# Vyvanuti III

Results of Statistical Estimation

August 21, 2023

1 Serious Course BA12

Characteristic	N = 36,179,545[1]
SeriousCovidProxy	7,440 (<0.1%)
Immunity	
_noimmunity	1,450,940 (4.0%)
_other	477,496 (1.3%)
boost_001-061	3,203,944 (8.9%)
boost_062-122	3,131,102 (8.7%)
boost_123-183	2,932,843 (8.1%)
boost_184-244	2,293,860 (6.3%)
full_001-061	439,779 (1.2%)
full_062-122	682,576 (1.9%)
full_123-183	2,402,914 (6.6%)
full_184-244	1,875,536 (5.2%)
full_245-305	964,382 (2.7%)
full_306-366	740,061 (2.0%)
full_367-427	257,372 (0.7%)
full_428-488	39,216 (0.1%)
hybridboost_001-061	2,072,168 (5.7%)
hybridboost_062-122	2,007,691 (5.5%)
hybridboost_123-183	1,518,313 (4.2%)
hybridfull_001-061	1,551,195 (4.3%)
hybridfull_062-122	1,806,092 (5.0%)
hybridfull_123-183	2,128,658 (5.9%)
hybridfull_184-244	1,233,125 (3.4%)
hybridfull_245-305	562,025 (1.6%)
hybridfull_306-366	303,256 (0.8%)
inf_062-122	646,394 (1.8%)
inf_123-183	592,422 (1.6%)
inf_306-366	193,168 (0.5%)
inf_367-427	228,142 (0.6%)
inf_428-488	250,056 (0.7%)
inf_489-549	194,819 (0.5%)
Sex	
F	18,719,412 (52%)
M	17,460,133 (48%)

[1] n (%)
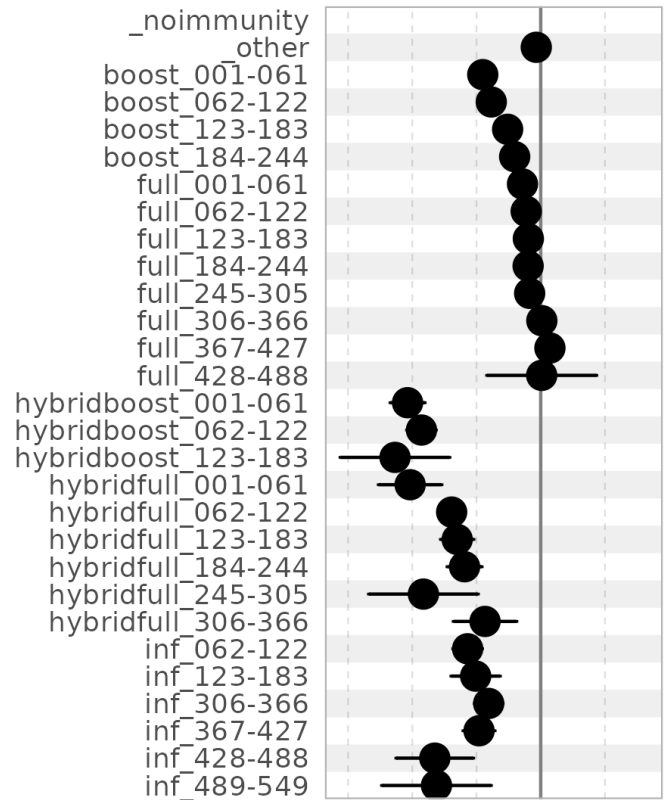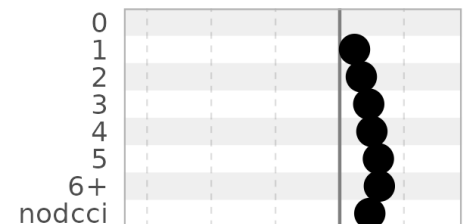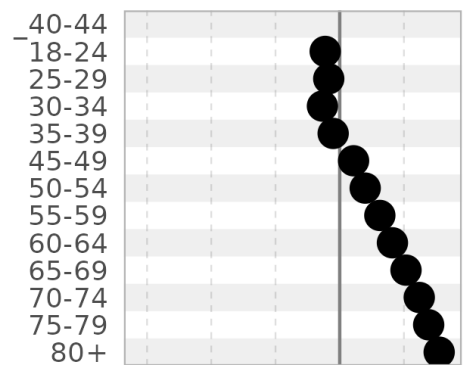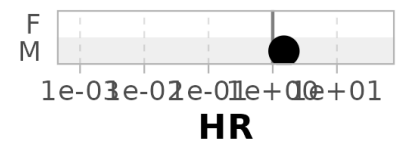
	beta	lower	upper	HR	lower	upper	eff	upper	lower
Immunity_other	-0.16	-0.34	0.02	0.85	0.71	1.02	0.15	0.29	-0.02
Immunityboost_001-061	-2.08	-2.18	-1.98	0.13	0.11	0.14	0.87	0.89	0.86
Immunityboost_062-122	-1.77	-1.84	-1.71	0.17	0.16	0.18	0.83	0.84	0.82
Immunityboost_123-183	-1.19	-1.28	-1.09	0.31	0.28	0.34	0.69	0.72	0.66
Immunityboost_184-244	-0.93	-1.40	-0.47	0.39	0.25	0.63	0.61	0.75	0.37
Immunityfull_001-061	-0.65	-0.84	-0.47	0.52	0.43	0.63	0.48	0.57	0.37
Immunityfull_062-122	-0.52	-0.68	-0.36	0.59	0.51	0.70	0.41	0.49	0.30
Immunityfull_123-183	-0.44	-0.59	-0.30	0.64	0.55	0.74	0.36	0.45	0.26
Immunityfull_184-244	-0.45	-0.55	-0.35	0.64	0.58	0.70	0.36	0.42	0.30
Immunityfull_245-305	-0.40	-0.51	-0.28	0.67	0.60	0.75	0.33	0.40	0.25
Immunityfull_306-366	0.04	-0.10	0.18	1.04	0.90	1.20	-0.04	0.10	-0.20
Immunityfull_367-427	0.33	0.03	0.63	1.39	1.03	1.87	-0.39	-0.03	-0.87
Immunityfull_428-488	0.04	-1.93	2.00	1.04	0.15	7.39	-0.04	0.85	-6.39
Immunityhybridboost_001-061	-4.77	-5.39	-4.15	0.01	0.00	0.02	0.99	1.00	0.98
Immunityhybridboost_062-122	-4.28	-4.80	-3.75	0.01	0.01	0.02	0.99	0.99	0.98
Immunityhybridboost_123-183	-5.23	-7.19	-3.26	0.01	0.00	0.04	0.99	1.00	0.96
Immunityhybridfull_001-061	-4.68	-5.81	-3.55	0.01	0.00	0.03	0.99	1.00	0.97
Immunityhybridfull_062-122	-3.19	-3.66	-2.73	0.04	0.03	0.07	0.96	0.97	0.93
Immunityhybridfull_123-183	-2.99	-3.59	-2.40	0.05	0.03	0.09	0.95	0.97	0.91
Immunityhybridfull_184-244	-2.73	-3.35	-2.11	0.07	0.04	0.12	0.93	0.96	0.88
Immunityhybridfull_245-305	-4.21	-6.17	-2.25	0.01	0.00	0.11	0.99	1.00	0.89
Immunityhybridfull_306-366	-2.00	-3.13	-0.86	0.14	0.04	0.42	0.86	0.96	0.58
Immunityinf_062-122	-2.62	-3.15	-2.09	0.07	0.04	0.12	0.93	0.96	0.88
Immunityinf_123-183	-2.33	-3.21	-1.46	0.10	0.04	0.23	0.90	0.96	0.77
Immunityinf_306-366	-1.87	-2.37	-1.36	0.15	0.09	0.26	0.85	0.91	0.74
Immunityinf_367-427	-2.21	-2.78	-1.64	0.11	0.06	0.19	0.89	0.94	0.81
Immunityinf_428-488	-3.80	-5.18	-2.41	0.02	0.01	0.09	0.98	0.99	0.91
Immunityinf_489-549	-3.74	-5.70	-1.78	0.02	0.00	0.17	0.98	1.00	0.83
DCCI1	0.53	0.44	0.62	1.70	1.56	1.85	-0.70	-0.56	-0.85
DCCI2	0.78	0.69	0.86	2.17	1.99	2.37	-1.17	-0.99	-1.37
DCCI3	1.04	0.95	1.13	2.83	2.59	3.10	-1.83	-1.59	-2.10
DCCI4	1.15	1.06	1.25	3.17	2.88	3.49	-2.17	-1.88	-2.49
DCCI5	1.39	1.28	1.49	4.00	3.61	4.42	-3.00	-2.61	-3.42
DCCI6+	1.42	1.33	1.51	4.14	3.78	4.53	-3.14	-2.78	-3.53
DCCInodcci	1.08	0.85	1.31	2.94	2.34	3.69	-1.94	-1.34	-2.69
AgeGr18-24	-0.52	-0.95	-0.09	0.59	0.39	0.92	0.41	0.61	0.08
AgeGr25-29	-0.39	-0.82	0.03	0.67	0.44	1.03	0.33	0.56	-0.03
AgeGr30-34	-0.62	-1.05	-0.19	0.54	0.35	0.83	0.46	0.65	0.17
AgeGr35-39	-0.23	-0.62	0.15	0.79	0.54	1.16	0.21	0.46	-0.16
AgeGr45-49	0.50	0.18	0.81	1.64	1.20	2.24	-0.64	-0.20	-1.24
AgeGr50-54	0.91	0.61	1.21	2.49	1.85	3.37	-1.49	-0.85	-2.37
AgeGr55-59	1.44	1.16	1.72	4.22	3.18	5.59	-3.22	-2.18	-4.59
AgeGr60-64	1.89	1.62	2.16	6.62	5.04	8.69	-5.62	-4.04	-7.69
AgeGr65-69	2.38	2.11	2.64	10.77	8.27	14.02	-9.77	-7.27	-13.02
AgeGr70-74	2.85	2.59	3.11	17.32	13.35	22.47	-16.32	-12.35	-21.47
AgeGr75-79	3.19	2.93	3.45	24.26	18.72	31.46	-23.26	-17.72	-30.46
AgeGr80+	3.57	3.31	3.82	35.37	27.33	45.77	-34.37	-26.33	-44.77
SexM	0.40	0.36	0.45	1.49	1.43	1.56	-0.49	-0.43	-0.56

Table 1: Cox model summary

	immunities	deltas	lower_of_deltas	upper_of_deltas
2	Immunityfull	0.03	0.02	0.04
3	Immunityboost	0.03	0.03	0.04
4	Immunitysecboost			
5	Immunitysecbnew			
6	Immunityinf	-0.00	-0.01	-0.00
7	Immunityhybridfull	0.00	0.00	0.01
8	Immunityhybridboost	0.00	-0.00	0.00

Table 2: Monthly percentage decrease of effectiveness/protection

	1	2	3	4	5	6	7
1		37.60%			61.20%	59.13%	57.68%
2	-37.60%				11.49%	13.22%	14.68%
3							
4							
5	-61.20%	-11.49%				3.38%	6.44%
6	-59.13%	-13.22%			-3.38%		1.09%
7	-57.68%	-14.68%			-6.44%	-1.09%	

Table 3: Effectiveness/protection differences

1	2	3	4	5	6	7
	13.30			16.48	26.94	19.39
-13.30				6.22	20.33	29.63
-16.48	-6.22				1.76	3.56
-26.94	-20.33			-1.76		2.20
-19.39	-29.63			-3.56	-2.20	

Table 4: Z-scores of effectiveness/protection differences

2   Serious Course BA45+

Characteristic	N = 55,953,206[1]
SeriousCovidProxy	5,850 (<0.1%)
Immunity	
_noimmunity	1,167,155 (2.1%)
_other	3,905,443 (7.0%)
bnew_001-061	12,129 (<0.1%)
bnew_062-122	11,963 (<0.1%)
boost_001-061	65,138 (0.1%)
boost_062-122	144,071 (0.3%)
boost_123-183	1,318,253 (2.4%)
boost_184-244	2,893,082 (5.2%)
boost_245-305	2,871,941 (5.1%)
boost_306-366	2,575,171 (4.6%)
boost_367-427	2,256,924 (4.0%)
boost_428-488	2,170,262 (3.9%)
boost_489-549	2,144,025 (3.8%)
full_123-183	132,649 (0.2%)
full_184-244	346,686 (0.6%)
full_245-305	508,710 (0.9%)
full_306-366	978,884 (1.7%)
full_367-427	1,047,871 (1.9%)
full_428-488	1,047,857 (1.9%)
full_489-549	1,033,996 (1.8%)
hybridboost_001-061	910,248 (1.6%)
hybridboost_062-122	1,172,961 (2.1%)
hybridboost_123-183	2,035,907 (3.6%)
hybridboost_184-244	2,360,230 (4.2%)
hybridboost_245-305	1,957,705 (3.5%)
hybridboost_306-366	1,490,775 (2.7%)
hybridboost_367-427	1,231,985 (2.2%)
hybridboost_428-488	1,118,100 (2.0%)
hybridboost_489-549	816,465 (1.5%)
hybridfull_062-122	312,845 (0.6%)
hybridfull_123-183	949,146 (1.7%)
hybridfull_184-244	1,443,414 (2.6%)
hybridfull_245-305	1,559,130 (2.8%)
hybridfull_306-366	1,593,290 (2.8%)
hybridfull_367-427	1,331,664 (2.4%)
hybridfull_428-488	1,038,468 (1.9%)
hybridfull_489-549	887,363 (1.6%)
inf_123-183	453,340 (0.8%)
inf_184-244	662,163 (1.2%)
inf_245-305	675,664 (1.2%)
inf_306-366	645,200 (1.2%)
inf_367-427	614,309 (1.1%)
inf_428-488	678,710 (1.2%)
inf_489-549	704,307 (1.3%)
secbnew_001-061	283,050 (0.5%)
secbnew_062-122	281,082 (0.5%)
secbnew_123-183	278,856 (0.5%)
secbnew_184-244	281,128 (0.5%)
secboost_001-061	319,429 (0.6%)
secboost_062-122	314,433 (0.6%)
secboost_123-183	310,183 (0.6%)
secboost_184-244	307,626 (0.5%)
secboost_245-305	301,820 (0.5%)
Sex	
F	29,187,513 (52%)
M	26,765,693 (48%)

[1] n (%)

6
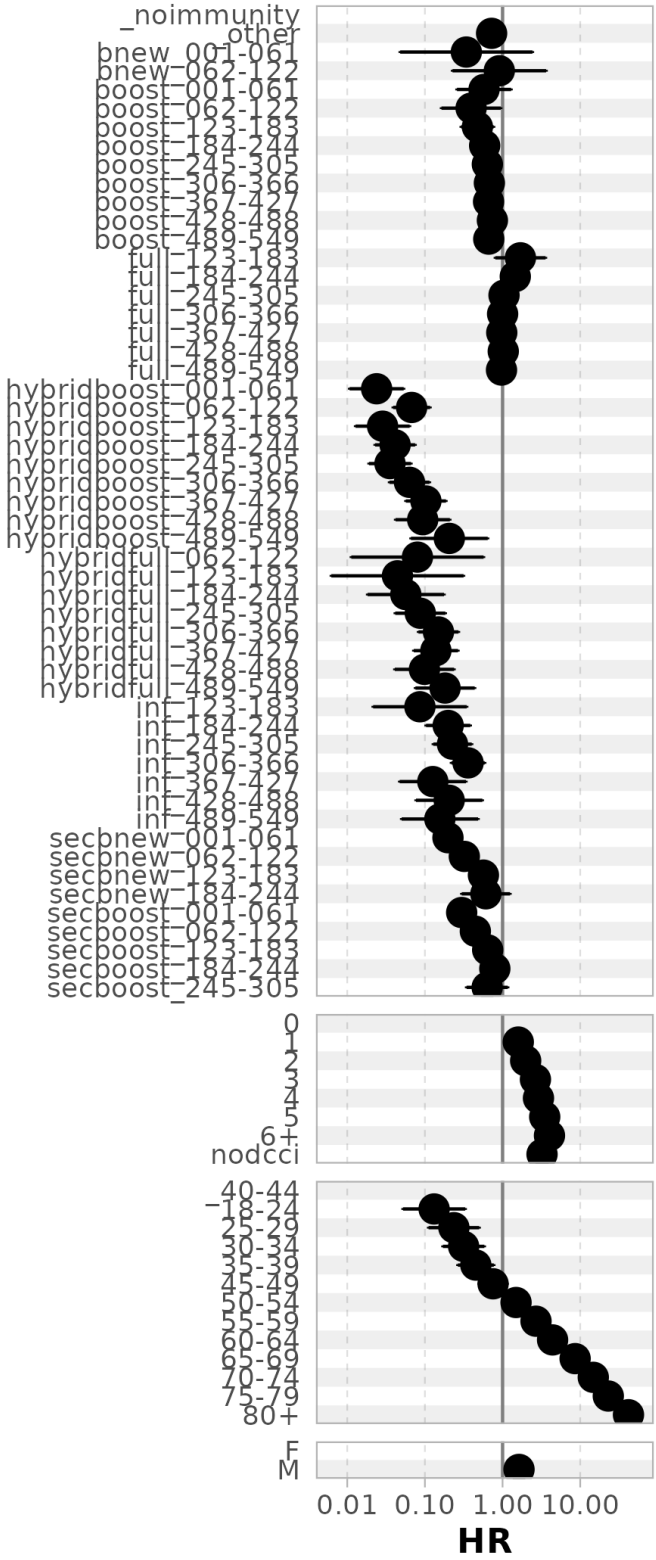
	beta	lower	upper	HR	lower	upper	eff	upper	lower
Immunity_other	-0.33	-0.46	-0.19	0.72	0.63	0.83	0.28	0.37	0.17
Immunitybnew_001-061	-1.07	-3.04	0.89	0.34	0.05	2.43	0.66	0.95	-1.43
Immunitybnew_062-122	-0.10	-1.49	1.29	0.91	0.23	3.64	0.09	0.77	-2.64
Immunityboost_001-061	-0.55	-1.35	0.25	0.58	0.26	1.29	0.42	0.74	-0.29
Immunityboost_062-122	-0.93	-1.81	-0.05	0.39	0.16	0.95	0.61	0.84	0.05
Immunityboost_123-183	-0.75	-1.23	-0.27	0.47	0.29	0.77	0.53	0.71	0.23
Immunityboost_184-244	-0.53	-0.67	-0.39	0.59	0.51	0.68	0.41	0.49	0.32
Immunityboost_245-305	-0.45	-0.54	-0.36	0.64	0.58	0.70	0.36	0.42	0.30
Immunityboost_306-366	-0.39	-0.49	-0.30	0.68	0.62	0.74	0.32	0.38	0.26
Immunityboost_367-427	-0.42	-0.54	-0.30	0.66	0.58	0.74	0.34	0.42	0.26
Immunityboost_428-488	-0.30	-0.44	-0.17	0.74	0.65	0.84	0.26	0.35	0.16
Immunityboost_489-549	-0.41	-0.64	-0.18	0.66	0.53	0.83	0.34	0.47	0.17
Immunityfull_123-183	0.53	-0.22	1.27	1.70	0.81	3.57	-0.70	0.19	-2.57
Immunityfull_184-244	0.38	0.06	0.69	1.46	1.06	2.00	-0.46	-0.06	-1.00
Immunityfull_245-305	0.04	-0.22	0.31	1.04	0.80	1.36	-0.04	0.20	-0.36
Immunityfull_306-366	0.00	-0.26	0.26	1.00	0.77	1.30	-0.00	0.23	-0.30
Immunityfull_367-427	-0.02	-0.21	0.17	0.98	0.81	1.18	0.02	0.19	-0.18
Immunityfull_428-488	0.02	-0.14	0.18	1.02	0.87	1.20	-0.02	0.13	-0.20
Immunityfull_489-549	-0.03	-0.22	0.16	0.97	0.80	1.17	0.03	0.20	-0.17
Immunityhybridboost_001-061	-3.73	-4.54	-2.93	0.02	0.01	0.05	0.98	0.99	0.95
Immunityhybridboost_062-122	-2.70	-3.24	-2.15	0.07	0.04	0.12	0.93	0.96	0.88
Immunityhybridboost_123-183	-3.56	-4.36	-2.76	0.03	0.01	0.06	0.97	0.99	0.94
Immunityhybridboost_184-244	-3.19	-3.78	-2.59	0.04	0.02	0.07	0.96	0.98	0.93
Immunityhybridboost_245-305	-3.34	-3.96	-2.72	0.04	0.02	0.07	0.96	0.98	0.93
Immunityhybridboost_306-366	-2.76	-3.35	-2.17	0.06	0.03	0.11	0.94	0.97	0.89
Immunityhybridboost_367-427	-2.27	-2.87	-1.68	0.10	0.06	0.19	0.90	0.94	0.81
Immunityhybridboost_428-488	-2.37	-3.17	-1.56	0.09	0.04	0.21	0.91	0.96	0.79
Immunityhybridboost_489-549	-1.58	-2.72	-0.44	0.21	0.07	0.64	0.79	0.93	0.36
Immunityhybridfull_062-122	-2.52	-4.49	-0.56	0.08	0.01	0.57	0.92	0.99	0.43
Immunityhybridfull_123-183	-3.12	-5.08	-1.16	0.04	0.01	0.31	0.96	0.99	0.69
Immunityhybridfull_184-244	-2.87	-4.00	-1.74	0.06	0.02	0.18	0.94	0.98	0.82
Immunityhybridfull_245-305	-2.44	-3.18	-1.70	0.09	0.04	0.18	0.91	0.96	0.82
Immunityhybridfull_306-366	-1.90	-2.49	-1.31	0.15	0.08	0.27	0.85	0.92	0.73
Immunityhybridfull_367-427	-1.98	-2.63	-1.32	0.14	0.07	0.27	0.86	0.93	0.73
Immunityhybridfull_428-488	-2.32	-3.20	-1.44	0.10	0.04	0.24	0.90	0.96	0.76
Immunityhybridfull_489-549	-1.71	-2.59	-0.83	0.18	0.08	0.44	0.82	0.92	0.56
Immunityinf_123-183	-2.45	-3.84	-1.06	0.09	0.02	0.35	0.91	0.98	0.65
Immunityinf_184-244	-1.61	-2.27	-0.96	0.20	0.10	0.38	0.80	0.90	0.62
Immunityinf_245-305	-1.49	-2.05	-0.92	0.23	0.13	0.40	0.77	0.87	0.60
Immunityinf_306-366	-1.02	-1.52	-0.53	0.36	0.22	0.59	0.64	0.78	0.41
Immunityinf_367-427	-2.07	-3.05	-1.09	0.13	0.05	0.34	0.87	0.95	0.66
Immunityinf_428-488	-1.58	-2.57	-0.60	0.21	0.08	0.55	0.79	0.92	0.45
Immunityinf_489-549	-1.86	-2.99	-0.73	0.16	0.05	0.48	0.84	0.95	0.52
Immunitysecbnew_001-061	-1.62	-1.96	-1.28	0.20	0.14	0.28	0.80	0.86	0.72
Immunitysecbnew_062-122	-1.13	-1.45	-0.82	0.32	0.24	0.44	0.68	0.76	0.56
Immunitysecbnew_123-183	-0.57	-0.85	-0.29	0.57	0.43	0.75	0.43	0.57	0.25
Immunitysecbnew_184-244	-0.50	-1.21	0.22	0.61	0.30	1.25	0.39	0.70	-0.25
Immunitysecboost_001-061	-1.21	-1.42	-1.01	0.30	0.24	0.36	0.70	0.76	0.64
Immunitysecboost_062-122	-0.81	-1.01	-0.60	0.45	0.36	0.55	0.55	0.64	0.45
Immunitysecboost_123-183	-0.44	-0.64	-0.24	0.64	0.53	0.78	0.36	0.47	0.22
Immunitysecboost_184-244	-0.23	-0.46	0.00	0.79	0.63	1.00	0.21	0.37	-0.00
Immunitysecboost_245-305	-0.46	-1.07	0.15	0.63	0.34	1.17	0.37	0.66	-0.17
DCCI1	0.47	0.37	0.56	1.59	1.44	1.76	-0.59	-0.44	-0.76
DCCI2	0.68	0.59	0.78	1.98	1.80	2.19	-0.98	-0.80	-1.19
DCCI3	0.97	0.87	1.07	2.65	2.40	2.93	-1.65	-1.40	-1.93
DCCI4	1.06	0.96	1.17	2.90	2.60	3.23	-1.90	-1.60	-2.23
DCCI5	1.25	1.13	1.37	3.49	3.11	3.92	-2.49	-2.11	-2.92
DCCI6+	1.39	1.29	1.49	4.02	3.62	4.45	-3.02	-2.62	-3.45
DCCInodcci	1.17	0.91	1.43	3.22	2.49	4.16	-2.22	-1.49	-3.16
AgeGr18-24	-2.03	-2.95	-1.11	0.13	0.05	0.33	0.87	0.95	0.67
AgeGr25-29	-1.44	-2.19	-0.69	0.24	0.11	0.50	0.76	0.89	0.50
AgeGr30-34	-1.16	-1.77	7 -0.54	0.31	0.17	0.58	0.69	0.83	0.42
AgeGr35-39	-0.79	-1.33	-0.26	0.45	0.27	0.77	0.55	0.73	0.23
AgeGr45-49	-0.28	-0.70	0.13	0.75	0.50	1.14	0.25	0.50	-0.14
AgeGr50-54	0.40	0.03	0.77	1.49	1.03	2.16	-0.49	-0.03	-1.16

	immunities	deltas	lower_of_deltas	upper_of_deltas
2	Immunityfull	-0.02	-0.05	0.01
3	Immunityboost	0.02	0.00	0.03
4	Immunitysecboost	0.08	0.05	0.10
5	Immunitysecbnew	0.08	0.05	0.12
6	Immunityinf	0.00	-0.01	0.02
7	Immunityhybridfull	0.01	-0.00	0.02
8	Immunityhybridboost	0.00	0.00	0.01

Table 6: Monthly percentage decrease of effectiveness/protection

	1	2	3	4	5	6	7
1		34.41%	56.46%	90.27%	82.70%	89.19%	92.42%
2	-34.41%		-11.32%	3.28%	43.72%	53.87%	58.49%
3	-56.46%	11.32%		10.51%	55.46%	55.75%	36.70%
4	-90.27%	-3.28%	-10.51%		46.97%	39.79%	23.97%
5	-82.70%	-43.72%	-55.46%	-46.97%		8.84%	12.00%
6	-89.19%	-53.87%	-55.75%	-39.79%	-8.84%		3.35%
7	-92.42%	-58.49%	-36.70%	-23.97%	-12.00%	-3.35%	

Table 7: Effectiveness/protection differences

1	2	3	4	5	6	7
	6.59	3.27	3.09	13.27	15.89	16.26
-6.59		-1.63	0.35	12.40	20.83	26.30
-3.27	1.63		3.01	8.00	10.66	14.47
-3.09	-0.35	-3.01		5.02	6.16	8.41
-13.27	-12.40	-8.00	-5.02		2.72	4.04
-15.89	-20.83	-10.66	-6.16	-2.72		1.93
-16.26	-26.30	-14.47	-8.41	-4.04	-1.93	

Table 8: Z-scores of effectiveness/protection differences

3 Long Covid BA12 - Infected

Characteristic	N = 1,176,493[1]
LongCovid	15,587 (1.3%)
Immunity	
_noimmunity	253,202 (22%)
_other	13,320 (1.1%)
boost_001-061	126,737 (11%)
boost_062-122	121,903 (10%)
boost_123-183	41,718 (3.5%)
boost_184-244	48,291 (4.1%)
boost_245-305	38,005 (3.2%)
boost_306-366	4,909 (0.4%)
full_001-061	23,079 (2.0%)
full_062-122	28,503 (2.4%)
full_123-183	85,332 (7.3%)
full_184-244	118,129 (10%)
full_245-305	31,911 (2.7%)
full_306-366	14,088 (1.2%)
full_367-427	11,161 (0.9%)
full_428-488	3,053 (0.3%)
full_489-549	652 (<0.1%)
hybridboost_001-061	17,027 (1.4%)
hybridboost_062-122	13,256 (1.1%)
hybridboost_123-183	6,418 (0.5%)
hybridboost_184-244	10,842 (0.9%)
hybridboost_245-305	5,312 (0.5%)
hybridboost_306-366	415 (<0.1%)
hybridfull_001-061	3,393 (0.3%)
hybridfull_062-122	10,710 (0.9%)
hybridfull_123-183	19,823 (1.7%)
hybridfull_184-244	25,882 (2.2%)
hybridfull_245-305	10,386 (0.9%)
hybridfull_306-366	4,448 (0.4%)
hybridfull_367-427	2,813 (0.2%)
hybridfull_428-488	749 (<0.1%)
hybridfull_489-549	141 (<0.1%)
inf_062-122	10,435 (0.9%)
inf_123-183	7,152 (0.6%)
inf_184-244	7,406 (0.6%)
inf_245-305	6,841 (0.6%)
inf_306-366	13,880 (1.2%)
inf_367-427	14,166 (1.2%)
inf_428-488	13,251 (1.1%)
inf_489-549	5,942 (0.5%)
secboost_001-061	1,764 (0.1%)
secboost_062-122	48 (<0.1%)
DCCI	
0	648,332 (55%)
1	282,607 (24%)
2	118,879 (10%)
3	57,730 (4.9%)
4	29,690 (2.5%)
5	15,810 (1.3%)
6+	23,445 (2.0%)
Sex	
F	649,835 (55%)
M	526,658 (45%)

[1] n (%)

Variable		N	Odds ratio	p
Immunity	noimmunity	253202		Reference
	_other	13320		0.93 (0.80, 1.08) 0.381
	boost_001-061	126737		0.75 (0.70, 0.79)<0.001
	boost_062-122	121903		0.81 (0.76, 0.85)<0.001
	boost_123-183	41718		0.87 (0.81, 0.94)<0.001
	boost_184-244	48291		0.92 (0.85, 0.99) 0.029
	boost_245-305	38005		0.89 (0.83, 0.97) 0.005
	boost_306-366	4909		0.80 (0.66, 0.96) 0.022
	full_001-061	23079		0.91 (0.79, 1.04) 0.175
	full_062-122	28503		0.90 (0.80, 1.02) 0.092
	full_123-183	85332		0.83 (0.77, 0.90)<0.001
	full_184-244	118129		0.84 (0.79, 0.90)<0.001
	full_245-305	31911		0.97 (0.88, 1.06) 0.499
	full_306-366	14088		0.95 (0.82, 1.09) 0.496
	full_367-427	11161		1.01 (0.86, 1.17) 0.922
	full_428-488	3053		1.09 (0.85, 1.37) 0.476
	full_489-549	652		1.28 (0.79, 1.95) 0.285
	hybridboost_001-061	17027		0.64 (0.54, 0.75)<0.001
	hybridboost_062-122	13256		0.74 (0.63, 0.86)<0.001
	hybridboost_123-183	6418		0.84 (0.68, 1.02) 0.093
	hybridboost_184-244	10842		0.70 (0.59, 0.83)<0.001
	hybridboost_245-305	5312		0.83 (0.67, 1.01) 0.072
	hybridboost_306-366	415		0.47 (0.17, 1.03) 0.096
	hybridfull_001-061	3393		0.78 (0.53, 1.09) 0.170
	hybridfull_062-122	10710		0.68 (0.55, 0.83)<0.001
	hybridfull_123-183	19823		0.79 (0.68, 0.92) 0.003
	hybridfull_184-244	25882		0.76 (0.66, 0.86)<0.001
	hybridfull_245-305	10386		0.76 (0.62, 0.90) 0.003
	hybridfull_306-366	4448		0.90 (0.69, 1.16) 0.434
	hybridfull_367-427	2813		0.86 (0.61, 1.18) 0.389
	hybridfull_428-488	749		1.11 (0.64, 1.79) 0.684
	hybridfull_489-549	141		1.09 (0.27, 2.90) 0.882
	inf_062-122	10435		1.23 (1.03, 1.44) 0.016
	inf_123-183	7152		0.80 (0.62, 1.00) 0.064
	inf_184-244	7406		0.77 (0.60, 0.94) 0.034
	inf_245-305	6841		0.74 (0.57, 0.94) 0.017
	inf_306-366	13880		0.80 (0.67, 0.94) 0.010
	inf_367-427	14166		0.75 (0.62, 0.88)<0.001
	inf_428-488	13251		0.79 (0.66, 0.94) 0.008
	inf_489-549	5942		0.79 (0.62, 1.01) 0.065
	secboost_001-061	1764		0.88 (0.64, 1.16) 0.381
	secboost_062-122	48		1.57 (0.26, 5.11) 0.535
DCCI	0	648332		Reference
	1	282607		1.68 (1.61, 1.75)<0.001
	2	118879		1.94 (1.84, 2.04)<0.001
	3	57730		2.20 (2.06, 2.34)<0.001
	4	29690		2.40 (2.22, 2.59)<0.001
	5	15810		2.52 (2.29, 2.78)<0.001
	6+	23445		2.76 (2.55, 2.99)<0.001
AgeGr	_40-44	140718		Reference
	18-24	93730		0.51 (0.46, 0.57)<0.001
	25-29	101566		0.62 (0.56, 0.68)<0.001
	30-34	121898		0.71 (0.65, 0.78)<0.001
	35-39	124514		0.84 (0.78, 0.91)<0.001
	45-49	144575		1.23 (1.15, 1.32)<0.001
	50-54	106922		1.39 (1.30, 1.50)<0.001
	55-59	98097		1.59 (1.48, 1.71)<0.001
	60-64	66623		1.63 (1.51, 1.76)<0.001
	65-69	57462		1.78 (1.64, 1.92)<0.001
	70-74	49063		1.89 (1.74, 2.05)<0.001
	75-79	35388		1.99 (1.82, 2.17)<0.001
	80+	35937		2.07 (1.90, 2.26)<0.001
Sex	F	649835		Reference
	M	526658		0.83 (0.80, 0.85)<0.001

0.2 0.5 1 2 5

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	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	-4.6345	0.0331	-140.19	0.0000
Immunity_other	-0.0682	0.0780	-0.88	0.3813
Immunityboost_001-061	-0.2923	0.0319	-9.16	0.0000
Immunityboost_062-122	-0.2145	0.0292	-7.35	0.0000
Immunityboost_123-183	-0.1360	0.0402	-3.39	0.0007
Immunityboost_184-244	-0.0840	0.0385	-2.18	0.0291
Immunityboost_245-305	-0.1129	0.0401	-2.82	0.0048
Immunityboost_306-366	-0.2247	0.0979	-2.29	0.0217
Immunityfull_001-061	-0.0930	0.0685	-1.36	0.1747
Immunityfull_062-122	-0.1041	0.0618	-1.69	0.0919
Immunityfull_123-183	-0.1839	0.0423	-4.35	0.0000
Immunityfull_184-244	-0.1745	0.0333	-5.24	0.0000
Immunityfull_245-305	-0.0328	0.0485	-0.68	0.4990
Immunityfull_306-366	-0.0497	0.0730	-0.68	0.4965
Immunityfull_367-427	0.0077	0.0779	0.10	0.9216
Immunityfull_428-488	0.0870	0.1220	0.71	0.4759
Immunityfull_489-549	0.2451	0.2292	1.07	0.2848
Immunityhybridboost_001-061	-0.4493	0.0813	-5.53	0.0000
Immunityhybridboost_062-122	-0.3029	0.0770	-3.93	0.0001
Immunityhybridboost_123-183	-0.1741	0.1037	-1.68	0.0931
Immunityhybridboost_184-244	-0.3500	0.0887	-3.95	0.0001
Immunityhybridboost_245-305	-0.1908	0.1060	-1.80	0.0719
Immunityhybridboost_306-366	-0.7499	0.4511	-1.66	0.0964
Immunityhybridfull_001-061	-0.2532	0.1846	-1.37	0.1702
Immunityhybridfull_062-122	-0.3827	0.1042	-3.67	0.0002
Immunityhybridfull_123-183	-0.2319	0.0767	-3.02	0.0025
Immunityhybridfull_184-244	-0.2785	0.0651	-4.28	0.0000
Immunityhybridfull_245-305	-0.2804	0.0941	-2.98	0.0029
Immunityhybridfull_306-366	-0.1037	0.1326	-0.78	0.4341
Immunityhybridfull_367-427	-0.1456	0.1691	-0.86	0.3892
Immunityhybridfull_428-488	0.1067	0.2622	0.41	0.6839
Immunityhybridfull_489-549	0.0871	0.5860	0.15	0.8819
Immunityinf_062-122	0.2049	0.0849	2.41	0.0159
Immunityinf_123-183	-0.2269	0.1225	-1.85	0.0640
Immunityinf_184-244	-0.2596	0.1225	-2.12	0.0340
Immunityinf_245-305	-0.3043	0.1271	-2.40	0.0166
Immunityinf_306-366	-0.2262	0.0872	-2.59	0.0095
Immunityinf_367-427	-0.2943	0.0875	-3.36	0.0008
Immunityinf_428-488	-0.2335	0.0876	-2.67	0.0077
Immunityinf_489-549	-0.2296	0.1244	-1.85	0.0650
Immunitysecboost_001-061	-0.1327	0.1513	-0.88	0.3805
Immunitysecboost_062-122	0.4500	0.7252	0.62	0.5349
DCCI1	0.5195	0.0212	24.51	0.0000
DCCI2	0.6611	0.0260	25.48	0.0000
DCCI3	0.7873	0.0316	24.91	0.0000
DCCI4	0.8746	0.0390	22.45	0.0000
DCCI5	0.9262	0.0488	18.98	0.0000
DCCI6+	1.0152	0.0409	24.85	0.0000
AgeGr18-24	-0.6757	0.0551	-12.25	0.0000
AgeGr25-29	-0.4820	0.0492	-9.80	0.0000
AgeGr30-34	-0.3398	0.0441	-7.71	0.0000
AgeGr35-39	-0.1718	0.0414	-4.15	0.0000
AgeGr45-49	0.2071	0.0359	5.77	0.0000
AgeGr50-54	0.3327	0.0371	8.96	0.0000
AgeGr55-59	0.4629	0.0366	12.64	0.0000
AgeGr60-64	0.4888	0.0398	12.28	0.0000
AgeGr65-69	0.5756	0.0404	14.26	0.0000
AgeGr70-74	0.6362	0.0415	15.34	0.0000
AgeGr75-79	0.6872	0.0445	15.45	0.0000
AgeGr80+	0.7296	0.0437	16.69	0.0000
SexM	-0.1908	0.0166	-11.48	0.0000

Table 9: Logistic regression summary

	immunities	deltas	lower_of_deltas	upper_of_deltas
2	Immunityfull	0.01	0.00	0.02
3	Immunityboost	0.02	0.01	0.03
4	Immunitysecboost	0.35	-0.78	1.47
5	Immunitysecnew			
6	Immunityinf	-0.02	-0.03	-0.00
7	Immunityhybridfull	0.01	-0.00	0.03
8	Immunityhybridboost	0.01	-0.01	0.03

Table 10: Monthly percentage decrease of effectiveness/protection

	1	2	3	4	5	6	7
1		1.91%	2.44%		10.80%	11.15%	15.66%
2	-1.91%		-13.77%		-0.05%	10.97%	10.91%
3	-2.44%	13.77%			34.10%	12.15%	24.65%
4							
5	-10.80%	0.05%	-34.10%			5.10%	13.42%
6	-11.15%	-10.97%	-12.15%		-5.10%		0.92%
7	-15.66%	-10.91%	-24.65%		-13.42%	-0.92%	

Table 11: Effectiveness/protection differences

1	2	3	4	5	6	7
	0.84	0.17		2.72	3.51	4.41
-0.84		-1.04		-0.01	3.35	3.60
-0.17	1.04			0.30	0.63	1.76
-2.72	0.01	-0.30			1.04	2.30
-3.51	-3.35	-0.63		-1.04		0.21
-4.41	-3.60	-1.76		-2.30	-0.21	

Table 12: Z-scores of effectiveness/protection differences