

Supplementary Information

Supplementary Table 1: Calibration of LuLISA N, LuLISA S and pseudo-neutralisation assays on prepandemic samples and confirmed COVID-19 cases.

	Serological Assay			
	LuLISA N	LuLISA S	PNT	LN LS PNT
Readings threshold (RLU/s)	39915	27821	14037	as defined at left
Prepandemic samples	523	232	223	223
Confirmed COVID-19 cases	309	45	99	45
False positive	0	0	0	0
True positive	266	43	84	45
True negative	523	232	223	223
False negative	43	2	15	0
Specificity	1.00	1.00	1.00	1.00
Sensitivity	0.86	0.96	0.85	1.00

LN=LuLISA N assay, LS=LuLISA S assay, PNT=Pseudo-neutralisation assay. LN|LS|PNT refers to positive in any of the three assays. Readings are expressed in relative light units per second (RLU/s). Confirmed COVID-19 cases were hospitalised patients with positive RT-PCR for SARS-CoV-2.

Supplementary Table 2: Distribution of sample specimens included by collection period.

	9-15 March 2020		6 -12 April 2020		11-17 May 2020		France	
	n	%	n	%	n	%	n	%
Overall	3834	100	3595	100	3592	100	66784232	100
Sex								
Male	1689	44.1	1557	43.3	1543	43	32263970	48.3
Female	2145	55.9	2038	56.7	2049	57	34520262	51.7
Age								
0-9	359	9.4	167	4.6	255	7.1	7670792	11.5
10-19	420	11	298	8.3	336	9.4	8263694	12.4
20-29	423	11	355	9.9	318	8.9	7434257	11.1
30-39	500	13	461	12.8	409	11.4	8250560	12.4
40-49	487	12.7	455	12.7	390	10.9	8556317	12.8
50-59	461	12	489	13.6	469	13.1	8770338	13.1
60-69	455	11.9	487	13.5	496	13.8	7991860	12
70-79	382	10	455	12.7	480	13.4	5690626	8.5
80+	347	9.1	428	11.9	439	12.2	4155788	6.2
Region								
Guadeloupe	262	6.8	149	4.1	252	7	376879	0.6
Martinique	111	2.9	208	5.8	254	7.1	358749	0.5
Guyane	96	2.5	64	1.8	102	2.8	290691	0.4
La Réunion	144	3.8	90	2.5	105	2.9	859959	1.3
Île-de-France	641	16.7	614	17.1	534	14.9	12278210	18.4
Centre-Val-de-Loire	146	3.8	116	3.2	122	3.4	2559073	3.8
Bourgogne-Franche Comté	102	2.7	138	3.8	123	3.4	2783039	4.2
Normandie	208	5.4	210	5.8	208	5.8	3303500	4.9
Hauts-de-France	301	7.9	309	8.6	262	7.3	5962662	8.9
Grand-Est	255	6.7	199	5.5	205	5.7	5511747	8.3
Pays de la Loire	119	3.1	156	4.3	135	3.8	3801797	5.7
Bretagne	129	3.4	121	3.4	95	2.6	3340379	5
Nouvelle-Aquitaine	339	8.8	328	9.1	282	7.9	5999982	9
Occitanie	281	7.3	250	7	206	5.7	5924858	8.9
Auvergne-Rhône-Alpes	233	6.1	286	8	234	6.5	8032377	12
Provence-Alpes-Côte d'Azur	453	11.8	296	8.2	397	11.1	5055651	7.6
Corse	14	0.4	61	1.7	76	2.1	344679	0.5

All available residual sera were included from French overseas regions (Guadeloupe, Martinique, French Guiana and La Reunion). Sample selection was stratified by age, sex and region for Metropolitan France.

Supplementary Table 3: Combination of unadjusted results for the three serological assays by collection period.

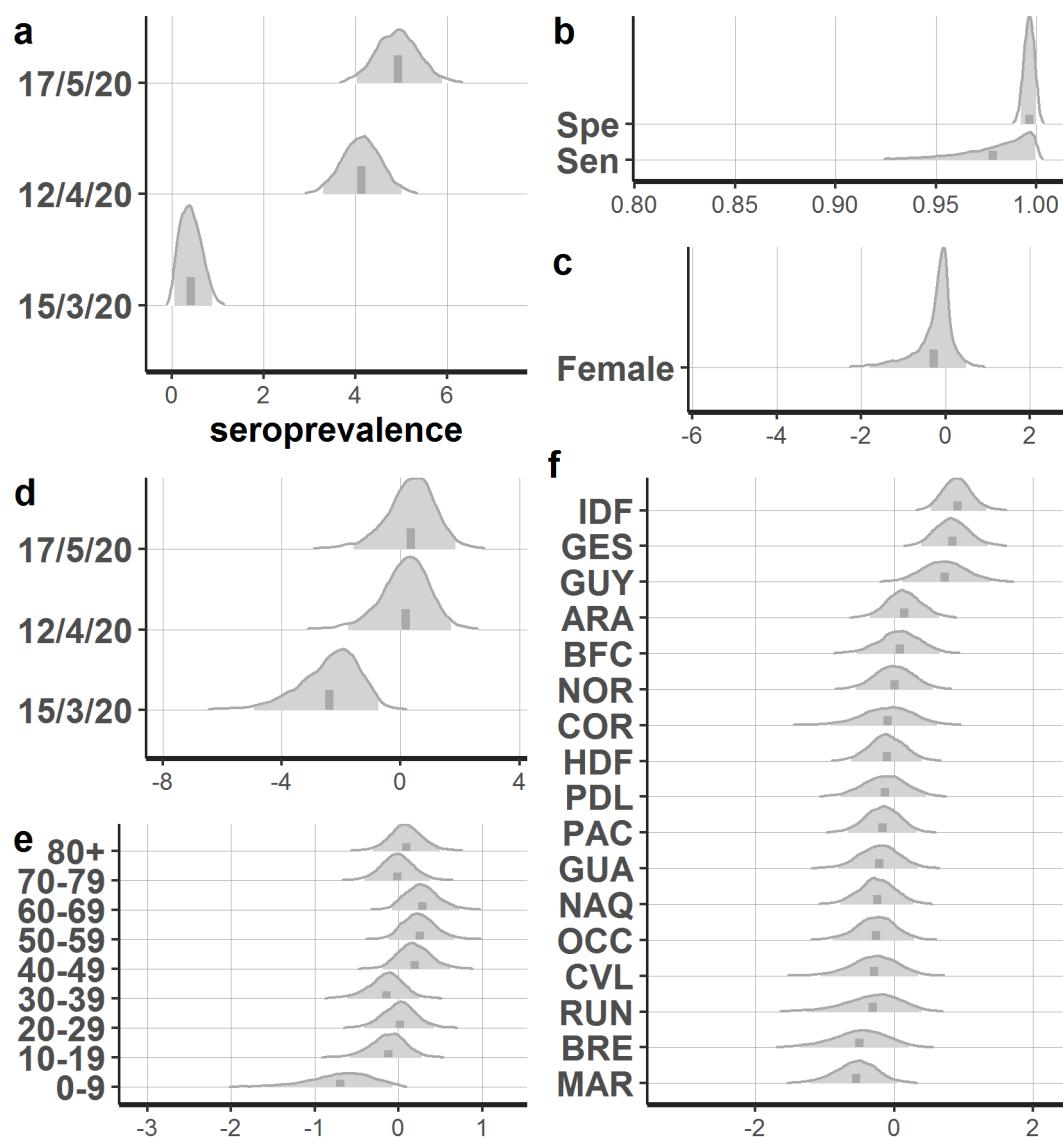
LuLISA N	LuLISA S	PNT	9-15 March 2020		6-12 April 2020		11-17 May 2020	
			n	%	n	%	n	%
positive	positive	positive	1	0.0	66	1.8	87	2.4
positive	positive	negative	0	0.0	13	0.4	6	0.2
positive	negative	positive	0	0.0	5	0.1	3	0.1
negative	positive	positive	0	0.0	9	0.3	13	0.4
positive	negative	negative	6	0.2	18	0.5	35	1.0
negative	positive	negative	20	0.5	37	1.0	32	0.9
negative	negative	positive	0	0.0	8	0.2	2	0.1
negative	negative	negative	3807	99.3	3439	95.7	3414	95.0
			3834	100	3595	100	3592	100

Positivity thresholds in relative light units per second (RLU/s) are 39915 for LuLISA N, 27821 for LuLISA S and 14037 for Pseudo-neutralisation (PNT).

Supplementary Table 4: Estimated prevalence of SARS-CoV-2 antibodies in French population from March-May 2020.

	9-15 March 2020	6 -12 April 2020	11-17 May 2020
	Prevalence (95% CI)	Prevalence (95% CI)	Prevalence (95% CI)
Overall	0.4% (0.1-0.9)	4.1% (3.3-5.0)	4.9% (4.0-5.9)
Sex			
Male	0.5% (0.1-1.0)	4.5% (3.5-5.6)	5.4% (4.3-6.6)
Female	0.4% (0.0-0.8)	3.8% (2.9-4.7)	4.5% (3.6-5.5)
Age group, years			
0-9	0.2% (0.0-0.6)	2.3% (0.9-4.1)	2.7% (1.1-4.9)
10-19	0.4% (0.0-0.8)	3.7% (2.3-5.3)	4.4% (2.9-6.2)
20-29	0.4% (0.1-1.0)	4.3% (3.0-6.0)	5.2% (3.6-7.1)
30-39	0.4% (0.0-0.8)	3.7% (2.4-5.1)	4.4% (2.9-6.0)
40-49	0.5% (0.1-1.1)	4.9% (3.4-6.7)	5.9% (4.2-7.9)
50-59	0.5% (0.1-1.1)	5.1% (3.7-6.8)	6.1% (4.4-8.0)
60-69	0.5% (0.1-1.1)	5.1% (3.6-6.8)	6.0% (4.4-8.1)
70-79	0.4% (0.0-0.9)	3.8% (2.6-5.2)	4.5% (3.1-6.1)
≥80	0.4% (0.0-0.9)	4.1% (2.9-5.5)	4.8% (3.4-6.5)
Regions			
Guadeloupe	0.3% (0.0-0.7)	2.7% (1.4-4.4)	3.3% (1.7-5.1)
Martinique	0.2% (0.0-0.5)	2.0% (1.0-3.4)	2.4% (1.2-3.9)
French Guiana	0.6% (0.1-1.4)	6.0% (3.3-9.9)	7.1% (4.0-11.5)
La Reunion	0.3% (0.0-0.8)	2.5% (0.8-4.9)	3.0% (1.0-5.8)
Île-de-france	0.8% (0.1-1.6)	7.4% (5.7-9.4)	8.8% (6.9-11.0)
Centre-Val-de-Loire	0.3% (0.0-0.7)	2.6% (1.1-4.6)	3.1% (1.3-5.4)
Bourgogne-Franche Comté	0.4% (0.0-0.9)	3.6% (1.9-5.8)	4.3% (2.2-6.9)
Normandie	0.3% (0.0-0.8)	3.3% (1.9-5.1)	3.9% (2.3-6.0)
Hauts-de-France	0.3% (0.0-0.7)	2.9% (1.7-4.4)	3.5% (2.1-5.3)
Grand-Est	0.7% (0.1-1.7)	7.2% (4.8-10.2)	8.6% (5.8-11.8)
Pays de la Loire	0.3% (0.0-0.7)	2.9% (1.4-4.9)	3.5% (1.8-5.9)
Bretagne	0.2% (0.0-0.6)	2.1% (0.8-4.0)	2.6% (1.0-4.8)
Nouvelle-Aquitaine	0.3% (0.0-0.6)	2.6% (1.5-4.0)	3.2% (1.8-4.7)
Occitanie	0.3% (0.0-0.6)	2.6% (1.3-4.1)	3.1% (1.6-4.9)
Auvergne-Rhône-Alpes	0.4% (0.0-0.8)	3.7% (2.3-5.4)	4.4% (2.8-6.5)
Provence-Alpes-Côte d'Azur	0.3% (0.0-0.6)	2.8% (1.6-4.2)	3.3% (2.0-4.9)
Corse	0.3% (0.0-0.8)	3.2% (1.3-5.8)	3.8% (1.5-6.9)

Prevalence of SARS-CoV-2 antibodies was based on at least one positive test among LuLISA S, LuLISA N and pseudo-neutralisation assays (see main text).



Supplementary Figure 1: Posterior distributions of prevalence, test performance and regression coefficients.

a Seroprevalence by study period . **b** Overall sensitivity and specificity. Regression coefficients for study period (**c**), sex (**d**), age class (**e**) and region (**f**). 90% uncertainty intervals (combining all chains) are in light grey and point estimates of mean in darker grey.