

## Supplementary materials

**Table S1.** Size of the population in each age group from INSEE French census (Institut National de la Statistique et des Etudes Economiques) as of January 1<sup>st</sup>, 2021.

Age class	Size
[0;4]	3,671,719
[5;9]	4,084,036
[10;14]	4,187,992
[15;19]	4,140,996
[20;24]	3,757,482
[25;29]	3,713,426
[30;34]	4,056,469
[35;39]	4,231,788
[40;44]	4,072,226
[45;49]	4,512,223
[50;54]	4,425,730
[55;59]	4,359,376
[60;64]	4,099,662
[65;69]	3,899,944
[70;74]	3,477,098
$\geq 75$	6,373,536
Total	67,063,703

**Table S2.** Proportions of mild ( $p_{im}^2$ ), moderate ( $p_{im}^3$ ) and severe ( $p_{im}^4$ ) infections by age  $m$  ( $1 \leq m \leq 16$ ) and by susceptibility status  $i$  ( $1 \leq i \leq 4$ ).

Age class	$p_{1m}^2$	$p_{1m}^3$	$p_{1m}^4$
[0;4]	0,985	0,014	0,001
[5;9]	0,979	0,020	0,001
[10;14]	0,976	0,023	0,001
[15;19]	0,960	0,038	0,003
[20;24]	0,930	0,065	0,005
[25;29]	0,900	0,091	0,009
[30;34]	0,874	0,112	0,014
[35;39]	0,848	0,132	0,020
[40;44]	0,808	0,162	0,030
[45;49]	0,766	0,191	0,043
[50;54]	0,710	0,227	0,064
[55;59]	0,622	0,281	0,098
[60;64]	0,527	0,331	0,143
[65;69]	0,435	0,367	0,197
[70;74]	0,348	0,390	0,262
$\geq 75$	0,218	0,364	0,418

$p_{1m}^i$  are directly informed by Clark et al. [1].

Age class	$p^2_{2m}$	$p^3_{2m}$	$p^4_{2m}$
[0;4]	0,9969	0,0028	0,0003
[5;9]	0,9960	0,0037	0,0003
[10;14]	0,9956	0,0042	0,0003
[15;19]	0,9923	0,0078	0,0009
[20;24]	0,9853	0,0133	0,0015
[25;29]	0,9774	0,0200	0,0027
[30;34]	0,9692	0,0266	0,0042
[35;39]	0,9602	0,0338	0,0060
[40;44]	0,9457	0,0453	0,0090
[45;49]	0,9284	0,0588	0,0129
[50;54]	0,9030	0,0789	0,0192
[55;59]	0,8609	0,1108	0,0294
[60;64]	0,8084	0,1498	0,0429
[65;69]	0,7470	0,1930	0,0591
[70;74]	0,6795	0,2419	0,0786
$\geq 75$	0,5274	0,3472	0,1254

$p^j_{2m}$  are calculated assuming that  $p^2_{2m} = p^2_{1m} + (1-0.5*0.3)p^3_{1m}$ ,  $p^3_{2m} = 0.7*p^4_{1m} + 0.5*0.3*p^3_{1m}$  and  $p^4_{2m} = 0.3*p^4_{1m}$ .

Age class	$p^2_{3m}$	$p^3_{3m}$	$p^4_{3m}$
[0;4]	0,985	0,015	0,000
[5;9]	0,979	0,021	0,000
[10;14]	0,976	0,024	0,000
[15;19]	0,960	0,041	0,000
[20;24]	0,930	0,070	0,000
[25;29]	0,900	0,100	0,000
[30;34]	0,874	0,126	0,000
[35;39]	0,848	0,152	0,000
[40;44]	0,808	0,192	0,000
[45;49]	0,766	0,234	0,000
[50;54]	0,710	0,291	0,000
[55;59]	0,622	0,379	0,000
[60;64]	0,527	0,474	0,000
[65;69]	0,435	0,564	0,000
[70;74]	0,348	0,652	0,000
$\geq 75$	0,218	0,782	0,000

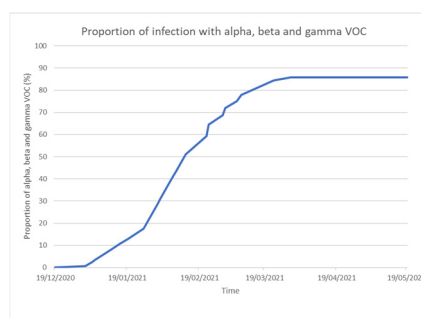
$p^j_{3m}$  are calculated assuming that  $p^2_{3m} = p^2_{1m}$ ,  $p^3_{3m} = p^4_{1m} + p^3_{1m}$  and  $p^4_{3m} = 0$ .

**Table S3.** Eligible age classes to vaccination by month in the model.

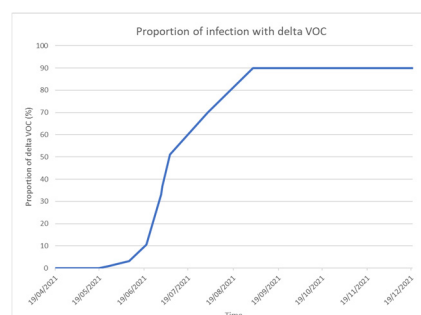
Month	Eligible age class	Month	Eligible age class
January	$\geq 75$	July	$\geq 10$
February	$\geq 75$	August	$\geq 10$
March	$\geq 60$	September	$\geq 10$
April	$\geq 50$	October	$\geq 10$
May	$\geq 20$	November	$\geq 10$
June	$\geq 10$	December	$\geq 10$

**Table S4.** Vaccine coverage with at least one dose at the end of each month informed by vaccination French database VAC-SI (Système d'Informations pour le suivi de la VACCination).

Month	Vaccine coverage with at least one dose at the end of each month (%)
January	2.45
February	4.60
March	12.22
April	23.63
May	38.85
June	50.64



**Figure S1.** Proportion of alpha, beta or gamma Variants Of Concern (VOC) infections among all COVID-19 infections from French surveillance database SI-DEP (Système d'Informations de DEPistage) and Santé Publique France surveys from January 2021 to May 2021.



**Figure S2.** Proportion of delta Variant Of Concern (VOC) infections among all COVID-19 infections from French surveillance database SI-DEP (Système d'Informations de DEPistage) from May 2021 to July 2021 and from ECDC's (European Centre for Disease Prevention and Control) projections from July to August 2021.

**Table S5.** Contact matrices for pre-pandemic contacts at home, at school, at work and other contacts in France, provided by Prem et. al [2].

	HOME															
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
0	0,688061	0,47768	0,19942	0,080462	0,134592	0,379075	0,702365	0,571827	0,198565	0,066211	0,052676	0,036809	0,02239	0,006494	0,002993	0,00522
5	0,325932	1,009634	0,385944	0,126838	0,037585	0,145181	0,573297	0,714298	0,468638	0,129078	0,03717	0,022007	0,011999	0,006392	0,002603	0,003312
10	0,128181	0,369161	1,588507	0,421811	0,059928	0,026051	0,126748	0,457233	0,63762	0,272502	0,063979	0,014102	0,008759	0,0083	0,006661	0,003335
15	0,047173	0,096142	0,392455	1,254115	0,206093	0,032457	0,017091	0,168149	0,401699	0,495991	0,189244	0,042055	0,009506	0,007754	0,00499	0,002221
20	0,096405	0,047508	0,072079	0,390331	1,191402	0,197242	0,04027	0,01859	0,117882	0,487593	0,271308	0,112326	0,014587	0,002322	0,0024	0,002529
25	0,366726	0,096787	0,025564	0,055108	0,207189	1,014666	0,195743	0,028819	0,013956	0,05159	0,209117	0,098403	0,037097	0,007793	0,000856	0,004342
30	0,519928	0,475619	0,163414	0,023519	0,046657	0,19064	0,932506	0,199322	0,053371	0,015524	0,030213	0,051241	0,050143	0,007601	0,003313	0,003024
35	0,447115	0,711948	0,552992	0,193906	0,023157	0,030994	0,163766	1,042591	0,164947	0,03814	0,019008	0,014456	0,027545	0,012462	0,006892	0,002375
40	0,169285	0,41168	0,661424	0,441584	0,088938	0,022194	0,059488	0,159125	0,867285	0,144631	0,028336	0,004299	0,015838	0,014718	0,005351	0,005975
45	0,08251	0,180596	0,361976	0,618391	0,36123	0,051807	0,02151	0,064652	0,144427	0,796167	0,124662	0,0233	0,007601	0,00722	0,005596	0,008886
50	0,125564	0,103706	0,201282	0,338546	0,390068	0,230417	0,065329	0,033642	0,060287	0,166583	0,74747	0,132954	0,021398	0,00577	0,004745	0,021755
55	0,233811	0,217834	0,146832	0,233026	0,270983	0,290321	0,213433	0,060539	0,027171	0,107779	0,221376	0,866688	0,125525	0,034265	0,004821	0,01819
60	0,261257	0,23384	0,163821	0,135336	0,107688	0,169806	0,261427	0,158204	0,075378	0,033413	0,086644	0,193533	0,908575	0,109923	0,022561	0,0055
65	0,139879	0,214505	0,200491	0,107827	0,065775	0,082189	0,144265	0,149013	0,127643	0,055598	0,047119	0,079539	0,126782	0,691952	0,090216	0,011954
70	0,081573	0,242322	0,234412	0,213315	0,031554	0,065307	0,060626	0,164654	0,141832	0,130553	0,062974	0,036982	0,115141	0,185317	0,52601	0,108659
75	0,199006	0,248851	0,384293	0,301761	0,073838	0,074449	0,094919	0,190461	0,264034	0,204618	0,357401	0,140654	0,055149	0,103625	0,110188	0,42997

	SCHOOL															
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
0	2,423317	0,316795	0,056616	0,061873	0,016538	0,086418	0,159975	0,131168	0,062385	0,073877	0,039413	0,026864	0,002379	0,000823	8,27E-66	6,40E-120
5	0,396403	2,693404	0,149118	0,016606	0,01669	0,055242	0,074119	0,07873	0,07744	0,055006	0,04699	0,015159	0,004197	0,001096	0,000348	8,10E-39
10	0,003278	0,57892	3,343917	0,10431	0,01068	0,042896	0,044908	0,080341	0,085068	0,066506	0,047289	0,024727	0,00449	0,000572	4,94E-25	0,000182
15	0,019842	0,024969	1,045318	3,605976	0,043691	0,048554	0,055761	0,08817	0,075296	0,088394	0,049428	0,030491	0,004869	0,000825	6,22E-33	1,71E-70
20	0,022229	0,013345	0,005293	0,446844	0,257036	0,033255	0,022805	0,030292	0,019724	0,024325	0,013184	0,00966	0,000622	0,001128	0,000177	1,22E-47
25	0,027886	0,076988	0,02407	0,124165	0,184199	0,126952	0,022679	0,032915	0,040019	0,035284	0,009371	0,015596	0,004081	0,002166	0,000463	0,001287
30	0,056356	0,264675	0,174398	0,110956	0,03436	0,070986	0,065925	0,050138	0,0559	0,029315	0,024374	0,003783	0,005294	0,000404	1,66E-48	3,11E-55
35	0,105979	0,17561	0,128075	0,065077	0,014619	0,050071	0,071387	0,058714	0,067007	0,032327	0,004871	0,011483	0,000584	0,001916	1,85E-123	9,71E-67
40	0,034648	0,102567	0,081044	0,326451	0,007181	0,025663	0,025759	0,038373	0,084545	0,030394	0,034463	0,00974	0,005925	0,000443	4,82E-68	2,41E-92
45	0,290592	0,230712	0,148747	0,530154	0,005225	0,032159	0,063435	0,060411	0,057917	0,035105	0,043871	0,020366	0,003608	0,001577	6,22E-134	3,28E-72
50	0,071845	0,385147	0,479616	0,511824	0,00535	0,016632	0,047436	0,051439	0,065808	0,090621	0,046598	0,025021	0,005172	8,47E-24	1,24E-117	5,65E-78
55	0,222714	0,373913	0,322418	0,365212	0,006354	0,065086	0,025817	0,047263	0,061043	0,044548	0,039369	0,043929	0,010233	1,10E-31	0,000783	0,000763
60	0,067492	0,052495	0,026763	0,124012	0,011289	0,001616	0,015128	0,004456	0,009915	0,015818	0,012666	0,006649	0,020707	0,010852	4,42E-67	2,12E-37
65	0,001774	0,021404	0,008328	5,82E-32	0,00177	0,001728	0,011233	0,004955	0,005022	0,008109	0,001858	0,014481	0,007931	0,017278	0,011123	3,46E-126
70	1,29E-28	5,11E-26	1,93E-40	0,007609	2,64E-22	1,70E-24	1,26E-26	0,007628	0,007858	0,021177	0,035255	0,02146	0,007741	0,008013	0,007913	0,021383
75	2,83E-94	0,021161	8,48E-42	0,021289	4,90E-36	0,007598	9,78E-69	2,23E-60	1,44E-48	8,57E-60	4,70E-42	1,60E-46	2,21E-83	8,86E-107	1,02E-80	6,61E-113

	WORK															
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
0	0	0	0	0	0	0	0	0	0	0	0	0	0	8,21E-92	1,21E-05	3,16E-125
5	0	0	0	0	0	0	0	0	0	0	0	0	0	1,35E-05	7,65E-79	2,38E-65
10	0	0	0,014566	0,006934	0,010019	0,002899	0,02392	0,006819	0,024009	0,013956	0,005312	5,66E-09	1,58E-18	2,80E-53	4,96E-06	3,78E-102
15	0	0	0,012359	0,465661	0,504972	0,290428	0,273328	0,254158	0,284017	0,224052	0,126467	0,025944	0,001402	8,35E-06	2,86E-06	1,89E-31
20	0	0	0,021889	0,340347	0,891532	0,854474	0,719952	0,793497	0,60096	0,481606	0,353457	0,070204	0,005224	9,86E-06	1,33E-05	3,74E-06
25	0	0	0,028152	0,29917	0,848489	1,428921	1,032235	1,008132	0,934231	0,655398	0,517834	0,103426	0,006969	1,61E-05	1,01E-05	3,01E-06
30	0	0	0,032201	0,163215	0,593526	0,978649	1,292918	1,134236	1,019614	0,832958	0,482937	0,121815	0,006588	1,64E-05	4,10E-06	3,49E-06
35	0	0	0,019809	0,325651	0,492504	0,9195	0,994002	1,373982	1,340825	0,928444	0,649787	0,111775	0,00467	1,23E-05	9,14E-06	6,02E-06
40	0	0	0,022453	0,204014	0,581487	0,912221	1,086205	1,162794	1,428988	1,148896	0,793711	0,119043	0,006869	1,44E-05	1,03E-05	1,30E-05
45	0	0	0,029976	0,25517	0,396557	0,686163	0,888148	0,976758	1,013636	0,989896	0,612885	0,13482	0,005475	1,63E-05	1,08E-05	6,09E-06
50	0	0	0,03057	0,180021	0,311334	0,652409	0,767315	0,799289	1,085675	1,047858	0,765183	0,160481	0,006171	1,18E-05	1,18E-05	1,02E-05
55	0	0	0,020975	0,053869	0,093412	0,171829	0,241186	0,227484	0,291715	0,230261	0,205195	0,055507	0,002592	1,35E-05	6,59E-06	6,66E-06
60	0	0	0,001689	0,001742	0,008855	0,015784	0,017553	0,020751	0,022507	0,021991	0,01615	0,005389	0,000212	2,03E-05	8,26E-06	1,48E-05
65	7,60E-06	3,36E-06	7,65E-06	2,28E-05	3,15E-05	7,89E-05	7,24E-05	2,92E-05	6,62E-05	5,96E-05	7,71E-05	5,31E-05	4,66E-05	1,42E-05	2,49E-05	1,19E-05
70	5,79E-55	7,89E-42	2,55E-06	2,61E-05	1,68E-05	2,12E-05	3,57E-05	4,02E-05	3,56E-05	3,10E-05	2,13E-05	4,50E-05	2,61E-05	1,68E-05	1,67E-05	2,61E-05
75	2,36E-141	9,07E-97	1,19E-89	9,40E-22	4,66E-05	4,70E-05	4,69E-05	8,42E-05	2,78E-05	1,03E-05	1,07E-05	7,26E-75	1,10E-65	1,03E-05	5,17E-49	8,28E-43

	OTHER															
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
0	0,693543	0,311971	0,155879	0,113034	0,190623	0,287716	0,346709	0,338489	0,234633	0,170371	0,214966	0,208538	0,161568	0,120728	0,084797	0,048645
5	0,339689	1,329525	0,475759	0,12955	0,109453	0,214681	0,2733	0,345402	0,299103	0,14732	0,123148	0,148272	0,160718	0,104148	0,055309	0,049799
10	0,106863	0,590358	2,038973	0,312856	0,206428	0,172536	0,207677	0,282532	0,333989	0,217512	0,149173	0,107785	0,08828	0,079298	0,063044	0,066149
15	0,057277	0,187355	0,851206	2,505921	0,605197	0,279758	0,184743	0,251656	0,263827	0,240537	0,113363	0,065412	0,055955	0,044238	0,029544	0,023918

**Table S6.** Definitions of perturbation matrices for contacts at school (S), at work (W) and other contacts (O).

Perturbation matrices	Definitions
S2	School closure or national vacations
S3	Zone A vacations
S4	Zones A and C vacations
S5	Zones B and C vacations
S6	Zone B vacations
O1	Closure of bars/restaurants, cinemas/theatres, non-essential businesses and travels restriction < 3 hours to < 20km from home (2 <sup>nd</sup> and 3 <sup>rd</sup> lockdowns)
O2	Closure of bars/restaurants, cinemas/theatres, non-essential businesses and strict travels restriction < 1 hours à < 1km (1 <sup>st</sup> lockdown)
O3	Closure of bars/restaurants, cinemas/theatres and curfew
W1	Obligatory to work from home if feasible (2 <sup>nd</sup> and 3 <sup>rd</sup> lockdowns)
W2	Strict obligatory to work from home, lay-off if not feasible (1 <sup>st</sup> lockdown)
W3	Recommendation to work from home

*Zone A: academies of Besançon, Bordeaux, Clermont-Ferrand, Dijon, Grenoble, Limoges, Lyon and Poitiers/  
Zone B: academies of Aix-Marseille, Amiens, Caen, Lille, Nancy-Metz, Nantes, Nice, Orléans-Tours, Reims, Rennes, Rouen and Strasbourg/ Zone C : academies of Créteil, Montpellier, Paris, Toulouse and Versailles*

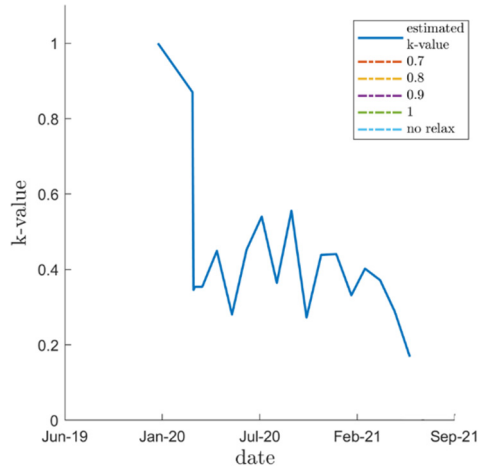
**Table S7.** Percentage reduction in contacts by each perturbation matrices for contacts at school\*, at work and other contacts.

Perturbation matrices	Percentage reduction in contacts at school	Percentage reduction in contacts at work	Percentage reduction in other contacts
S2	-95%		
S3	-24%		
S4	-50%		
S5	-67%		
S6	-44%		
O1			-40% under 65 -70% over 65
O2			-90% under 65 -95% over 65
O3			-20% under 65 -50% over 65
W1		-40%	
W2		-70%	
W3		-30%	

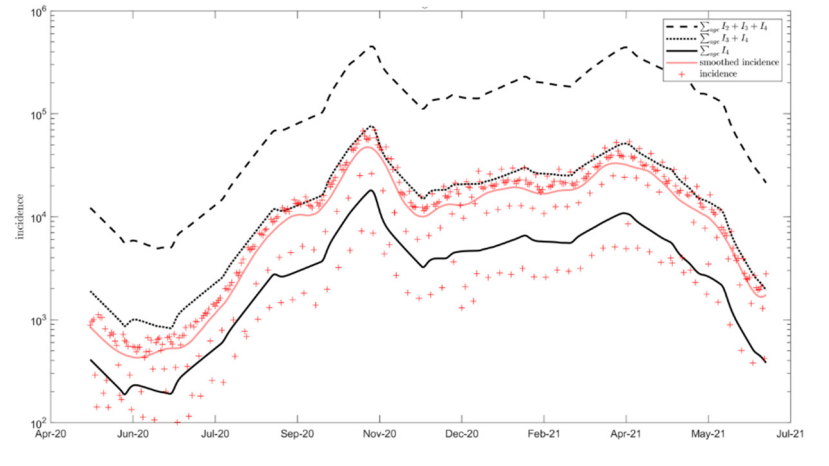
*\*For contacts at school, we weighted the percentage reduction in contacts at school for each zone's vacations according to the population's size in each zone*

**Table S8.** Application periods of perturbation matrices for contacts at school (S), at work (W) and other contacts (O).

Start	End	S	O	W	Start	End	S	O	W
01/01/2020	12/03/2020	0	0	0	04/04/2021	06/04/2021	2	3	1
12/03/2020	14/03/2020	2	0	0	06/04/2021	26/04/2021	2	1	1
14/03/2020	17/03/2020	2	3	0	26/04/2021	03/05/2021	0	1	1
17/03/2020	02/06/2020	2	2	2	03/05/2021	12/05/2021	0	1	3
02/06/2020	22/06/2020	2	0	3	12/05/2021	16/05/2021	2	1	3
22/06/2020	04/07/2020	0	0	3	16/05/2021	18/05/2021	0	1	3
04/07/2020	01/09/2020	2	0	3	18/05/2021	20/06/2021	0	3	3
01/09/2020	17/10/2020	0	0	3	20/06/2021	06/07/2021	0	0	3
17/10/2020	30/10/2020	2	0	3	06/07/2021	01/09/2021	2	0	3
30/10/2020	01/11/2020	2	1	1	01/09/2021	23/10/2021	0	0	0
01/11/2020	15/12/2020	0	1	1	23/10/2021	08/11/2021	2	0	0
15/12/2020	19/12/2020	0	3	3	08/11/2021	18/12/2021	0	0	0
19/12/2020	04/01/2021	2	3	3	18/12/2021	01/01/2022	2	0	0
04/01/2021	06/02/2021	0	3	3	01/01/2022	07/02/2022	0	0	0
06/02/2021	13/02/2021	3	3	3	07/02/2022	14/02/2022	3	0	0
13/02/2021	22/02/2021	4	3	3	14/02/2022	21/02/2022	5	0	0
22/02/2021	01/03/2021	5	3	3	21/02/2022	28/02/2022	4	0	0
01/03/2021	07/03/2021	6	3	3	28/02/2022	07/03/2022	6	0	0
07/03/2021	04/04/2021	0	3	3	07/03/2022	01/04/2022	0	0	0

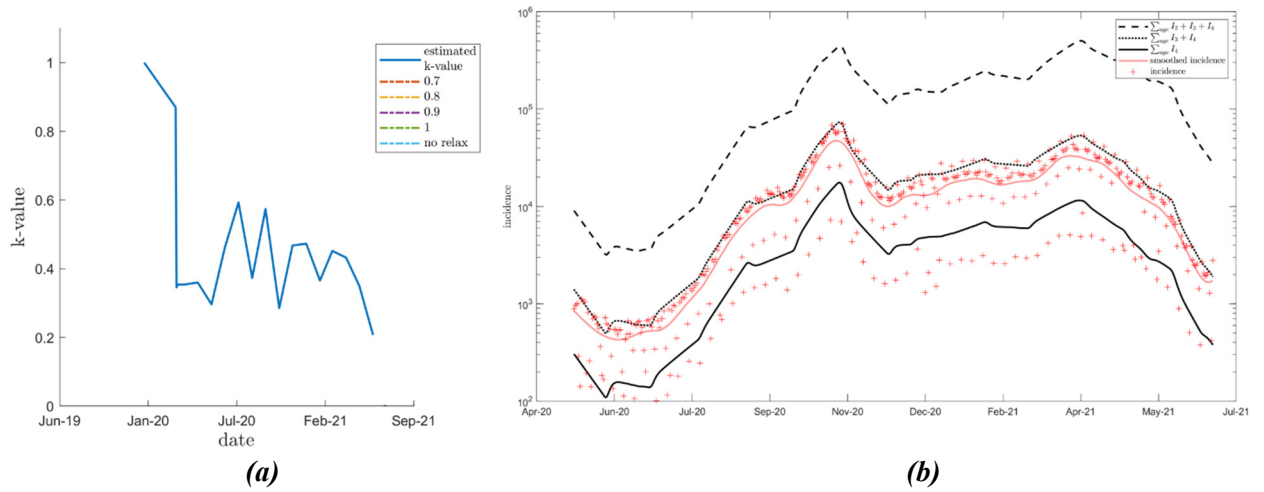


(a)

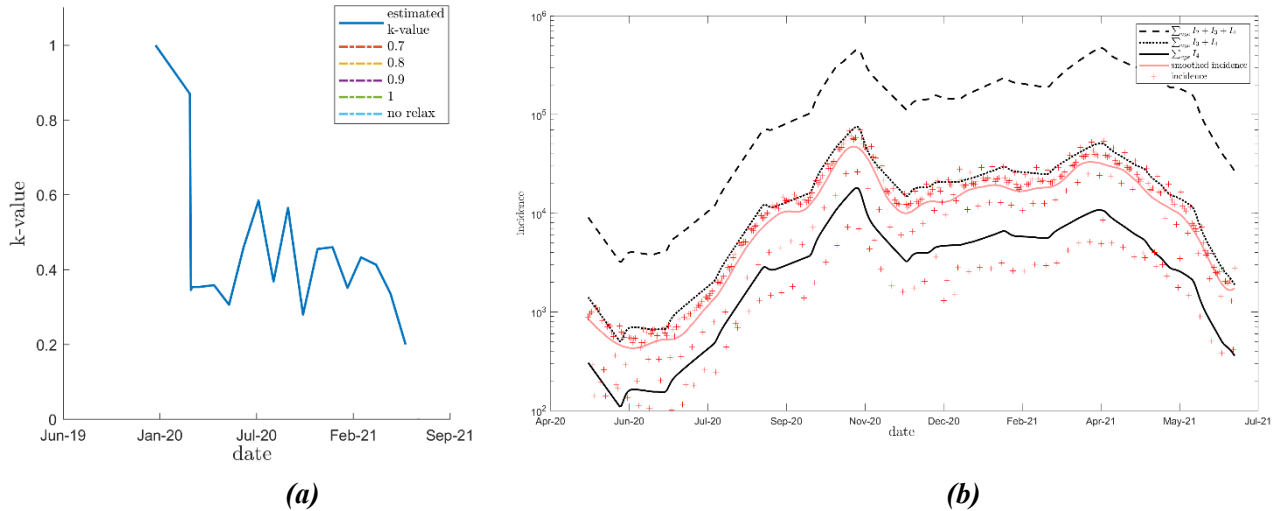


(b)

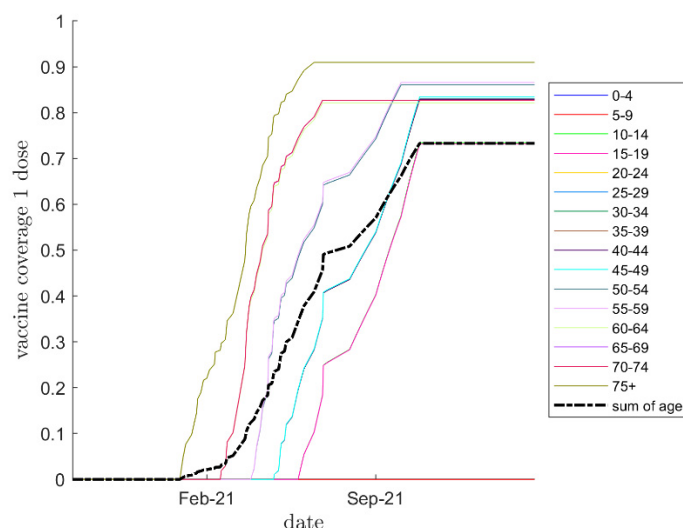
**Figure S3.** Calibration's plot for the 3 years immunity duration analysis. **(a)** K-value estimation from May 13<sup>th</sup>, 2020 to July 1<sup>st</sup>, 2021; **(b)** Model fit (logarithmic scale) from May 13<sup>th</sup>, 2020 to July 1<sup>st</sup>, 2021 to reported COVID-19 cases from French surveillance database (SI-DEP-Système d'Informations de DEPistage).



**Figure S4.** Calibration's plot for the no waning immunity analysis. **(a)** K-value estimation from May 13<sup>th</sup>, 2020 to July 1<sup>st</sup>, 2021; **(b)** Model fit (logarithmic scale) from May 13<sup>th</sup>, 2020 to July 1<sup>st</sup>, 2021 to reported COVID-19 cases from French surveillance database (SI-DEP-Système d'Informations de DEPistage).



**Figure S5.** Calibration's plot for the 9 years waning immunity analysis with a better vaccine efficacy. **(a)** K-value estimation from May 13<sup>th</sup>, 2020 to July 1<sup>st</sup>, 2021; **(b)** Model fit (logarithmic scale) from May 13<sup>th</sup>, 2020 to July 1<sup>st</sup>, 2021 to reported COVID-19 cases from French surveillance database (SI-DEP-Système d'Informations de DEPistage).

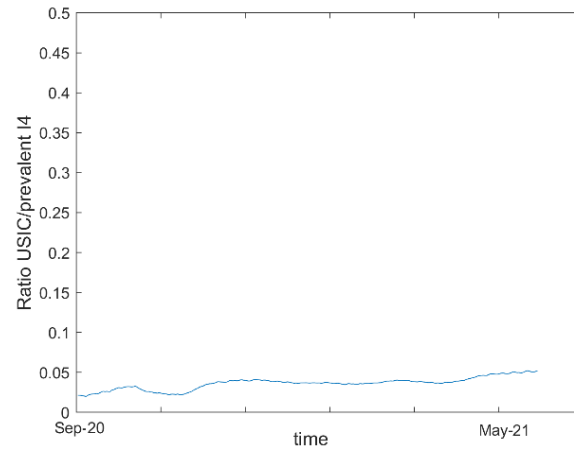


**Figure S6.** Proportion of the population vaccinated with at least one dose by age class, taking into account vaccine hesitancy.

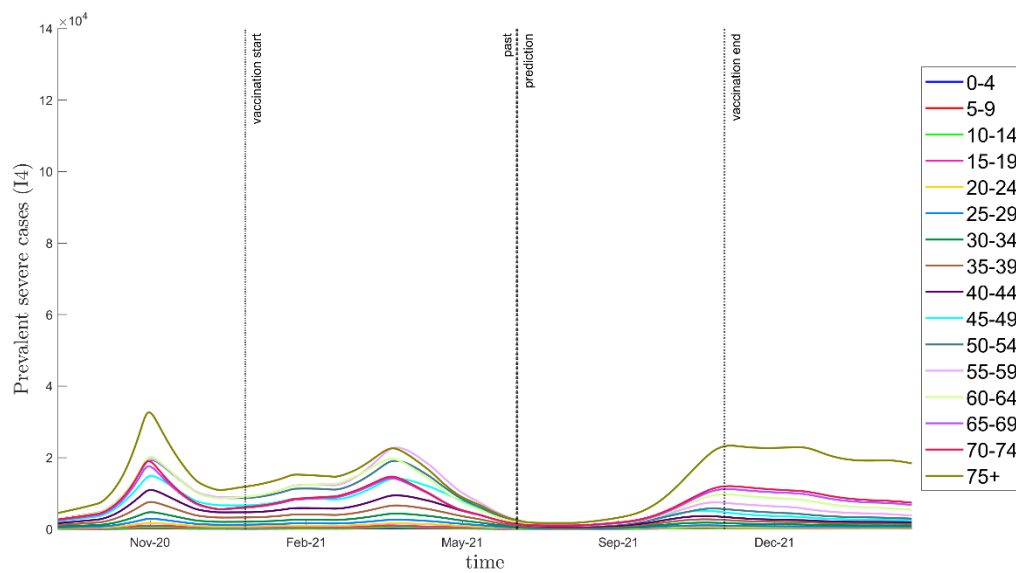
**Table S9.** Proportion of the population vaccinated with at least one dose and vaccinated with 2 doses at the end of each month taking into account vaccine hesitancy.

Month	Proportion vaccinated with 1 or 2 doses (%)	Proportion vaccinated with 2 doses (%)
January	1.4	0.4
February	2.7	1.6
March	10.6	4.7
April	20.9	12.3
May	34.4	23.3
June	49.1	34.4
July	50.9	44.1
August	57.1	50.1
September	66.2	57.2
October	73.3	65.4
November	73.3	69.1
December	73.3	70.3

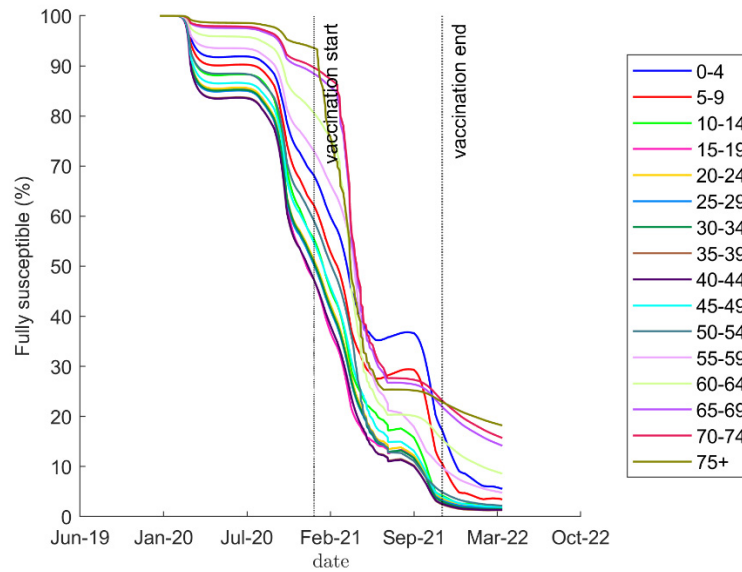




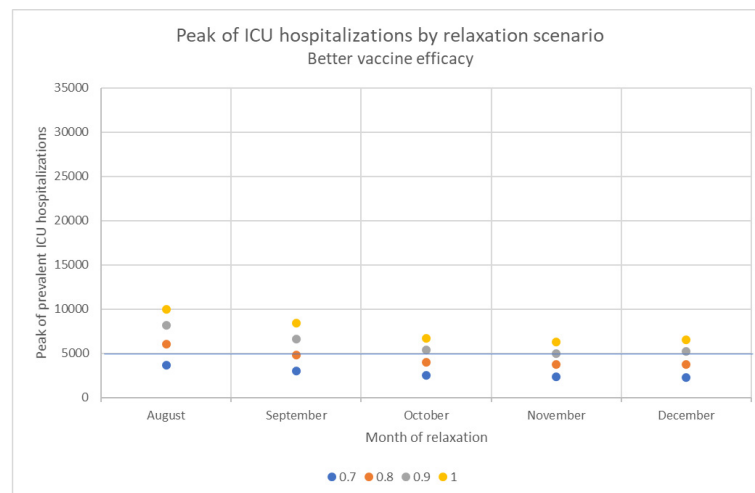
**Figure S7.** Ratio between intensive care units' (ICU) hospitalizations from SI-VIC database and prevalent  $I_4$  cases from September 1<sup>st</sup>, 2020 to May 31<sup>th</sup>, 2021. SI-VIC = Système d'Information pour le suivi des VICTimes d'attentats et de situations sanitaires exceptionnelles.



**Figure S8.** Prevalent severe cases  $I_4$  by age class in the no barrier gesture relaxation scenario, assuming that immunity wanes in 9 years (main analysis).



**Figure S9.** Proportion of fully susceptible individuals ( $S_1$ ) in each age class in the no barrier gesture relaxation scenario, assuming that immunity wanes in 9 years (main analysis).



**Figure S10.** Peak of Intensive Care Units' hospitalizations (ICU) predicted in France from July 2021 following each relaxation scenario assuming a better vaccine efficacy. Relaxation scenarios: k-value (barrier gesture compliance index) raised either to 0.7, 0.8, 0.9 or 1 in August, September, October, November or December. Better vaccine efficacy = 70 and 90% vaccine efficacy against infections after 1 and 2 doses, respectively.

**Table S10.** Average variation of intensive care units' (ICU) hospitalizations peak predicted following each relaxation scenario assuming a better vaccine efficacy compared to the predictions obtained in the main analysis\*.

Vaccine efficacy hypothesis	Average variation of ICU peak compared to main analysis** (%)
70% and 90% vaccine efficacy against infections after respectively 1 and 2 doses	-41.0

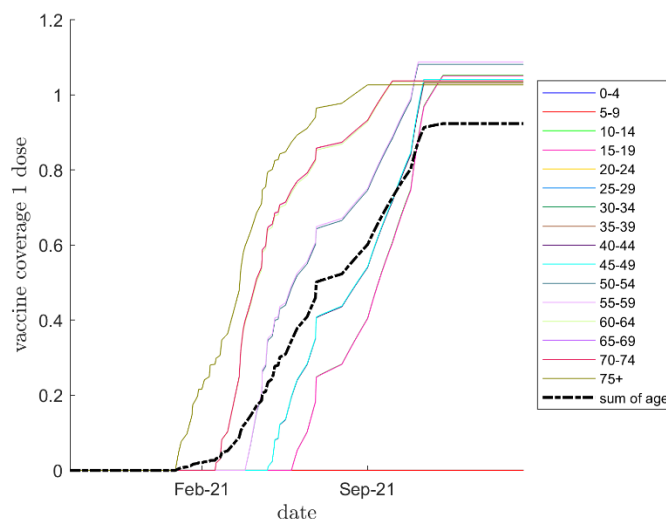
\*Main analysis = 50 and 80% vaccine efficacy against infections after 1 and 2 doses, respectively.

\*Average value of the peak of ICU hospitalizations predicted following each relaxation scenario (k-value elevated to 0.7, 0.8, 0.9 or 1 in August, September, October, November and December).

**Table S11.** Average variation of intensive care units' (ICU) hospitalizations peak predicted following each relaxation scenario for each hypothesis of immunity duration compared to the predictions obtained in the 9 years immunity duration analysis (main analysis).

Hypothesis of immunity duration	Average variation of ICU peak compared to main analysis* (%)
3 years immunity duration	+86.1
No waning immunity	-46.1

\*Average value of the peak of ICU hospitalizations predicted following each relaxation scenario (k-value elevated to 0.7, 0.8, 0.9 or 1 in August, September, October, November and December)



**Figure S11.** Proportion of the population vaccinated with at least one dose by age class assuming no vaccine hesitancy.

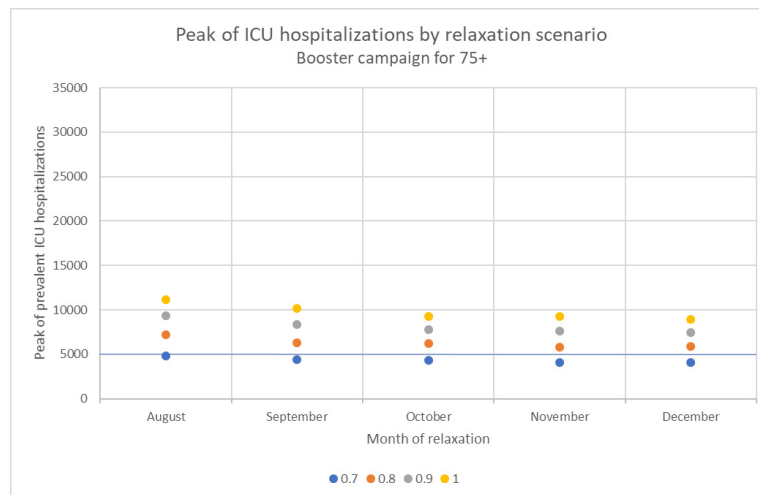
**Table S12.** Proportion of the population vaccinated with at least one dose and vaccinated with 2 doses at the end of each month assuming no vaccine hesitancy.

Month	Proportion vaccinated with 1 or 2 doses (%)	Proportion vaccinated with 2 doses (%)
January	1.4	0.4
February	2.7	1.6
March	10.6	4.8
April	21.0	12.4
May	34.5	23.4
June	50.2	34.5
July	52.4	45.0
August	60.2	52.1
September	72.7	61.3
October	87.6	72.4
November	92.4	83.2
December	92.4	87.4

**Table S13.** Average variation of intensive care units' (ICU) hospitalizations peak predicted following each relaxation scenario assuming no vaccine hesitancy compared to the main analysis with vaccine hesitancy.

Month of relaxation	Average variation of ICU peak compared to main analysis* (%)
August	-30.0
September	-34.1
October	-44.9
November	-63.0
December	-66.5

\*Average value of the peak of ICU hospitalizations predicted following each relaxation scenario (k-value elevated to 0.7, 0.8, 0.9 or 1 for each month of relaxation)



**Figure S12.** Peak of Intensive Care Units' hospitalizations (ICU) predicted in France from July 2021 following each relaxation scenario assuming a booster vaccination campaign on the September 1<sup>st</sup>, 2021 for the 75+. Relaxation scenarios: k-value (barrier gesture compliance index) raised either to 0.7, 0.8, 0.9 or 1 in August, September, October, November or December.

**Table S14.** Average variation of intensive care units' (ICU) hospitalizations peak predicted following each relaxation scenario assuming a booster vaccination campaign on the September 1<sup>st</sup>, 2021 for the 75+ compared to the main analysis without booster.

Average variation of ICU peak compared to main analysis* (%)	
Booster vaccination campaign for the 75+	-16.3

\*Average value of the peak of ICU hospitalizations predicted following each relaxation scenario (k-value elevated to 0.7, 0.8, 0.9 or 1 in August, September, October, November and December)

## Reference

1. Clark, A.; Jit, M.; Warren-Gash, C.; Guthrie, B.; Wang, H. H. et al. Global, Regional, and National Estimates of the Population at Increased Risk of Severe COVID-19 Due to Underlying Health Conditions in 2020: A Modelling Study. *Lancet Glob. Health* **2020**, 8 (8), e1003–e1017.
2. Prem, K.; Zandvoort, K. V.; Klepac, P.; Eggo, R. M.; Davies, N. G. et al. Projecting contact matrices in 177 geographical regions: an update and comparison with empirical data for the COVID-19 era. *PLoS computational biology* **2021**, 17(7), e1009098.