

Table1. Descriptive summary by number of vaccine doses administered, based on individual measurements

	Number of vaccine doses administered				
	3 (N=118)	4 (N=235)	5 (N=339)	more than 6 (N=129)	All (N=821)
Sex					
Male	20 (16.9%)	58 (24.7%)	75 (22.1%)	33 (25.6%)	186 (22.7%)
Female	98 (83.1%)	177 (75.3%)	264 (77.9%)	96 (74.4%)	635 (77.3%)
Age group (years)					
18-30s	29 (24.6%)	45 (19.1%)	54 (15.9%)	25 (19.4%)	153 (18.6%)
40-50s	68 (57.6%)	127 (54.0%)	117 (34.5%)	60 (46.5%)	372 (45.3%)
60-70s	13 (11.0%)	45 (19.1%)	81 (23.9%)	24 (18.6%)	163 (19.9%)
Over 80s	8 (6.8%)	18 (7.7%)	87 (25.7%)	20 (15.5%)	133 (16.2%)
Vaccine type					
Pfizer original	93 (78.8%)	58 (24.7%)	4 (1.2%)	0 (0.0%)	155 (18.9%)
Pfizer Omicron-compatible	19 (16.1%)	101 (43.0%)	297 (87.6%)	24 (18.6%)	441 (53.7%)
Pfizer XBB-compatible	0 (0.0%)	0 (0.0%)	14 (4.1%)	79 (61.2%)	93 (11.3%)
Moderna original	4 (3.4%)	66 (28.1%)	2 (0.6%)	0 (0.0%)	72 (8.8%)
Moderna Omicron	0 (0.0%)	10 (4.3%)	22 (6.5%)	15 (11.6%)	47 (5.7%)
Moderna XBB-compatible	2 (1.7%)	0 (0.0%)	0 (0.0%)	11 (8.5%)	13 (1.6%)
Days post- vaccination	581.54 (149.73)	420.29 (81.57)	330.04 (82.56)	86.81 (71.31)	353.80 (169.94)
Prior COVID-19 infection					
No	34 (28.8%)	53 (22.6%)	99 (29.2%)	54 (41.9%)	240 (29.2%)
Yes	84 (71.2%)	182 (77.4%)	240 (70.8%)	75 (58.1%)	581 (70.8%)
Prevalent strains at infection					
Original strain	0	6 (3.3%)	2 (0.8%)	0 (0.0%)	8 (1.4%)
Alpha variant	0	4 (2.2%)	199 (82.9%)	0 (0.0%)	4 (0.7%)
Delta variant	0	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Omicron variant	80 (95.2%)	167 (91.8%)	230 (95.8%)	73 (97.3%)	554 (97.4%)
Days post-infection					
No history of infection	38 (32.2%)	58 (24.7%)	107 (31.6%)	56 (43.4%)	259 (31.5%)
7-89 days	4 (3.4%)	12 (5.1%)	8 (2.4%)	4 (3.1%)	28 (3.4%)
90-179 days	10 (8.5%)	20 (8.5%)	16 (4.7%)	12 (9.3%)	58 (7.1%)
Over 180 days	66 (55.9%)	145 (61.7%)	208 (61.4%)	57 (44.2%)	476 (58.0%)
Underlying medical conditions					
No	97 (82.2%)	182 (77.4%)	215 (63.4%)	89 (69.0%)	583 (71.0%)
Yes	21 (17.8%)	53 (22.6%)	124 (36.6%)	40 (31.0%)	238 (29.0%)
Immunocompromised state					
No	118 (100.0%)	221 (94.0%)	327 (96.5%)	127 (98.4%)	793 (96.6%)
Yes	0 (0.0%)	14 (6.0%)	12 (3.5%)	2 (1.6%)	28 (3.4%)
Attributes					
General public	53 (44.9%)	67 (28.5%)	71 (20.9%)	16 (12.4%)	207 (25.2%)
Residents and staff of elderly facility	13 (11.0%)	48 (20.4%)	59 (17.4%)	41 (31.8%)	161 (19.6%)
Healthcare professionals	52 (44.1%)	120 (51.1%)	209 (61.7%)	72 (55.8%)	453 (55.2%)
Anti-nucleocapsid (N) protein antibodies *	0.993 (1.959)	1.330 (2.269)	0.831 (1.692)	0.806 (1.691)	0.993 (1.921)
S-RBD IgG antibody titers* (AU/mL)	8431.7 (12758.4)	11619.2 (22678.5)	12655.7 (21037.3)	27823.2 (36366.0)	12660.6 (23881.9)
S-RBD IgG antibody titers** (AU/mL)	6117.7 (4655.2-8039.6)	8313.6 (6693.7-10325.5)	10577.5 (9283.8-12051.5)	23701.2 (20196.4-27814.1)	10359.1 (9393.5-11423.9)

Total of 821 data points with 424 individuals.

Categorical data are presented as frequency with percentage.

*S-RBD IgG antibody titers are presented as median with interquartile range.

**S-RBD IgG antibody titers are presented as geometric mean titers with 95% confidence intervals.

Table 2. Mixed effects model on antibody titer trends after vaccination

Explanatory variables	Model 1 (n=821)			Model 2 (n=676)		
	Coefficient	95% CI		Coefficient	95% CI	
(Intercept)	3.780	3.407	4.153	3.772	3.339	4.204
Days post-vaccination (in 10 day-intervals)	-0.007	-0.015	0.002	-0.007	-0.016	0.003
Previous COVID-19 infection	0.192	-0.078	0.463	0.300	-0.008	0.609
Previous COVID-19 infection* _Δ Days post-vaccination	0.006	0.001	0.011	0.005	0.000	0.011
Number of days since infection						
0–89 days	0.371	0.139	0.603	0.310	0.046	0.574
90–179 days	0.261	0.034	0.488	0.187	-0.073	0.447
Over 180 days	0.052	-0.165	0.269	-0.030	-0.278	0.218
Vaccine type						
Pfizer Omicron-compatible	0.156	-0.032	0.344	0.153	-0.072	0.379
Pfizer XBB-compatible	0.226	-0.051	0.504	0.235	-0.090	0.560
Moderna original	0.137	-0.104	0.378	0.129	-0.173	0.430
Moderna Omicron	0.279	0.012	0.546	0.279	-0.026	0.585
Moderna XBB-compatible	0.338	-0.052	0.728	0.403	-0.038	0.844
Recent vaccine dose						
4	-0.040	-0.241	0.162	-0.053	-0.290	0.185
5	0.088	-0.129	0.306	0.072	-0.182	0.327
6 and more	0.301	0.033	0.568	0.355	0.046	0.664
Age group (years)						
Age 40–59	0.075	-0.149	0.299	0.032	-0.235	0.300
Age 60–79	0.048	-0.219	0.316	0.100	-0.226	0.427
Over 80	0.046	-0.239	0.330	0.169	-0.201	0.538
Age group (years)* _Δ Days post-vaccination						
Age 40–59* _Δ Days post-vaccination	-0.002	-0.008	0.004	0.000	-0.008	0.007
Age 60–79* _Δ Days post-vaccination	-0.005	-0.013	0.002	-0.006	-0.015	0.003
Over 80* _Δ Days post-vaccination	-0.005	-0.013	0.003	-0.008	-0.019	0.003
Female sex	-0.159	-0.365	0.047	-0.109	-0.350	0.132
Female sex* _Δ Days post-vaccination	0.002	-0.003	0.008	0.000	-0.006	0.007
Underlying medical conditions				-0.216	-0.439	0.008
Underlying medical conditions* _Δ Days post-vaccination				0.008	0.001	0.014
Immunocompromised state				-0.051	-0.521	0.420
Immunocompromised state* _Δ Days post-vaccination				-0.002	-0.017	0.013
Attributes						
Residents and staff of elderly facility				-0.032	-0.196	0.132
Healthcare professionals				0.000	-0.144	0.143
Random-effects parameters	Estimate	95% CI		Estimate	95% CI	
Variance of the random coefficient associated with Days post-vaccination	0.000	0.000	0.000	0.000	0.000	0.000
Variance of the random intercept	0.145	0.103	0.204	0.140	0.093	0.211
Variance of the residual error	0.025	0.022	0.029	0.026	0.022	0.030
BIC		751.300			703.720	

References for the categorical variables are as follows:

No history of previous COVID-19 infection is the reference group for the post-infection days category.

Pfizer original vaccine is the reference group for the vaccine type category.

Dose of 3 is the reference group for the recent vaccine dose category.

Age <40 years is the reference group for the age group category.

Male sex, no underlying medical conditions, and non-immunocompromised state are the reference group for female sex, underlying medical condition, and immunocompromised state.

General public is the reference group for the attribute category.

Days post-vaccination, a continuous variable measured at 10-day intervals from 0 to 80 days, representing 800 days.

The symbol “:” indicates interaction.

CI, confidence interval

BIC, Bayesian Information Criterion