≤50, >50)		
CNS Demyelinating disorder	-	-
Encephalitis meningitis and myelitis	7.47 (0.279)	-
Guillain-Barre	1.88 (0.930)	-
Bell's palsy	3.37 (0.761)	-
Myasthenic disorder	15.57 (0.016)	-
Haemorrhagic stroke	-	8.24 (0.221)

Subarachnoid haemorrhage	-	-
Interaction with sex		-
CNS Demyelinating disorder	-	-
Encephalitis meningitis and myelitis	5.30 (0.506)	-
Guillain-Barre	4.43 (0.618)	-
Bell's palsy	7.02 (0.319)	-
Myasthenic disorder	5.57 (0.473)	-
Haemorrhagic stroke	-	17.72 (0.007)
Subarachnoid haemorrhage	-	-

Supplementary table 4b: Incidence rate ratios (IRR 95% CI) by age groups or sex for the outcomes in pre-defined risk periods immediately before and after exposure to vaccination and before and after a positive SARS-CoV-2 test result, adjusted for calendar time from 1 December 2020 to 31 May 2021 (cells with < 5 are suppressed).

	Time period	ChAdOx1nCoV-19 vaccine		BNT162b2 mRNA vaccine		Positive SARS-CoV-2 test	
		events	IRR (95% CI)	events	IRR (95% CI)	events	IRR (95% CI)
Interaction with age group							
Myasthenic disorder							
Age ≤ 50	baseline	44	1.00	29	1.00	8	1.00
	-28 to -1 days	12	1.09 (0.54, 2.17)	9	1.39 (0.63, 3.09)	*	0.77 (0.09, 6.50)
	0 day	0	n/a	0	n/a	*	17.43 (2.04, 148.80)
	1-7 days	0	n/a	*	1.81 (0.51, 6.45)	5	11.20 (3.29, 38.07)
	8-14 days	*	n/a	*	1.83 (0.52, 6.47)	0	n/a
	15-21 days	8	2.44 (1.07, 5.55)	*	1.62 (0.36, 7.23)	*	2.09 (0.25, 17.44)
	22-28 days	*	0.84 (0.25, 2.81)	*	1.26 (0.29, 5.56)	*	1.97 (0.24, 16.13)
Age > 50	baseline	267	1.00	184	1.00	24	1.00
	-28 to -1 days	58	0.65 (0.47, 0.90)	35	0.49 (0.33, 0.72)	25	4.75 (2.62, 8.64)
	0 day	0	n/a	*	0.98 (0.31, 3.12)	17	70.94 (36.93, 136.28)

	1-7 days	17	0.76 (0.45, 1.29)	15	0.71 (0.41, 1.24)	24	13.90 (7.66, 25.24)
	8-14 days	26	1.28 (0.82, 1.97)	21	0.99 (0.61, 1.60)	9	4.92 (2.24, 10.83)
	15-21 days	25	1.34 (0.86, 2.07)	20	0.94 (0.57, 1.53)	*	2.16 (0.74, 6.29)
	22-28 days	20	1.00 (0.62, 1.62)	25	1.40 (0.90, 2.16)	5	2.97 (1.12, 7.87)
Interaction with sex							
Haemorrhagic stroke							
Female	baseline	695	1.00	401	1.00	95	1.00
	-28 to -1 days	109	0.49 (0.39, 0.60)	30	0.27 (0.18, 0.39)	80	4.69 (3.35, 6.57)
	0 day	6	0.69 (0.31, 1.55)	*	0.42 (0.10, 1.69)	9	11.12 (5.52, 22.40)
	1-7 days	63	1.03 (0.78, 1.34)	50	1.44 (1.05, 1.96)	11	1.90 (1.00, 3.61)
	8-14 days	89	1.44 (1.14, 1.82)	44	1.23 (0.89, 1.71)	7	1.16 (0.53, 2.53)
	15-21 days	70	1.14 (0.88, 1.47)	67	1.84 (1.40, 2.42)	5	0.84 (0.34, 2.07)
	22-28 days	66	1.10 (0.85, 1.44)	49	1.30 (0.96, 1.77)	*	0.52 (0.16, 1.64)
Male	baseline	760	1.00	409	1.00	78	1.00
	-28 to -1 days	123	0.46 (0.38, 0.57)	56	0.46 (0.34, 0.61)	83	4.99 (3.53, 7.04)
	0 day	*	0.10 (0.01, 0.70)	*	0.76 (0.28, 2.04)	11	14.41 (7.54, 27.52)
	1-7 days	68	0.95 (0.73, 1.23)	43	1.13 (0.82, 1.57)	12	2.24 (1.20, 4.18)
	8-14 days	52	0.73 (0.55, 0.98)	45	1.13 (0.82, 1.56)	7	1.26 (0.58, 2.76)
	15-21 days	58	0.84 (0.63, 1.10)	39	0.98 (0.70, 1.38)	5	0.87 (0.35, 2.17)
	22-28 days	60	0.91 (0.70, 1.20)	42	1.03 (0.74, 1.42)	*	0.52 (0.16, 1.66)

Supplementary table 5: Measures of effect of vaccinations and SARS-CoV-2 infections presented in absolute terms, number needed to expose for one excess event; excess events due to exposure; excess events per 10 million exposed. Only associations significant at the 0.01 level were reported over the 1-28 days post exposure. When IRR were not significant over the 1-28 days post-vaccine, absolute measures were not given.

	IRR (95% CI) 1-28 days*	Number needed to expose to cause one excess event (95% CI)	Excess events per 10,000,000 exposed (95% CI)
CNS Demyelinating disorder			
with ChAdOx1nCoV-19 vaccine	0.97 (0.78, 1.22)	-	-
with BNT162b2 mRNA vaccine	1.02 (0.75, 1.40)	-	-
with SARS-CoV-2 infection	1.67 (0.93, 3.00)	-	-
Encephalitis meningitis and myelitis			
with ChAdOx1nCoV-19 vaccine	1.07 (0.87, 1.31)	-	-
with BNT162b2 mRNA vaccine	1.14 (0.86, 1.51)	-	-
with SARS-CoV-2 infection	2.70 (1.78, 4.11)	81166 (44168, 76269)	123 (131, 226)
Guillain-Barre			
with ChAdOx1nCoV-19 vaccine	2.04 (1.60, 2.60)	261766 (216855, 355865)	38 (28, 46)
with BNT162b2 mRNA vaccine	0.86 (0.54, 1.36)	-	-
with SARS-CoV-2 infection	5.25 (3.00, 9.18)	68809 (62512, 83526)	145 (120, 160)
Bell's palsy			
with ChAdOx1nCoV-19 vaccine	1.07 (0.94, 1.21)	-	-
with BNT162b2 mRNA vaccine	1.06 (0.90, 1.26)	-	-
with SARS-CoV-2 infection	1.34 (0.91, 1.97)	-	-
Myasthenic disorder			
with ChAdOx1nCoV-19 vaccine	1.23 (0.94, 1.62)	-	-
with BNT162b2 mRNA vaccine	1.18 (0.88, 1.59)	-	-
with SARS-CoV-2 infection	3.01 (1.70, 5.36)	61284 (50310, 99387)	163 (101, 199)
Haemorrhagic stroke			
with ChAdOx1nCoV-19 vaccine	1.02 (0.90, 1.15)	-	-
with BNT162b2 mRNA vaccine	1.24 (1.07, 1.43)	165426 (106478, 489416)	60 (20, 94)
with SARS-CoV-2 infection	0.85 (0.57, 1.26)	-	-
Subarachnoid haemorrhage			
with ChAdOx1nCoV-19 vaccine	1.01 (0.86, 1.18)	-	-
with BNT162b2 mRNA vaccine	1.05 (0.84, 1.30)	-	-
with SARS-CoV-2 infection	1.51 (0.96, 2.36)	-	-

Supplementary Table 6: Incidence rate ratios (IRR 95% CI) for celiac disease (negative control) and anaphylaxis (positive control) in pre-defined risk periods immediately before and after exposure to vaccination and before and after a positive SARS-CoV-2 result, adjusted for calendar time from 1 December 2020 to 31 Maggio 2021 (cells with < 5 are suppressed).

		Celiac disease (negative control)		Anaphylaxis (positive control)	
		events	IRR (95% CI)	events	IRR (95% CI)
Group	Time period				
ChAdOx1nCoV-19 vaccine	baseline	2403	1.00	438	1.00
	-28 to -1 days	715	0.95 (0.87, 1.04)	111	0.82 (0.66, 1.02)
	0 day	*	0.07 (0.02, 0.29)	47	9.68 (7.08, 13.24)
	1-7 days	164	0.84 (0.72, 0.99)	52	1.55 (1.15, 2.09)
	8-14 days	196	1.01 (0.87, 1.17)	25	0.74 (0.49, 1.11)
	15-21 days	184	0.97 (0.83, 1.13)	36	1.05 (0.74, 1.49)
	22-28 days	183	0.99 (0.85, 1.16)	26	0.78 (0.52, 1.18)
BNT162b2 mRNA vaccine	baseline	1610	1.00	167	1.00
	-28 to -1 days	437	0.88 (0.79, 0.98)	31	0.73 (0.49, 1.08)
	0 day	5	0.27 (0.11, 0.65)	29	19.31 (12.77, 29.19)
	1-7 days	98	0.75 (0.61, 0.92)	16	1.50 (0.89, 2.55)
	8-14 days	121	0.90 (0.75, 1.09)	22	1.99 (1.25, 3.17)
	15-21 days	122	0.89 (0.73, 1.07)	12	1.10 (0.60, 2.00)
	22-28 days	116	0.86 (0.71, 1.05)	11	0.99 (0.53, 1.84)
SARS-CoV-2	baseline	207	1.00	59	1.00
	-28 to -1 days	89	2.08 (1.60, 2.70)	16	1.49 (0.83, 2.67)
	0 day	42	25.62 (18.22, 36.03)	11	25.81 (13.25, 50.30)
	1-7 days	69	5.91 (4.45, 7.84)	8	2.68 (1.26, 5.70)
	8-14 days	53	4.33 (3.18, 5.90)	*	0.67 (0.16, 2.76)

	15-21 days	18	1.38 (0.85, 2.25)	*	0.95 (0.30, 3.07)
	22-28 days	19	1.35 (0.84, 2.16)	6	1.77 (0.76, 4.13)

Supplementary table 7a: Incidence rate ratios (IRR 95% CI) for single outcomes in pre-defined risk periods immediately before and after exposure to vaccination, adjusted for calendar time from 1 December 2020 to 31 May 2021. Comparisons between different sensitivity analyses (cells with < 5 are suppressed).

		Main		Sensitivity 1*		Sensitivity 2*		Sensitivity 3*		Sensitivity 4*		Sensitivity 5*	
		events	IRR (95% CI)	events	IRR (95% CI)	events	IRR (95% CI)	events	IRR (95% CI)	events	IRR (95% CI)	events	IRR (95% CI)
CNS Demyelinating disorder°													
ChAdOx1nC oV-19 vaccine	Baseline	473	1.00	473	1.00			464	1.00	174	1.00	473	1.00
	-28 to -1 days	117	0.83 (0.67, 1.03)	117	0.83 (0.67, 1.03)			117	0.83 (0.67, 1.03)	43	0.71 (0.50, 1.03)	117	0.82 (0.66, 1.02)
	0 day	0	n/a	0	n/a			0	n/a	0	n/a	0	n/a
	1-7 days	38	1.03 (0.73, 1.44)	38	1.02 (0.73, 1.44)			37	1.01 (0.71, 1.42)	16	1.11 (0.64, 1.91)	38	1.02 (0.73, 1.44)
	8-14 days	35	0.95 (0.67, 1.36)	35	0.95 (0.67, 1.35)			35	0.96 (0.67, 1.37)	11	0.81 (0.43, 1.54)	35	0.95 (0.67, 1.35)
	15-21 days	38	1.04 (0.74, 1.46)	38	1.04 (0.74, 1.46)			38	1.04 (0.74, 1.46)	16	1.25 (0.73, 2.17)	38	1.03 (0.73, 1.45)
	22-28 days	33	0.93 (0.65, 1.33)	33	0.93 (0.64, 1.33)			32	0.90 (0.62, 1.30)	13	1.13 (0.62, 2.05)	33	0.92 (0.64, 1.32)
BNT162b2 mRNA vaccine	Baseline	244	1.00	242	1.00			240	1.00	81	1.00	242	1.00
	-28 to -1 days	58	0.92 (0.68, 1.24)	58	0.93 (0.69, 1.25)			58	0.93 (0.69, 1.26)	6	0.47 (0.20, 1.10)	58	0.91 (0.67, 1.23)
	0 day	*	0.43 (0.06, 3.05)	*	0.43 (0.06, 3.09)			*	0.43 (0.06, 3.11)	*	2.61 (0.36, 19.13)	*	0.42 (0.06, 3.02)
	1-7 days	15	0.91 (0.53, 1.55)	15	0.92 (0.54, 1.57)			15	0.93 (0.54, 1.58)	*	0.37 (0.05, 2.72)	15	0.90 (0.53, 1.53)
	8-14 days	16	0.94 (0.56, 1.58)	15	0.89 (0.52, 1.51)			16	0.95 (0.57, 1.60)	5	1.89 (0.73, 4.89)	16	0.93 (0.55, 1.56)
	15-21 days	16	0.92	16	0.93			16	0.93	*	1.53	16	0.91

			(0.55, 1.55)		(0.55, 1.56)				(0.56, 1.57)		(0.54, 4.38)		(0.54, 1.53)
	22-28 days	21	1.19 (0.75, 1.89)	21	1.20 (0.76, 1.90)			21	1.20 (0.76, 1.90)	*	1.14 (0.35, 3.76)	21	1.18 (0.74, 1.86)
Encephalitis meningitis and myelitis													
ChAdOx1nC oV-19 vaccine	Baseline	602	1.00	586	1.00	171	1.00	594	1.00	291	1.00	599	1.00
	-28 to -1 days	78	0.42 (0.33, 0.54)	78	0.43 (0.34, 0.56)			78	0.42 (0.33, 0.54)	25	0.31 (0.20, 0.47)	78	0.42 (0.33, 0.54)
	0 day	*	0.46 (0.15, 1.43)	*	0.48 (0.15, 1.50)	*	0.34 (0.10, 1.11)	*	0.46 (0.15, 1.44)	*	0.36 (0.05, 2.59)	*	0.46 (0.15, 1.43)
	1-7 days	52	1.15 (0.85, 1.54)	47	1.09 (0.80, 1.49)	52	0.86 (0.55, 1.35)	52	1.16 (0.86, 1.56)	28	1.48 (0.98, 2.23)	52	1.14 (0.85, 1.54)
	8-14 days	58	1.32 (0.99, 1.76)	57	1.38 (1.03, 1.84)	58	1.06 (0.71, 1.58)	58	1.34 (1.00, 1.78)	34	1.84 (1.26, 2.70)	58	1.32 (0.99, 1.75)
	15-21 days	37	0.89 (0.63, 1.25)	37	0.94 (0.66, 1.32)	37	0.76 (0.50, 1.15)	37	0.90 (0.64, 1.27)	14	0.81 (0.47, 1.41)	37	0.88 (0.63, 1.25)
	22-28 days	38	0.96 (0.68, 1.35)	36	0.96 (0.68, 1.37)	38	0.86 (0.58, 1.26)	38	0.97 (0.69, 1.37)	22	1.41 (0.90, 2.23)	38	0.95 (0.68, 1.34)
BNT162b2 mRNA vaccine	Baseline	275	1.00	268	1.00	135	1.00	273	1.00	120	1.00	271	1.00
	-28 to -1 days	45	0.59 (0.42, 0.82)	45	0.60 (0.43, 0.83)			45	0.59 (0.43, 0.83)	8	0.45 (0.22, 0.95)	45	0.58 (0.41, 0.80)
	0 day	0	n/a	0	n/a	0	n/a	0	n/a	0	n/a	0	n/a
	1-7 days	22	1.02 (0.65, 1.61)	20	0.95 (0.59, 1.52)	22	0.64 (0.35, 1.18)	22	1.03 (0.66, 1.62)	9	2.01 (0.98, 4.13)	22	1.00 (0.63, 1.56)
	8-14 days	27	1.17 (0.77, 1.77)	25	1.10 (0.72, 1.69)	27	0.81 (0.48, 1.38)	27	1.18 (0.78, 1.78)	8	1.65 (0.77, 3.51)	27	1.14 (0.75, 1.73)
	15-21 days	21	0.95 (0.60, 1.50)	19	0.88 (0.55, 1.43)	21	0.69 (0.40, 1.17)	21	0.96 (0.60, 1.51)	11	2.32 (1.20, 4.51)	21	0.93 (0.59, 1.47)
	22-28 days	27	1.28 (0.85, 1.93)	25	1.22 (0.80, 1.87)	27	0.96 (0.61, 1.53)	27	1.28 (0.85, 1.93)	9	1.92 (0.93, 3.93)	27	1.25 (0.83, 1.88)
Guillain-Barre°													
ChAdOx1nC oV-19 vaccine	Baseline	264	1.00	260	1.00			261	1.00	101	1.00	264	1.00
	-28 to -1 days	41	0.44 (0.31, 0.63)	41	0.45 (0.32, 0.64)			41	0.44 (0.31, 0.63)	10	0.29 (0.15, 0.57)	41	0.45 (0.31, 0.63)
	0 day	0	n/a	0	n/a			0	n/a	0	n/a	0	n/a

	1-7 days	17	0.74 (0.44, 1.23)	17	0.76 (0.46, 1.26)			17	0.73 (0.44, 1.22)	7	0.84 (0.38, 1.84)	17	0.74 (0.45, 1.23)
	8-14 days	23	1.02 (0.65, 1.59)	22	1.01 (0.64, 1.59)			23	1.01 (0.65, 1.58)	14	1.72 (0.95, 3.11)	23	1.02 (0.65, 1.60)
	15-21 days	65	2.90 (2.15, 3.92)	62	2.86 (2.11, 3.89)			64	2.84 (2.10, 3.84)	51	6.55 (4.43, 9.69)	65	2.90 (2.15, 3.91)
	22-28 days	48	2.21 (1.59, 3.09)	48	2.29 (1.64, 3.20)			48	2.20 (1.58, 3.07)	30	4.15 (2.63, 6.56)	48	2.20 (1.58, 3.07)
BNT162b2 mRNA vaccine	Baseline	109	1.00	107	1.00			108	1.00	41	1.00	108	1.00
	-28 to -1 days	21	0.67 (0.41, 1.10)	21	0.68 (0.41, 1.11)			21	0.68 (0.42, 1.12)	*	0.15 (0.02, 1.12)	21	0.66 (0.40, 1.08)
	0 day	0	n/a	0	n/a			0	n/a	0	n/a	0	n/a
	1-7 days	9	0.99 (0.49, 2.00)	9	1.01 (0.50, 2.05)			9	1.00 (0.49, 2.02)	*	1.50 (0.43, 5.19)	9	0.97 (0.48, 1.96)
	8-14 days	7	0.71 (0.32, 1.56)	7	0.73 (0.33, 1.59)			7	0.72 (0.33, 1.57)	*	1.43 (0.41, 4.93)	7	0.70 (0.32, 1.53)
	15-21 days	9	0.91 (0.45, 1.84)	9	0.94 (0.47, 1.89)			9	0.92 (0.46, 1.85)	*	0.94 (0.22, 4.08)	9	0.90 (0.45, 1.80)
	22-28 days	9	0.90 (0.45, 1.82)	8	0.83 (0.40, 1.73)			9	0.91 (0.45, 1.82)	*	1.72 (0.57, 5.14)	9	0.89 (0.44, 1.78)
Myasthenic disorder													
ChAdOx1nC oV-19 vaccine	Baseline	311	1.00	302	1.00	133	1.00	309	1.00	69	1.00	309	1.00
	-28 to -1 days	70	0.72 (0.54, 0.96)	69	0.74 (0.55, 0.99)			70	0.72 (0.54, 0.96)	12	0.71 (0.37, 1.35)	70	0.73 (0.54, 0.97)
	0 day	0	n/a	0	n/a	0	n/a	0	n/a	0	n/a	0	n/a
	1-7 days	17	0.70 (0.42, 1.16)	15	0.65 (0.38, 1.12)	17	0.90 (0.47, 1.72)	17	0.70 (0.42, 1.16)	*	0.44 (0.10, 1.89)	17	0.70 (0.42, 1.17)
	8-14 days	26	1.16 (0.76, 1.77)	23	1.10 (0.70, 1.71)	26	1.37 (0.80, 2.35)	26	1.17 (0.76, 1.78)	8	1.88 (0.86, 4.14)	26	1.17 (0.77, 1.79)
	15-21 days	33	1.57 (1.07, 2.30)	33	1.66 (1.13, 2.43)	33	1.77 (1.11, 2.83)	33	1.58 (1.08, 2.31)	6	1.71 (0.72, 4.10)	33	1.58 (1.08, 2.32)
	22-28 days	23	1.01 (0.65, 1.57)	23	1.06 (0.68, 1.64)	23	1.12 (0.69, 1.83)	23	1.01 (0.65, 1.57)	5	1.40 (0.54, 3.61)	23	1.01 (0.65, 1.58)
	Baseline	213	1.00	205	1.00	132	1.00	213	1.00	38	1.00	211	1.00

BNT162b2 mRNA vaccine	-28 to -1 days	44	0.58 (0.41, 0.83)	44	0.61 (0.43, 0.86)			44	0.58 (0.41, 0.82)	8	0.92 (0.41, 2.06)	44	0.57 (0.41, 0.81)
	0 day	*	0.96 (0.30, 3.04)	*	1.01 (0.32, 3.20)	*	1.33 (0.37, 4.85)	*	0.96 (0.30, 3.03)	0	n/a	*	0.94 (0.30, 2.98)
	1-7 days	18	0.83 (0.50, 1.37)	16	0.79 (0.46, 1.34)	18	1.04 (0.50, 2.13)	18	0.83 (0.50, 1.37)	*	0.98 (0.28, 3.43)	18	0.81 (0.49, 1.34)
	8-14 days	24	1.09 (0.70, 1.71)	23	1.13 (0.71, 1.78)	24	1.21 (0.65, 2.24)	24	1.09 (0.70, 1.71)	*	1.09 (0.31, 3.76)	24	1.07 (0.68, 1.68)
	15-21 days	22	1.02 (0.64, 1.63)	20	1.01 (0.62, 1.63)	22	1.14 (0.64, 2.01)	22	1.02 (0.64, 1.62)	6	2.21 (0.84, 5.81)	22	1.01 (0.63, 1.60)
	22-28 days	27	1.46 (0.96, 2.22)	25	1.46 (0.95, 2.25)	27	1.61 (0.99, 2.64)	27	1.46 (0.96, 2.21)	5	2.35 (0.85, 6.46)	27	1.45 (0.96, 2.20)
Haemorrhagic stroke													
ChAdOx1nC oV-19 vaccine	Baseline	1456	1.00	1195	1.00	668	1.00	1424	1.00	750	1.00	1436	1.00
	-28 to -1 days	232	0.47 (0.41, 0.55)	224	0.57 (0.49, 0.67)			232	0.48 (0.41, 0.55)	61	0.26 (0.20, 0.33)	232	0.49 (0.42, 0.56)
	0 day	7	0.37 (0.18, 0.78)	6	0.41 (0.19, 0.93)	7	0.22 (0.10, 0.47)	7	0.37 (0.18, 0.78)	*	0.42 (0.16, 1.13)	7	0.38 (0.18, 0.80)
	1-7 days	131	0.98 (0.82, 1.18)	94	0.93 (0.75, 1.15)	131	0.61 (0.48, 0.78)	130	0.98 (0.81, 1.18)	91	1.35 (1.07, 1.69)	131	1.01 (0.84, 1.21)
	8-14 days	141	1.06 (0.89, 1.27)	93	0.93 (0.75, 1.16)	141	0.72 (0.57, 0.90)	139	1.06 (0.88, 1.27)	104	1.53 (1.24, 1.90)	141	1.08 (0.91, 1.30)
	15-21 days	128	0.98 (0.81, 1.18)	92	0.95 (0.77, 1.19)	128	0.72 (0.58, 0.89)	127	0.98 (0.81, 1.18)	85	1.25 (0.99, 1.58)	128	0.99 (0.82, 1.19)
	22-28 days	126	1.00 (0.83, 1.21)	86	0.95 (0.76, 1.19)	126	0.79 (0.64, 0.97)	125	1.00 (0.83, 1.21)	62	0.94 (0.72, 1.23)	126	1.01 (0.83, 1.21)
BNT162b2 mRNA vaccine	Baseline	811	1.00	574	1.00	622	1.00	806	1.00	416	1.00	800	1.00
	-28 to -1 days	86	0.36 (0.29, 0.46)	83	0.43 (0.34, 0.55)			84	0.35 (0.28, 0.44)	13	0.18 (0.10, 0.32)	86	0.34 (0.27, 0.43)
	0 day	6	0.59 (0.27, 1.33)	*	0.39 (0.12, 1.21)	6	0.26 (0.11, 0.60)	6	0.59 (0.26, 1.31)	*	0.87 (0.28, 2.73)	6	0.56 (0.25, 1.26)
	1-7 days	93	1.27 (1.02, 1.59)	63	1.14 (0.87, 1.50)	93	0.60 (0.44, 0.82)	93	1.25 (1.00, 1.57)	51	1.94 (1.42, 2.66)	93	1.21 (0.96, 1.51)
	8-14 days	89	1.18 (0.94, 1.48)	59	1.06 (0.80, 1.40)	89	0.64 (0.48, 0.86)	89	1.16 (0.92, 1.46)	52	1.85 (1.36, 2.51)	89	1.12 (0.89, 1.40)

	15-21 days	106	1.38 (1.12, 1.71)	69	1.24 (0.96, 1.61)	106	0.86 (0.67, 1.11)	106	1.37 (1.11, 1.69)	64	2.13 (1.61, 2.81)	106	1.31 (1.06, 1.62)
	22-28 days	91	1.15 (0.92, 1.44)	59	1.06 (0.81, 1.40)	91	0.80 (0.62, 1.02)	91	1.14 (0.91, 1.42)	60	1.79 (1.35, 2.38)	91	1.09 (0.87, 1.36)
Subarachnoid haemorrhage													
ChAdOx1nC oV-19 vaccine	Baseline	971	1.00	866	1.00	343	1.00	954	1.00	460	1.00	966	1.00
	-28 to -1 days	157	0.49 (0.41, 0.58)	155	0.55 (0.46, 0.65)			157	0.49 (0.41, 0.58)	37	0.22 (0.16, 0.31)	157	0.49 (0.41, 0.58)
	0 day	*	0.34 (0.13, 0.91)	*	0.20 (0.05, 0.80)	*	0.26 (0.09, 0.71)	*	0.34 (0.13, 0.91)	*	0.66 (0.24, 1.76)	*	0.34 (0.13, 0.92)
	1-7 days	70	0.85 (0.66, 1.10)	56	0.81 (0.61, 1.07)	70	0.65 (0.46, 0.92)	70	0.86 (0.67, 1.10)	44	1.06 (0.77, 1.47)	70	0.86 (0.67, 1.10)
	8-14 days	93	1.16 (0.93, 1.44)	76	1.14 (0.89, 1.45)	93	0.93 (0.69, 1.26)	91	1.14 (0.91, 1.42)	63	1.61 (1.22, 2.13)	93	1.16 (0.93, 1.45)
	15-21 days	72	0.92 (0.72, 1.18)	52	0.82 (0.61, 1.09)	72	0.77 (0.57, 1.04)	72	0.92 (0.72, 1.19)	54	1.44 (1.07, 1.94)	72	0.92 (0.72, 1.18)
	22-28 days	69	0.94 (0.73, 1.20)	49	0.82 (0.61, 1.10)	69	0.82 (0.62, 1.09)	69	0.94 (0.73, 1.21)	44	1.26 (0.91, 1.74)	69	0.93 (0.72, 1.19)
BNT162b2 mRNA vaccine	Baseline	415	1.00	355	1.00	240	1.00	409	1.00	191	1.00	405	1.00
	-28 to -1 days	53	0.43 (0.32, 0.58)	53	0.47 (0.35, 0.64)			53	0.44 (0.32, 0.59)	*	0.10 (0.03, 0.30)	53	0.42 (0.31, 0.56)
	0 day	0	n/a	0	n/a	0	n/a	0	n/a	0	n/a	0	n/a
	1-7 days	38	1.08 (0.77, 1.52)	25	0.81 (0.53, 1.22)	38	0.85 (0.53, 1.37)	38	1.09 (0.77, 1.54)	21	2.17 (1.35, 3.50)	38	1.05 (0.75, 1.48)
	8-14 days	41	1.14 (0.82, 1.59)	37	1.20 (0.84, 1.70)	41	0.93 (0.61, 1.42)	41	1.15 (0.82, 1.60)	15	1.43 (0.83, 2.47)	41	1.11 (0.80, 1.55)
	15-21 days	31	0.85 (0.58, 1.23)	24	0.77 (0.50, 1.17)	31	0.74 (0.48, 1.14)	31	0.85 (0.59, 1.24)	14	1.28 (0.73, 2.25)	31	0.83 (0.57, 1.20)
	22-28 days	41	1.16 (0.84, 1.61)	32	1.08 (0.75, 1.56)	41	1.02 (0.71, 1.47)	41	1.17 (0.84, 1.62)	21	1.82 (1.14, 2.91)	41	1.14 (0.82, 1.58)
Celiac													
ChAdOx1nC oV-19 vaccine	Baseline	2403	1.00	2400	1.00	775	1.00	2368	1.00	594	1.00	2399	1.00
	-28 to -1 days	715	0.95 (0.87, 1.04)	715	0.95 (0.87, 1.04)			715	0.95 (0.87, 1.04)	174	0.79 (0.65, 0.96)	715	0.95 (0.86, 1.04)

	0 day	*	0.07 (0.02, 0.29)	*	0.07 (0.02, 0.29)	*	0.10 (0.02, 0.39)	*	0.07 (0.02, 0.29)	0	n/a	*	0.07 (0.02, 0.29)
	1-7 days	164	0.84 (0.72, 0.99)	164	0.84 (0.72, 0.99)	164	1.11 (0.88, 1.40)	164	0.85 (0.72, 1.00)	38	0.74 (0.52, 1.06)	164	0.84 (0.71, 0.99)
	8-14 days	196	1.01 (0.87, 1.17)	196	1.01 (0.87, 1.18)	196	1.28 (1.04, 1.58)	196	1.02 (0.87, 1.18)	38	0.79 (0.56, 1.12)	196	1.01 (0.87, 1.17)
	15-21 days	184	0.97 (0.83, 1.13)	184	0.97 (0.83, 1.13)	184	1.19 (0.98, 1.45)	184	0.97 (0.83, 1.14)	36	0.79 (0.55, 1.14)	184	0.97 (0.83, 1.13)
	22-28 days	183	0.99 (0.85, 1.16)	183	0.99 (0.85, 1.16)	183	1.19 (0.99, 1.43)	183	1.00 (0.85, 1.16)	38	0.94 (0.66, 1.33)	183	0.99 (0.85, 1.15)
BNT162b2 mRNA vaccine	Baseline	1610	1.00	1606	1.00	755	1.00	1597	1.00	279	1.00	1595	1.00
	-28 to -1 days	437	0.88 (0.79, 0.98)	437	0.88 (0.79, 0.99)			437	0.88 (0.79, 0.99)	29	0.82 (0.55, 1.22)	437	0.88 (0.79, 0.98)
	0 day	5	0.27 (0.11, 0.65)	5	0.27 (0.11, 0.65)	5	0.38 (0.15, 0.93)	5	0.27 (0.11, 0.65)	*	1.00 (0.14, 7.19)	5	0.27 (0.11, 0.65)
	1-7 days	98	0.75 (0.61, 0.92)	98	0.75 (0.61, 0.93)	98	1.01 (0.76, 1.34)	97	0.75 (0.60, 0.92)	12	1.77 (0.97, 3.24)	98	0.75 (0.61, 0.92)
	8-14 days	121	0.90 (0.75, 1.09)	121	0.91 (0.75, 1.10)	121	1.14 (0.89, 1.46)	121	0.91 (0.75, 1.10)	15	2.17 (1.25, 3.76)	121	0.90 (0.75, 1.09)
	15-21 days	122	0.89 (0.73, 1.07)	119	0.87 (0.72, 1.05)	122	1.11 (0.88, 1.40)	122	0.89 (0.74, 1.08)	14	2.04 (1.15, 3.61)	122	0.89 (0.73, 1.07)
	22-28 days	116	0.86 (0.71, 1.05)	116	0.87 (0.71, 1.05)	116	1.02 (0.82, 1.27)	116	0.86 (0.71, 1.05)	7	1.05 (0.48, 2.28)	116	0.86 (0.71, 1.04)
Anaphylaxis													
ChAdOx1nC oV-19 vaccine	Baseline	438	1.00	438	1.00	160	1.00	422	1.00	164	1.00	433	1.00
	-28 to -1 days	111	0.82 (0.66, 1.02)	111	0.82 (0.66, 1.02)			111	0.83 (0.66, 1.03)	39	0.81 (0.55, 1.18)	111	0.82 (0.66, 1.02)
	0 day	47	9.68 (7.08, 13.24)	47	9.72 (7.10, 13.29)	47	8.33 (4.93, 14.08)	46	9.64 (7.02, 13.24)	41	29.79 (20.33, 43.63)	47	9.71 (7.10, 13.28)
	1-7 days	52	1.55 (1.15, 2.09)	52	1.55 (1.15, 2.10)	52	1.36 (0.83, 2.22)	52	1.57 (1.16, 2.12)	27	2.97 (1.91, 4.63)	52	1.55 (1.15, 2.10)
	8-14 days	25	0.74 (0.49, 1.11)	25	0.74 (0.49, 1.11)	25	0.64 (0.37, 1.08)	25	0.75 (0.50, 1.13)	8	0.88 (0.42, 1.84)	25	0.74 (0.49, 1.11)
	15-21 days	36	1.05	36	1.05	36	0.94	36	1.07	12	1.34	36	1.05

			(0.74, 1.49)		(0.74, 1.49)		(0.60, 1.46)		(0.75, 1.52)		(0.72, 2.49)		(0.74, 1.49)
	22-28 days	26	0.78 (0.52, 1.18)	26	0.79 (0.52, 1.18)	26	0.73 (0.46, 1.16)	26	0.80 (0.53, 1.20)	*	0.50 (0.18, 1.37)	26	0.78 (0.52, 1.17)
BNT162b2 mRNA vaccine	Baseline	167	1.00	165	1.00	76	1.00	162	1.00	64	1.00	165	1.00
	-28 to -1 days	31	0.73 (0.49, 1.08)	31	0.74 (0.50, 1.10)			31	0.77 (0.51, 1.14)	8	0.79 (0.37, 1.69)	31	0.71 (0.48, 1.06)
	0 day	29	19.31 (12.77, 29.19)	29	19.65 (12.99, 29.72)	29	14.81 (7.51, 29.21)	29	19.92 (13.13, 30.22)	23	83.74 (47.35, 148.08)	29	18.78 (12.42, 28.39)
	1-7 days	16	1.50 (0.89, 2.55)	16	1.53 (0.90, 2.60)	16	1.22 (0.59, 2.50)	16	1.54 (0.91, 2.62)	9	4.54 (2.11, 9.77)	16	1.46 (0.86, 2.48)
	8-14 days	22	1.99 (1.25, 3.17)	22	2.03 (1.28, 3.23)	22	1.63 (0.87, 3.04)	21	1.94 (1.21, 3.12)	5	2.38 (0.90, 6.31)	22	1.94 (1.22, 3.08)
	15-21 days	12	1.10 (0.60, 2.00)	12	1.12 (0.61, 2.04)	12	1.01 (0.51, 2.01)	12	1.12 (0.61, 2.04)	*	2.12 (0.73, 6.13)	12	1.07 (0.59, 1.95)
	22-28 days	11	0.99 (0.53, 1.84)	11	1.00 (0.54, 1.87)	11	0.94 (0.48, 1.87)	10	0.92 (0.48, 1.76)	*	1.02 (0.24, 4.35)	11	0.96 (0.51, 1.79)

*Sensitivity 1: excluding those who died from the outcome; Sensitivity 2: restricting analysis to the period post-vaccination, without censoring at death, Sensitivity 3: restricting the study period until the 1 May 2021, Sensitivity 4: restricting analysis to patients who received only one vaccine dose and Sensitivity 5: censoring at 12 weeks post vaccination.

° Sensitivity model 2 does not converge.

Supplementary table 7b: Incidence rate ratios (IRR 95% CI) for single outcomes in pre-defined risk periods 28 days immediately before and 35 days after exposure to vaccination and to a positive SARS-CoV-2 test, adjusted for calendar time from 1 December 2020 to 31 May 2021.

	Time period	ChAdOx1nCoV-19 vaccine		BNT162b2 mRNA vaccine		Positive SARS-CoV-2 test	
		events	IRR (95% CI)	events	IRR (95% CI)	events	IRR (95% CI)
CNS Demyelinating disorder	Baseline	440	1.00	230	1.00	52	1.00
	-28 to -1 days	117	0.82 (0.66, 1.02)	58	0.90 (0.66, 1.22)	27	3.04 (1.83, 5.04)
	0 day	0	n/a	*	0.42 (0.06, 2.99)	7	19.97 (8.86, 45.01)
	1-7 days	38	1.02 (0.72, 1.44)	15	0.89 (0.52, 1.52)	9	3.56 (1.71, 7.40)

	15-21 days	136	1.31 (1.09, 1.58)	65	1.04 (0.80, 1.36)	9	1.09 (0.55, 2.15)
	22-28 days	115	1.14 (0.94, 1.39)	71	1.16 (0.90, 1.49)	7	0.80 (0.37, 1.72)
	29-35 days	108	1.13 (0.92, 1.38)	57	0.92 (0.70, 1.22)	9	0.96 (0.49, 1.89)
Myasthenic disorder	Baseline	292	1.00	199	1.00	30	1.00
	-28 to -1 days	70	0.70 (0.52, 0.93)	44	0.57 (0.40, 0.81)	26	4.13 (2.34, 7.27)
	0 day	0	n/a	*	0.94 (0.30, 2.96)	18	62.69 (33.79, 116.30)
	1-7 days	17	0.67 (0.40, 1.12)	18	0.80 (0.48, 1.34)	29	14.05 (8.14, 24.25)
	8-14 days	26	1.12 (0.73, 1.72)	24	1.06 (0.67, 1.66)	9	4.09 (1.90, 8.82)
	15-21 days	33	1.51 (1.03, 2.23)	22	0.99 (0.62, 1.57)	5	2.23 (0.85, 5.83)
	22-28 days	23	0.97 (0.62, 1.52)	27	1.40 (0.92, 2.14)	6	2.89 (1.19, 7.05)
	29-35 days	19	0.81 (0.50, 1.30)	14	0.73 (0.42, 1.27)	*	1.47 (0.45, 4.86)
Haemorrhagic stroke	Baseline	1325	1.00	724	1.00	165	1.00
	-28 to -1 days	232	0.48 (0.42, 0.56)	86	0.36 (0.29, 0.46)	163	4.79 (3.74, 6.12)
	0 day	7	0.38 (0.18, 0.80)	6	0.60 (0.27, 1.35)	20	12.58 (7.81, 20.26)
	1-7 days	131	1.00 (0.83, 1.21)	93	1.29 (1.03, 1.62)	23	2.04 (1.30, 3.20)
	8-14 days	141	1.09 (0.91, 1.31)	89	1.19 (0.95, 1.50)	14	1.21 (0.69, 2.10)
	15-21 days	128	1.00 (0.83, 1.21)	106	1.41 (1.14, 1.74)	10	0.86 (0.45, 1.63)
	22-28 days	126	1.03 (0.85, 1.24)	91	1.17 (0.94, 1.47)	6	0.52 (0.23, 1.17)
	29-35 days	131	1.14 (0.95, 1.38)	87	1.11 (0.88, 1.39)	13	1.10 (0.62, 1.95)
Subarachnoid haemorrhage	Baseline	910	1.00	385	1.00	93	1.00
	-28 to -1 days	157	0.48 (0.40, 0.57)	53	0.43 (0.32, 0.57)	60	3.22 (2.24, 4.61)
	0 day	*	0.33 (0.13, 0.90)	0	n/a	19	22.90 (13.69, 38.31)
	1-7 days	70	0.84 (0.65, 1.08)	38	1.06 (0.75, 1.49)	23	3.93 (2.44, 6.35)
	8-14 days	93	1.13 (0.90, 1.41)	41	1.11 (0.80, 1.55)	12	2.03 (1.10, 3.77)
	15-21 days	72	0.90 (0.70, 1.16)	31	0.83 (0.57, 1.20)	7	1.16 (0.53, 2.53)
	22-28 days	69	0.91 (0.71, 1.18)	41	1.13 (0.81, 1.57)	7	1.13 (0.52, 2.45)

	29-35 days	61	0.87 (0.67, 1.14)	30	0.83 (0.57, 1.21)	*	0.31 (0.08, 1.25)
--	------------	----	-------------------	----	-------------------	---	-------------------

Supplementary table 7c: Incidence rate ratios (IRR 95% CI) for individual outcomes in pre-defined risk periods immediately before and after exposure to a positive SARS-CoV-2 test result, adjusted for calendar time from 1 December 2020 until 31 May 2021, 2021 (cells with < 5 are suppressed): comparisons between patients infected before vaccination and all patients (infected before and after vaccination)

	Time period	Positive SARS-CoV-2 test (before vaccination)		Positive SARS-CoV-2 test before or after vaccination)	
		events	IRR (95% CI)	events	IRR (95% CI)
Acute CNS Demyelinating disorder	Baseline	52	1.00	53	1.00
	-28 to -1 days	21	2.35 (1.37, 4.03)	27	2.94 (1.79, 4.83)
	0 day	6	17.12 (7.22, 40.62)	7	19.34 (8.63, 43.38)
	1-7 days	7	2.78 (1.24, 6.22)	9	3.45 (1.67, 7.14)
	8-14 days	7	2.70 (1.21, 6.04)	7	2.61 (1.17, 5.84)
	15-21 days	6	2.12 (0.90, 4.97)	6	2.05 (0.87, 4.82)
	22-28 days	*	0.62 (0.15, 2.54)	*	0.60 (0.15, 2.47)
Encephalitis meningitis and myelitis	Baseline	55	1.00	66	1.00
	-28 to -1 days	63	6.14 (4.07, 9.26)	78	5.64 (3.91, 8.13)
	0 day	16	36.22 (20.15, 65.09)	23	38.57 (23.41, 63.56)
	1-7 days	18	5.79 (3.31, 10.14)	24	5.71 (3.49, 9.32)
	8-14 days	22	6.81 (4.05, 11.44)	24	5.63 (3.46, 9.15)

	15-21 days	6	1.81 (0.77, 4.26)	6	1.38 (0.59, 3.21)
	22-28 days	5	1.43 (0.57, 3.58)	6	1.33 (0.57, 3.08)
Guillain-Barre syndrome	Baseline	28	1.00	30	1.00
	-28 to -1 days	20	5.14 (2.74, 9.67)	23	4.85 (2.67, 8.82)
	0 day	5	28.47 (10.67, 75.96)	7	33.37 (14.21, 78.36)
	1-7 days	8	6.39 (2.82, 14.47)	11	7.36 (3.57, 15.18)
	8-14 days	8	6.25 (2.76, 14.13)	8	5.19 (2.31, 11.65)
	15-21 days	10	7.30 (3.45, 15.42)	11	6.89 (3.37, 14.09)
	22-28 days	6	4.02 (1.64, 9.86)	6	3.51 (1.44, 8.57)
Bell's palsy	Baseline	120	1.00	134	1.00
	-28 to -1 days	65	3.09 (2.22, 4.29)	86	3.34 (2.49, 4.48)
	0 day	27	31.04 (20.09, 47.94)	35	33.23 (22.57, 48.94)
	1-7 days	35	5.66 (3.82, 8.40)	44	5.84 (4.09, 8.33)
	8-14 days	15	2.36 (1.37, 4.08)	17	2.17 (1.30, 3.63)
	15-21 days	8	1.18 (0.57, 2.42)	9	1.09 (0.55, 2.15)
	22-28 days	5	0.68 (0.28, 1.67)	7	0.80 (0.37, 1.72)
	Baseline	28	1.00	32	1.00

Myasthenic disorder	-28 to -1 days	19	3.59 (1.92, 6.73)	26	4.00 (2.30, 6.96)
	0 day	13	54.96 (27.50, 109.82)	18	61.32 (33.43, 112.50)
	1-7 days	22	13.22 (7.30, 23.97)	29	13.74 (8.07, 23.41)
	8-14 days	8	4.51 (2.01, 10.14)	9	3.98 (1.86, 8.52)
	15-21 days	*	1.65 (0.49, 5.48)	5	2.17 (0.84, 5.63)
	22-28 days	5	2.92 (1.11, 7.64)	6	2.81 (1.16, 6.79)
Haemorrhagic stroke	Baseline	149	1.00	173	1.00
	-28 to -1 days	125	4.75 (3.62, 6.24)	163	4.73 (3.72, 6.02)
	0 day	13	10.90 (6.11, 19.46)	20	12.42 (7.73, 19.95)
	1-7 days	14	1.64 (0.94, 2.87)	23	2.01 (1.29, 3.15)
	8-14 days	6	0.67 (0.30, 1.54)	14	1.19 (0.69, 2.07)
	15-21 days	6	0.66 (0.29, 1.51)	10	0.84 (0.44, 1.61)
	22-28 days	5	0.55 (0.23, 1.36)	6	0.51 (0.23, 1.16)
Subarachnoid haemorrhage	Baseline	75	1.00	88	1.00
	-28 to -1 days	51	3.64 (2.46, 5.39)	60	3.40 (2.38, 4.86)
	0 day	12	19.89 (10.61, 37.28)	19	24.22 (14.50, 40.45)

1-7 days	16	3.81 (2.18, 6.67)	23	4.17 (2.59, 6.71)
8-14 days	8	1.88 (0.90, 3.95)	12	2.15 (1.16, 3.99)
15-21 days	6	1.38 (0.60, 3.20)	7	1.23 (0.57, 2.67)
22-28 days	6	1.32 (0.57, 3.05)	7	1.19 (0.55, 2.58)

Supplementary table 7d: Incidence rate ratios (IRR 95% CI) for single outcomes in pre-defined risk periods 28 days immediately before and 28 days after exposure to vaccination and to a positive SARS-CoV-2 test, adjusted for calendar time from 1 December 2020 to 31 May 2021 restricted to patients who did not have a SARS-CoV-2 positive test.

	Time period	ChAdOx1nCoV-19 vaccine		BNT162b2 mRNA vaccine	
		events	IRR (95% CI)	events	IRR (95% CI)
CNS Demyelinating disorder	Baseline	406	1.00	221	1.00
	-28 to -1 days	108	0.88 (0.70, 1.11)	53	0.92 (0.67, 1.25)
	0 day	0	n/a	*	0.48 (0.07, 3.44)
	1-7 days	36	1.10 (0.77, 1.56)	12	0.83 (0.46, 1.49)
	8-14 days	31	0.96 (0.66, 1.40)	12	0.80 (0.44, 1.45)
	15-21 days	31	0.96 (0.66, 1.41)	15	0.97 (0.57, 1.65)
	22-28 days	30	0.96 (0.65, 1.40)	18	1.14 (0.69, 1.86)
Encephalitis/meningitis/myelitis	Baseline	455	1.00	232	1.00
	-28 to -1 days	62	0.39 (0.30, 0.52)	37	0.58 (0.40, 0.83)
	0 day	*	0.52 (0.17, 1.62)	0	n/a
	1-7 days	43	1.08 (0.78, 1.50)	19	1.05 (0.65, 1.71)
	8-14 days	52	1.33 (0.98, 1.79)	21	1.11 (0.70, 1.77)
	15-21 days	30	0.79 (0.54, 1.16)	20	1.07 (0.67, 1.71)
	22-28 days	34	0.95 (0.66, 1.36)	22	1.20 (0.76, 1.88)
Guillain-Barre	Baseline	201	1.00	88	1.00

	-28 to -1 days	33	0.46 (0.31, 0.68)	20	0.86 (0.51, 1.43)
	0 day	0	n/a	0	n/a
	1-7 days	12	0.59 (0.32, 1.07)	8	1.15 (0.55, 2.43)
	8-14 days	21	1.03 (0.64, 1.64)	5	0.66 (0.26, 1.65)
	15-21 days	63	3.06 (2.24, 4.18)	8	1.00 (0.48, 2.11)
	22-28 days	46	2.32 (1.64, 3.27)	7	0.85 (0.39, 1.87)
Bell's palsy	Baseline	1156	1.00	646	1.00
	-28 to -1 days	295	0.81 (0.71, 0.93)	157	0.81 (0.67, 0.97)
	0 day	5	0.37 (0.15, 0.89)	*	0.40 (0.13, 1.26)
	1-7 days	80	0.84 (0.67, 1.06)	47	0.88 (0.65, 1.20)
	8-14 days	73	0.77 (0.60, 0.98)	51	0.94 (0.70, 1.27)
	15-21 days	126	1.33 (1.10, 1.61)	59	1.07 (0.81, 1.40)
	22-28 days	99	1.06 (0.86, 1.31)	61	1.11 (0.85, 1.45)
Myasthenic disorder	Baseline	232	1.00	191	1.00
	-28 to -1 days	62	0.83 (0.61, 1.14)	40	0.60 (0.42, 0.86)
	0 day	0	n/a	*	1.08 (0.34, 3.41)
	1-7 days	15	0.78 (0.45, 1.34)	15	0.82 (0.48, 1.42)
	8-14 days	24	1.32 (0.85, 2.06)	20	1.09 (0.67, 1.77)
	15-21 days	29	1.64 (1.09, 2.47)	18	0.99 (0.60, 1.64)
	22-28 days	20	1.04 (0.65, 1.67)	25	1.54 (1.00, 2.38)
Haemorrhagic stroke	Baseline	1169	1.00	746	1.00
	-28 to -1 days	214	0.51 (0.44, 0.59)	81	0.38 (0.30, 0.49)
	0 day	6	0.37 (0.16, 0.82)	5	0.56 (0.23, 1.35)
	1-7 days	112	0.97 (0.80, 1.19)	82	1.27 (1.00, 1.61)
	8-14 days	123	1.06 (0.88, 1.29)	74	1.08 (0.84, 1.38)

	15-21 days	114	0.98 (0.81, 1.20)	96	1.36 (1.09, 1.70)
	22-28 days	116	1.03 (0.85, 1.26)	82	1.12 (0.88, 1.41)
Subarachnoid haemorrhage	Baseline	833	1.00	374	1.00
	-28 to -1 days	136	0.47 (0.39, 0.57)	49	0.44 (0.32, 0.59)
	0 day	*	0.19 (0.05, 0.76)	0	n/a
	1-7 days	66	0.91 (0.70, 1.17)	31	0.98 (0.68, 1.43)
	8-14 days	76	1.06 (0.83, 1.35)	37	1.17 (0.82, 1.65)
	15-21 days	62	0.88 (0.67, 1.15)	26	0.80 (0.53, 1.20)
	22-28 days	63	0.94 (0.72, 1.22)	38	1.18 (0.84, 1.66)

Supplementary table 8: ICD-10 codes used to identify cases with each outcome.

Composite outcomes	ICD-10 code and description
Demyelinating disorder	G361 Acute and subacute haemorrhagic leukoencephalitis [Hurst] G368 Other specified acute disseminated demyelination G369 Acute disseminated demyelination, unspecified G372 Central pontine myelinolysis G373 Acute transverse myelitis in demyelinating disease of central nervous system G378 Other specified demyelinating diseases of central nervous system G379 Demyelinating disease of central nervous system, unspecified H46X Optic neuritis H481 Retrobulbar neuritis in diseases classified elsewhere
	A87 - Viral meningitis

Encephalitis meningitis and myelitis	A870 - Enteroviral meningitis
	A871 - Adenoviral meningitis
	A878 - Other viral meningitis
	A879 - Viral meningitis, unspecified
	G030 - Nonpyogenic meningitis
	G039 - Meningitis, unspecified
	G04 - Encephalitis, myelitis and encephalomyelitis
	G048 - Other encephalitis, myelitis and encephalomyelitis
	G049 - Encephalitis, myelitis and encephalomyelitis, unspecified
	G05 – Encephalitis, myelitis, encephalomyelitis in diseases classified elsewhere
	G051 - Encephalitis, myelitis and encephalomyelitis in viral diseases classified elsewhere
	G058 - Encephalitis, myelitis and encephalomyelitis in other diseases classified elsewhere
Guillain-Barre	G610 - Guillain-Barré syndrome
Bell's palsy	G510 - Bell palsy
Myasthenic disorder	G70 - Myasthenia gravis and other myoneural disorders
	G700 - Myasthenia gravis
	G709 - Myoneural disorder, unspecified
	G733 - Myasthenic syndromes in other diseases classified elsewhere
Haemorrhagic stroke	I61 - Intracerebral haemorrhage

	I610 - Intracerebral haemorrhage in hemisphere, subcortical
	I611, I611 - Intracerebral haemorrhage in hemisphere, cortical
	I612, I612 - Intracerebral haemorrhage in hemisphere, unspecified
	I613, I613 - Intracerebral haemorrhage in brain stem
	I614, I614 - Intracerebral haemorrhage in cerebellum
	I615, I615 - Intracerebral haemorrhage, intraventricular
	I616, I616 - Intracerebral haemorrhage, multiple localized
	I618, I618 - Other intracerebral haemorrhage
	I619, I619 - Intracerebral haemorrhage, unspecified
Subarachnoid haemorrhage	I60 - Subarachnoid haemorrhage
	I600 - Subarachnoid haemorrhage from carotid siphon and bifurcation
	I601 - Subarachnoid haemorrhage from middle cerebral artery
	I602 - Subarachnoid haemorrhage from anterior communicating artery
	I603 - Subarachnoid haemorrhage from posterior communicating artery
	I604 - Subarachnoid haemorrhage from basilar artery
	I605 - Subarachnoid haemorrhage from vertebral artery
	I606 - Subarachnoid haemorrhage from other intracranial arteries
	I607 - Subarachnoid haemorrhage from intracranial artery, unspecified
	I608 - Other subarachnoid haemorrhage
	I609 - Subarachnoid haemorrhage, unspecified

	I690 - Sequelae of subarachnoid haemorrhage

