

Appendix: Supplemental Figures & Tables

Supplement to: Chen P, Bergman P, Blennow O, et al. Real-world assessment of immunogenicity in immunocompromised individuals following SARS-CoV-2 mRNA vaccination: A one-year follow-up of the prospective clinical trial COVAXID

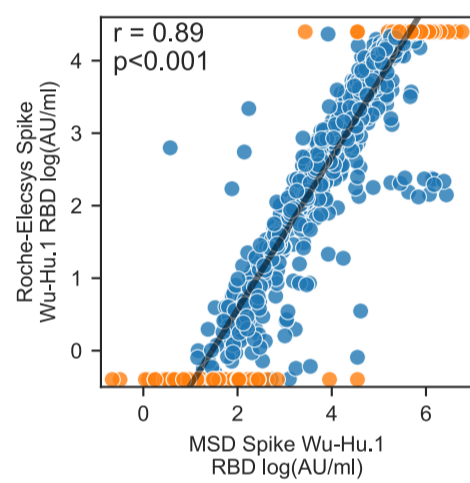
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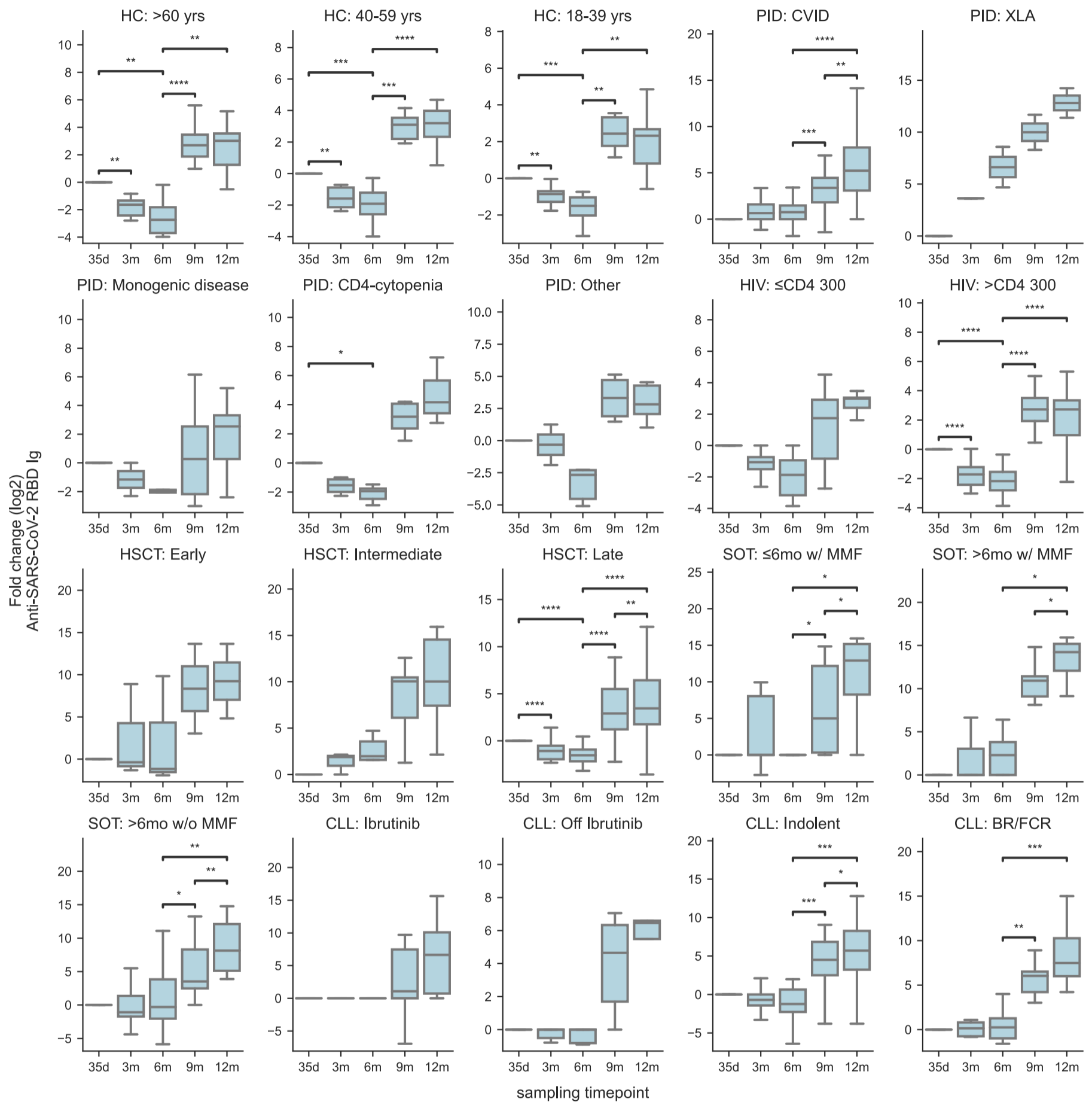
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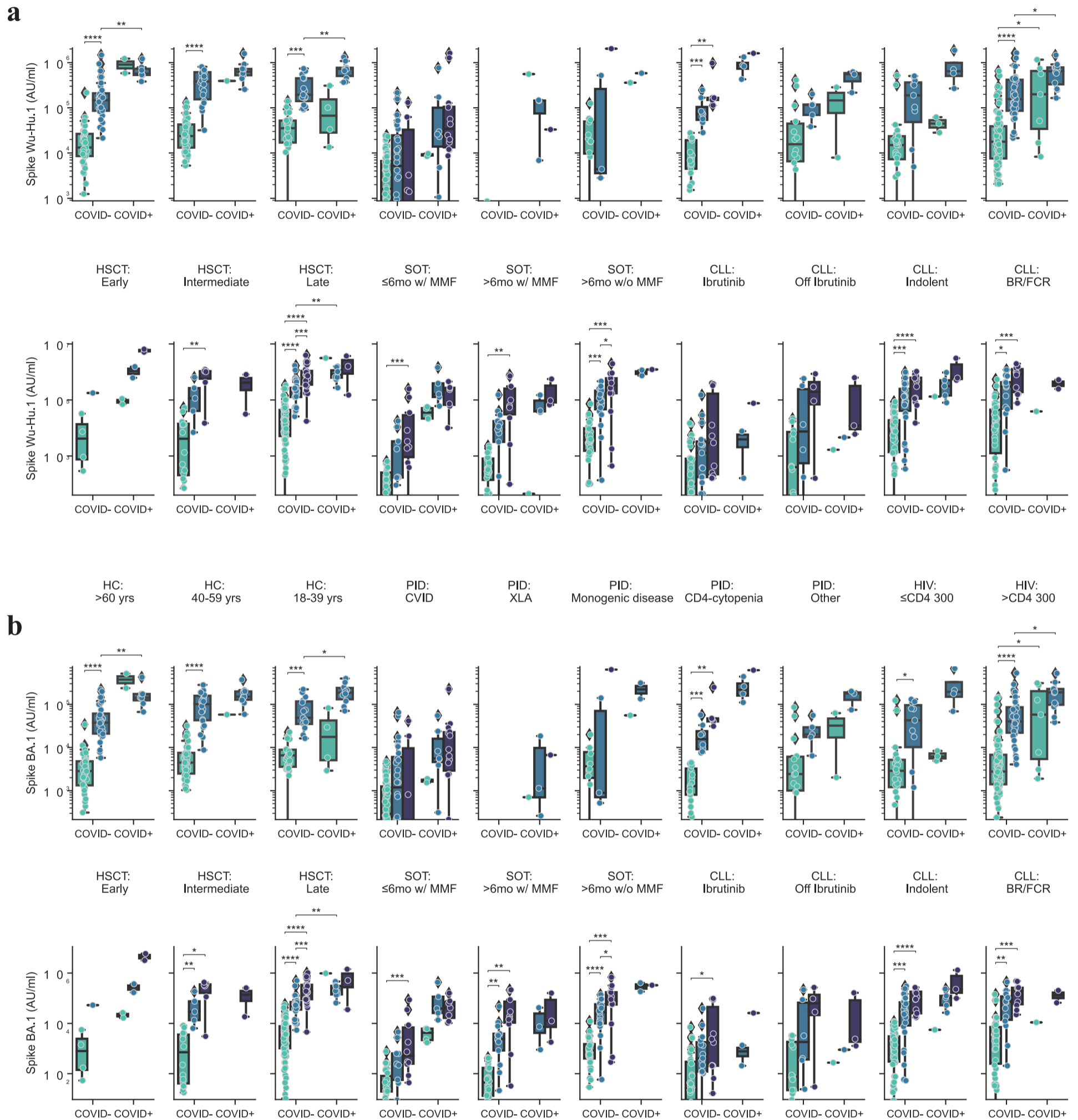
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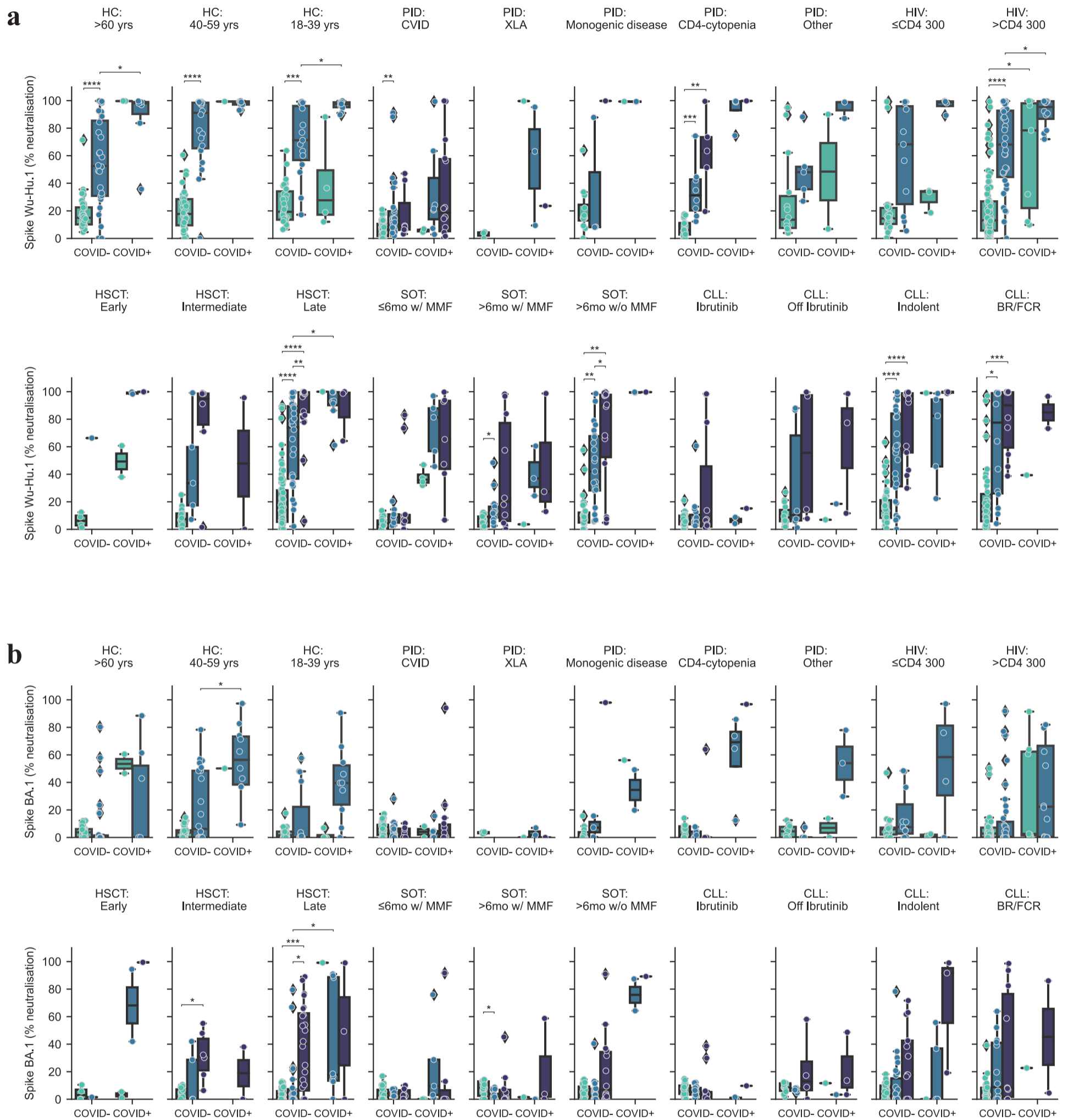
Supplementary Figure S1. Correlation between Roche-Elecsys and MSD platform for SARS-CoV-2 Spike-RBD. Values below 0.4 or above 25,000 on the Elecsys platform are indicated in orange. R = Pearson correlation coefficient. Correlation and p-value are calculated on log-transformed values within detection range on the Roche-Elecsys platform.



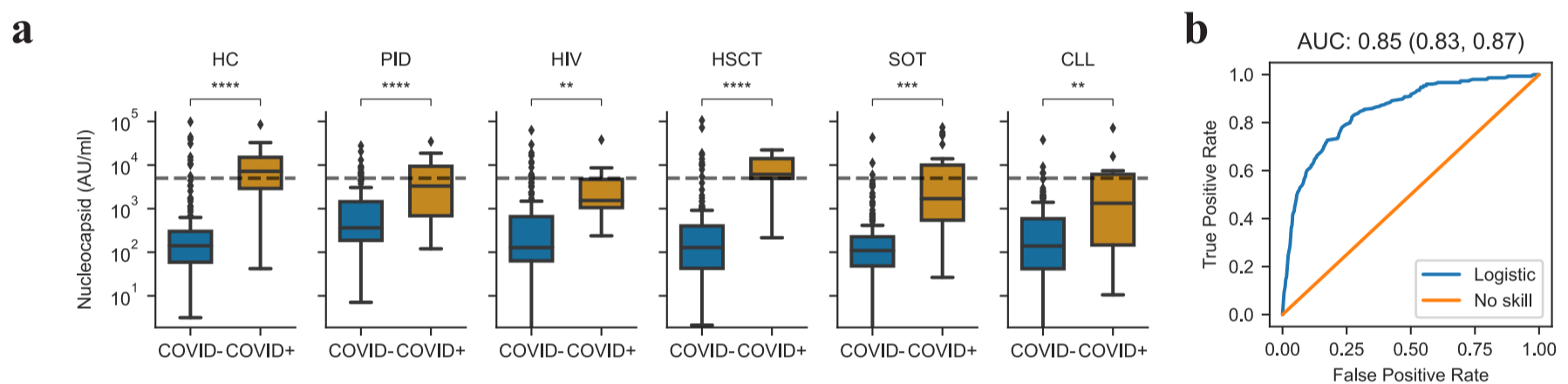
Supplementary Figure S2. Subgroup-stratified dynamics of SARS-CoV-2 Wu-Hu.1 Ab titres. Fold change of Spike-RBD titres at each timepoint at a subgroup level. Values are normalized to the day 35-timepoint. Statistical tests were performed on paired Spike-RBD titres using Wilcoxon, and Bonferroni correction for multiple comparisons. The star annotation (*) indicates statistical significance at a p-value threshold of 0.05 (or ** for $p < 0.01$, *** for $p < 0.001$, **** for $p < 0.0001$). For sample sizes, please see Table 1. Whiskers for all boxplots represents 1.5x IQR.



Supplementary Figure S3. Comparison of Ab titres between subgroups. Box plot showing (A) Spike Wu-Hu.1 and (B) Spike BA.1 Ab titres, stratified based on COVID-19 status as defined by prior positive COVID-19 test (PCR/RAT) and/or Nucleocapsid Ab titres >5,000 AU/ml in each patient subgroup. Statistical tests performed were Mann-Whitney with Bonferroni correction for multiple comparisons. The star annotation (*) indicates statistical significance at a p-value threshold of 0.05 (or ** for $p < 0.01$, *** for $p < 0.001$, **** for $p < 0.0001$). For sample sizes, please see Table 1. Whiskers for all boxplots represents 1.5x IQR.



Supplementary Figure S4. Comparison of Spike neutralisation between subgroups. Box plot showing Ab neutralisation against Wu-Hu.1 (A) and BA.1 (B), stratified based on COVID-19 status as defined by prior positive COVID-19 test (PCR/RAT) and/or Nucleocapsid Ab titres >5,000 AU/ml in each patient subgroup. Statistical tests performed were Mann-Whitney with Bonferroni correction for multiple comparisons. The star annotation (*) indicates statistical significance at a p-value threshold of 0.05 (or ** for $p < 0.01$, *** for $p < 0.001$, **** for $p < 0.0001$). For sample sizes, please see Table 1. Whiskers for all boxplots represents 1.5x IQR.



Supplementary Figure S5. Nucleocapsid titres in verified and unverified COVID-19 cases. (a) Box plot showing Nucleocapsid Ab titres stratified based on verified COVID-19 diagnosis in healthy controls and patient groups. The dotted line represents the cut-off value for COVID-19 positive (not PCR or rapid antigen test) determined by Nucleocapsid titre levels, as provided by MSD. Statistical tests were performed using Mann-Whitney U test. **(b)** Receiver operator characteristics of Nucleocapsid and COVID-19 diagnosis. The ROC curve was generated using sensitivity and specificity values calculated at different cut-off values using logistic regression, with the area under the curve (AUC, 95% CI) indicating the overall diagnostic performance. The star annotation (*) indicates statistical significance at a p-value threshold of 0.05 (or ** for $p < 0.01$, *** for $p < 0.001$, **** for $p < 0.0001$). For sample sizes, please see Table 1. Whiskers for all boxplots represents 1.5x IQR.

Figure	Group	Variant	Comparison A	Comparison B	p-value
Fig 1b	HC	WuHu.1	35d	3m	<0.0001
Fig 1b	HC	WuHu.1	35d	6m	<0.0001
Fig 1b	HC	WuHu.1	6m	9m	<0.0001
Fig 1b	HC	WuHu.1	6m	12m	<0.0001
Fig 1b	HC	WuHu.1	9m	12m	1.00
Fig 1b	PID	WuHu.1	35d	3m	1.00
Fig 1b	PID	WuHu.1	35d	6m	0.056
Fig 1b	PID	WuHu.1	6m	9m	<0.0001
Fig 1b	PID	WuHu.1	6m	12m	<0.0001
Fig 1b	PID	WuHu.1	9m	12m	0.0028
Fig 1b	HIV	WuHu.1	35d	3m	<0.0001
Fig 1b	HIV	WuHu.1	35d	6m	<0.0001
Fig 1b	HIV	WuHu.1	6m	9m	<0.0001
Fig 1b	HIV	WuHu.1	6m	12m	<0.0001
Fig 1b	HIV	WuHu.1	9m	12m	0.64
Fig 1b	HSCT	WuHu.1	35d	3m	0.0017
Fig 1b	HSCT	WuHu.1	35d	6m	<0.0001
Fig 1b	HSCT	WuHu.1	6m	9m	<0.0001
Fig 1b	HSCT	WuHu.1	6m	12m	<0.0001
Fig 1b	HSCT	WuHu.1	9m	12m	0.0002
Fig 1b	SOT	WuHu.1	35d	3m	1.00
Fig 1b	SOT	WuHu.1	35d	6m	1.00
Fig 1b	SOT	WuHu.1	6m	9m	<0.0001
Fig 1b	SOT	WuHu.1	6m	12m	<0.0001
Fig 1b	SOT	WuHu.1	9m	12m	<0.0001
Fig 1b	CLL	WuHu.1	35d	3m	0.51
Fig 1b	CLL	WuHu.1	35d	6m	1.00
Fig 1b	CLL	WuHu.1	6m	9m	<0.0001
Fig 1b	CLL	WuHu.1	6m	12m	<0.0001
Fig 1b	CLL	WuHu.1	9m	12m	<0.0001
Fig 2a	HC	WuHu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	<0.0001
Fig 2a	HC	WuHu.1	(COVID+, 2 doses)	(COVID+, 3 doses)	0.30
Fig 2a	HC	WuHu.1	(COVID-, 2 doses)	(COVID+, 2 doses)	0.0013
Fig 2a	HC	WuHu.1	(COVID-, 3 doses)	(COVID+, 3 doses)	<0.0001
Fig 2a	PID	WuHu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0.022
Fig 2a	PID	WuHu.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0.16
Fig 2a	PID	WuHu.1	(COVID-, 3 doses)	(COVID-, 4 doses)	1.00
Fig 2a	PID	WuHu.1	(COVID+, 2 doses)	(COVID+, 3 doses)	1.00
Fig 2a	PID	WuHu.1	(COVID+, 2 doses)	(COVID+, 4 doses)	1.00
Fig 2a	PID	WuHu.1	(COVID+, 3 doses)	(COVID+, 4 doses)	1.00
Fig 2a	PID	WuHu.1	(COVID-, 2 doses)	(COVID+, 2 doses)	0.041
Fig 2a	PID	WuHu.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0.027
Fig 2a	PID	WuHu.1	(COVID-, 4 doses)	(COVID+, 4 doses)	1.00
Fig 2a	HIV	WuHu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	<0.0001
Fig 2a	HIV	WuHu.1	(COVID+, 2 doses)	(COVID+, 3 doses)	0.23
Fig 2a	HIV	WuHu.1	(COVID-, 2 doses)	(COVID+, 2 doses)	0.013
Fig 2a	HIV	WuHu.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0.0034
Fig 2a	HSCT	WuHu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	<0.0001
Fig 2a	HSCT	WuHu.1	(COVID-, 2 doses)	(COVID-, 4 doses)	<0.0001
Fig 2a	HSCT	WuHu.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0.0002
Fig 2a	HSCT	WuHu.1	(COVID+, 2 doses)	(COVID+, 3 doses)	1.00
Fig 2a	HSCT	WuHu.1	(COVID+, 2 doses)	(COVID+, 4 doses)	1.00
Fig 2a	HSCT	WuHu.1	(COVID+, 3 doses)	(COVID+, 4 doses)	1.00
Fig 2a	HSCT	WuHu.1	(COVID-, 2 doses)	(COVID+, 2 doses)	0.16

Fig 2a	HSCT	WuHu.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·0008
Fig 2a	HSCT	WuHu.1	(COVID-, 4 doses)	(COVID+, 4 doses)	1·00
Fig 2a	SOT	WuHu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	<0·0001
Fig 2a	SOT	WuHu.1	(COVID-, 2 doses)	(COVID-, 4 doses)	<0·0001
Fig 2a	SOT	WuHu.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·074
Fig 2a	SOT	WuHu.1	(COVID+, 2 doses)	(COVID+, 3 doses)	0·33
Fig 2a	SOT	WuHu.1	(COVID+, 2 doses)	(COVID+, 4 doses)	0·25
Fig 2a	SOT	WuHu.1	(COVID+, 3 doses)	(COVID+, 4 doses)	1·00
Fig 2a	SOT	WuHu.1	(COVID-, 2 doses)	(COVID+, 2 doses)	1·00
Fig 2a	SOT	WuHu.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·042
Fig 2a	SOT	WuHu.1	(COVID-, 4 doses)	(COVID+, 4 doses)	1·00
Fig 2a	CLL	WuHu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·0001
Fig 2a	CLL	WuHu.1	(COVID-, 2 doses)	(COVID-, 4 doses)	<0·0001
Fig 2a	CLL	WuHu.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·12
Fig 2a	CLL	WuHu.1	(COVID+, 2 doses)	(COVID+, 3 doses)	1·00
Fig 2a	CLL	WuHu.1	(COVID+, 2 doses)	(COVID+, 4 doses)	1·00
Fig 2a	CLL	WuHu.1	(COVID+, 3 doses)	(COVID+, 4 doses)	1·00
Fig 2a	CLL	WuHu.1	(COVID-, 2 doses)	(COVID+, 2 doses)	1·00
Fig 2a	CLL	WuHu.1	(COVID-, 3 doses)	(COVID+, 3 doses)	1·00
Fig 2a	CLL	WuHu.1	(COVID-, 4 doses)	(COVID+, 4 doses)	1·00
Fig 3c	HC	WuHu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	<0·0001
Fig 3c	HC	WuHu.1	(COVID+, 2 doses)	(COVID+, 3 doses)	1·00
Fig 3c	HC	WuHu.1	(COVID-, 2 doses)	(COVID+, 2 doses)	0·0040
Fig 3c	HC	WuHu.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·0002
Fig 3c	PID	WuHu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·0015
Fig 3c	PID	WuHu.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·024
Fig 3c	PID	WuHu.1	(COVID-, 3 doses)	(COVID-, 4 doses)	1·00
Fig 3c	PID	WuHu.1	(COVID+, 2 doses)	(COVID+, 3 doses)	1·00
Fig 3c	PID	WuHu.1	(COVID+, 2 doses)	(COVID+, 4 doses)	1·00
Fig 3c	PID	WuHu.1	(COVID+, 3 doses)	(COVID+, 4 doses)	1·00
Fig 3c	PID	WuHu.1	(COVID-, 2 doses)	(COVID+, 2 doses)	0·57
Fig 3c	PID	WuHu.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·064
Fig 3c	PID	WuHu.1	(COVID-, 4 doses)	(COVID+, 4 doses)	1·00
Fig 3c	HIV	WuHu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	<0·0001
Fig 3c	HIV	WuHu.1	(COVID+, 2 doses)	(COVID+, 3 doses)	0·73
Fig 3c	HIV	WuHu.1	(COVID-, 2 doses)	(COVID+, 2 doses)	0·0018
Fig 3c	HIV	WuHu.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·0036
Fig 3c	HSCT	WuHu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	<0·0001
Fig 3c	HSCT	WuHu.1	(COVID-, 2 doses)	(COVID-, 4 doses)	<0·0001
Fig 3c	HSCT	WuHu.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·0013
Fig 3c	HSCT	WuHu.1	(COVID+, 2 doses)	(COVID+, 3 doses)	1·00
Fig 3c	HSCT	WuHu.1	(COVID+, 2 doses)	(COVID+, 4 doses)	1·00
Fig 3c	HSCT	WuHu.1	(COVID+, 3 doses)	(COVID+, 4 doses)	1·00
Fig 3c	HSCT	WuHu.1	(COVID-, 2 doses)	(COVID+, 2 doses)	0·068
Fig 3c	HSCT	WuHu.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·0087
Fig 3c	HSCT	WuHu.1	(COVID-, 4 doses)	(COVID+, 4 doses)	1·00
Fig 3c	SOT	WuHu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	<0·0001
Fig 3c	SOT	WuHu.1	(COVID-, 2 doses)	(COVID-, 4 doses)	<0·0001
Fig 3c	SOT	WuHu.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·75
Fig 3c	SOT	WuHu.1	(COVID+, 2 doses)	(COVID+, 3 doses)	0·30
Fig 3c	SOT	WuHu.1	(COVID+, 2 doses)	(COVID+, 4 doses)	1·00
Fig 3c	SOT	WuHu.1	(COVID+, 3 doses)	(COVID+, 4 doses)	1·00
Fig 3c	SOT	WuHu.1	(COVID-, 2 doses)	(COVID+, 2 doses)	0·35
Fig 3c	SOT	WuHu.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·0066
Fig 3c	SOT	WuHu.1	(COVID-, 4 doses)	(COVID+, 4 doses)	1·00
Fig 3c	CLL	WuHu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	<0·0001
Fig 3c	CLL	WuHu.1	(COVID-, 2 doses)	(COVID-, 4 doses)	<0·0001

Fig 3c	CLL	WuHu.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0.33
Fig 3c	CLL	WuHu.1	(COVID+, 2 doses)	(COVID+, 3 doses)	1.00
Fig 3c	CLL	WuHu.1	(COVID+, 2 doses)	(COVID+, 4 doses)	1.00
Fig 3c	CLL	WuHu.1	(COVID+, 3 doses)	(COVID+, 4 doses)	1.00
Fig 3c	CLL	WuHu.1	(COVID-, 2 doses)	(COVID+, 2 doses)	0.16
Fig 3c	CLL	WuHu.1	(COVID-, 3 doses)	(COVID+, 3 doses)	1.00
Fig 3c	CLL	WuHu.1	(COVID-, 4 doses)	(COVID+, 4 doses)	1.00
Fig 3c	HC	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	1.00
Fig 3c	HC	BA.1	(COVID+, 2 doses)	(COVID+, 3 doses)	1.00
Fig 3c	HC	BA.1	(COVID-, 2 doses)	(COVID+, 2 doses)	1.00
Fig 3c	HC	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0.0023
Fig 3c	PID	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0.14
Fig 3c	PID	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	1.00
Fig 3c	PID	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	1.00
Fig 3c	PID	BA.1	(COVID+, 2 doses)	(COVID+, 3 doses)	1.00
Fig 3c	PID	BA.1	(COVID+, 2 doses)	(COVID+, 4 doses)	1.00
Fig 3c	PID	BA.1	(COVID+, 3 doses)	(COVID+, 4 doses)	1.00
Fig 3c	PID	BA.1	(COVID-, 2 doses)	(COVID+, 2 doses)	1.00
Fig 3c	PID	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0.15
Fig 3c	PID	BA.1	(COVID-, 4 doses)	(COVID+, 4 doses)	1.00
Fig 3c	HIV	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0.87
Fig 3c	HIV	BA.1	(COVID+, 2 doses)	(COVID+, 3 doses)	1.00
Fig 3c	HIV	BA.1	(COVID-, 2 doses)	(COVID+, 2 doses)	1.00
Fig 3c	HIV	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0.23
Fig 3c	HSCT	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	1.00
Fig 3c	HSCT	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	<0.0001
Fig 3c	HSCT	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0.0038
Fig 3c	HSCT	BA.1	(COVID+, 2 doses)	(COVID+, 3 doses)	1.00
Fig 3c	HSCT	BA.1	(COVID+, 2 doses)	(COVID+, 4 doses)	1.00
Fig 3c	HSCT	BA.1	(COVID+, 3 doses)	(COVID+, 4 doses)	1.00
Fig 3c	HSCT	BA.1	(COVID-, 2 doses)	(COVID+, 2 doses)	1.00
Fig 3c	HSCT	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0.0056
Fig 3c	HSCT	BA.1	(COVID-, 4 doses)	(COVID+, 4 doses)	1.00
Fig 3c	SOT	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0.17
Fig 3c	SOT	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	1.00
Fig 3c	SOT	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	1.00
Fig 3c	SOT	BA.1	(COVID+, 2 doses)	(COVID+, 3 doses)	1.00
Fig 3c	SOT	BA.1	(COVID+, 2 doses)	(COVID+, 4 doses)	1.00
Fig 3c	SOT	BA.1	(COVID+, 3 doses)	(COVID+, 4 doses)	1.00
Fig 3c	SOT	BA.1	(COVID-, 2 doses)	(COVID+, 2 doses)	0.13
Fig 3c	SOT	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	1.00
Fig 3c	SOT	BA.1	(COVID-, 4 doses)	(COVID+, 4 doses)	1.00
Fig 3c	CLL	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	1.00
Fig 3c	CLL	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	1.00
Fig 3c	CLL	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	1.00
Fig 3c	CLL	BA.1	(COVID+, 2 doses)	(COVID+, 3 doses)	1.00
Fig 3c	CLL	BA.1	(COVID+, 2 doses)	(COVID+, 4 doses)	0.56
Fig 3c	CLL	BA.1	(COVID+, 3 doses)	(COVID+, 4 doses)	0.16
Fig 3c	CLL	BA.1	(COVID-, 2 doses)	(COVID+, 2 doses)	1.00
Fig 3c	CLL	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	1.00
Fig 3c	CLL	BA.1	(COVID-, 4 doses)	(COVID+, 4 doses)	0.76
Fig 4a	HC	Wu-Hu.1	('3m', COVID-)	('3m', COVID+)	1.00
Fig 4a	HC	Wu-Hu.1	('6m', COVID-)	('6m', COVID+)	1.00
Fig 4a	HC	Wu-Hu.1	('9m', COVID-)	('9m', COVID+)	1.00
Fig 4a	PID	Wu-Hu.1	('3m', COVID-)	('3m', COVID+)	1.00
Fig 4a	PID	Wu-Hu.1	('6m', COVID-)	('6m', COVID+)	1.00
Fig 4a	PID	Wu-Hu.1	('9m', COVID-)	('9m', COVID+)	1.00

Fig 4a	HIV	Wu-Hu.1	('3m', COVID-)	('3m', COVID+)	1·00
Fig 4a	HIV	Wu-Hu.1	('6m', COVID-)	('6m', COVID+)	1·00
Fig 4a	HIV	Wu-Hu.1	('9m', COVID-)	('9m', COVID+)	1·00
Fig 4a	HSCT	Wu-Hu.1	('3m', COVID-)	('3m', COVID+)	1·00
Fig 4a	HSCT	Wu-Hu.1	('6m', COVID-)	('6m', COVID+)	1·00
Fig 4a	HSCT	Wu-Hu.1	('9m', COVID-)	('9m', COVID+)	0·63
Fig 4a	SOT	Wu-Hu.1	('3m', COVID-)	('3m', COVID+)	0·82
Fig 4a	SOT	Wu-Hu.1	('6m', COVID-)	('6m', COVID+)	1·00
Fig 4a	SOT	Wu-Hu.1	('9m', COVID-)	('9m', COVID+)	0·64
Fig 4a	CLL	Wu-Hu.1	('3m', COVID-)	('3m', COVID+)	0·90
Fig 4a	CLL	Wu-Hu.1	('6m', COVID-)	('6m', COVID+)	0·40
Fig 4a	CLL	Wu-Hu.1	('9m', COVID-)	('9m', COVID+)	0·80
Fig 4a	HC	BA.1	('3m', COVID-)	('3m', COVID+)	1·00
Fig 4a	HC	BA.1	('6m', COVID-)	('6m', COVID+)	1·00
Fig 4a	HC	BA.1	('9m', COVID-)	('9m', COVID+)	1·00
Fig 4a	PID	BA.1	('3m', COVID-)	('3m', COVID+)	1·00
Fig 4a	PID	BA.1	('6m', COVID-)	('6m', COVID+)	1·00
Fig 4a	PID	BA.1	('9m', COVID-)	('9m', COVID+)	1·00
Fig 4a	HIV	BA.1	('3m', COVID-)	('3m', COVID+)	1·00
Fig 4a	HIV	BA.1	('6m', COVID-)	('6m', COVID+)	1·00
Fig 4a	HIV	BA.1	('9m', COVID-)	('9m', COVID+)	1·00
Fig 4a	HSCT	BA.1	('3m', COVID-)	('3m', COVID+)	1·00
Fig 4a	HSCT	BA.1	('6m', COVID-)	('6m', COVID+)	1·00
Fig 4a	HSCT	BA.1	('9m', COVID-)	('9m', COVID+)	0·43
Fig 4a	SOT	BA.1	('3m', COVID-)	('3m', COVID+)	1·00
Fig 4a	SOT	BA.1	('6m', COVID-)	('6m', COVID+)	0·77
Fig 4a	SOT	BA.1	('9m', COVID-)	('9m', COVID+)	0·58
Fig 4a	CLL	BA.1	('3m', COVID-)	('3m', COVID+)	0·99
Fig 4a	CLL	BA.1	('6m', COVID-)	('6m', COVID+)	0·44
Fig 4a	CLL	BA.1	('9m', COVID-)	('9m', COVID+)	0·42

Supp Fig 2	HC: >60 yrs	Wu-Hu.1	35d	3m	0·0049
Supp Fig 2	HC: >60 yrs	Wu-Hu.1	35d	6m	0·0097
Supp Fig 2	HC: >60 yrs	Wu-Hu.1	6m	9m	<0·0001
Supp Fig 2	HC: >60 yrs	Wu-Hu.1	6m	12m	0·0010
Supp Fig 2	HC: >60 yrs	Wu-Hu.1	9m	12m	1·00
Supp Fig 2	HC: 40-59 yrs	Wu-Hu.1	35d	3m	0·0049
Supp Fig 2	HC: 40-59 yrs	Wu-Hu.1	35d	6m	0·0002
Supp Fig 2	HC: 40-59 yrs	Wu-Hu.1	6m	9m	0·0004
Supp Fig 2	HC: 40-59 yrs	Wu-Hu.1	6m	12m	<0·0001
Supp Fig 2	HC: 40-59 yrs	Wu-Hu.1	9m	12m	1·00
Supp Fig 2	HC: 18-39 yrs	Wu-Hu.1	35d	3m	0·0049
Supp Fig 2	HC: 18-39 yrs	Wu-Hu.1	35d	6m	0·0006
Supp Fig 2	HC: 18-39 yrs	Wu-Hu.1	6m	9m	0·0049
Supp Fig 2	HC: 18-39 yrs	Wu-Hu.1	6m	12m	0·0024
Supp Fig 2	HC: 18-39 yrs	Wu-Hu.1	9m	12m	0·87
Supp Fig 2	PID: CVID	Wu-Hu.1	35d	3m	0·063
Supp Fig 2	PID: CVID	Wu-Hu.1	35d	6m	0·75
Supp Fig 2	PID: CVID	Wu-Hu.1	6m	9m	0·0003
Supp Fig 2	PID: CVID	Wu-Hu.1	6m	12m	<0·0001
Supp Fig 2	PID: CVID	Wu-Hu.1	9m	12m	0·0011
Supp Fig 2	PID: XLA	Wu-Hu.1	35d	3m	1·00
Supp Fig 2	PID: XLA	Wu-Hu.1	35d	6m	1·00
Supp Fig 2	PID: XLA	Wu-Hu.1	6m	9m	1·00
Supp Fig 2	PID: XLA	Wu-Hu.1	6m	12m	1·00
Supp Fig 2	PID: XLA	Wu-Hu.1	9m	12m	1·00
Supp Fig 2	PID: Monogenic disease	Wu-Hu.1	35d	3m	1·00
Supp Fig 2	PID: Monogenic disease	Wu-Hu.1	35d	6m	0·34

Supp Fig 2	PID: Monogenic disease	Wu-Hu.1	6m	9m	1·00
Supp Fig 2	PID: Monogenic disease	Wu-Hu.1	6m	12m	0·94
Supp Fig 2	PID: Monogenic disease	Wu-Hu.1	9m	12m	1·00
Supp Fig 2	PID: CD4-cytopenia	Wu-Hu.1	35d	3m	0·62
Supp Fig 2	PID: CD4-cytopenia	Wu-Hu.1	35d	6m	0·039
Supp Fig 2	PID: CD4-cytopenia	Wu-Hu.1	6m	9m	0·078
Supp Fig 2	PID: CD4-cytopenia	Wu-Hu.1	6m	12m	0·078
Supp Fig 2	PID: CD4-cytopenia	Wu-Hu.1	9m	12m	0·37
Supp Fig 2	PID: Other	Wu-Hu.1	35d	3m	1·00
Supp Fig 2	PID: Other	Wu-Hu.1	35d	6m	0·31
Supp Fig 2	PID: Other	Wu-Hu.1	6m	9m	0·16
Supp Fig 2	PID: Other	Wu-Hu.1	6m	12m	0·16
Supp Fig 2	PID: Other	Wu-Hu.1	9m	12m	1·00
Supp Fig 2	HIV: ≤CD4 300	Wu-Hu.1	35d	3m	0·54
Supp Fig 2	HIV: ≤CD4 300	Wu-Hu.1	35d	6m	0·30
Supp Fig 2	HIV: ≤CD4 300	Wu-Hu.1	6m	9m	0·25
Supp Fig 2	HIV: ≤CD4 300	Wu-Hu.1	6m	12m	0·059
Supp Fig 2	HIV: ≤CD4 300	Wu-Hu.1	9m	12m	1·00
Supp Fig 2	HIV: >CD4 300	Wu-Hu.1	35d	3m	<0·0001
Supp Fig 2	HIV: >CD4 300	Wu-Hu.1	35d	6m	<0·0001
Supp Fig 2	HIV: >CD4 300	Wu-Hu.1	6m	9m	<0·0001
Supp Fig 2	HIV: >CD4 300	Wu-Hu.1	6m	12m	<0·0001
Supp Fig 2	HIV: >CD4 300	Wu-Hu.1	9m	12m	0·27
Supp Fig 2	HSCT: Early	Wu-Hu.1	35d	3m	1·00
Supp Fig 2	HSCT: Early	Wu-Hu.1	35d	6m	1·00
Supp Fig 2	HSCT: Early	Wu-Hu.1	6m	9m	1·00
Supp Fig 2	HSCT: Early	Wu-Hu.1	6m	12m	1·00
Supp Fig 2	HSCT: Early	Wu-Hu.1	9m	12m	1·00
Supp Fig 2	HSCT: Intermediate	Wu-Hu.1	35d	3m	0·90
Supp Fig 2	HSCT: Intermediate	Wu-Hu.1	35d	6m	1·00
Supp Fig 2	HSCT: Intermediate	Wu-Hu.1	6m	9m	0·31
Supp Fig 2	HSCT: Intermediate	Wu-Hu.1	6m	12m	0·31
Supp Fig 2	HSCT: Intermediate	Wu-Hu.1	9m	12m	0·14
Supp Fig 2	HSCT: Late	Wu-Hu.1	35d	3m	<0·0001
Supp Fig 2	HSCT: Late	Wu-Hu.1	35d	6m	<0·0001
Supp Fig 2	HSCT: Late	Wu-Hu.1	6m	9m	<0·0001
Supp Fig 2	HSCT: Late	Wu-Hu.1	6m	12m	<0·0001
Supp Fig 2	HSCT: Late	Wu-Hu.1	9m	12m	0·0044
Supp Fig 2	SOT: ≤6mo w/ MMF	Wu-Hu.1	35d	3m	1·00
Supp Fig 2	SOT: ≤6mo w/ MMF	Wu-Hu.1	35d	6m	1·00
Supp Fig 2	SOT: ≤6mo w/ MMF	Wu-Hu.1	6m	9m	0·038
Supp Fig 2	SOT: ≤6mo w/ MMF	Wu-Hu.1	6m	12m	0·038
Supp Fig 2	SOT: ≤6mo w/ MMF	Wu-Hu.1	9m	12m	0·025
Supp Fig 2	SOT: >6mo w/ MMF	Wu-Hu.1	35d	3m	0·34
Supp Fig 2	SOT: >6mo w/ MMF	Wu-Hu.1	35d	6m	0·090
Supp Fig 2	SOT: >6mo w/ MMF	Wu-Hu.1	6m	9m	0·13
Supp Fig 2	SOT: >6mo w/ MMF	Wu-Hu.1	6m	12m	0·025
Supp Fig 2	SOT: >6mo w/ MMF	Wu-Hu.1	9m	12m	0·025
Supp Fig 2	SOT: >6mo w/o MMF	Wu-Hu.1	35d	3m	1·00
Supp Fig 2	SOT: >6mo w/o MMF	Wu-Hu.1	35d	6m	1·00
Supp Fig 2	SOT: >6mo w/o MMF	Wu-Hu.1	6m	9m	0·015
Supp Fig 2	SOT: >6mo w/o MMF	Wu-Hu.1	6m	12m	0·0098
Supp Fig 2	SOT: >6mo w/o MMF	Wu-Hu.1	9m	12m	0·0049
Supp Fig 2	CLL: Ibrutinib	Wu-Hu.1	35d	3m	1·00
Supp Fig 2	CLL: Ibrutinib	Wu-Hu.1	35d	6m	1·00
Supp Fig 2	CLL: Ibrutinib	Wu-Hu.1	6m	9m	0·090
Supp Fig 2	CLL: Ibrutinib	Wu-Hu.1	6m	12m	0·059
Supp Fig 2	CLL: Ibrutinib	Wu-Hu.1	9m	12m	0·059

Supp Fig 2	CLL: Off Ibrutinib	Wu-Hu.1	35d	3m	1·00
Supp Fig 2	CLL: Off Ibrutinib	Wu-Hu.1	35d	6m	1·00
Supp Fig 2	CLL: Off Ibrutinib	Wu-Hu.1	6m	9m	0·22
Supp Fig 2	CLL: Off Ibrutinib	Wu-Hu.1	6m	12m	0·22
Supp Fig 2	CLL: Off Ibrutinib	Wu-Hu.1	9m	12m	0·22
Supp Fig 2	CLL: Indolent	Wu-Hu.1	35d	3m	1·00
Supp Fig 2	CLL: Indolent	Wu-Hu.1	35d	6m	1·00
Supp Fig 2	CLL: Indolent	Wu-Hu.1	6m	9m	0·0008
Supp Fig 2	CLL: Indolent	Wu-Hu.1	6m	12m	0·0004
Supp Fig 2	CLL: Indolent	Wu-Hu.1	9m	12m	0·018
Supp Fig 2	CLL: BR/FCR	Wu-Hu.1	35d	3m	1·00
Supp Fig 2	CLL: BR/FCR	Wu-Hu.1	35d	6m	1·00
Supp Fig 2	CLL: BR/FCR	Wu-Hu.1	6m	9m	0·0061
Supp Fig 2	CLL: BR/FCR	Wu-Hu.1	6m	12m	0·0006
Supp Fig 2	CLL: BR/FCR	Wu-Hu.1	9m	12m	0·054
Supp Fig 3a	HC: >60 yrs	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	<0·0001
Supp Fig 3a	HC: >60 yrs	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·0025
Supp Fig 3a	HC: 40-59 yrs	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	<0·0001
Supp Fig 3a	HC: 40-59 yrs	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·11
Supp Fig 3a	HC: 18-39 yrs	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·0001
Supp Fig 3a	HC: 18-39 yrs	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·0049
Supp Fig 3a	PID: CVID	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·20
Supp Fig 3a	PID: CVID	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	1·00
Supp Fig 3a	PID: CVID	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	1·00
Supp Fig 3a	PID: CVID	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·63
Supp Fig 3a	PID: CVID	BA.1	(COVID-, 4 doses)	(COVID+, 4 doses)	0·40
Supp Fig 3a	PID: CVID	BA.1	(COVID+, 3 doses)	(COVID+, 4 doses)	1·00
Supp Fig 3a	PID: CD4-cytopenia	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·0005
Supp Fig 3a	PID: CD4-cytopenia	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·0030
Supp Fig 3a	PID: CD4-cytopenia	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·14
Supp Fig 3a	HIV: ≤CD4 300	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·088
Supp Fig 3a	HIV: >CD4 300	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	<0·0001
Supp Fig 3a	HIV: >CD4 300	BA.1	(COVID-, 2 doses)	(COVID+, 2 doses)	0·044
Supp Fig 3a	HIV: >CD4 300	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·047
Supp Fig 3a	HIV: >CD4 300	BA.1	(COVID+, 2 doses)	(COVID+, 3 doses)	1·00
Supp Fig 3a	HSCT: Intermediate	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·056
Supp Fig 3a	HSCT: Intermediate	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·0080
Supp Fig 3a	HSCT: Intermediate	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·25
Supp Fig 3a	HSCT: Late	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	<0·0001
Supp Fig 3a	HSCT: Late	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	<0·0001
Supp Fig 3a	HSCT: Late	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·0006
Supp Fig 3a	HSCT: Late	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·0042
Supp Fig 3a	SOT: ≤6mo w/ MMF	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·068
Supp Fig 3a	SOT: ≤6mo w/ MMF	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·0001
Supp Fig 3a	SOT: ≤6mo w/ MMF	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·24
Supp Fig 3a	SOT: ≤6mo w/ MMF	BA.1	(COVID-, 4 doses)	(COVID+, 4 doses)	0·080
Supp Fig 3a	SOT: >6mo w/ MMF	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·050
Supp Fig 3a	SOT: >6mo w/ MMF	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·0018
Supp Fig 3a	SOT: >6mo w/ MMF	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·082
Supp Fig 3a	SOT: >6mo w/o MMF	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·0001
Supp Fig 3a	SOT: >6mo w/o MMF	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·0004
Supp Fig 3a	SOT: >6mo w/o MMF	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·017
Supp Fig 3a	CLL: Ibrutinib	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·16
Supp Fig 3a	CLL: Ibrutinib	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·051
Supp Fig 3a	CLL: Ibrutinib	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·86
Supp Fig 3a	CLL: Off Ibrutinib	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·41
Supp Fig 3a	CLL: Indolent	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·0002

Supp Fig 3a	CLL: Indolent	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	<0·0001
Supp Fig 3a	CLL: Indolent	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·26
Supp Fig 3a	CLL: Indolent	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·62
Supp Fig 3a	CLL: BR/FCR	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·010
Supp Fig 3a	CLL: BR/FCR	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·0002
Supp Fig 3a	CLL: BR/FCR	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·13
Supp Fig 3b	HC: >60 yrs	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	<0·0001
Supp Fig 3b	HC: >60 yrs	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·0050
Supp Fig 3b	HC: 40-59 yrs	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	<0·0001
Supp Fig 3b	HC: 40-59 yrs	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·26
Supp Fig 3b	HC: 18-39 yrs	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·0001
Supp Fig 3b	HC: 18-39 yrs	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·016
Supp Fig 3b	PID: CVID	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·19
Supp Fig 3b	PID: CVID	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	1·00
Supp Fig 3b	PID: CVID	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	1·00
Supp Fig 3b	PID: CVID	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·51
Supp Fig 3b	PID: CVID	BA.1	(COVID-, 4 doses)	(COVID+, 4 doses)	0·28
Supp Fig 3b	PID: CVID	BA.1	(COVID+, 3 doses)	(COVID+, 4 doses)	1·00
Supp Fig 3b	PID: CD4-cytopenia	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·0005
Supp Fig 3b	PID: CD4-cytopenia	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·0030
Supp Fig 3b	PID: CD4-cytopenia	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·091
Supp Fig 3b	HIV: ≤CD4 300	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·043
Supp Fig 3b	HIV: >CD4 300	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	<0·0001
Supp Fig 3b	HIV: >CD4 300	BA.1	(COVID-, 2 doses)	(COVID+, 2 doses)	0·023
Supp Fig 3b	HIV: >CD4 300	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·023
Supp Fig 3b	HIV: >CD4 300	BA.1	(COVID+, 2 doses)	(COVID+, 3 doses)	1·00
Supp Fig 3b	HSCT: Intermediate	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·0047
Supp Fig 3b	HSCT: Intermediate	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·014
Supp Fig 3b	HSCT: Intermediate	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·38
Supp Fig 3b	HSCT: Late	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	<0·0001
Supp Fig 3b	HSCT: Late	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	<0·0001
Supp Fig 3b	HSCT: Late	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·0003
Supp Fig 3b	HSCT: Late	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·0032
Supp Fig 3b	SOT: ≤6mo w/ MMF	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·080
Supp Fig 3b	SOT: ≤6mo w/ MMF	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·0003
Supp Fig 3b	SOT: ≤6mo w/ MMF	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·56
Supp Fig 3b	SOT: ≤6mo w/ MMF	BA.1	(COVID-, 4 doses)	(COVID+, 4 doses)	0·17
Supp Fig 3b	SOT: >6mo w/ MMF	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·0019
Supp Fig 3b	SOT: >6mo w/ MMF	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·0012
Supp Fig 3b	SOT: >6mo w/ MMF	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·069
Supp Fig 3b	SOT: >6mo w/o MMF	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	<0·0001
Supp Fig 3b	SOT: >6mo w/o MMF	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·0003
Supp Fig 3b	SOT: >6mo w/o MMF	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·022
Supp Fig 3b	CLL: Ibrutinib	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·074
Supp Fig 3b	CLL: Ibrutinib	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·021
Supp Fig 3b	CLL: Ibrutinib	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	1·00
Supp Fig 3b	CLL: Off Ibrutinib	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·18
Supp Fig 3b	CLL: Indolent	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·0001
Supp Fig 3b	CLL: Indolent	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	<0·0001
Supp Fig 3b	CLL: Indolent	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·32
Supp Fig 3b	CLL: Indolent	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·55
Supp Fig 3b	CLL: BR/FCR	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·0044
Supp Fig 3b	CLL: BR/FCR	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·0002
Supp Fig 3b	CLL: BR/FCR	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·18
Supp Fig 4a	HC: >60 yrs	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	<0·0001
Supp Fig 4a	HC: >60 yrs	Wu-Hu.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·012
Supp Fig 4a	HC: 40-59 yrs	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	<0·0001
Supp Fig 4a	HC: 40-59 yrs	Wu-Hu.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·16

Supp Fig 4a	HC: 18-39 yrs	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·0002
Supp Fig 4a	HC: 18-39 yrs	Wu-Hu.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·041
Supp Fig 4a	PID: CVID	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·0091
Supp Fig 4a	PID: CVID	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·61
Supp Fig 4a	PID: CVID	Wu-Hu.1	(COVID-, 3 doses)	(COVID-, 4 doses)	1·00
Supp Fig 4a	PID: CVID	Wu-Hu.1	(COVID-, 3 doses)	(COVID+, 3 doses)	1·00
Supp Fig 4a	PID: CVID	Wu-Hu.1	(COVID-, 4 doses)	(COVID+, 4 doses)	1·00
Supp Fig 4a	PID: CVID	Wu-Hu.1	(COVID+, 3 doses)	(COVID+, 4 doses)	1·00
Supp Fig 4a	PID: CD4-cytopenia	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·0005
Supp Fig 4a	PID: CD4-cytopenia	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·0030
Supp Fig 4a	PID: CD4-cytopenia	Wu-Hu.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·61
Supp Fig 4a	HIV: ≤CD4 300	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·055
Supp Fig 4a	HIV: >CD4 300	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	<0·0001
Supp Fig 4a	HIV: >CD4 300	Wu-Hu.1	(COVID-, 2 doses)	(COVID+, 2 doses)	0·023
Supp Fig 4a	HIV: >CD4 300	Wu-Hu.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·036
Supp Fig 4a	HIV: >CD4 300	Wu-Hu.1	(COVID+, 2 doses)	(COVID+, 3 doses)	1·00
Supp Fig 4a	HSCT: Intermediate	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·056
Supp Fig 4a	HSCT: Intermediate	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·088
Supp Fig 4a	HSCT: Intermediate	Wu-Hu.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·99
Supp Fig 4a	HSCT: Late	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	<0·0001
Supp Fig 4a	HSCT: Late	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 4 doses)	<0·0001
Supp Fig 4a	HSCT: Late	Wu-Hu.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·0012
Supp Fig 4a	HSCT: Late	Wu-Hu.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·049
Supp Fig 4a	SOT: ≤6mo w/ MMF	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·15
Supp Fig 4a	SOT: ≤6mo w/ MMF	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·18
Supp Fig 4a	SOT: ≤6mo w/ MMF	Wu-Hu.1	(COVID-, 3 doses)	(COVID-, 4 doses)	1·00
Supp Fig 4a	SOT: ≤6mo w/ MMF	Wu-Hu.1	(COVID-, 4 doses)	(COVID+, 4 doses)	0·33
Supp Fig 4a	SOT: >6mo w/ MMF	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·011
Supp Fig 4a	SOT: >6mo w/ MMF	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·14
Supp Fig 4a	SOT: >6mo w/ MMF	Wu-Hu.1	(COVID-, 3 doses)	(COVID-, 4 doses)	1·00
Supp Fig 4a	SOT: >6mo w/o MMF	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·0029
Supp Fig 4a	SOT: >6mo w/o MMF	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·0012
Supp Fig 4a	SOT: >6mo w/o MMF	Wu-Hu.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·017
Supp Fig 4a	CLL: Ibrutinib	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	1·00
Supp Fig 4a	CLL: Ibrutinib	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 4 doses)	1·00
Supp Fig 4a	CLL: Ibrutinib	Wu-Hu.1	(COVID-, 3 doses)	(COVID-, 4 doses)	1·00
Supp Fig 4a	CLL: Off Ibrutinib	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·66
Supp Fig 4a	CLL: Indolent	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	<0·0001
Supp Fig 4a	CLL: Indolent	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 4 doses)	<0·0001
Supp Fig 4a	CLL: Indolent	Wu-Hu.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·16
Supp Fig 4a	CLL: Indolent	Wu-Hu.1	(COVID-, 3 doses)	(COVID+, 3 doses)	1·00
Supp Fig 4a	CLL: BR/FCR	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·015
Supp Fig 4a	CLL: BR/FCR	Wu-Hu.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·0002
Supp Fig 4a	CLL: BR/FCR	Wu-Hu.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·18
Supp Fig 4b	HC: >60 yrs	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·39
Supp Fig 4b	HC: >60 yrs	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·90
Supp Fig 4b	HC: 40-59 yrs	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·37
Supp Fig 4b	HC: 40-59 yrs	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·045
Supp Fig 4b	HC: 18-39 yrs	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	1·00
Supp Fig 4b	HC: 18-39 yrs	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·097
Supp Fig 4b	PID: CVID	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·15
Supp Fig 4b	PID: CVID	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	1·00
Supp Fig 4b	PID: CVID	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	1·00
Supp Fig 4b	PID: CVID	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	1·00
Supp Fig 4b	PID: CVID	BA.1	(COVID-, 4 doses)	(COVID+, 4 doses)	1·00
Supp Fig 4b	PID: CVID	BA.1	(COVID+, 3 doses)	(COVID+, 4 doses)	1·00
Supp Fig 4b	PID: CD4-cytopenia	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·49
Supp Fig 4b	PID: CD4-cytopenia	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·40

Supp Fig 4b	PID: CD4-cytopenia	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	1·00
Supp Fig 4b	HIV: ≤CD4 300	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·81
Supp Fig 4b	HIV: >CD4 300	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	1·00
Supp Fig 4b	HIV: >CD4 300	BA.1	(COVID-, 2 doses)	(COVID+, 2 doses)	1·00
Supp Fig 4b	HIV: >CD4 300	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·39
Supp Fig 4b	HIV: >CD4 300	BA.1	(COVID+, 2 doses)	(COVID+, 3 doses)	1·00
Supp Fig 4b	HSCT: Intermediate	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	1·00
Supp Fig 4b	HSCT: Intermediate	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·011
Supp Fig 4b	HSCT: Intermediate	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·35
Supp Fig 4b	HSCT: Late	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	1·00
Supp Fig 4b	HSCT: Late	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·0009
Supp Fig 4b	HSCT: Late	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·016
Supp Fig 4b	HSCT: Late	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	0·017
Supp Fig 4b	SOT: ≤6mo w/ MMF	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	1·00
Supp Fig 4b	SOT: ≤6mo w/ MMF	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	1·00
Supp Fig 4b	SOT: ≤6mo w/ MMF	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	1·00
Supp Fig 4b	SOT: ≤6mo w/ MMF	BA.1	(COVID-, 4 doses)	(COVID+, 4 doses)	1·00
Supp Fig 4b	SOT: >6mo w/ MMF	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·020
Supp Fig 4b	SOT: >6mo w/ MMF	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·30
Supp Fig 4b	SOT: >6mo w/ MMF	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	1·00
Supp Fig 4b	SOT: >6mo w/o MMF	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	1·00
Supp Fig 4b	SOT: >6mo w/o MMF	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·31
Supp Fig 4b	SOT: >6mo w/o MMF	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·10
Supp Fig 4b	CLL: Ibrutinib	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·25
Supp Fig 4b	CLL: Ibrutinib	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·051
Supp Fig 4b	CLL: Ibrutinib	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·86
Supp Fig 4b	CLL: Off Ibrutinib	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·23
Supp Fig 4b	CLL: Indolent	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	0·86
Supp Fig 4b	CLL: Indolent	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·23
Supp Fig 4b	CLL: Indolent	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	0·39
Supp Fig 4b	CLL: Indolent	BA.1	(COVID-, 3 doses)	(COVID+, 3 doses)	1·00
Supp Fig 4b	CLL: BR/FCR	BA.1	(COVID-, 2 doses)	(COVID-, 3 doses)	1·00
Supp Fig 4b	CLL: BR/FCR	BA.1	(COVID-, 2 doses)	(COVID-, 4 doses)	0·50
Supp Fig 4b	CLL: BR/FCR	BA.1	(COVID-, 3 doses)	(COVID-, 4 doses)	1·00
Supp Fig 5	HC	Nucleocapsid	COVID+	COVID-	<0·0001
Supp Fig 5	PID	Nucleocapsid	COVID+	COVID-	<0·0001
Supp Fig 5	HIV	Nucleocapsid	COVID+	COVID-	0·0075
Supp Fig 5	HSCT	Nucleocapsid	COVID+	COVID-	<0·0001
Supp Fig 5	SOT	Nucleocapsid	COVID+	COVID-	0·0002
Supp Fig 5	CLL	Nucleocapsid	COVID+	COVID-	0·0064

Supplementary Table S1. Non-dichotomized p-values

Study subjects [n, %]	Drop-outs		Reconsented study cohort		Statistics
	Males	Females	Males	Females	p-value
HC	14 (43·8%)	18 (56·2%)	25 (43·1%)	33 (56·9%)	0·0489
PID	13 (48·1%)	14 (51·9%)	22 (34·9%)	41 (65·1%)	0·0004
HIV	23 (65·7%)	12 (34·3%)	32 (58·2%)	23 (41·8%)	0·0895
HSCT	15 (53·6%)	13 (46·4%)	32 (51·6%)	30 (48·4%)	0·0137
SOT	19 (52·8%)	17 (47·2%)	27 (50·9%)	26 (49·1%)	0·2221
CLL	19 (76·0%)	6 (24·0%)	41 (63·1%)	24 (36·9%)	0·0014
Age in years [median, IQR]					p-value
HC	35·5 (28·0-51·0)	55·0 (36·0-69·0)	55·0 (36·0-69·0)	57·0 (43·0-68·0)	0·0759
PID	38·0 (31·0-42·0)	47·0 (38·3-53·0)	47·0 (38·3-53·0)	55·0 (47·0-66·0)	0·0002
HIV	53·0 (40·5-60·5)	58·5 (49·0-68·5)	58·5 (49·0-68·5)	49·0 (43·0-62·5)	0·0563
HSCT	50·0 (39·0-57·5)	62·0 (54·8-68·0)	62·0 (54·8-68·0)	60·5 (50·3-67·8)	0·0006
SOT	55·0 (48·5-65·0)	59·0 (51·5-64·5)	59·0 (51·5-64·5)	53·5 (43·0-64·0)	0·7570
CLL	63·0 (59·0-74·5)	70·0 (63·0-74·0)	70·0 (63·0-74·0)	75·0 (69·8-79·5)	0·0473
Ab titres at day 35 in AU/ml [geometric mean, geometric SD]					GMR (95% CI), p-value
HC	3452·5 (2·4)	2800·4 (1·9)	2215·8 (2·6)	1972·9 (2·1)	0·68 (0·48, 0·95), 0·030
PID	35·6 (91·1)	78·0 (62·1)	23·8 (45·7)	102·8 (27·0)	1·21 (0·18, 8·23), 0·835
HIV	1565·0 (2·4)	1450·0 (2·8)	1790·4 (6·1)	1236·2 (8·0)	1·02 (0·56, 1·86), 0·965
HSCT	463·6 (47·6)	1131·1 (41·7)	243·6 (33·3)	476·4 (34·9)	0·46 (0·09, 2·50), 0·361
SOT	13·2 (41·5)	4·9 (22·2)	2·6 (22·2)	4·6 (26·5)	0·41 (0·10, 1·72), 0·220
CLL	6·5 (27·6)	0·4 (1·0)	14·7 (19·6)	30·5 (19·4)	4·81 (0·94, 24·68), 0·056

For sex, a two-sided binomial test with the null hypothesis that the proportion of females is the same for the reconsented study and those who dropped out was used. For age and antibody titres, p-values were calculated using Mann-Whitney U test and Independent t-test, respectively. For all statistics, study-group comparisons were made (male + female) between drop-outs and reconsented study group. GMR = geometric mean ratio, CI = Confidence interval, IQR = interquartile range

Supplementary Table S2. Demographics and antibody titers in reconsented study subjects and drop-outs.

	Third dose		Fourth dose	
	BNT162b2 (Comirnaty, Pfizer/BioNTech)	mRNA-1273 (Spikevax, Moderna)	BNT162b2 (Comirnaty, Pfizer/BioNTech)	mRNA-1273 (Spikevax, Moderna)
HC subgroups				
18-39 yrs	11	3		
40-59 yrs	11	8		
>60 yrs	20	1		
PID subgroups				
CVID	32	3	4	18
XLA	2	1
Monogenic disease	2	2	..	1
CD4-cytopenia	10	..	3	3
Other	5
HIV subgroups				
≤CD4 300	7	4		
>CD4 300	26	8		
HSCT subgroups				
Early	4	..	1	3
Intermediate	10	..	4	4
Late	41	1	3	24
SOT subgroups				
≤6mo	30	..	3	12
>6mo w/ MMF	19	..	4	8
>6mo w/o MMF	34	..	6	11
CLL subgroups				
Ibrutinib	15	..	1	12
Off Ibrutinib	6	2	1	4
Indolent	23	2	4	12
BR/FCR	14	..	1	13

Supplementary Table S3. Number of administered 3rd and 4th vaccine doses