

Vyvanuti III

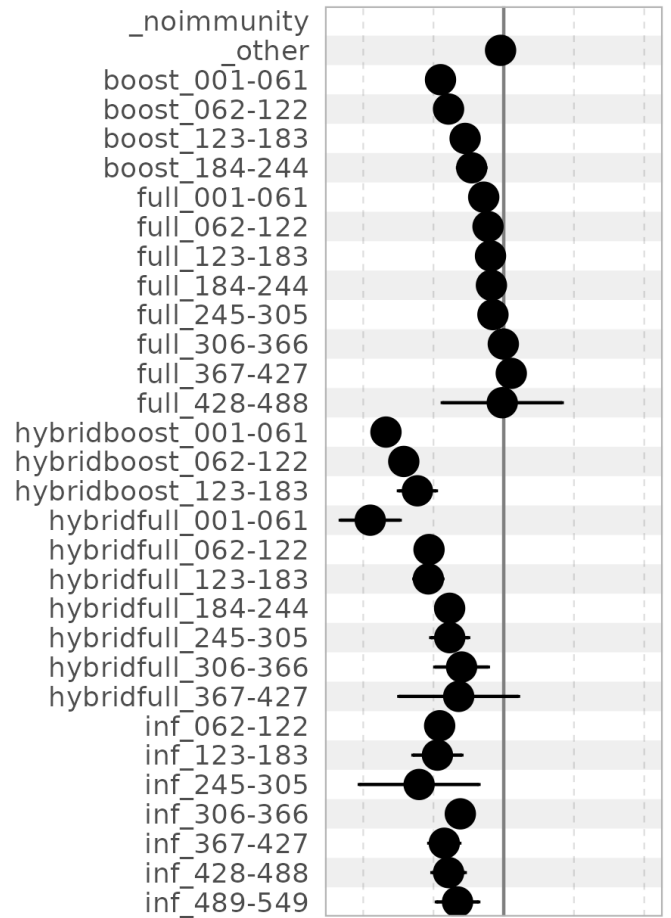
Results of Statistical Estimation

May 5, 2023

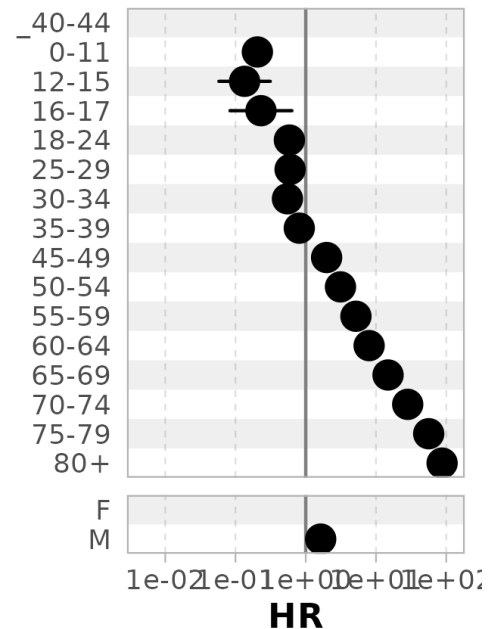
1 Serious Course BA12

Characteristic	N = 43,154,538 ¹
SeriousCovidProxy	7,656 (<0.1%)
Immunity	
_noimmunity	2,867,553 (6.6%)
_other	732,962 (1.7%)
boost_001-061	3,350,025 (7.8%)
boost_062-122	3,264,147 (7.6%)
boost_123-183	3,049,848 (7.1%)
boost_184-244	2,338,205 (5.4%)
full_001-061	610,276 (1.4%)
full_062-122	976,872 (2.3%)
full_123-183	2,866,169 (6.6%)
full_184-244	2,163,706 (5.0%)
full_245-305	1,137,393 (2.6%)
full_306-366	856,990 (2.0%)
full_367-427	268,250 (0.6%)
full_428-488	40,985 (<0.1%)
hybridboost_001-061	2,152,926 (5.0%)
hybridboost_062-122	2,073,520 (4.8%)
hybridboost_123-183	1,558,849 (3.6%)
hybridfull_001-061	1,854,771 (4.3%)
hybridfull_062-122	2,132,577 (4.9%)
hybridfull_123-183	2,445,060 (5.7%)
hybridfull_184-244	1,351,132 (3.1%)
hybridfull_245-305	610,400 (1.4%)
hybridfull_306-366	324,500 (0.8%)
hybridfull_367-427	75,490 (0.2%)
inf_062-122	1,190,450 (2.8%)
inf_123-183	1,106,986 (2.6%)
inf_245-305	343,688 (0.8%)
inf_306-366	318,216 (0.7%)
inf_367-427	371,936 (0.9%)
inf_428-488	403,641 (0.9%)
inf_489-549	317,015 (0.7%)
Sex	
F	22,046,730 (51%)
M	21,107,808 (49%)
¹ n (%)	

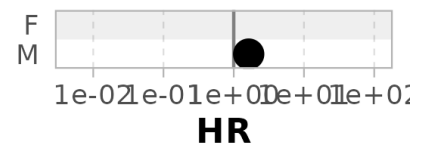
Immunity



AgeGr



Sex



	beta	lower	upper	HR	lower	upper	eff	upper	lower
Immunity_other	-0.10	-0.28	0.07	0.90	0.76	1.08	0.10	0.24	-0.08
Immunityboost_001-061	-2.07	-2.17	-1.97	0.13	0.11	0.14	0.87	0.89	0.86
Immunityboost_062-122	-1.81	-1.87	-1.74	0.16	0.15	0.17	0.84	0.85	0.83
Immunityboost_123-183	-1.27	-1.36	-1.17	0.28	0.26	0.31	0.72	0.74	0.69
Immunityboost_184-244	-1.05	-1.51	-0.58	0.35	0.22	0.56	0.65	0.78	0.44
Immunityfull_001-061	-0.66	-0.84	-0.47	0.52	0.43	0.62	0.48	0.57	0.38
Immunityfull_062-122	-0.51	-0.67	-0.36	0.60	0.51	0.70	0.40	0.49	0.30
Immunityfull_123-183	-0.43	-0.58	-0.29	0.65	0.56	0.75	0.35	0.44	0.25
Immunityfull_184-244	-0.40	-0.50	-0.31	0.67	0.61	0.74	0.33	0.39	0.26
Immunityfull_245-305	-0.35	-0.47	-0.24	0.70	0.63	0.78	0.30	0.37	0.22
Immunityfull_306-366	-0.01	-0.16	0.13	0.99	0.85	1.14	0.01	0.15	-0.14
Immunityfull_367-427	0.25	-0.05	0.54	1.28	0.95	1.72	-0.28	0.05	-0.72
Immunityfull_428-488	-0.05	-2.01	1.92	0.95	0.13	6.80	0.05	0.87	-5.80
Immunityhybridboost_001-061	-3.86	-4.27	-3.45	0.02	0.01	0.03	0.98	0.99	0.97
Immunityhybridboost_062-122	-3.28	-3.61	-2.94	0.04	0.03	0.05	0.96	0.97	0.95
Immunityhybridboost_123-183	-2.83	-3.45	-2.21	0.06	0.03	0.11	0.94	0.97	0.89
Immunityhybridfull_001-061	-4.38	-5.36	-3.39	0.01	0.00	0.03	0.99	1.00	0.97
Immunityhybridfull_062-122	-2.45	-2.78	-2.12	0.09	0.06	0.12	0.91	0.94	0.88
Immunityhybridfull_123-183	-2.47	-2.95	-1.99	0.08	0.05	0.14	0.92	0.95	0.86
Immunityhybridfull_184-244	-1.77	-2.18	-1.36	0.17	0.11	0.26	0.83	0.89	0.74
Immunityhybridfull_245-305	-1.77	-2.39	-1.15	0.17	0.09	0.32	0.83	0.91	0.68
Immunityhybridfull_306-366	-1.38	-2.26	-0.50	0.25	0.10	0.60	0.75	0.90	0.40
Immunityhybridfull_367-427	-1.48	-3.44	0.48	0.23	0.03	1.62	0.77	0.97	-0.62
Immunityinf_062-122	-2.10	-2.50	-1.70	0.12	0.08	0.18	0.88	0.92	0.82
Immunityinf_123-183	-2.17	-2.97	-1.37	0.11	0.05	0.25	0.89	0.95	0.75
Immunityinf_245-305	-2.77	-4.73	-0.81	0.06	0.01	0.44	0.94	0.99	0.56
Immunityinf_306-366	-1.42	-1.83	-1.01	0.24	0.16	0.36	0.76	0.84	0.64
Immunityinf_367-427	-1.95	-2.46	-1.44	0.14	0.09	0.24	0.86	0.91	0.76
Immunityinf_428-488	-1.81	-2.35	-1.26	0.16	0.10	0.28	0.84	0.90	0.72
Immunityinf_489-549	-1.51	-2.21	-0.82	0.22	0.11	0.44	0.78	0.89	0.56
AgeGr0-11	-1.58	-1.96	-1.21	0.20	0.14	0.30	0.80	0.86	0.70
AgeGr12-15	-2.00	-2.84	-1.17	0.13	0.06	0.31	0.87	0.94	0.69
AgeGr16-17	-1.47	-2.48	-0.46	0.23	0.08	0.63	0.77	0.92	0.37
AgeGr18-24	-0.54	-0.94	-0.13	0.58	0.39	0.88	0.42	0.61	0.12
AgeGr25-29	-0.51	-0.92	-0.11	0.60	0.40	0.90	0.40	0.60	0.10
AgeGr30-34	-0.60	-1.01	-0.19	0.55	0.37	0.82	0.45	0.63	0.18
AgeGr35-39	-0.21	-0.57	0.15	0.81	0.56	1.16	0.19	0.44	-0.16
AgeGr45-49	0.68	0.39	0.98	1.98	1.48	2.66	-0.98	-0.48	-1.66
AgeGr50-54	1.14	0.86	1.42	3.12	2.35	4.14	-2.12	-1.35	-3.14
AgeGr55-59	1.65	1.38	1.91	5.18	3.98	6.76	-4.18	-2.98	-5.76
AgeGr60-64	2.08	1.82	2.33	7.98	6.18	10.31	-6.98	-5.18	-9.31
AgeGr65-69	2.70	2.45	2.94	14.84	11.60	18.99	-13.84	-10.60	-17.99
AgeGr70-74	3.34	3.10	3.58	28.28	22.21	36.02	-27.28	-21.21	-35.02
AgeGr75-79	4.03	3.79	4.27	56.26	44.21	71.58	-55.26	-43.21	-70.58
AgeGr80+	4.47	4.23	4.71	87.32	68.82	110.79	-86.32	-67.82	-109.79
SexM	0.49	0.44	0.54	1.63	1.56	1.71	-0.63	-0.56	-0.71

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	0.02	0.04
4	Immunitysecboost			
5	Immunitysecbnew			
6	Immunityinf	0.00	-0.00	0.01
7	Immunityhybridfull	0.02	0.02	0.03
8	Immunityhybridboost	0.01	0.00	0.02

Table 2: Monthly percentage decrease of effectiveness/protection

	1	2	3	4	5	6	7
1		39.16%			57.74%	52.85%	54.73%
2	-39.16%				6.90%	11.30%	12.01%
3							
4							
5	-57.74%	-6.90%				1.99%	7.84%
6	-52.85%	-11.30%			-1.99%		0.35%
7	-54.73%	-12.01%			-7.84%	-0.35%	

Table 3: Effectiveness/protection differences

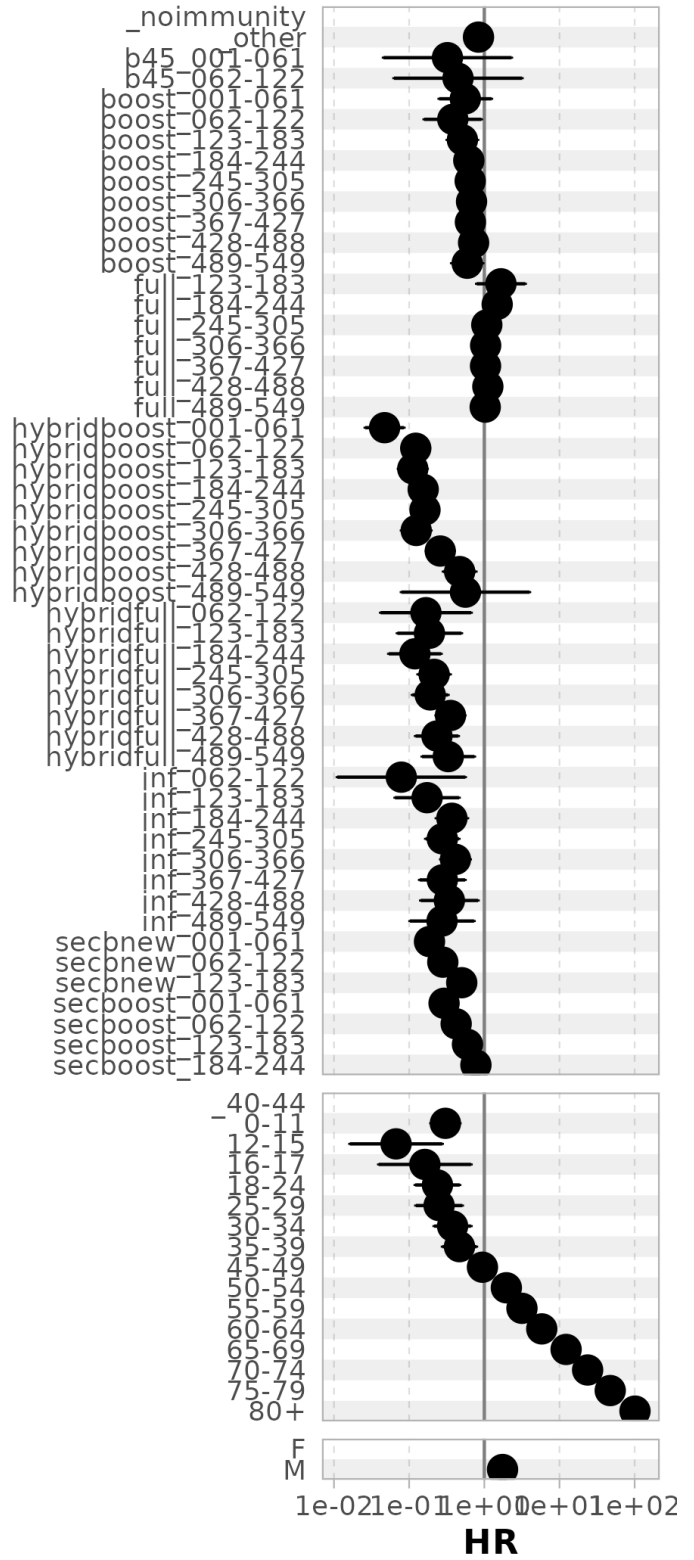
	1	2	3	4	5	6	7
		14.11			16.84	21.64	18.32
	-14.11				3.06	15.22	21.22
	-16.84	-3.06				0.85	3.40
	-21.64	-15.22			-0.85		0.53
	-18.32	-21.22			-3.40	-0.53	

Table 4: Z-scores of effectiveness/protection differences

2 Serious Course BA45+

Characteristic	N = 51,814,001 ¹
SeriousCovidProxy	5,655 (<0.1%)
Immunity	
_noimmunity	2,190,732 (4.2%)
_other	1,570,280 (3.0%)
b45_001-061	14,570 (<0.1%)
b45_062-122	13,252 (<0.1%)
boost_001-061	84,695 (0.2%)
boost_062-122	180,269 (0.3%)
boost_123-183	1,440,039 (2.8%)
boost_184-244	3,025,527 (5.8%)
boost_245-305	2,979,044 (5.7%)
boost_306-366	2,656,963 (5.1%)
boost_367-427	2,286,622 (4.4%)
boost_428-488	1,582,076 (3.1%)
boost_489-549	187,715 (0.4%)
full_123-183	212,041 (0.4%)
full_184-244	489,693 (0.9%)
full_245-305	728,875 (1.4%)
full_306-366	1,259,132 (2.4%)
full_367-427	1,317,836 (2.5%)
full_428-488	1,210,870 (2.3%)
full_489-549	907,075 (1.8%)
hybridboost_001-061	916,712 (1.8%)
hybridboost_062-122	1,142,659 (2.2%)
hybridboost_123-183	1,930,279 (3.7%)
hybridboost_184-244	1,981,956 (3.8%)
hybridboost_245-305	1,508,009 (2.9%)
hybridboost_306-366	1,253,928 (2.4%)
hybridboost_367-427	904,298 (1.7%)
hybridboost_428-488	307,951 (0.6%)
hybridboost_489-549	22,986 (<0.1%)
hybridfull_062-122	345,785 (0.7%)
hybridfull_123-183	1,133,345 (2.2%)
hybridfull_184-244	1,666,168 (3.2%)
hybridfull_245-305	1,756,829 (3.4%)
hybridfull_306-366	1,806,966 (3.5%)
hybridfull_367-427	1,451,552 (2.8%)
hybridfull_428-488	631,791 (1.2%)
hybridfull_489-549	293,336 (0.6%)
inf_062-122	215,700 (0.4%)
inf_123-183	754,747 (1.5%)
inf_184-244	1,145,860 (2.2%)
inf_245-305	1,141,466 (2.2%)
inf_306-366	1,121,379 (2.2%)
inf_367-427	1,068,250 (2.1%)
inf_428-488	682,001 (1.3%)
inf_489-549	425,171 (0.8%)
secbnew_001-061	287,147 (0.6%)
secbnew_062-122	277,716 (0.5%)
secbnew_123-183	205,232 (0.4%)
secboost_001-061	323,771 (0.6%)
secboost_062-122	317,146 (0.6%)
secboost_123-183	299,789 (0.6%)
secboost_184-244	156,770 (0.3%)
Sex	
F	26,590,016 (51%)
M	25,223,985 (49%)
¹ n (%)	

Immunity



	beta	lower	upper	HR	lower	upper	eff	upper	lower
Immunity_other	-0.18	-0.32	-0.04	0.84	0.73	0.96	0.16	0.27	0.04
Immunityb45.001-061	-1.13	-3.09	0.83	0.32	0.05	2.30	0.68	0.95	-1.30
Immunityb45.062-122	-0.81	-2.77	1.16	0.45	0.06	3.18	0.55	0.94	-2.18
Immunityboost.001-061	-0.58	-1.38	0.22	0.56	0.25	1.25	0.44	0.75	-0.25
Immunityboost.062-122	-0.97	-1.84	-0.09	0.38	0.16	0.92	0.62	0.84	0.08
Immunityboost.123-183	-0.67	-1.14	-0.20	0.51	0.32	0.82	0.49	0.68	0.18
Immunityboost.184-244	-0.47	-0.62	-0.33	0.62	0.54	0.72	0.38	0.46	0.28
Immunityboost.245-305	-0.43	-0.52	-0.34	0.65	0.59	0.71	0.35	0.41	0.29
Immunityboost.306-366	-0.39	-0.48	-0.30	0.68	0.62	0.74	0.32	0.38	0.26
Immunityboost.367-427	-0.43	-0.55	-0.30	0.65	0.58	0.74	0.35	0.42	0.26
Immunityboost.428-488	-0.33	-0.48	-0.18	0.72	0.62	0.84	0.28	0.38	0.16
Immunityboost.489-549	-0.52	-1.00	-0.05	0.59	0.37	0.95	0.41	0.63	0.05
Immunityfull.123-183	0.51	-0.23	1.25	1.66	0.79	3.50	-0.66	0.21	-2.50
Immunityfull.184-244	0.39	0.08	0.71	1.48	1.08	2.03	-0.48	-0.08	-1.03
Immunityfull.245-305	0.08	-0.19	0.34	1.08	0.83	1.40	-0.08	0.17	-0.40
Immunityfull.306-366	0.04	-0.21	0.30	1.04	0.81	1.35	-0.04	0.19	-0.35
Immunityfull.367-427	0.04	-0.15	0.23	1.04	0.86	1.25	-0.04	0.14	-0.25
Immunityfull.428-488	0.11	-0.06	0.27	1.11	0.95	1.31	-0.11	0.05	-0.31
Immunityfull.489-549	0.03	-0.16	0.22	1.03	0.85	1.24	-0.03	0.15	-0.24
Immunityhybridboost.001-061	-3.05	-3.65	-2.46	0.05	0.03	0.09	0.95	0.97	0.91
Immunityhybridboost.062-122	-2.10	-2.52	-1.68	0.12	0.08	0.19	0.88	0.92	0.81
Immunityhybridboost.123-183	-2.19	-2.63	-1.75	0.11	0.07	0.17	0.89	0.93	0.83
Immunityhybridboost.184-244	-1.87	-2.21	-1.53	0.15	0.11	0.22	0.85	0.89	0.78
Immunityhybridboost.245-305	-1.82	-2.14	-1.50	0.16	0.12	0.22	0.84	0.88	0.78
Immunityhybridboost.306-366	-2.09	-2.54	-1.63	0.12	0.08	0.20	0.88	0.92	0.80
Immunityhybridboost.367-427	-1.35	-1.77	-0.93	0.26	0.17	0.40	0.74	0.83	0.60
Immunityhybridboost.428-488	-0.76	-1.25	-0.26	0.47	0.29	0.77	0.53	0.71	0.23
Immunityhybridboost.489-549	-0.58	-2.54	1.39	0.56	0.08	4.00	0.44	0.92	-3.00
Immunityhybridfull.062-122	-1.79	-3.18	-0.40	0.17	0.04	0.67	0.83	0.96	0.33
Immunityhybridfull.123-183	-1.68	-2.66	-0.70	0.19	0.07	0.50	0.81	0.93	0.50
Immunityhybridfull.184-244	-2.13	-2.93	-1.32	0.12	0.05	0.27	0.88	0.95	0.73
Immunityhybridfull.245-305	-1.54	-2.03	-1.04	0.21	0.13	0.35	0.79	0.87	0.65
Immunityhybridfull.306-366	-1.66	-2.20	-1.11	0.19	0.11	0.33	0.81	0.89	0.67
Immunityhybridfull.367-427	-1.04	-1.48	-0.59	0.35	0.23	0.55	0.65	0.77	0.45
Immunityhybridfull.428-488	-1.45	-2.11	-0.80	0.23	0.12	0.45	0.77	0.88	0.55
Immunityhybridfull.489-549	-1.10	-1.91	-0.30	0.33	0.15	0.74	0.67	0.85	0.26
Immunityinf.062-122	-2.54	-4.50	-0.58	0.08	0.01	0.56	0.92	0.99	0.44
Immunityinf.123-183	-1.75	-2.73	-0.77	0.17	0.06	0.46	0.83	0.94	0.54
Immunityinf.184-244	-0.99	-1.47	-0.51	0.37	0.23	0.60	0.63	0.77	0.40
Immunityinf.245-305	-1.29	-1.80	-0.78	0.28	0.17	0.46	0.72	0.83	0.54
Immunityinf.306-366	-0.88	-1.34	-0.43	0.41	0.26	0.65	0.59	0.74	0.35
Immunityinf.367-427	-1.29	-1.98	-0.59	0.28	0.14	0.55	0.72	0.86	0.45
Immunityinf.428-488	-1.07	-1.95	-0.19	0.34	0.14	0.83	0.66	0.86	0.17
Immunityinf.489-549	-1.30	-2.28	-0.31	0.27	0.10	0.73	0.73	0.90	0.27
Immunitysecbnew.001-061	-1.68	-2.02	-1.34	0.19	0.13	0.26	0.81	0.87	0.74
Immunitysecbnew.062-122	-1.27	-1.60	-0.94	0.28	0.20	0.39	0.72	0.80	0.61
Immunitysecbnew.123-183	-0.69	-1.08	-0.30	0.50	0.34	0.74	0.50	0.66	0.26
Immunitysecboost.001-061	-1.23	-1.44	-1.03	0.29	0.24	0.36	0.71	0.76	0.64
Immunitysecboost.062-122	-0.86	-1.07	-0.66	0.42	0.34	0.52	0.58	0.66	0.48
Immunitysecboost.123-183	-0.52	-0.73	-0.30	0.60	0.48	0.74	0.40	0.52	0.26
Immunitysecboost.184-244	-0.26	-0.56	0.05	0.77	0.57	1.05	0.23	0.43	-0.05
AgeGr0-11	-1.19	-1.64	-0.75	0.30	0.19	0.47	0.70	0.81	0.53
AgeGr12-15	-2.70	-4.12	-1.29	0.07	0.02	0.28	0.93	0.98	0.72
AgeGr16-17	-1.82	-3.24	-0.41	0.16	0.04	0.67	0.84	0.96	0.33
AgeGr18-24	-1.44	-2.12	-0.75	0.24	0.12	0.47	0.76	0.88	0.53
AgeGr25-29	-1.39	-2.10	-0.67	0.25	0.12	0.51	0.75	0.88	0.49
AgeGr30-34	-0.97	-1.54	-0.41	0.38	0.21	0.67	0.62	0.79	0.33
AgeGr35-39	-0.76	-1.28	-0.24	0.47	0.28	0.79	0.53	0.72	0.21
AgeGr45-49	-0.06	-0.46	0.34	0.94	0.63	1.41	0.06	0.37	-0.41
AgeGr50-54	0.68	0.32	1.03	1.96	1.37	2.81	-0.96	-0.37	-1.81
AgeGr55-59	1.15	0.82	1.49	3.17	2.27	4.43	-2.17	-1.27	-3.43
AgeGr60-64	1.76	1.44	2.08	5.81	4.24	7.97	-4.81	-3.24	-6.97
AgeGr65-69	2.51	2.21	2.80	12.25	9.10	16.50	-11.25	-8.10	-15.50
AgeGr70-74	3.17	2.87	3.46	23.69	17.69	31.73	-22.69	-16.69	-30.73
AgeGr75-79	3.86	3.57	4.15	47.35	35.42	63.30	-46.35	-34.42	-62.30
AgeGr80-84	4.63	4.23	4.83	101.11	75.07	124.77	-100.11	-74.07	-122.77

	immunities	deltas	lower_of_deltas	upper_of_deltas
2	Immunityfull	-0.02	-0.05	0.02
3	Immunityboost	0.01	-0.00	0.02
4	Immunitysecboost	0.08	0.05	0.10
5	Immunitysecbnew	0.06	0.02	0.11
6	Immunityinf	0.02	0.00	0.03
7	Immunityhybridfull	0.01	-0.00	0.03
8	Immunityhybridboost	0.01	0.01	0.02

Table 6: Monthly percentage decrease of effectiveness/protection

	1	2	3	4	5	6	7
1		42.38%	76.18%	116.39%	77.72%	83.22%	84.73%
2	-42.38%		-5.93%	11.64%	32.64%	43.67%	47.53%
3	-76.18%	5.93%		11.50%	38.04%	43.09%	30.14%
4	-116.39%	-11.64%	-11.50%		24.21%	20.66%	16.25%
5	-77.72%	-32.64%	-38.04%	-24.21%		7.81%	9.32%
6	-83.22%	-43.67%	-43.09%	-20.66%	-7.81%		2.53%
7	-84.73%	-47.53%	-30.14%	-16.25%	-9.32%	-2.53%	

Table 7: Effectiveness/protection differences

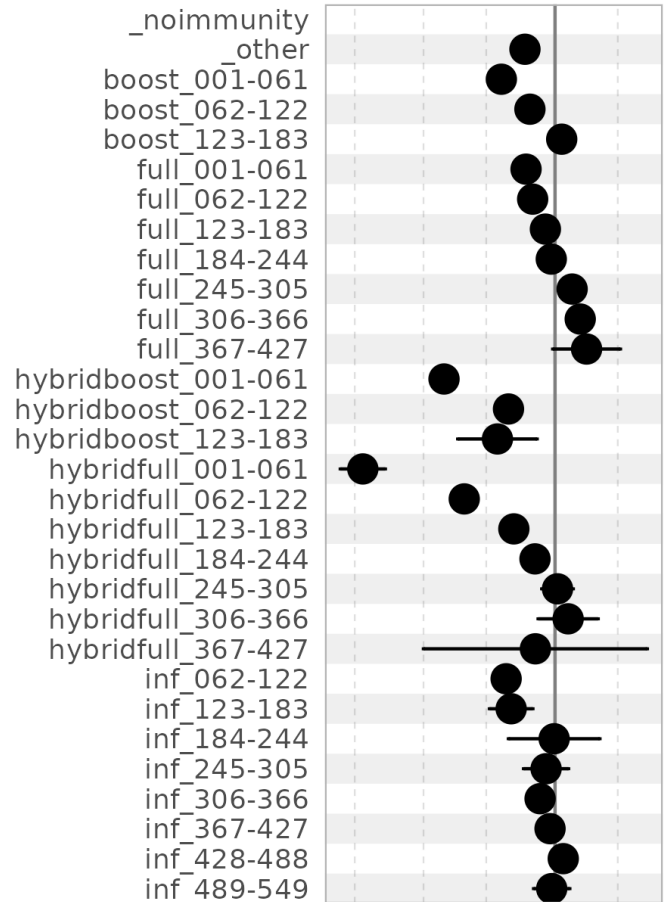
	1	2	3	4	5	6	7
		7.41	3.09	1.82	10.82	12.99	12.34
	-7.41		-0.75	1.11	7.87	13.92	19.36
	-3.09	0.75		3.35	5.94	5.98	11.58
	-1.82	-1.11	-3.35		3.20	2.21	5.68
	-10.82	-7.87	-5.94	-3.20		1.81	2.56
	-12.99	-13.92	-5.98	-2.21	-1.81		0.88
	-12.34	-19.36	-11.58	-5.68	-2.56	-0.88	

Table 8: Z-scores of effectiveness/protection differences

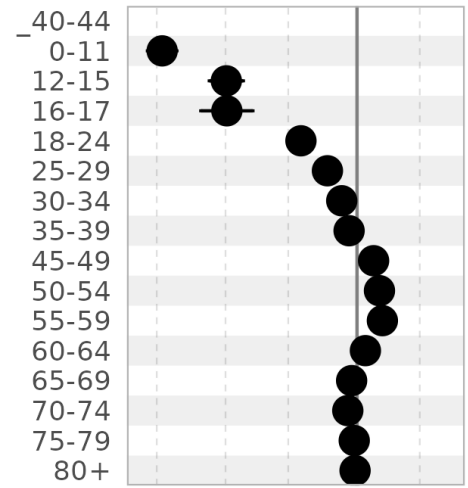
3 Long Covid BA12 - Population

Characteristic	N = 30,887,455 ¹
LongCovid	9,022 (<0.1%)
Immunity	
_noimmunity	3,286,956 (11%)
_other	804,675 (2.6%)
boost_001-061	3,389,220 (11%)
boost_062-122	2,786,587 (9.0%)
boost_123-183	511,869 (1.7%)
full_001-061	701,085 (2.3%)
full_062-122	1,820,356 (5.9%)
full_123-183	3,952,335 (13%)
full_184-244	2,156,818 (7.0%)
full_245-305	567,208 (1.8%)
full_306-366	71,652 (0.2%)
full_367-427	10,991 (<0.1%)
hybridboost_001-061	1,809,375 (5.9%)
hybridboost_062-122	791,724 (2.6%)
hybridboost_123-183	71,636 (0.2%)
hybridfull_001-061	1,853,423 (6.0%)
hybridfull_062-122	1,447,611 (4.7%)
hybridfull_123-183	1,488,396 (4.8%)
hybridfull_184-244	705,772 (2.3%)
hybridfull_245-305	171,451 (0.6%)
hybridfull_306-366	24,483 (<0.1%)
hybridfull_367-427	3,444 (<0.1%)
inf_062-122	747,267 (2.4%)
inf_123-183	292,239 (0.9%)
inf_184-244	73,777 (0.2%)
inf_245-305	278,648 (0.9%)
inf_306-366	374,307 (1.2%)
inf_367-427	392,120 (1.3%)
inf_428-488	207,942 (0.7%)
inf_489-549	94,088 (0.3%)
Sex	
F	15,791,550 (51%)
M	15,095,905 (49%)
¹ n (%)	

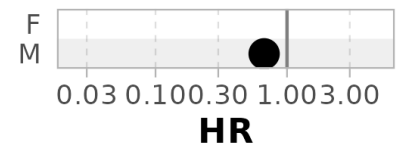
Immunity



AgeGr



Sex



	beta	lower	upper	HR	lower	upper	eff	upper	lower
Immunity_other	-0.53	-0.74	-0.31	0.59	0.48	0.73	0.41	0.52	0.27
Immunityboost_001-061	-0.94	-1.01	-0.87	0.39	0.36	0.42	0.61	0.64	0.58
Immunityboost_062-122	-0.44	-0.51	-0.37	0.64	0.60	0.69	0.36	0.40	0.31
Immunityboost_123-183	0.12	-0.03	0.27	1.12	0.97	1.30	-0.12	0.03	-0.30
Immunityfull_001-061	-0.51	-0.66	-0.36	0.60	0.52	0.70	0.40	0.48	0.30
Immunityfull_062-122	-0.39	-0.52	-0.26	0.68	0.59	0.77	0.32	0.41	0.23
Immunityfull_123-183	-0.17	-0.27	-0.07	0.84	0.77	0.93	0.16	0.23	0.07
Immunityfull_184-244	-0.07	-0.14	0.01	0.94	0.87	1.01	0.06	0.13	-0.01
Immunityfull_245-305	0.30	0.18	0.42	1.35	1.19	1.53	-0.35	-0.19	-0.53
Immunityfull_306-366	0.44	0.20	0.68	1.55	1.23	1.97	-0.55	-0.23	-0.97
Immunityfull_367-427	0.55	-0.04	1.15	1.74	0.96	3.14	-0.74	0.04	-2.14
Immunityhybridboost_001-061	-1.94	-2.11	-1.78	0.14	0.12	0.17	0.86	0.88	0.83
Immunityhybridboost_062-122	-0.81	-0.97	-0.65	0.44	0.38	0.52	0.56	0.62	0.48
Immunityhybridboost_123-183	-1.01	-1.70	-0.31	0.36	0.18	0.73	0.64	0.82	0.27
Immunityhybridfull_001-061	-3.37	-3.76	-2.97	0.03	0.02	0.05	0.97	0.98	0.95
Immunityhybridfull_062-122	-1.59	-1.79	-1.39	0.20	0.17	0.25	0.80	0.83	0.75
Immunityhybridfull_123-183	-0.72	-0.90	-0.54	0.49	0.41	0.58	0.51	0.59	0.42
Immunityhybridfull_184-244	-0.35	-0.50	-0.20	0.70	0.60	0.82	0.30	0.40	0.18
Immunityhybridfull_245-305	0.04	-0.23	0.32	1.04	0.79	1.38	-0.04	0.21	-0.38
Immunityhybridfull_306-366	0.23	-0.30	0.76	1.26	0.74	2.13	-0.26	0.26	-1.13
Immunityhybridfull_367-427	-0.34	-2.30	1.62	0.71	0.10	5.04	0.29	0.90	-4.04
Immunityinf_062-122	-0.86	-1.02	-0.69	0.42	0.36	0.50	0.58	0.64	0.50
Immunityinf_123-183	-0.77	-1.15	-0.39	0.46	0.32	0.68	0.54	0.68	0.32
Immunityinf_184-244	-0.02	-0.82	0.79	0.98	0.44	2.19	0.02	0.56	-1.19
Immunityinf_245-305	-0.16	-0.55	0.24	0.85	0.58	1.27	0.15	0.42	-0.27
Immunityinf_306-366	-0.26	-0.44	-0.08	0.77	0.64	0.92	0.23	0.36	0.08
Immunityinf_367-427	-0.09	-0.27	0.09	0.92	0.77	1.10	0.08	0.23	-0.10
Immunityinf_428-488	0.14	-0.04	0.33	1.15	0.96	1.39	-0.15	0.04	-0.39
Immunityinf_489-549	-0.06	-0.38	0.26	0.94	0.69	1.30	0.06	0.31	-0.30
AgeGr0-11	-3.41	-3.67	-3.15	0.03	0.03	0.04	0.97	0.97	0.96
AgeGr12-15	-2.29	-2.59	-1.99	0.10	0.08	0.14	0.90	0.92	0.86
AgeGr16-17	-2.28	-2.73	-1.82	0.10	0.06	0.16	0.90	0.94	0.84
AgeGr18-24	-0.98	-1.12	-0.84	0.37	0.32	0.43	0.63	0.68	0.57
AgeGr25-29	-0.52	-0.64	-0.40	0.60	0.53	0.67	0.40	0.47	0.33
AgeGr30-34	-0.27	-0.38	-0.16	0.77	0.69	0.85	0.23	0.31	0.15
AgeGr35-39	-0.14	-0.24	-0.04	0.87	0.78	0.97	0.13	0.22	0.03
AgeGr45-49	0.29	0.20	0.38	1.34	1.22	1.46	-0.34	-0.22	-0.46
AgeGr50-54	0.39	0.30	0.48	1.48	1.35	1.62	-0.48	-0.35	-0.62
AgeGr55-59	0.44	0.35	0.54	1.56	1.42	1.71	-0.56	-0.42	-0.71
AgeGr60-64	0.15	0.05	0.25	1.16	1.05	1.28	-0.16	-0.05	-0.28
AgeGr65-69	-0.09	-0.20	0.01	0.91	0.82	1.01	0.09	0.18	-0.01
AgeGr70-74	-0.16	-0.27	-0.05	0.85	0.76	0.95	0.15	0.24	0.05
AgeGr75-79	-0.05	-0.16	0.07	0.95	0.85	1.07	0.05	0.15	-0.07
AgeGr80+	-0.03	-0.14	0.07	0.97	0.87	1.08	0.03	0.13	-0.08
SexM	-0.40	-0.44	-0.36	0.67	0.64	0.70	0.33	0.36	0.30

Table 9: Cox model summary

	immunities	deltas	lower_of_deltas	upper_of_deltas
2	Immunityfull	0.07	0.06	0.09
3	Immunityboost	0.14	0.11	0.16
4	Immunitysecboost			
5	Immunitysecbnew			
6	Immunityinf	0.05	0.04	0.06
7	Immunityhybridfull	0.11	0.09	0.12
8	Immunityhybridboost	0.13	0.09	0.16

Table 10: Monthly percentage decrease of effectiveness/protection

	1	2	3	4	5	6	7
1		8.28%			31.88%	42.84%	37.29%
2	-8.28%				25.48%	37.29%	24.44%
3							
4							
5	-31.88%	-25.48%				17.03%	-0.77%
6	-42.84%	-37.29%			-17.03%		-11.86%
7	-37.29%	-24.44%			0.77%	11.86%	

Table 11: Effectiveness/protection differences

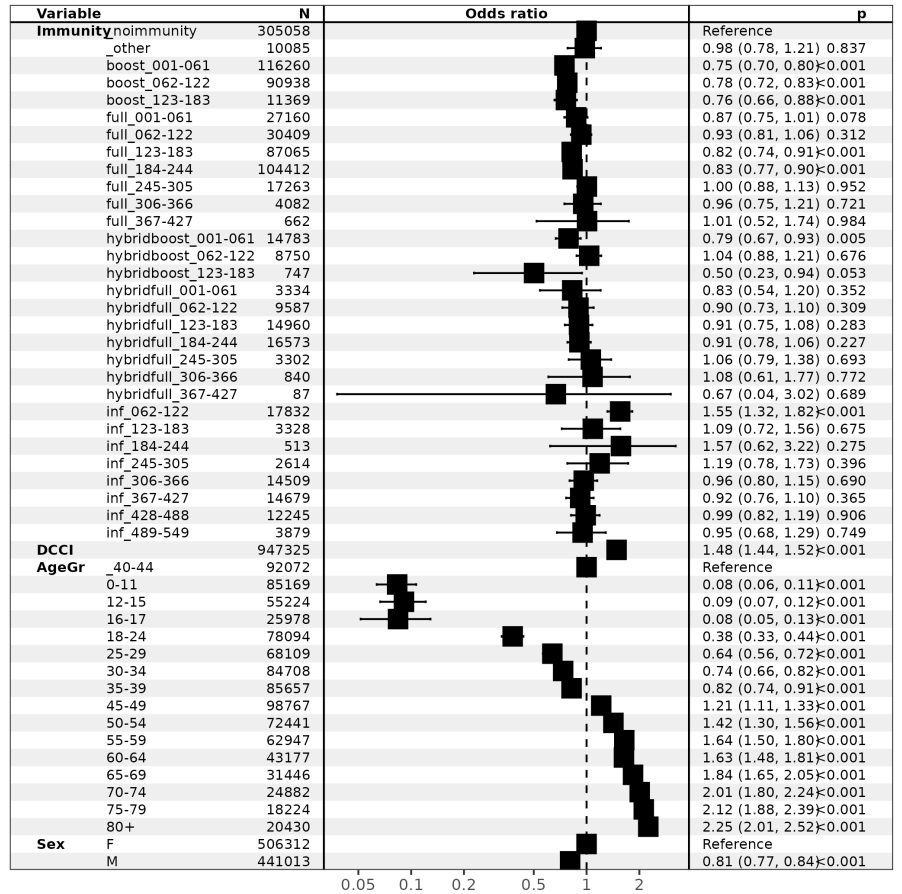
	1	2	3	4	5	6	7
		2.59			7.04	15.79	10.50
	-2.59				6.73	25.91	15.52
	-7.04	-6.73				4.72	-0.17
	-15.79	-25.91			-4.72		-9.18
	-10.50	-15.52			0.17	9.18	

Table 12: Z-scores of effectiveness/protection differences

4 Long Covid BA12 - Infected

Characteristic	N = 947,325 ¹
LongCovid	9,022 (1.0%)
Immunity	
_noimmunity	305,058 (32%)
_other	10,085 (1.1%)
boost_001-061	116,260 (12%)
boost_062-122	90,938 (9.6%)
boost_123-183	11,369 (1.2%)
full_001-061	27,160 (2.9%)
full_062-122	30,409 (3.2%)
full_123-183	87,065 (9.2%)
full_184-244	104,412 (11%)
full_245-305	17,263 (1.8%)
full_306-366	4,082 (0.4%)
full_367-427	662 (<0.1%)
hybridboost_001-061	14,783 (1.6%)
hybridboost_062-122	8,750 (0.9%)
hybridboost_123-183	747 (<0.1%)
hybridfull_001-061	3,334 (0.4%)
hybridfull_062-122	9,587 (1.0%)
hybridfull_123-183	14,960 (1.6%)
hybridfull_184-244	16,573 (1.7%)
hybridfull_245-305	3,302 (0.3%)
hybridfull_306-366	840 (<0.1%)
hybridfull_367-427	87 (<0.1%)
inf_062-122	17,832 (1.9%)
inf_123-183	3,328 (0.4%)
inf_184-244	513 (<0.1%)
inf_245-305	2,614 (0.3%)
inf_306-366	14,509 (1.5%)
inf_367-427	14,679 (1.5%)
inf_428-488	12,245 (1.3%)
inf_489-549	3,879 (0.4%)
Sex	
F	506,312 (53%)
M	441,013 (47%)

¹ n (%)



	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-4.7002	0.0412	-114.21	0.0000
Immunity_other	-0.0230	0.1115	-0.21	0.8366
Immunityboost_001-061	-0.2904	0.0363	-8.01	0.0000
Immunityboost_062-122	-0.2535	0.0358	-7.09	0.0000
Immunityboost_123-183	-0.2716	0.0747	-3.63	0.0003
Immunityfull_001-061	-0.1365	0.0775	-1.76	0.0780
Immunityfull_062-122	-0.0690	0.0682	-1.01	0.3115
Immunityfull_123-183	-0.1954	0.0505	-3.87	0.0001
Immunityfull_184-244	-0.1841	0.0385	-4.79	0.0000
Immunityfull_245-305	0.0038	0.0634	0.06	0.9517
Immunityfull_306-366	-0.0436	0.1219	-0.36	0.7205
Immunityfull_367-427	0.0063	0.3060	0.02	0.9836
Immunityhybridboost_001-061	-0.2371	0.0836	-2.84	0.0045
Immunityhybridboost_062-122	0.0344	0.0825	0.42	0.6762
Immunityhybridboost_123-183	-0.6893	0.3570	-1.93	0.0535
Immunityhybridfull_001-061	-0.1885	0.2024	-0.93	0.3516
Immunityhybridfull_062-122	-0.1063	0.1046	-1.02	0.3094
Immunityhybridfull_123-183	-0.0991	0.0923	-1.07	0.2827
Immunityhybridfull_184-244	-0.0944	0.0780	-1.21	0.2265
Immunityhybridfull_245-305	0.0560	0.1419	0.39	0.6932
Immunityhybridfull_306-366	0.0786	0.2712	0.29	0.7720
Immunityhybridfull_367-427	-0.4030	1.0078	-0.40	0.6892
Immunityinf_062-122	0.4409	0.0831	5.31	0.0000
Immunityinf_123-183	0.0818	0.1952	0.42	0.6752
Immunityinf_184-244	0.4515	0.4132	1.09	0.2746
Immunityinf_245-305	0.1721	0.2029	0.85	0.3964
Immunityinf_306-366	-0.0370	0.0926	-0.40	0.6896
Immunityinf_367-427	-0.0833	0.0919	-0.91	0.3648
Immunityinf_428-488	-0.0113	0.0953	-0.12	0.9056
Immunityinf_489-549	-0.0522	0.1629	-0.32	0.7486
DCCI	0.3939	0.0140	28.16	0.0000
AgeGr0-11	-2.4863	0.1317	-18.88	0.0000
AgeGr12-15	-2.3971	0.1520	-15.77	0.0000
AgeGr16-17	-2.4748	0.2324	-10.65	0.0000
AgeGr18-24	-0.9702	0.0728	-13.34	0.0000
AgeGr25-29	-0.4494	0.0624	-7.20	0.0000
AgeGr30-34	-0.3073	0.0554	-5.55	0.0000
AgeGr35-39	-0.1971	0.0530	-3.72	0.0002
AgeGr45-49	0.1922	0.0460	4.18	0.0000
AgeGr50-54	0.3523	0.0473	7.44	0.0000
AgeGr55-59	0.4950	0.0471	10.50	0.0000
AgeGr60-64	0.4908	0.0517	9.49	0.0000
AgeGr65-69	0.6098	0.0545	11.19	0.0000
AgeGr70-74	0.6975	0.0567	12.30	0.0000
AgeGr75-79	0.7510	0.0609	12.33	0.0000
AgeGr80+	0.8101	0.0574	14.12	0.0000
SexM	-0.2157	0.0218	-9.89	0.0000

Table 13: Logistic regression summary

	immunities	deltas	lower_of_deltas	upper_of_deltas
2	Immunityfull	0.00	-0.01	0.02
3	Immunityboost	0.01	-0.02	0.03
4	Immunitysecboost			
5	Immunitysecbnew			
6	Immunityinf	-0.04	-0.06	-0.02
7	Immunityhybridfull	0.02	-0.02	0.05
8	Immunityhybridboost	0.01	-0.06	0.09

Table 14: Monthly percentage decrease of effectiveness/protection

	1	2	3	4	5	6	7
1		11.50%			-27.95%	-4.93%	4.03%
2	-11.50%				-66.20%	-12.54%	-9.65%
3							
4							
5	27.95%	66.20%				37.18%	53.37%
6	4.93%	12.54%			-37.18%		2.24%
7	-4.03%	9.65%			-53.37%	-2.24%	

Table 15: Effectiveness/protection differences

	1	2	3	4	5	6	7
		2.91			-3.41	-1.08	0.63
	-2.91				-5.95	-1.97	-1.90
	3.41	5.95				3.50	4.03
	1.08	1.97			-3.50		0.25
	-0.63	1.90			-4.03	-0.25	

Table 16: Z-scores of effectiveness/protection differences