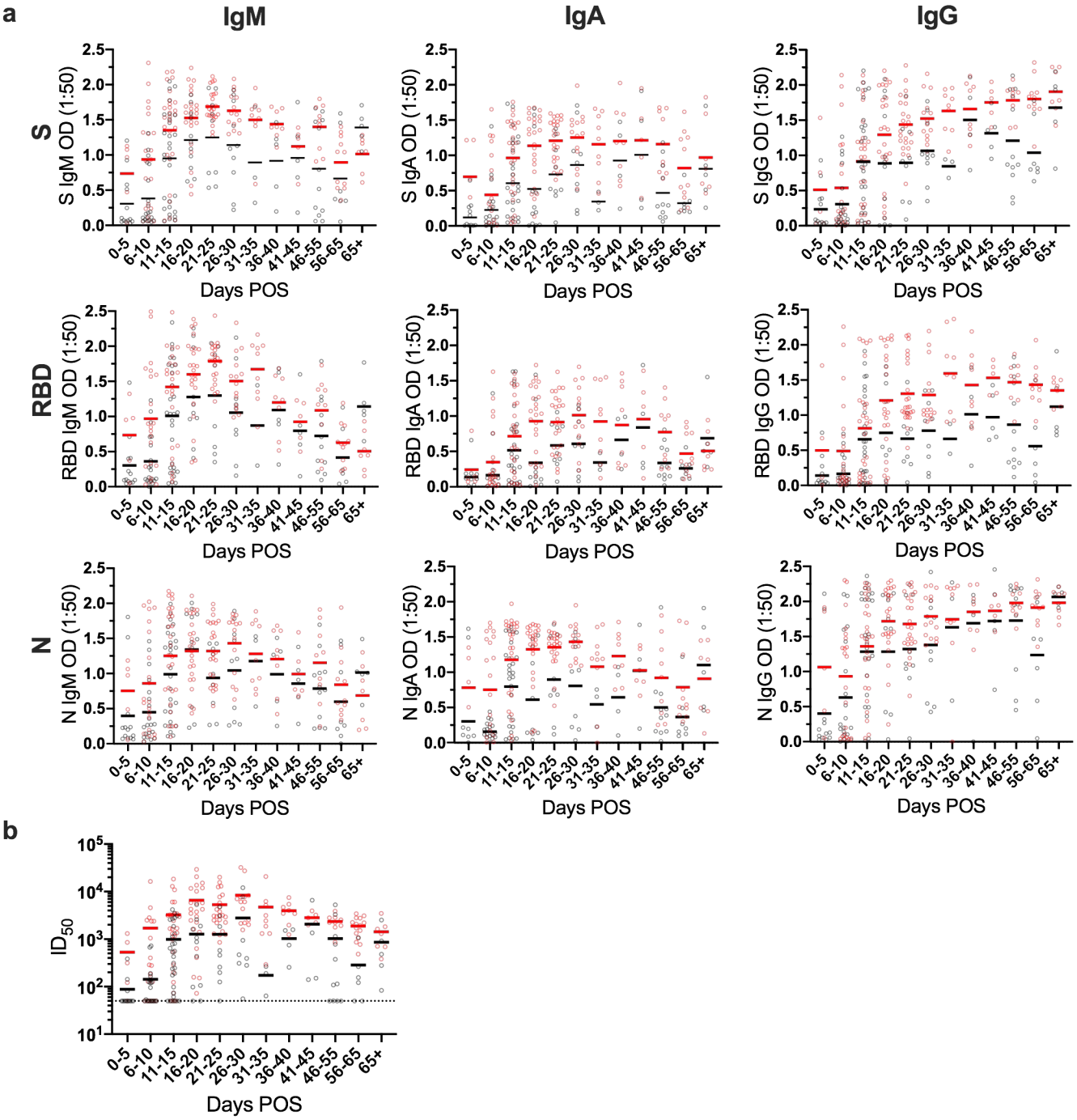
Extended Figure Legends:

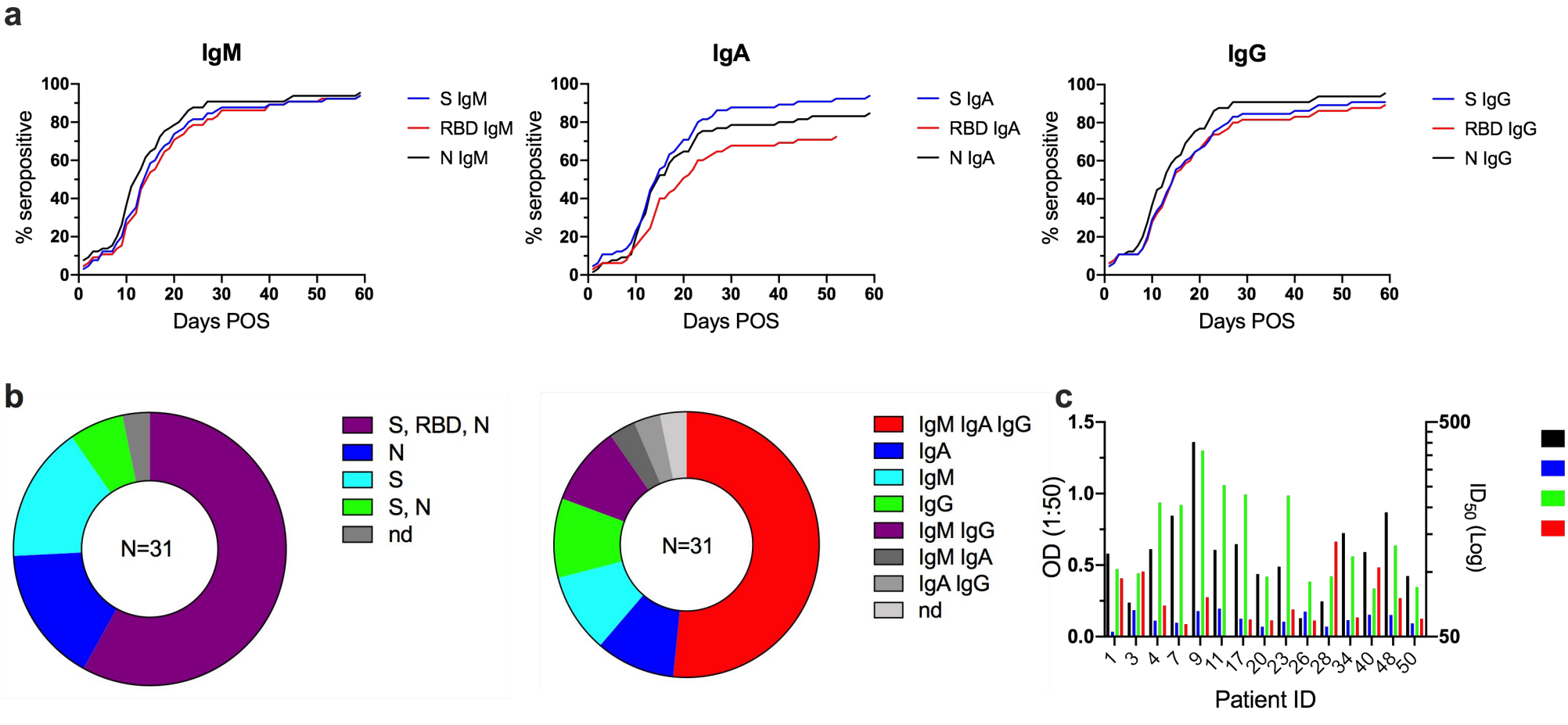
Figure S1: Cross-sectional SARS-CoV-2 Ab responses overtime. a) IgM, IgA and IgG OD values against S, RBD and N are binned based on days post onset of symptoms (POS). The data is grouped based on disease severity, 0-3 (black) and 4/5 (red). The mean OD value is shown for each time window for both the 0-3 and 4/5 severity groups. OD = optical density. b) ID_{50} measured using the SARS-CoV-2 pseudotype neutralization assay are binned based on days post onset of symptoms (POS). The data is grouped based on disease severity, 0-3 (black) and 4/5 (red). The mean ID_{50} value is shown for each time window for both the 0-3 and 4/5 severity groups.

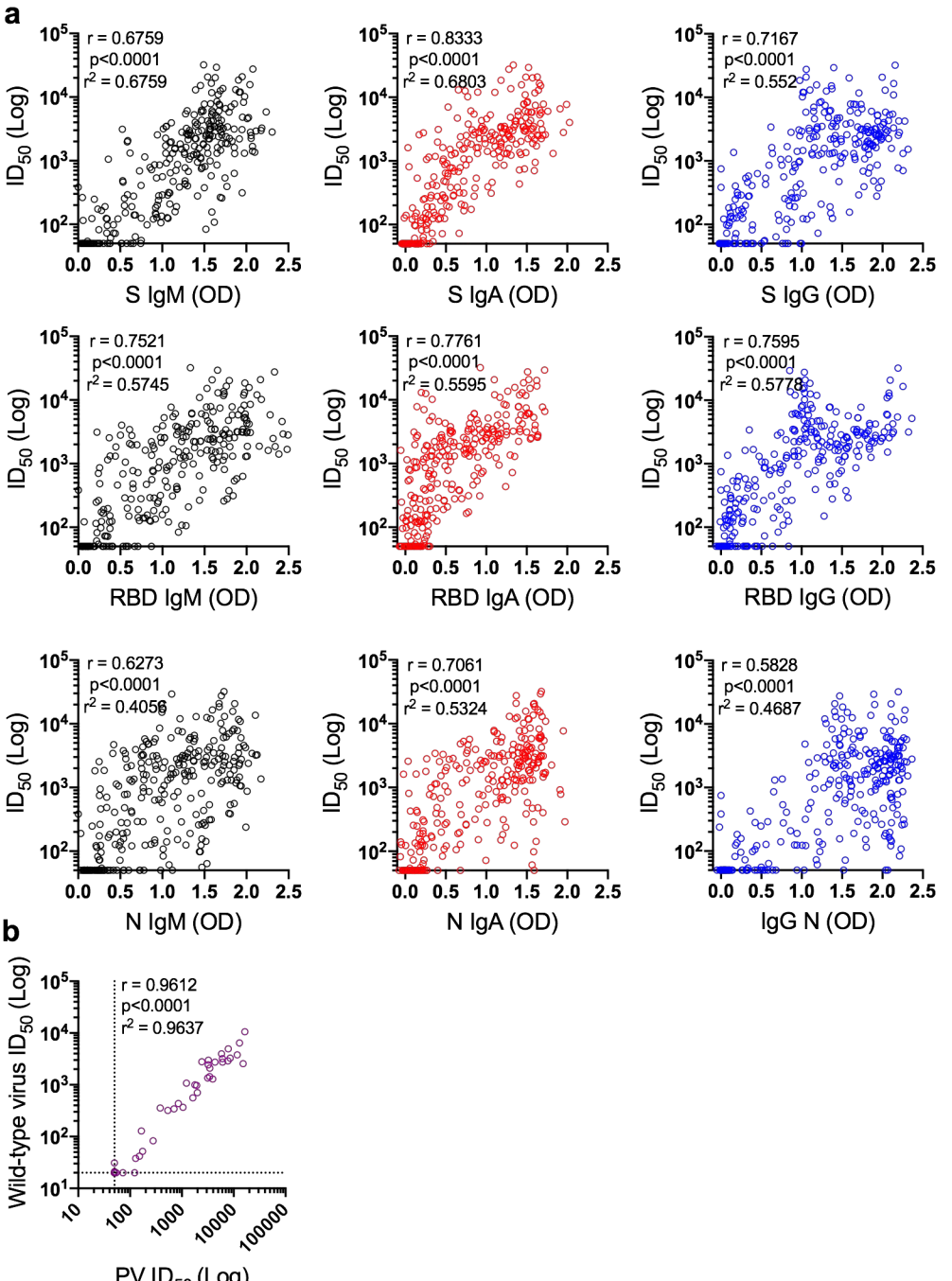
Figure S2: Antibody isotype and specificity at the first time point for which an individual became seropositive. A) A cumulative frequency analysis describing the seroconversion in the hospitalized cohort. Graph shows the percentage of individuals in the cohort that become IgM, IgA or IgG seropositive to S, RBD and N. B) Patterns of seroconversion based on antigen and Ab isotype for a subset of donors from whom sera was collected over sequential early time points (<14 days POS, n=31). For individuals with at least 2 sera collected <14 days POS, the first antigen(s) and Ab isotype(s) that gave an OD that was 4-fold above background is reported. C) Pseudovirus neutralization and ELISA binding at early time points POS for a subset of individuals where there was measurable neutralization titres but IgG binding to S is low (OD <0.2) and IgM and/or IgA to S is higher (OD >0.4).

Figure S3: Correlations between OD values and ID_{50}. a) Correlation of ID_{50} with IgG, IgM, IgA OD values (at 1:50) against S, RBD and N (Spearman correlation, r). b) Correlation of ID_{50}

843 measured using wild-type virus and ID_{50} measured using pseudovirus neutralization assays
844 (Spearman correlation, r). A linear regression was used to calculate the goodness of fit (r^2).
845
846 **Figure S4: Ab responses in HCW cohort.** A) Ab responses (IgG and IgM to S, RBD and N) over
847 time. Each line represents one individual. Asymptomatic individuals shown in green,
848 symptomatic individuals shown in black and PCR+ HCW shown in red (for comparsion). The
849 dotted line represents day 0 post onset of symptoms. B) Correlation of ID_{50} with IgG and
850 IgM OD values against S and N (Spearman correlation, r). A linear regression was used to
851 calculate the goodness of fit (r^2).
852
853
854


a
IgM
IgA
IgG
S
RBD
N
S IgM OD (1:50)
S IgA OD (1:50)
S IgG OD (1:50)
RBD IgM OD (1:50)
RBD IgA OD (1:50)
RBD IgG OD (1:50)
N IgM OD (1:50)
N IgA OD (1:50)
N IgG OD (1:50)
Days POS
0-5
6-10
11-15
16-20
21-25
26-30
31-35
36-40
41-45
46-55
56-65
65+
b
ID50
Days POS


a
IgM
% seropositive
Days POS
S IgM
RBD IgM
N IgM
IgA
% seropositive
Days POS
S IgA
RBD IgA
N IgA
IgG
% seropositive
Days POS
S IgG
RBD IgG
N IgG
b
N=31
S, RBD, N
N
S
S, N
nd
N=31
IgM IgA IgG
IgA
IgM
IgG
IgM IgG
IgM IgA
IgA IgG
nd
c
OD (1:50)
ID50 (Log)
Patient ID
ID50 (PV)
IgG S
IgM S
IgA S


a
r = 0.6759
p<0.0001
r² = 0.6759
ID50 (Log)
S IgM (OD)
r = 0.8333
p<0.0001
r² = 0.6803
S IgA (OD)
r = 0.7167
p<0.0001
r² = 0.552
S IgG (OD)
r = 0.7521
p<0.0001
r² = 0.5745
RBD IgM (OD)
r = 0.7761
p<0.0001
r² = 0.5595
RBD IgA (OD)
r = 0.7595
p<0.0001
r² = 0.5778
RBD IgG (OD)
r = 0.6273
p<0.0001
r² = 0.4056
N IgM (OD)
r = 0.7061
p<0.0001
r² = 0.5324
N IgA (OD)
r = 0.5828
p<0.0001
r² = 0.4687
IgG N (OD)
b
r = 0.9612
p<0.0001
r² = 0.9637
Wild-type virus ID50 (Log)
PV ID50 (Log)

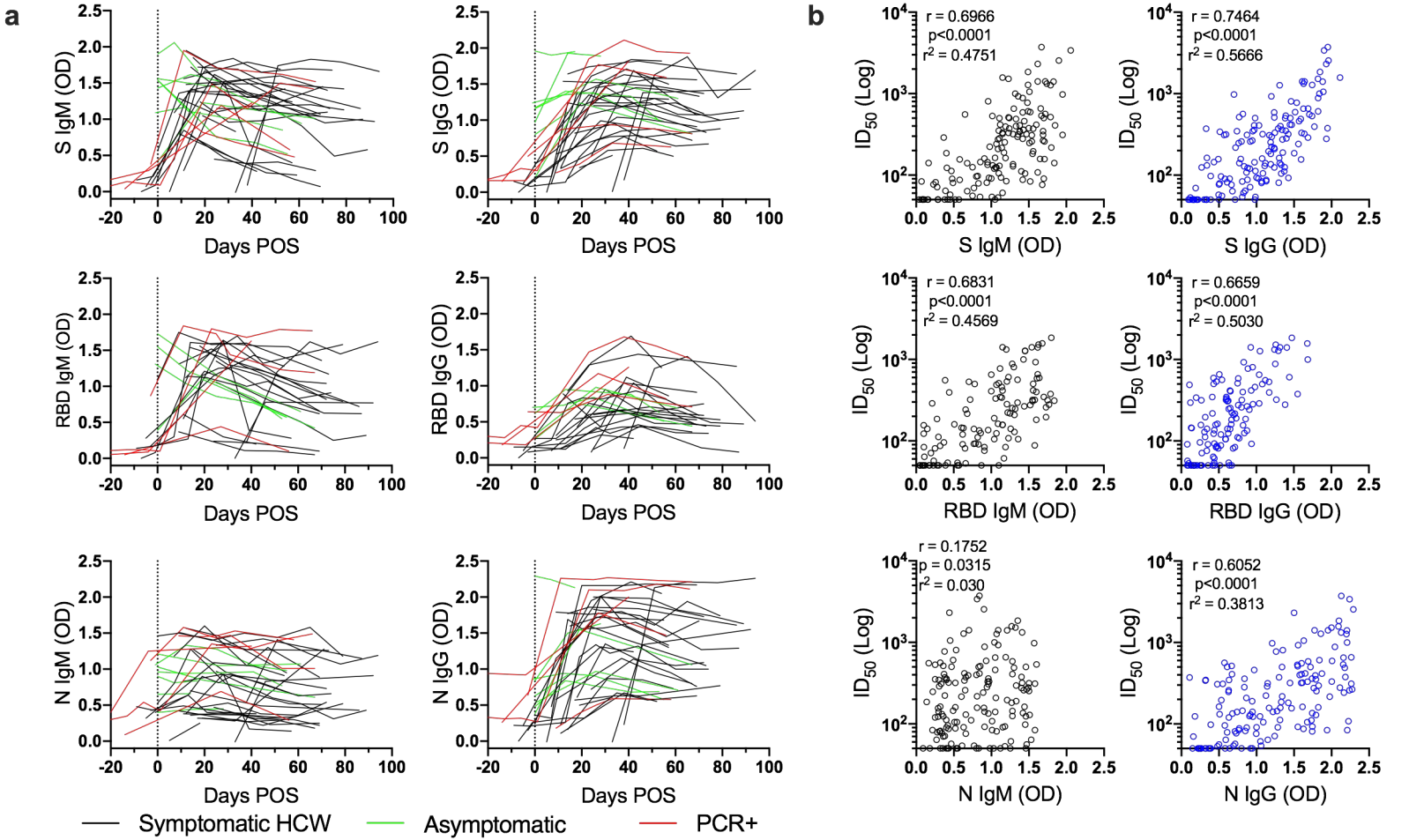

a
S IgM (OD)
S IgG (OD)
RBD IgM (OD)
RBD IgG (OD)
N IgM (OD)
N IgG (OD)
Days POS
Symptomatic HCW
Asymptomatic
PCR+
b
r = 0.6966
p<0.0001
r² = 0.4751
r = 0.7464
p<0.0001
r² = 0.5666
r = 0.6831
p<0.0001
r² = 0.4569
r = 0.6659
p<0.0001
r² = 0.5030
r = 0.1752
p = 0.0315
r² = 0.030
r = 0.6052
p<0.0001
r² = 0.3813
ID50 (Log)
S IgM (OD)
S IgG (OD)
RBD IgM (OD)
RBD IgG (OD)
N IgM (OD)
N IgG (OD)

Table S1: Patient information. Age range, comorbidities, disease severity, hyper-inflammatory status, gender and outcome are listed for each hospitalized participant. Hyper-inflammatory (HI), Atrial fibrillation (AF), acute myeloid leukaemia (AML), cancer (ca), chronic kidney disease (CKD), chronic obstructive pulmonary disease (COPD), end-stage renal failure (ESRF), hypertension (HTN), ischaemic heart disease (IHD), interstitial lung disease (ILD), non-alcoholic fatty liver disease (NAFLD), simultaneous pancreatic/kidney transplant (SPK), type 1 diabetes mellitus (T1DM), type 2 diabetes mellitus (T2DM), venous thromboembolism (VTE)

Donor number	Severity score	Hyper-inflammatory	Comorbidities	Age range	Sex	Final outcome
1	4	N	asthma, HTN, obesity, T2DM, sarcoidosis	50-59	M	Died
2	4	Y	obesity	50-59	M	Died
3	4	N	HTN	40-49	M	Died
4	4	Y	AF, HTN, obesity, sarcoidosis,	60-69	M	Discharged
5	4	N	HTN, T2DM	60-69	M	Discharged
6	4	Y	T1DM	40-49	M	Ward
7	4	Y	Hypothyroidism	70-79	M	Discharged
8	4	Y	T2DM, NAFLD	50-59	M	Died
9	4	Y	HTN, IHD	70-79	M	Died
10	4	Y	T2DM	70-79	M	Died
11	4	N	HTN, prostate ca	70-79	M	Discharged
12	4	Y	none	40-49	M	Discharged
13	4	Y	none	50-59	M	Ward
14	4	N	obesity, T2DM	50-59	F	Discharged
15	4	N	COPD	70-79	M	Discharged
16	2	N	none	50-59	M	Discharged
17	1	N	obesity	30-39	F	Discharged
18	1	N	CKD, dementia, HTN, IHD, obesity, VTE	70-79	F	Discharged
19	2	N	AF	90-99	M	Discharged
20	2	N	dementia, T2DM	60-69	M	Discharged
21	1	N	hepatitis C, Huntingdon's disease	60-69	M	Discharged
22	1	N	AF, dementia, HTN, stroke	80-89	M	Discharged
23	1	N	CKD, T2DM, VTE	60-69	M	Died
24	4	N	chronic pancreatitis, T2DM	60-69	M	Ward
25	1	N	AF, Marfan's syndrome	50-59	M	Discharged
26	0	N	ESRF, obesity, T1DM	20-29	F	Discharged
28	4	N	none	40-49	M	Discharged
29	0	N	ESRF, T1DM, SPK	40-49	M	Discharged
31	0	N	ESRF, obesity	20-29	F	Discharged
32	4	N	HTN, T2DM	60-69	M	Discharged
33	4	N	HTN, obesity	60-69	F	Discharged
34	4	Y	asthma, obesity	50-59	F	Discharged
35	4	N	none	40-49	M	Discharged
36	4	Y	none	30-39	M	Discharged
37	4	N	asthma, inflammatory polyarthritis, obesity	60-69	M	Discharged
38	4	N	none	30-39	M	Discharged
39	4	N	T2DM, obesity	30-39	M	Discharged
40	5	N	obesity	30-39	F	Discharged
41	5	Y	none	60-69	M	Discharged
42	5	N	asthma, obesity	40-49	M	Transferred to local hospital
43	5	Y	HTN	50-59	M	Transferred to local hospital
44	5	N	none	50-59	M	Died
45	5	N	none	50-59	M	Discharged
46	5	Y	asthma, obesity, T2DM	50-59	M	Died
47	2	N	none	20-29	M	Discharged
48	3	N	depression, obesity, T1DM	50-59	M	Discharged
49	1	N	HTN, T2DM	60-69	M	Discharged
50	2	N	none	60-69	M	Discharged
51	2	N	none	30-39	M	Discharged
52	0	N	AF, ESRF, T2DM	60-69	M	Ward
53	2	N	HTN, obesity	50-59	M	Discharged
54	0	N	AML	20-29	F	Discharged
55	3	N	bladder ca	60-69	M	Died
56	1	N	asthma	50-59	M	Discharged
57	0	N	dementia, frailty, Parkinsonism	90-99	M	Died
58	1	N	CKD, frailty	90-99	F	Died
59	0	N	CCF, IHD, PVD, stroke, T2DM	80-89	M	Transferred to local hospital
60	0	N	mycosis fungoides,	50-59	F	Ward
61	1	N	COPD, bronchiectasis, renal transplant	70-79	M	Discharged

Table S2: Cumulative frequency of seropositivity for SARS-CoV-2 antigens. Percentage of individuals that become seropositive (IgM, IgA, IgG) in a specific time window for antigens S, RBD and N in ELISA. A sample was considered seropositive when the OD value was four-fold above background.

	Cumulative seropositivity (%)									
	IgG			IgM			IgA			IgG or IgM or IgA
Days POS	S	RBD	N	S	RBD	N	S	RBD	N	S or RBD or N
7	10.8	10.8	15.4	12.3	10.8	15.4	12.3	6.2	9.2	21.5
14	47.7	47.7	58.5	52.3	49.2	61.5	49.2	32.3	47.7	66.2
21	67.7	69.2	76.9	75.4	72.3	80.0	70.8	52.3	64.6	86.2
28	83.1	80.0	90.8	84.6	81.5	90.8	86.2	64.6	76.9	93.8
35	84.6	81.5	90.8	87.7	86.2	90.8	87.7	67.7	78.5	93.8
42	86.2	83.1	90.8	89.2	89.2	90.8	89.2	69.2	80.0	93.8
49	89.2	86.2	93.8	90.8	90.8	93.8	90.8	70.8	83.1	95.4
56	90.8	87.7	93.8	92.3	92.3	93.8	92.3	72.3	83.1	95.4
63	92.3	89.2	93.8	92.3	92.3	95.4	93.8	72.3	84.6	96.9

Table S3: ID_{50} summary at different days post onset of symptoms. Percentage of individuals in a given time window with undetectable (ID_{50} <50), low (ID_{50} 50-200), medium (ID_{50} 201-500), high (ID_{50} 501-2000) or potent (ID_{50} 2000+) nAb titres. Every serum sample from all individuals in the PCR+ hospital cohort is included in this table. Historic healthy control sera samples were collected before the COVID-19 global pandemic and tested at 1:20 dilution.

				Days post onset of symptoms											
	ID_{50}	ID_{50}	Covid	0-5	6-10.	11-15.	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-65	65+
Undetectable	<50	3.1	100	55.6	40.0	16.1	5.7	3.0	4.3	0.0	0.0	0.0	0.0	25.0	11.8	0.0
Low	50-200	7.7	0	16.7	30.0	14.3	14.3	6.1	4.3	16.7	0.0	22.2	12.5	8.3	11.8	8.3
Medium	201-500	10.8	0	16.7	7.5	8.9	5.7	6.1	17.4	16.7	8.3	0.0	0.0	8.3	11.8	25.0
High	501-2000	18.5	0	11.1	7.5	28.6	20.0	21.2	8.7	25.0	41.7	22.2	12.5	33.3	35.3	50.0
Potent	2000+	60.0	0	0.0	15.0	32.1	54.3	63.6	65.2	41.7	50.0	55.6	75.0	25.0	29.4	16.7
	Number of samples	65	25	18	40	56	35	33	23	12	12	9	8	12	17	12