Full genome viral sequences inform patterns of SARS-CoV-2 spread into and within Israel

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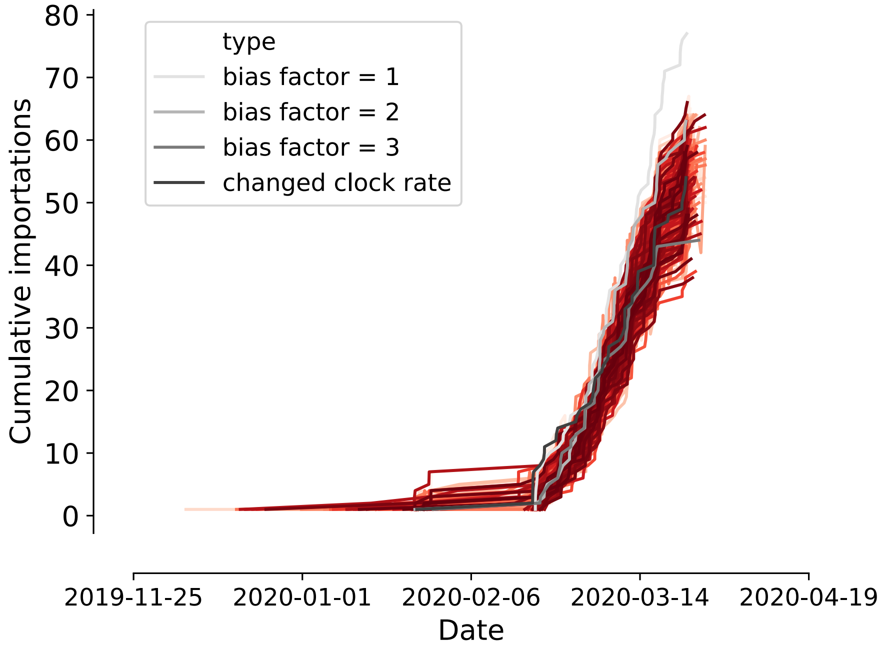
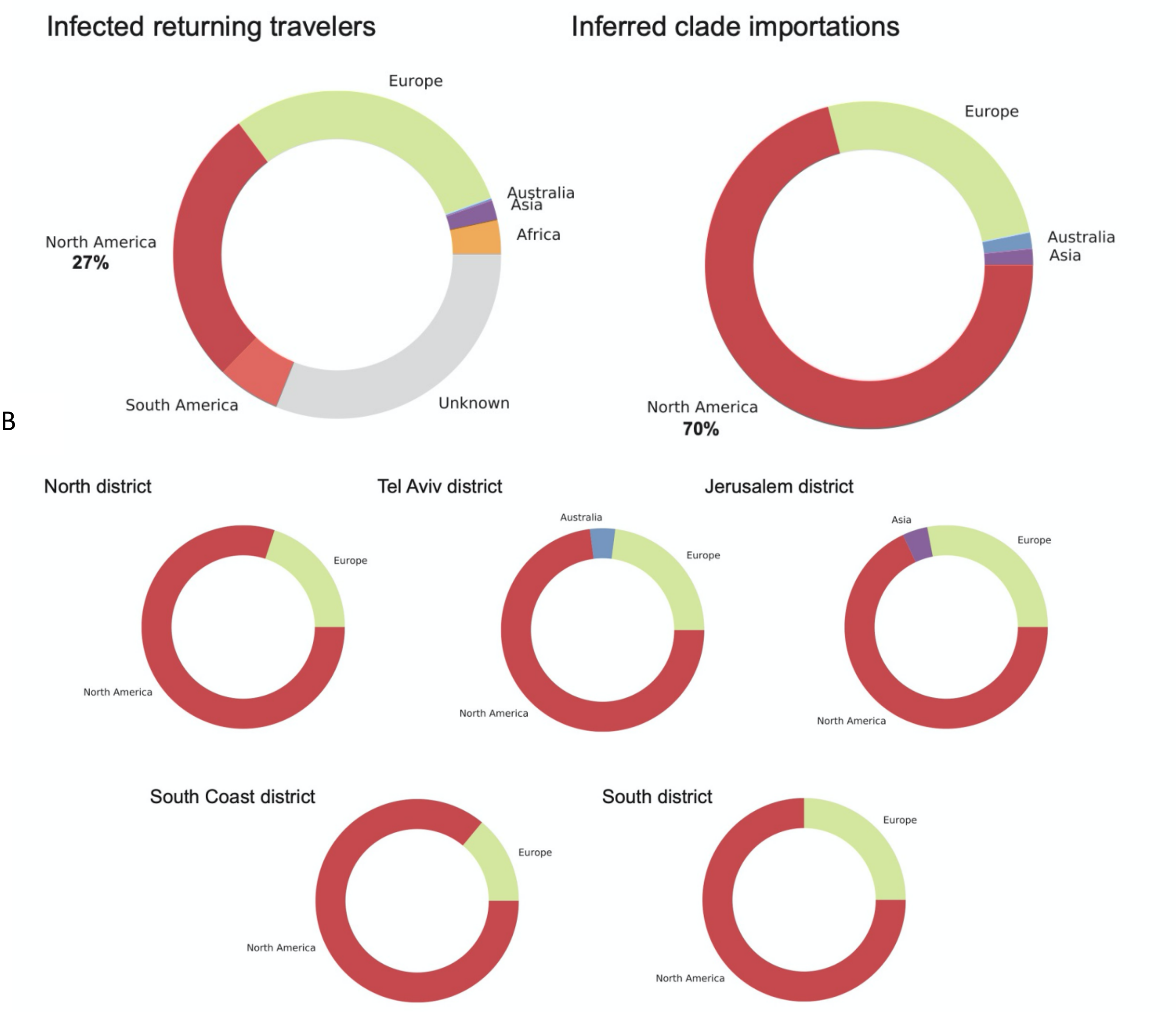
Supplementary Information

Supplementary Fig. 1. Inferred regions responsible for clade introductions into six focal countries. Each of the six countries shown had > 100 sequences available for analysis. Sectors in each pie chart show the proportion of clade introductions that were inferred to originate from the labeled regions. North America is highlighted in bold, and includes almost exclusively sequences from the U.S. For each country, we excluded local transmission (e.g., the Europe sector in the Netherlands excluded the Netherlands).

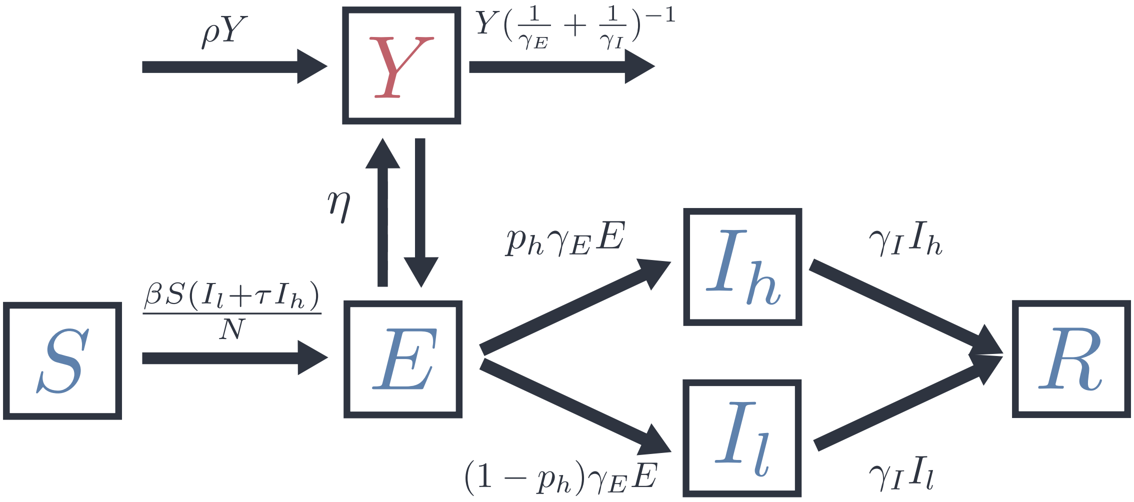


Supplementary Fig. 2. Cumulative number of importations throughout time. Cumulative sum of importation events into Israel for 1,000 bootstrap replicates are presented in red spectra. Changes in the sampling correction bias and clock rate are presented in greyscale. Bias factor of 1 means no sampling correction to the GTR matrix of the TreeTime model.

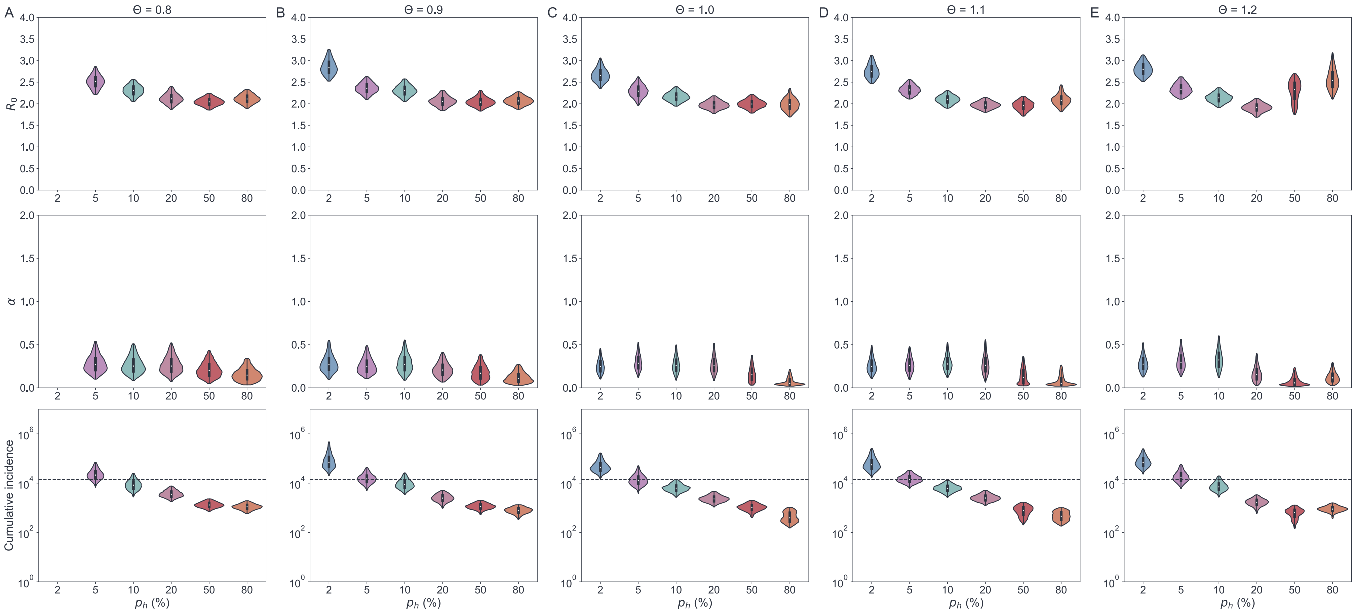
A



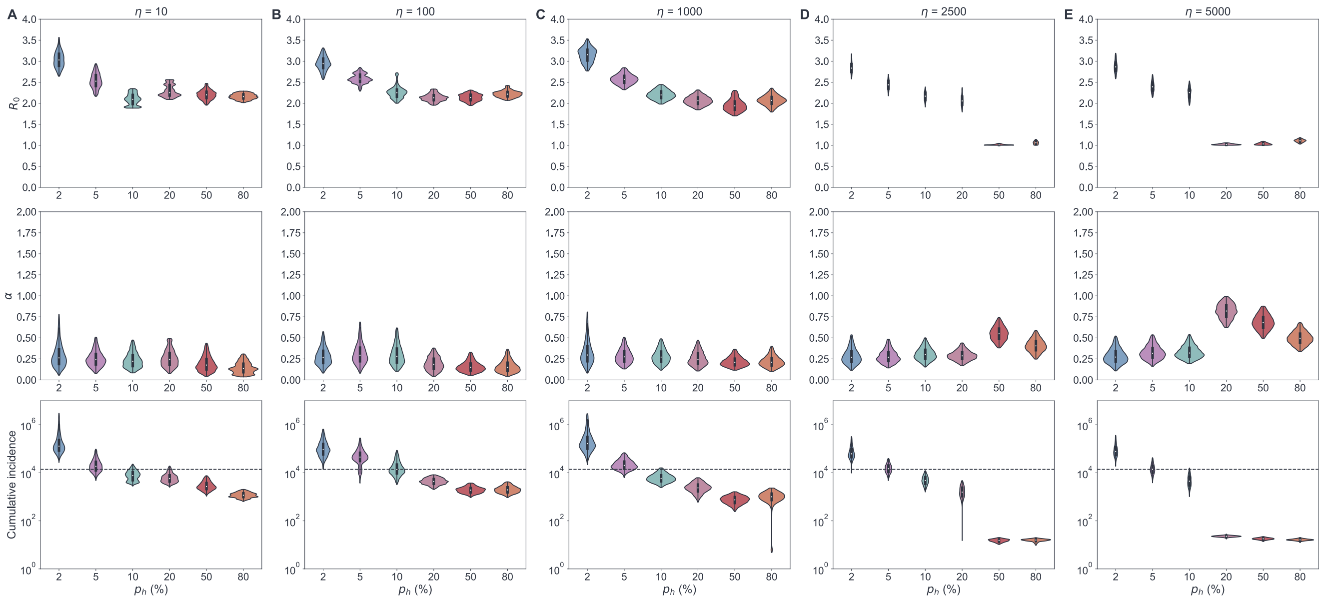
Supplementary Fig. 3. Distribution of importations into Israel. (A) Comparison of viral importations into Israel according to epidemiological data (the number of infected travelers reported) versus viral genetic data (inferred clade introductions). (B) Inferred proportion of clade introductions, by district within Israel. As in Figure S1, local transmissions were excluded from the analysis.



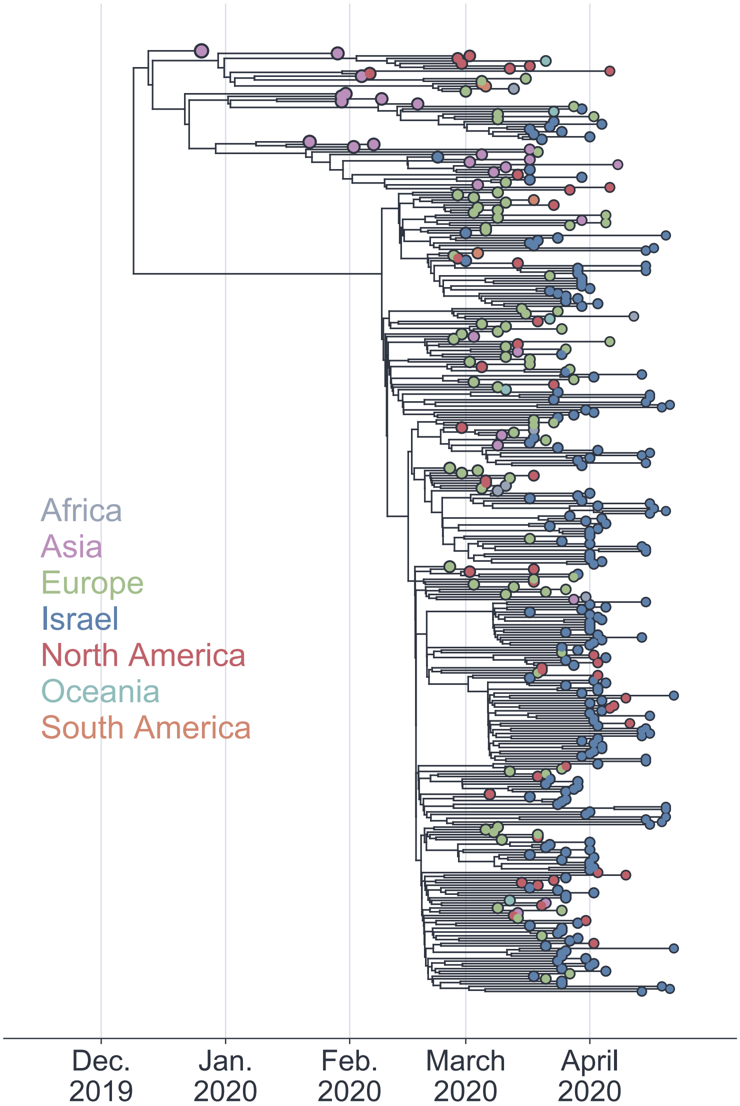
Supplementary Fig. 4. Compartmental model used in the phylodynamic analysis. Compartments shown in blue (S, E, I_h, I_l, R) represent classes of individuals within Israel. Compartment shown in red (Y) represents a single class of infected individuals outside of Israel. The transmission term within Israel is given by $\frac{\beta S(I_l+\tau I_h)}{N}$ where τ is a factor by which highly infectious individuals (I_h) are more infectious than those with lower infectiousness (I_l). The parameter p_h is the probability that an individual transition to the highly infectious (I_h) class. The parameter τ is given by $(\frac{1-p_h}{p_h})/(\frac{1}{0.8}-1)$, such that individuals in I_h are responsible for 80% of secondary infections. Infected individuals remain exposed for $\gamma_E^{-1} =$ 3 days and remain infectious for $\gamma_I^{-1} =$ 5.5 days. Exposed individuals migrate into and out of Israel at an overall rate of η, which we consider can change over time (discussed in more detail elsewhere in the text). Infected individuals in the exogenous reservoir (Y) reproduce at a per capita rate of ρ and individuals remain in this reservoir for and average of 8.5 days.



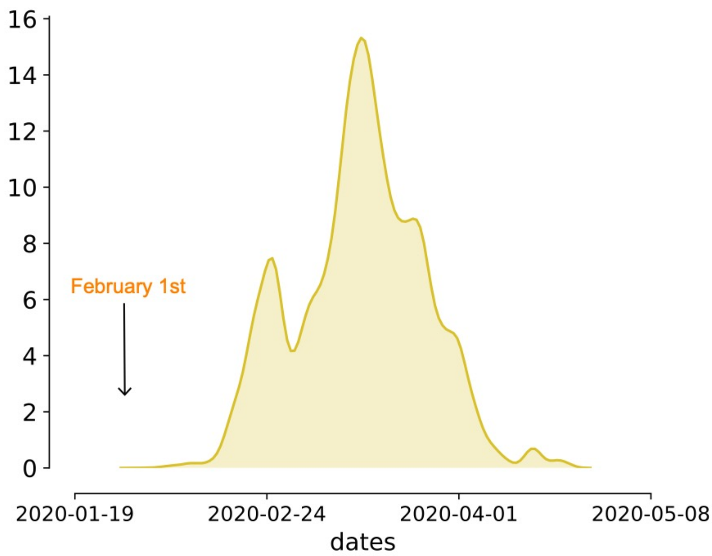
Supplementary Fig. 5. Sensitivity of phylodynamic analyses to the overall magnitude of the importation/exportation rate η. The parameter θ scales the importation/exportation rate $\eta(t)$ (see Methods). Estimated values of R_0, α, and cumulative incidence using the migration rate form based on phylogenetically-informed timing of clade introductions. Columns shown correspond to (A) θ = 0.8, (B) θ = 0.9, (C) θ = 1.0 (as shown in Figure 5), (D) θ = 1.1, (E) θ = 1.2. Horizontal dotted lines at N = 13,942 in the bottom row show the cumulative number of reported cases on April 22, 2020 as given by the ECDC. Only values which fall within the 95% highest posterior density (HPD) from the main MCMC chain are shown (total of 4,751 data points). Violin plots show the kernel density estimation of the underlying distribution. Median value is denoted by a white dot and the black bar in the center of the violin defines the interquartile range. The upper/lower adjacent values (the black line stretched from the bar) is defined as 1.5 times the width of the interquartile range past the first and third quartiles respectively. Density is only plotted over the range of observed values. Results for $p_h = 0.02,\ \theta = 0.8$ are excluded due to poor mixing of the MCMC chain for this set of parameters.



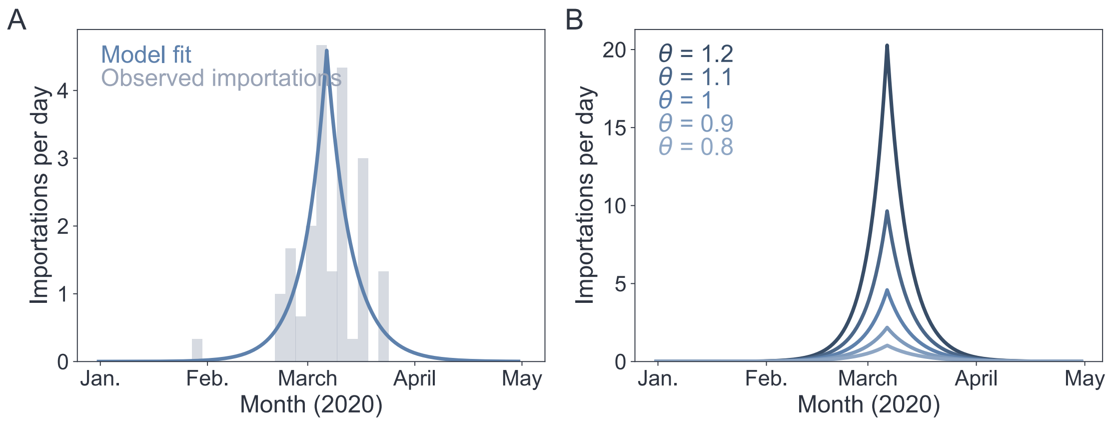
Supplementary Fig. 6. Sensitivity of phylodynamic analyses to the overall magnitude of the importation/exportation rate η, when η is assumed to be constant. Columns shown correspond to (A) η = 10 (B) η = 100, (C) η = 1000, (D) η = 2500, (E) η = 5000 . Horizontal dotted lines at N = 13,942 in the bottom row show the cumulative number of reported cases on April 22, 2020 as given by the ECDC. Only values which fall within the 95% highest posterior density (HPD) from the main MCMC chain are shown (total of 4,751 data points). Violin plots show the kernel density estimation of the underlying distribution. Median value is denoted by a white dot and the black bar in the center of the violin defines the interquartile range. The upper/lower adjacent values (the black line stretched from the bar) is defined as 1.5 times the width of the interquartile range past the first and third quartiles respectively. Density is only plotted over the range of observed values.



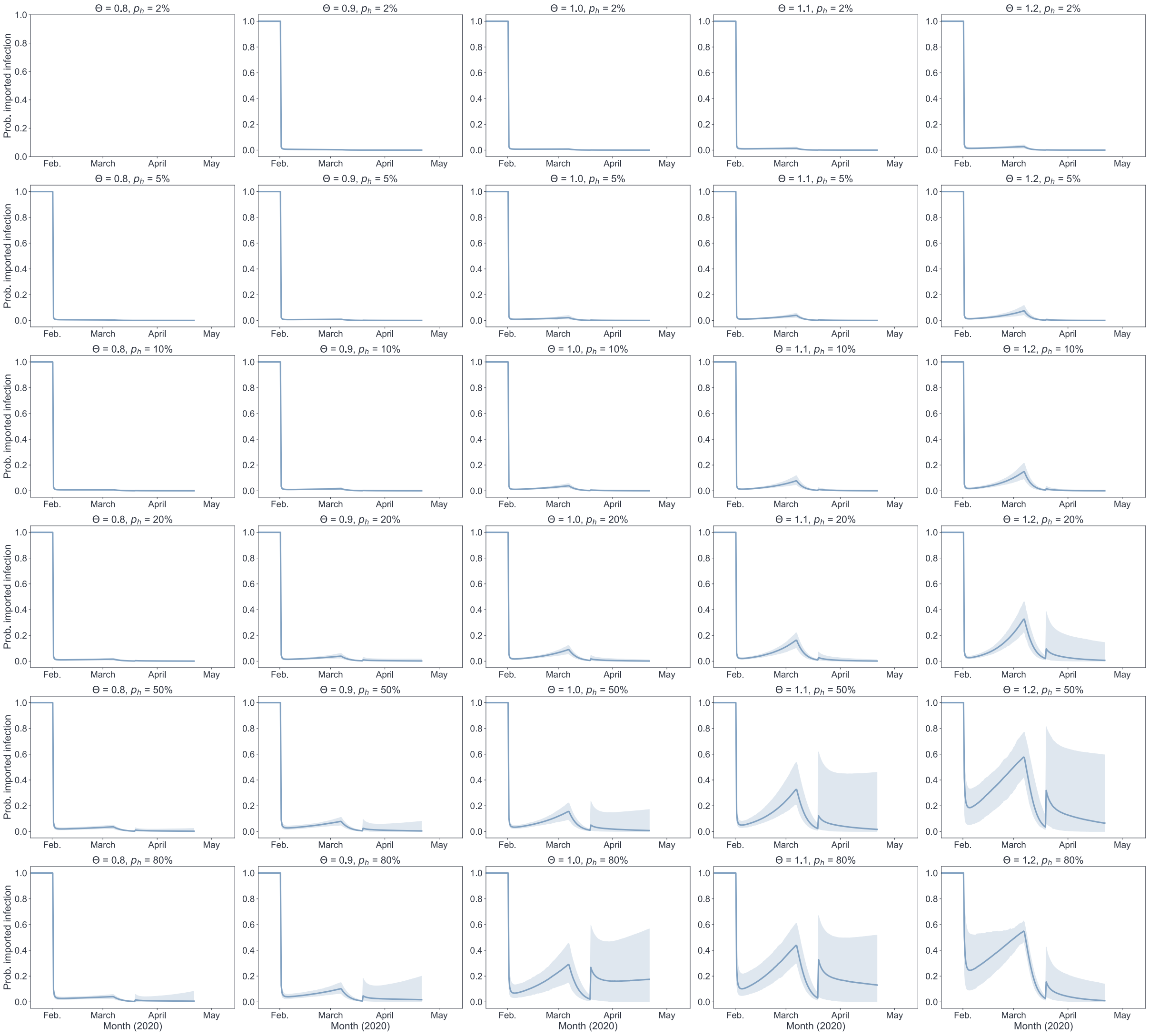
Supplementary Fig. 7. Time-aligned maximum clade credibility phylogeny. Phylogeny was estimated using both genetic and epidemiological parameters under an *SEIR* model implemented in BEAST2 and PhyDyn, under p_h = 5% and $\theta = 1.0$. Tips are colored by sampling location with Israel tips shown in blue.



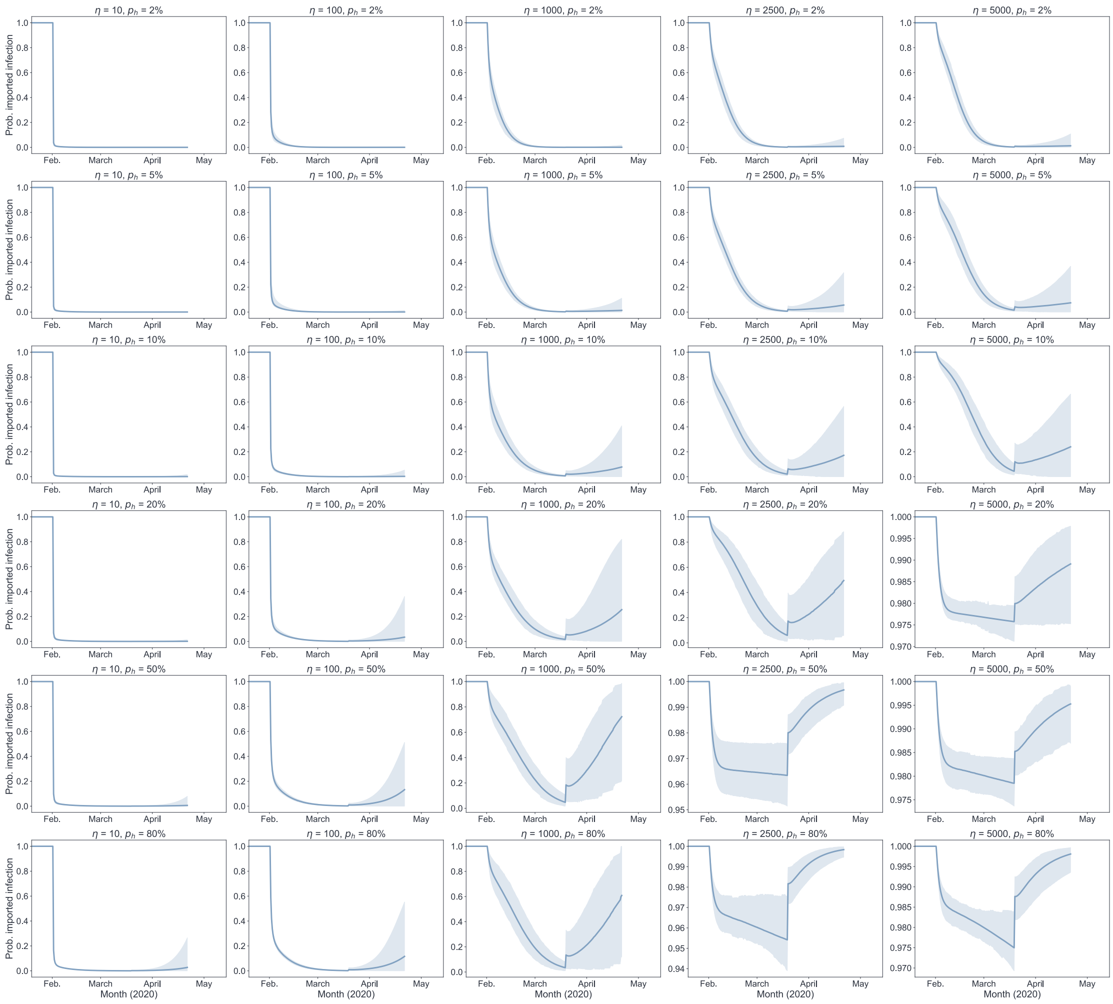
Supplementary Fig. 8. Distribution of importation dates into Israel. Density plot of all importation dates inferred from the phylogeny. Earliest importation is around February 1st (marked with an arrow). The highest peak of the distribution is around March 19th, ten days after the official date of airport closure (March 9th).



Supplementary Fig. 9. Distribution of importation dates into Israel assumed in our phylodynamic analysis. (A) Distribution of importation dates into Israel estimated using ancestral state reconstruction of a global phylogeny. Dates were grouped into non-overlapping three day windows and a piecewise exponential function fit to the data. (B) The growth and decay rates of the inferred importation curve were scaled by a range of θ values (0.8, 0.9, 1.0, 1.1, 1.2).



Supplementary Fig. 10. Probabilities of a new infection being due to importation rather than local infection under different magnitudes of the importation rate, assuming a functional form of η based on inferred timing of clade importations. Estimated state probabilities are shown across a range of θ (columns) and p_h (rows) values. Line represents the median estimate of the 95% HPD and shaded regions represent the limits of the 95% HPD. Results for $p_h = 0.02,\ \theta = 0.8$ are excluded due to poor mixing of the MCMC chain.



Supplementary Fig. 11. Probabilities of a new infection being due to importation rather than local infection under different magnitudes of the importation rate, assuming a constant η. Estimated state probabilities are shown across a range of η values (columns) and p_h values (rows). Line represents the median estimate of the 95% HPD and shaded regions represent the limits of the 95% HPD.

Supplementary Table 1: Global samples belonging to the S2430R clade that contain short unique deletions.

A sample was defined as belonging to the S2340R clade if it bore all 6 mutations that define the S2340R clade ('A20755C', 'A23403G', 'C1059T', 'C14408T', 'C3037T', 'G25563T'). The coordinates of the deletions are specified (coordinates based on the Wuhan ancestral sequences, see Methods), as is the country of origin of each sequence.

EPI_ID	deletion start	deletion end	deletion length	country
EPI_ISL_418202	26531	26531	1	USA
EPI_ISL_428377	510	518	9	USA
EPI_ISL_447362	3881	3898	18	Israel
EPI_ISL_447363	3881	3898	18	Israel
EPI_ISL_447377	28254	28254	1	Israel
EPI_ISL_447426	27387	27396	10	Israel
EPI_ISL_450084	23555	23582	28	USA
EPI_ISL_460096	29555	29602	48	Russia

Supplementary Table 2. Details of samples sequenced.

Sample ID	Ct E	Ct RdRp	Ct N	Ct average	Sex	Age	Date	Genome coverage	Geog. location of sample
1639953	28.5	30.5	32	30.18	M	10-19	26/3/20	0.996	North
1639996	23.1	24.4	26	24.45	M	20-29	26/3/20	0.996	North
2020038	22.5			22.46	F	50-59	17/3/20	0.994	Tel Aviv
2020051	30.9			30.87	M	40-49	17/3/20	0.976	Tel Aviv
2020063	28.4			28.39	F	20-29	17/3/20	0.985	Jerusalem
2020068	24.8			24.78	F	20-29	17/3/20	0.986	Jerusalem
2020069	28.2			28.24	F	30-39	17/3/20	0.987	Jerusalem
2020078	21.5			21.5	M	50-59	17/3/20	0.989	Jerusalem
2020084	24.9			24.87	M	60-69	17/3/20	0.994	Jerusalem
2020087	21.5			21.48	M	20-29	17/3/20	0.996	Jerusalem
2023920	18.6			18.56	M	40-49	17/3/20	0.996	Jerusalem
2023922	28			28	F	20-29	17/3/20	0.979	Jerusalem
2046129	23.1	24.2	27	24.88	M	20-29	31/3/20	0.996	North
2046171	29.6	30.8	33	31.24	F	50-59	31/3/20	0.954	North
2046434	19.5	20.6	24	21.28	F	50-59	1/4/20	0.996	North
2046548	28.5	31.1	34	31.01	M	40-49	1/4/20	0.991	North
2046614	24.4	26.2	28	26.24	F	30-39	2/4/20	0.996	North
2046616	20.5	22.3	25	22.47	F	70-79	2/4/20	0.996	North
2046815	13.8	16.5	18	16.08	F	80-89	4/4/20	0.994	North
2047004	23	24.5	27	24.81	M	30-39	27/3/20	0.996	North
2047011	28.5	30.2	32	30.24	M	20-29	26/3/20	0.952	North
2047016	25.7	26.7	29	26.99	F	0-9	26/3/20	0.996	North
2047145	10.3	11.8	15	12.38	F	30-39	26/3/20	0.996	North
2047188	13.6	15.3	18	15.48	M	20-29	26/3/20	0.996	North
2047189	9.75	11.7	14	11.87	M	20-29	26/3/20	0.996	North
2047364	20.8	22.8	25	22.68	F	60-69	28/3/20	0.996	North
2047392	27.6	29.9	31	29.42	F	30-39	29/3/20	0.966	North
2047418	24	25.4	28	25.67	M	0-9	29/3/20	0.996	North
2047567	26.8	28.7	31	28.97	F	30-39	29/3/20	0.978	North
2047586	22.8	24.1	27	24.71	F	20-29	29/3/20	0.996	North
2047604	22.7	24	26	24.32	M	50-59	29/3/20	0.996	North
2047738	20	22.1	25	22.21	M	10-19	30/3/20	0.996	North
2047749	19.3	20.7	23	21.03	F	40-49	30/3/20	0.996	North
2047772	23.8	25.7	26	25.3	F	30-39	30/3/20	0.996	North
2047883	21.1	22.9	25	22.87	M	60-69	31/3/20	0.996	North
2047927	32	33.7	36	33.74	F	60-69	31/3/20	0.918	North
2086001	28.4			28.4	F	10-19	1/4/20	0.988	Jerusalem
2086004	24.6			24.63	F	20-29	1/4/20	0.993	Jerusalem
2086008	20.2			20.24	M	90+	1/4/20	0.996	Jerusalem
2086012	24.4			24.39	M	20-29	1/4/20	0.988	Jerusalem
2086022	27.9			27.88	M	20-29	1/4/20	0.986	Jerusalem
2086033	28.8			28.79	F	60-69	1/4/20	0.991	Jerusalem
2086034	30			30.01	F	20-29	1/4/20	0.981	Jerusalem

2086045	20			19.99	M	50-59	1/4/20	0.996	Jerusalem
2089366	20.4			20.36	M	20-29	1/4/20	0.996	Jerusalem
2089368	25.6			25.62	M	60-69	1/4/20	0.985	Jerusalem
2089375	27.5			27.54	M	10-19	1/4/20	0.992	Jerusalem
2089380	30.1			30.14	F	60-69	1/4/20	0.979	Jerusalem
2089383	29.8			29.79	M	30-39	1/4/20	0.989	Jerusalem
2089697	28.3			28.27	F	20-29	1/4/20	0.989	Jerusalem
2089698	28.6			28.58	F	50-59	1/4/20	0.984	Jerusalem
2089712	25.5			25.52	M	20-29	1/4/20	0.989	Jerusalem
2089718	20.6			20.6	F	30-39	1/4/20	0.996	Jerusalem
2089723	28.6			28.55	M	30-39	1/4/20	0.992	Jerusalem
2089812	23.3			23.29	F	20-29	1/4/20	0.995	Jerusalem
2089839	25.5			25.5	M	60-69	1/4/20	0.989	Jerusalem
2089852	25.5			25.53	F	60-69	1/4/20	0.989	Jerusalem
2089861	18.3			18.31	M	70-79	1/4/20	0.996	Jerusalem
2089863	18.8			18.8	M	30-39	1/4/20	0.996	Jerusalem
2089866	20.7			20.7	M	30-39	1/4/20	0.996	Jerusalem
2099018	30.3			30.34	F	60-69	2/4/20	0.980	Jerusalem
2099019	27.5			27.48	M	20-29	2/4/20	0.992	Jerusalem
2099159	27.3			27.3	F	10-19	2/4/20	0.988	Jerusalem
2099251	23			22.98	F	20-29	2/4/20	0.996	Jerusalem
2099416	29			28.98	M	20-29	2/4/20	0.983	Jerusalem
2099421	20.5			20.45	M	50-59	2/4/20	0.996	Jerusalem
2107132	29.9			29.91	F	50-59	14/4/20	0.996	Jerusalem
2107137	19.6			19.6	F	10-19	14/4/20	0.996	Jerusalem
2107681	22.3			22.3	F	30-39	14/4/20	0.996	Jerusalem
2113155	25.6			25.55	M	0-9	15/4/20	0.996	Jerusalem
2113161	25.9			25.92	M	70-79	15/4/20	0.996	Jerusalem
2113173	29.8			29.78	M	10-19	15/4/20	0.996	Jerusalem
2113174	26.4			26.42	M	70-79	15/4/20	0.996	Tel Aviv
2113178	26.6			26.62	M	20-29	15/4/20	0.996	Jerusalem
2113255	29.1			29.14	F	60-69	14/4/20	0.994	Jerusalem
2113256	29.7			29.65	F	10-19	14/4/20	0.996	Jerusalem
2113601	25.1			25.07	M	0-9	15/4/20	0.996	Jerusalem
2113603	21.7			21.72	M	70-79	15/4/20	0.996	Jerusalem
2113678	29.8			29.78	M	0-9	15/4/20	0.996	Tel Aviv
2115701	26			25.96	F	10-19	16/4/20	0.996	Jerusalem
2115964	28.4			28.35	M	10-19	16/4/20	0.996	Tel Aviv
2115968	26.8			26.83	F	20-29	16/4/20	0.996	Tel Aviv
2115976	28.2			28.17	M	60-69	16/4/20	0.985	Tel Aviv
2115980	24.5			24.49	F	20-29	16/4/20	0.912	North
2115990	30.2			30.15	F	50-59	16/4/20	0.996	Jerusalem
2116859	29.6			29.6	F	10-19	20/4/20	0.953	Jerusalem
2123853	28.1			28.05	M	70-79	20/4/20	0.996	Jerusalem
2123863	27.5			27.47	M	80-89	20/4/20	0.996	Jerusalem
13075703	24	25.6	28	25.98	F	20-29	29/3/20	0.996	Tel Aviv
13075719	27.7	28.9	31	29.16	F	20-29	29/3/20	0.996	Tel Aviv
13075735	26.8	28.4	30	28.47	M	40-49	30/3/20	0.996	Tel Aviv
13075782	29.1	30.5	33	30.85	F	40-49	30/3/20	0.992	Tel Aviv

13075788	27.8	29.3	31	29.4	F	40-49	30/3/20	0.996	Tel Aviv
13075790	27.2	28.8	30	28.7	M	50-59	30/3/20	0.996	Tel Aviv
13075832	17.5	18.6	20	18.7	M	30-39	30/3/20	0.996	Tel Aviv
13075879	18.6	20	22	20.27	M	50-59	30/3/20	0.993	Tel Aviv
13075882	18.6	20.4	21	20.1	F	20-29	30/3/20	0.996	Tel Aviv
13075914	17.1	18.5	20	18.39	F	50-59	30/3/20	0.996	Tel Aviv
13077377	27	29	29	28.33	M	40-49	2/4/20	0.996	Tel Aviv
13077383	26	26	28	26.67	F	40-49	2/4/20	0.984	Jerusalem
13077413	24	25	26	25	M	70-79	3/4/20	0.996	Tel Aviv
13077494	28	29	31	29.33	M	20-29	2/4/20	0.856	South Coast
13077497	21	22	24	22.33	F	60-69	2/4/20	0.996	South Coast
13077498	17	18	21	18.67	M	20-29	3/4/20	0.996	South Coast
13077510	21	22	25	22.67	M	50-59	3/4/20	0.993	Jerusalem
13077511	25	26	28	26.33	M	20-29	3/4/20	0.986	Jerusalem
13077558	19	20	22	20.33	F	30-39	3/4/20	0.996	Tel Aviv
13077560	27	28	30	28.33	F	80-89	3/4/20	0.974	Tel Aviv
13077562	15	17	19	17	F	50-59	3/4/20	0.988	Tel Aviv
13077564	22	23	25	23.33	F	50-59	3/4/20	0.992	Tel Aviv
13077711	27	28	30	28.33	F	30-39	3/4/20	0.995	Tel Aviv
13077723	22	23	25	23.33	M	?	3/4/20	0.989	Tel Aviv
13077726	20	20	22	20.67	F	60-69	3/4/20	0.996	Tel Aviv
13077803	28	29	32	29.67	F	30-39	4/4/20	0.981	South Coast
13077823	15	17	19	17	F	10-19	4/4/20	0.996	South Coast
13077840	23	25	27	25	M	20-29	4/4/20	0.991	Jerusalem
13077846	19	20	23	20.67	F	0-9	4/4/20	0.996	Tel Aviv
13077847	24	26	27	25.67	M	10-19	4/4/20	0.986	Tel Aviv
13077875	18	19	21	19.33	F	40-49	4/4/20	0.996	Tel Aviv
13077882	24	26	27	25.67	M	40-49	4/4/20	0.987	Jerusalem
51137031				18.58	M	30-39	1/3/20	0.996	Tel Aviv
51137844				27.6	F	30-39	17/3/20	0.983	South
51140028				20.56	F	50-59	17/3/20	0.996	North
51140068				22.8	M	30-39	18/3/20	0.988	South
51140271				28.16	F	40-49	18/3/20	0.971	South Coast
51140279				25.76	F	20-29	18/3/20	0.976	South Coast
51140315				23.41	M	60-69	18/3/20	0.996	South
51140539				19.4	F	50-59	19/3/20	0.996	South
51140836				24.5	M	30-39	20/3/20	0.986	South
51141014				23.08	F	90+	22/3/20	0.996	South
51141121				29.05	M	70-79	22/3/20	0.989	South
51141225				18.58	F	40-49	22/3/20	0.996	South
51144342				25.59	M	90+	30/3/20	0.976	South
51145198				25.49	M	80-89	1/4/20	0.989	South
51145482				27.92	F	40-49	5/4/20	0.992	Tel Aviv
51146355				29.24	F	80-89	4/4/20	0.989	South
51146500				21.79	M	40-49	5/4/20	0.989	Tel Aviv
51146503				23.75	F	30-39	5/4/20	0.993	Jerusalem
51146669				24.41	M	10-19	5/4/20	0.994	Tel Aviv
51146683				24.8	M	10-19	5/4/20	0.965	Tel Aviv
130710062	28	28	28	28	M	40-49	14/4/20	0.991	Tel Aviv

130710067	23	24	24	23.67	M	60-69	14/4/20	0.996	Tel Aviv
130710097	29	31	32	30.67	M	70-79	15/4/20	0.996	Tel Aviv
130710099	33	33	34	33.33	M	60-69	15/4/20	0.979	Tel Aviv
130710157	20	21	24	21.67	M	70-79	15/4/20	0.996	Tel Aviv
130710159	27	28	29	28	F	80-89	15/4/20	0.990	Tel Aviv
130710211	18	19	20	19	F	70-79	16/4/20	0.996	Tel Aviv
130710217	22	23	26	23.67	M	50-59	16/4/20	0.996	Tel Aviv
130710390	28	29	30	29	F	30-39	17/4/20	0.996	Tel Aviv
130710414	20	21	22	21	M	20-29	17/4/20	0.996	Tel Aviv
130710643	31	31	31	31	M	40-49	19/4/20	0.986	Tel Aviv
130710644	29	30	31	30	F	80-89	19/4/20	0.985	Tel Aviv
130710716	30	31	31	30.67	F	60-69	19/4/20	0.989	Tel Aviv
130711082	18.5	20	22	20.17	F	60-69	20/4/20	0.996	Tel Aviv
130711104	27	29	29	28.33	F	80-89	20/4/20	0.993	Tel Aviv
130711112	31	32	31	31.33	F	80-89	21/4/20	0.991	Tel Aviv
130711116	25	27	25	25.67	F	60-69	21/4/20	0.996	Tel Aviv
130711367	29	27	27	27.67	F	60-69	22/4/20	0.996	North
130711417	32	31	30	31	M	60-69	22/4/20	0.974	Tel Aviv
701002313				27	M	50-59	21/3/20	0.996	South Coast
701002314				21	M	20-29	21/3/20	0.996	South Coast
701002317				25	M	50-59	21/3/20	0.996	South Coast
701002327				19	M	50-59	22/3/20	0.996	South Coast
701002334				21	M	70-79	22/3/20	0.996	South Coast
701002403				31	M	40-49	23/3/20	0.996	South Coast
701002407				27	M	40-49	23/3/20	0.959	South Coast
701002426				25	M	60-69	24/3/20	0.996	South Coast
701002431				18	M	20-29	24/3/20	0.996	South Coast
701002440				26	F	20-29	24/3/20	0.996	South Coast
701002442				18	M	30-39	24/3/20	0.996	South Coast
701002455				30	F	20-29	24/3/20	0.992	South Coast
701002456				30	F	60-69	24/3/20	0.980	South Coast
701002458				21	M	40-49	24/3/20	0.996	South Coast
701002462				21	M	70-79	24/3/20	0.996	South Coast
701002489				27	M	40-49	25/3/20	0.996	South Coast
701002504				21	M	70-79	25/3/20	0.996	South Coast
701002538				28	M	70-79	25/3/20	0.996	South Coast
701002540				21	F	40-49	25/3/20	0.996	South Coast
701002550				24	M	30-39	26/3/20	0.996	South Coast
701002555				23	F	40-49	26/3/20	0.996	South Coast
701002556				22	F	60-69	26/3/20	0.996	South Coast
701002561				28	M	50-59	26/3/20	0.996	South Coast
701002591				24	F	50-59	26/3/20	0.996	South Coast
701002666				26	M	40-49	26/3/20	0.996	South Coast
701002681				24	M	60-69	27/3/20	0.996	South Coast
701002752				27	M	10-19	28/3/20	0.987	South Coast
701002768				21	M	50-59	28/3/20	0.996	South Coast
701002786				27	M	60-69	29/3/20	0.996	South Coast
701002792				25	M	50-59	29/3/20	0.995	South Coast
990059202	26.9	28.4	27	27.4	M	60-69	25/3/20	0.996	South Coast

990059203	26.5	28.6	27	27.2	F	80-89	25/3/20	0.996	South Coast
990059204	28.4	30.1	28	28.97	F	30-39	25/3/20	0.976	South Coast
990059217	29.1	31.4	32	30.9	M	60-69	25/3/20	0.995	South Coast
990059230	26.5	29.7	29	28.5	F	0-9	25/3/20	0.972	South Coast
990059231	24.9	28	28	27	M	30-39	25/3/20	0.996	South Coast
990059232	24.5	26.7	28	26.3	M	10-19	25/3/20	0.996	South Coast
990059233	19.7	21.8	23	21.43	F	50-59	25/3/20	0.996	South Coast
990059237	28.3	30.6	32	30.23	F	0-9	25/3/20	0.989	South Coast
990059238	24.3	26.3	27	25.83	F	20-29	25/3/20	0.996	South Coast
990059244	27.9	30.8	31	29.97	F	?	25/3/20	0.938	South Coast
990059251	24.7	28	28	26.9	F	50-59	25/3/20	0.996	South Coast
990059252	24.4	26.8	28	26.27	F	20-29	25/3/20	0.996	South Coast
990300681	22.9	26.4	27	25.37	F	60-69	30/3/20	0.995	South Coast
990300691	29.3	31.7	32	31	M	20-29	31/3/20	0.970	South Coast
990300724	23.7	26.6	26	25.53	M	80-89	1/4/20	0.993	South Coast
990300860	19.3	21.9	0	20.6	M	20-29	2/4/20	0.996	South Coast
990307712	26	27.3	28	26.97	F	20-29	26/3/20	0.996	South Coast
990333068	30.1	32.7	34	32.13	M	60-69	24/3/20	0.963	South Coast
990333189	29.3	31.4	32	30.9	M	50-59	26/3/20	0.950	South Coast
990333193	20.7	22.6	24	22.43	F	40-49	26/3/20	0.996	South Coast
990333263	36.4	0	0	36.4	M	30-39	31/3/20	0.660	South Coast
990430264	29.3	31.7	33	31.17	F	40-49	29/3/20	0.970	South Coast
990430265	29.6	32.2	33	31.7	F	30-39	29/3/20	0.994	South Coast

Supplementary Table 3: Model parameter priors and estimated values (θ = 0.8)

Parameter	Prior	Posterior (Median (95% HPD))					
		p_h = 0.02	p_h = 0.05	p_h = 0.10	p_h = 0.20	p_h = 0.50	p_h = 0.80
Posterior			-46413 (-46465 -46358)	-46425 (-46483 -46357)	-46406 (-46469 -46343)	-46401 (-46462 -46347)	-46421 (-46481 -46360)
Tree height			0.377 (0.326 0.443)	0.384 (0.330 0.455)	0.367 (0.323 0.434)	0.356 (0.322 0.413)	0.358 (0.323 0.426)
Clock rate	Uniform(5.0e-4, 2.0e-3)		7.37e-04 (6.10e-04 8.83e-04)	7.36e-04 (6.07e-04 8.87e-04)	7.81e-04 (6.22e-04 9.26e-04)	8.09e-04 (6.84e-04 9.24e-04)	7.68e-04 (6.57e-04 8.87e-04)
κ	Lognormal(M=1.0, SD=1.25)		3.719 (3.111 4.484)	3.738 (3.076 4.463)	3.702 (3.028 4.422)	3.720 (3.125 4.499)	3.710 (3.061 4.444)
γ	Exponential(M=1.0)		3.51e-02 (1.05e-03 8.99e-02)	3.53e-02 (1.02e-03 8.85e-02)	3.90e-02 (1.08e-03 9.32e-02)	3.78e-02 (1.59e-03 8.75e-02)	3.71e-02 (1.01e-03 8.85e-02)
R_0	Lognormal(M=1.5, SD=0.5)		2.52 (2.21 2.86)	2.31 (2.05 2.56)	2.11 (1.87 2.40)	2.04 (1.86 2.24)	2.11 (1.89 2.33)
α	Uniform(0.0, 2.0)		0.27 (0.10 0.54)	0.25 (0.09 0.51)	0.25 (0.07 0.52)	0.20 (0.05 0.43)	0.15 (0.03 0.34)
E_{init}	Exponential(M=1.0)		12.06 (6.42 19.44)	10.19 (5.80 15.62)	8.80 (4.59 13.85)	4.60 (2.52 7.46)	3.25 (1.90 5.15)
Y_{init}	Exponential(M=1.0)		6.61e-03 (1.88e-03 1.64e-02)	6.72e-03 (2.34e-03 1.40e-02)	3.44e-03 (1.52e-03 1.49e-02)	2.89e-03 (1.87e-03 4.48e-03)	3.35e-03 (2.17e-03 6.23e-03)

Supplementary Table 4: Model parameter priors and estimated values (θ = 0.9)

Parameter	Prior	Posterior (Median (95% HPD))					
		p_h = 0.02	p_h = 0.05	p_h = 0.10	p_h = 0.20	p_h = 0.50	p_h = 0.80
Posterior		-46384 (-46439 -46323)	-46395 (-46458 -46334)	-46419 (-46473 -46363)	-46388 (-46454 -46326)	-46396 (-46466 -46335)	-46392 (-46451 -46325)
Tree height		0.361 (0.323 0.430)	0.370 (0.323 0.428)	0.380 (0.325 0.445)	0.362 (0.323 0.426)	0.360 (0.323 0.426)	0.360 (0.322 0.421)
Clock rate	Uniform(5.0e-4, 2.0e-3)	7.74e-04 (6.21e-04 8.97e-04)	7.84e-04 (6.63e-04 9.06e-04)	7.37e-04 (6.18e-04 8.63e-04)	8.13e-04 (6.91e-04 9.53e-04)	8.03e-04 (6.83e-04 9.24e-04)	7.98e-04 (6.94e-04 9.16e-04)
κ	Lognormal(M=1.0, SD=1.25)	3.738 (3.104 4.464)	3.743 (3.148 4.552)	3.704 (3.057 4.493)	3.694 (3.093 4.511)	3.732 (3.040 4.401)	3.712 (3.090 4.425)
γ	Exponential(M=1.0)	3.55e-02 (1.00e-03 8.73e-02)	3.80e-02 (1.16e-03 8.87e-02)	3.83e-02 (1.00e-03 8.83e-02)	3.55e-02 (1.01e-03 8.91e-02)	3.97e-02 (1.90e-03 8.98e-02)	3.84e-02 (1.02e-03 9.09e-02)
R_0	Lognormal(M=1.5, SD=0.5)	2.84 (2.52 3.26)	2.36 (2.10 2.63)	2.30 (2.05 2.57)	2.06 (1.84 2.31)	2.04 (1.83 2.31)	2.07 (1.87 2.28)
α	Uniform(0.0, 2.0)	0.27 (0.10 0.55)	0.24 (0.11 0.49)	0.27 (0.09 0.55)	0.21 (0.07 0.41)	0.17 (0.03 0.38)	0.11 (0.03 0.27)
E_{init}	Exponential(M=1.0)	12.47 (6.68 19.79)	15.30 (9.03 23.18)	10.47 (5.76 16.18)	8.42 (4.88 12.97)	4.27 (1.85 7.04)	2.90 (1.54 4.79)
Y_{init}	Exponential(M=1.0)	5.39e-03 (3.01e-03 1.23e-02)	4.56e-03 (2.50e-03 8.35e-03)	6.79e-03 (2.41e-03 1.45e-02)	3.26e-03 (1.70e-03 7.37e-03)	3.27e-03 (1.96e-03 5.16e-03)	3.35e-03 (2.24e-03 4.93e-03)

Supplementary Table 5: Model parameter priors and estimated values (θ = 1.0)

Parameter	Prior	Posterior (Median (95% HPD))					
		p_h = 0.02	p_h = 0.05	p_h = 0.10	p_h = 0.20	p_h = 0.50	p_h = 0.80
Posterior		-46363 (-46426 -46311)	-46370 (-46436 -46310)	-46392 (-46441 -46330)	-46374 (-46436 -46325)	-46396 (-46455 -46339)	-46347 (-46442 -46276)
Tree height		0.368 (0.323 0.437)	0.358 (0.323 0.429)	0.360 (0.322 0.420)	0.359 (0.322 0.414)	0.361 (0.323 0.420)	0.360 (0.323 0.420)
Clock rate	Uniform(5.0e-4, 2.0e-3)	8.01e-04 (6.49e-04 9.37e-04)	8.24e-04 (6.73e-04 9.97e-04)	7.87e-04 (6.82e-04 8.98e-04)	8.41e-04 (7.21e-04 9.55e-04)	7.98e-04 (6.82e-04 9.03e-04)	8.35e-04 (7.04e-04 9.62e-04)
κ	Lognormal(M=1.0, SD=1.25)	3.770 (3.041 4.455)	3.737 (3.055 4.444)	3.743 (3.099 4.500)	3.710 (2.982 4.388)	3.704 (3.087 4.432)	3.732 (3.067 4.526)
γ	Exponential(M=1.0)	3.76e-02 (1.01e-03 9.23e-02)	3.81e-02 (1.05e-03 9.01e-02)	3.79e-02 (1.10e-03 9.37e-02)	3.91e-02 (1.04e-03 8.88e-02)	3.89e-02 (1.14e-03 8.76e-02)	3.56e-02 (1.04e-03 8.58e-02)
R_0	Lognormal(M=1.5, SD=0.5)	2.66 (2.36 3.06)	2.29 (1.96 2.62)	2.16 (1.94 2.40)	1.97 (1.78 2.18)	1.99 (1.78 2.22)	1.98 (1.69 2.35)
α	Uniform(0.0, 2.0)	0.25 (0.10 0.45)	0.29 (0.12 0.53)	0.26 (0.09 0.50)	0.26 (0.08 0.52)	0.15 (0.03 0.38)	0.05 (0.02 0.21)
E_{init}	Exponential(M=1.0)	15.33 (7.65 24.34)	15.92 (7.50 26.28)	13.07 (7.63 19.05)	9.60 (5.76 13.70)	4.79 (2.82 7.16)	2.27 (0.44 3.94)
Y_{init}	Exponential(M=1.0)	5.77e-03 (2.51e-03 1.33e-02)	4.38e-03 (2.34e-03 9.65e-03)	4.56e-03 (2.70e-03 8.19e-03)	3.22e-03 (1.98e-03 5.29e-03)	3.64e-03 (2.42e-03 5.72e-03)	3.84e-03 (2.36e-03 5.96e-03)

Supplementary Table 6: Model parameter priors and estimated values (θ = 1.1)

Parameter	Prior	Posterior (Median (95% HPD))					
		p_h = 0.02	p_h = 0.05	p_h = 0.10	p_h = 0.20	p_h = 0.50	p_h = 0.80
Posterior		-46359 (-46429 -46296)	-46375 (-46426 -46320)	-46382 (-46434 -46333)	-46383 (-46439 -46335)	-46379 (-46444 -46298)	-46372 (-46434 -46305)
Tree height		0.394 (0.338 0.465)	0.375 (0.327 0.432)	0.371 (0.325 0.430)	0.363 (0.324 0.427)	0.362 (0.323 0.425)	0.369 (0.326 0.431)
Clock rate	Uniform(5.0e-4, 2.0e-3)	7.60e-04 (6.23e-04 8.93e-04)	7.83e-04 (6.87e-04 8.96e-04)	7.83e-04 (6.74e-04 9.16e-04)	8.10e-04 (6.85e-04 9.33e-04)	7.97e-04 (6.79e-04 9.12e-04)	7.72e-04 (6.74e-04 8.82e-04)
κ	Lognormal(M=1.0, SD=1.25)	3.741 (3.068 4.507)	3.739 (3.114 4.505)	3.708 (3.116 4.532)	3.704 (3.066 4.392)	3.733 (3.044 4.530)	3.765 (3.086 4.450)
γ	Exponential(M=1.0)	3.52e-02 (1.03e-03 8.89e-02)	3.61e-02 (1.02e-03 8.48e-02)	3.81e-02 (1.04e-03 8.99e-02)	3.60e-02 (1.07e-03 9.15e-02)	3.50e-02 (1.24e-03 8.81e-02)	3.51e-02 (1.02e-03 8.78e-02)
R_0	Lognormal(M=1.5, SD=0.5)	2.74 (2.47 3.13)	2.32 (2.11 2.56)	2.10 (1.90 2.31)	1.97 (1.80 2.14)	1.96 (1.71 2.17)	2.08 (1.81 2.44)
α	Uniform(0.0, 2.0)	0.25 (0.11 0.49)	0.26 (0.09 0.47)	0.28 (0.12 0.52)	0.26 (0.07 0.56)	0.12 (0.02 0.36)	0.05 (0.02 0.26)
E_{init}	Exponential(M=1.0)	14.42 (6.51 23.58)	17.19 (9.51 25.18)	16.01 (10.05 22.30)	10.34 (6.67 14.68)	4.15 (1.98 6.47)	1.77 (0.37 3.36)
Y_{init}	Exponential(M=1.0)	9.11e-03 (4.69e-03 1.67e-02)	6.40e-03 (3.83e-03 1.02e-02)	5.38e-03 (2.87e-03 8.66e-03)	4.64e-03 (2.82e-03 7.46e-03)	4.63e-03 (3.01e-03 6.83e-03)	6.03e-03 (3.66e-03 9.42e-03)

Supplementary Table 7: Model parameter priors and estimated values (θ = 1.2)

Parameter	Prior	Posterior (Median (95% HPD))					
		p_h = 0.02	p_h = 0.05	p_h = 0.10	p_h = 0.20	p_h = 0.50	p_h = 0.80
Posterior		-46351 (-46400 -46310)	-46378 (-46435 -46321)	-46385 (-46436 -46331)	-46355 (-46415 -46297)	-46346 (-46427 -46274)	-46406 (-46456 -46358)
Tree height		0.422 (0.368 0.488)	0.407 (0.354 0.474)	0.392 (0.337 0.456)	0.379 (0.329 0.437)	0.367 (0.327 0.422)	0.381 (0.338 0.437)
Clock rate	Uniform(5.0e-4, 2.0e-3)	7.46e-04 (6.52e-04 8.41e-04)	7.43e-04 (6.39e-04 8.65e-04)	7.60e-04 (6.55e-04 8.94e-04)	7.82e-04 (6.78e-04 9.09e-04)	7.52e-04 (6.44e-04 8.81e-04)	6.92e-04 (5.96e-04 8.01e-04)
κ	Lognormal(M=1.0, SD=1.25)	3.686 (3.062 4.395)	3.683 (3.043 4.458)	3.713 (3.091 4.422)	3.717 (3.029 4.462)	3.689 (3.012 4.392)	3.669 (3.016 4.399)
γ	Exponential(M=1.0)	3.88e-02 (1.13e-03 8.46e-02)	3.76e-02 (1.09e-03 8.78e-02)	3.67e-02 (1.04e-03 9.03e-02)	3.75e-02 (1.01e-03 9.39e-02)	3.61e-02 (1.31e-03 8.70e-02)	3.73e-02 (1.12e-03 9.24e-02)
R_0	Lognormal(M=1.5, SD=0.5)	2.80 (2.51 3.13)	2.33 (2.11 2.62)	2.14 (1.91 2.37)	1.91 (1.69 2.13)	2.33 (1.75 2.70)	2.54 (2.11 3.18)
α	Uniform(0.0, 2.0)	0.27 (0.13 0.52)	0.30 (0.13 0.56)	0.32 (0.12 0.60)	0.15 (0.03 0.40)	0.06 (0.02 0.23)	0.12 (0.02 0.29)
E_{init}	Exponential(M=1.0)	13.47 (6.82 21.96)	17.31 (9.80 26.52)	14.30 (8.12 21.25)	10.54 (6.14 15.98)	0.98 (0.28 3.87)	0.60 (0.04 1.83)
Y_{init}	Exponential(M=1.0)	1.38e-02 (9.24e-03 1.98e-02)	1.15e-02 (6.26e-03 1.91e-02)	8.82e-03 (4.80e-03 1.35e-02)	7.10e-03 (3.68e-03 1.08e-02)	8.02e-03 (4.16e-03 1.41e-02)	9.90e-03 (5.60e-03 1.88e-02)

Supplementary Table 8: Model parameter priors and estimated values (η = 10)

Parameter	Prior	Posterior (Median (95% HPD))					
		p_h = 0.02	p_h = 0.05	p_h = 0.10	p_h = 0.20	p_h = 0.50	p_h = 0.80
Posterior		-46404 (-46444 -46360)	-46403 (-46459 -46341)	-46376 (-46428 -46302)	-46318 (-46398 -46257)	-46355 (-46406 -46301)	-46344 (-46384 -46299)
Tree height		0.394 (0.344 0.448)	0.377 (0.330 0.438)	0.407 (0.357 0.453)	0.445 (0.387 0.500)	0.473 (0.419 0.529)	0.450 (0.403 0.496)
Clock rate	Uniform(5.0e-4, 2.0e-3)	6.75e-04 (5.60e-04 7.81e-04)	7.29e-04 (5.81e-04 8.75e-04)	6.62e-04 (5.68e-04 7.53e-04)	6.16e-04 (5.34e-04 6.91e-04)	5.46e-04 (5.00e-04 6.20e-04)	6.31e-04 (5.66e-04 7.05e-04)
κ	Lognormal(M=1.0, SD=1.25)	3.709 (3.074 4.455)	3.746 (3.119 4.534)	3.727 (3.068 4.507)	3.718 (3.045 4.478)	3.694 (3.139 4.518)	3.683 (3.090 4.525)
γ	Exponential(M=1.0)	3.56e-02 (1.10e-03 8.78e-02)	3.37e-02 (1.28e-03 8.77e-02)	3.76e-02 (1.03e-03 9.27e-02)	3.76e-02 (1.00e-03 8.98e-02)	3.46e-02 (1.23e-03 8.77e-02)	3.57e-02 (1.64e-03 9.15e-02)
R_0	Lognormal(M=1.5, SD=0.5, MIN=1.0)	3.03 (2.64 3.56)	2.52 (2.16 2.94)	2.09 (1.88 2.35)	2.25 (2.09 2.56)	2.20 (1.96 2.47)	2.16 (2.02 2.29)
α	Uniform(0.0, 2.0)	0.26 (0.06 0.78)	0.24 (0.08 0.51)	0.22 (0.08 0.47)	0.24 (0.08 0.49)	0.18 (0.04 0.44)	0.14 (0.04 0.31)
E_{init}	Exponential(M=1.0)	11.29 (5.93 18.48)	10.61 (5.33 17.85)	21.86 (17.25 25.48)	8.13 (4.73 12.73)	5.59 (3.58 8.27)	3.12 (2.83 3.66)
Y_{init}	Exponential(M=1.0)	1.14e-02 (4.64e-03 2.60e-02)	7.76e-03 (2.49e-03 2.41e-02)	1.38e-02 (6.91e-03 2.49e-02)	3.29e-02 (1.32e-02 7.50e-02)	6.82e-02 (2.18e-02 1.74e-01)	4.82e-02 (2.75e-02 8.72e-02)

Supplementary Table 9: Model parameter priors and estimated values (η = 100)

Parameter	Prior	Posterior (Median (95% HPD))					
		p_h = 0.02	p_h = 0.05	p_h = 0.10	p_h = 0.20	p_h = 0.50	p_h = 0.80
Posterior		-46392 (-46447 -46341)	-46339 (-46399 -46293)	-46389 (-46435 -46316)	-46373 (-46436 -46321)	-46379 (-46424 -46334)	-46379 (-46431 -46324)
Tree height		0.375 (0.329 0.431)	0.435 (0.338 0.494)	0.398 (0.344 0.483)	0.397 (0.343 0.460)	0.421 (0.362 0.488)	0.471 (0.410 0.544)
Clock rate	Uniform(5.0e-4, 2.0e-3)	7.06e-04 (5.94e-04 8.61e-04)	6.03e-04 (5.17e-04 8.14e-04)	6.20e-04 (5.00e-04 7.27e-04)	6.33e-04 (5.42e-04 7.35e-04)	6.04e-04 (5.12e-04 6.88e-04)	5.38e-04 (5.00e-04 5.97e-04)
κ	Lognormal(M=1.0, SD=1.25)	3.699 (3.055 4.405)	3.718 (3.009 4.404)	3.724 (3.077 4.515)	3.739 (3.098 4.454)	3.691 (2.991 4.433)	3.703 (3.061 4.438)
γ	Exponential(M=1.0)	3.50e-02 (1.03e-03 8.47e-02)	3.59e-02 (1.39e-03 8.92e-02)	3.53e-02 (1.06e-03 8.63e-02)	3.72e-02 (1.14e-03 8.99e-02)	3.52e-02 (1.27e-03 9.11e-02)	3.39e-02 (1.03e-03 8.23e-02)
R_0	Lognormal(M=1.5, SD=0.5, MIN=1.0)	2.94 (2.57 3.31)	2.57 (2.29 2.85)	2.25 (2.00 2.72)	2.13 (1.95 2.34)	2.14 (1.95 2.31)	2.22 (2.07 2.42)
α	Uniform(0.0, 2.0)	0.27 (0.08 0.57)	0.29 (0.08 0.69)	0.28 (0.10 0.62)	0.18 (0.04 0.38)	0.15 (0.05 0.33)	0.15 (0.04 0.37)
E_{init}	Exponential(M=1.0)	11.22 (6.25 17.19)	18.17 (8.53 24.04)	19.96 (16.05 25.55)	11.80 (7.88 14.31)	5.33 (4.11 6.61)	4.17 (3.75 4.71)
Y_{init}	Exponential(M=1.0)	8.85e-03 (2.72e-03 2.13e-02)	4.56e-02 (2.61e-03 1.35e-01)	1.78e-02 (5.16e-03 1.12e-01)	1.57e-02 (3.12e-03 5.08e-02)	2.84e-02 (8.84e-03 8.63e-02)	9.58e-02 (3.68e-02 2.90e-01)

Supplementary Table 10: Model parameter priors and estimated values (η = 1000)

Parameter	Prior	Posterior (Median (95% HPD))					
		p_h = 0.02	p_h = 0.05	p_h = 0.10	p_h = 0.20	p_h = 0.50	p_h = 0.80
Posterior		-46378 (-46419 -46325)	-46356 (-46409 -46309)	-46361 (-46414 -46297)	-46373 (-46435 -46296)	-46405 (-46464 -46317)	-46481 (-46545 -46395)
Tree height		0.365 (0.336 0.400)	0.351 (0.325 0.380)	0.337 (0.323 0.366)	0.338 (0.323 0.358)	0.335 (0.322 0.350)	0.342 (0.322 0.366)
Clock rate	Uniform(5.0e-4, 2.0e-3)	6.80e-04 (5.94e-04 8.04e-04)	7.55e-04 (6.50e-04 8.52e-04)	7.89e-04 (6.73e-04 9.25e-04)	7.82e-04 (6.59e-04 9.04e-04)	7.63e-04 (6.65e-04 8.81e-04)	6.63e-04 (5.53e-04 7.97e-04)
κ	Lognormal(M=1.0, SD=1.25)	3.732 (3.088 4.535)	3.710 (3.079 4.476)	3.737 (3.064 4.491)	3.724 (3.049 4.480)	3.719 (3.081 4.480)	3.726 (3.053 4.414)
γ	Exponential(M=1.0)	3.53e-02 (1.00e-03 9.50e-02)	3.64e-02 (1.28e-03 9.05e-02)	3.56e-02 (1.12e-03 8.55e-02)	3.40e-02 (1.12e-03 8.97e-02)	3.71e-02 (1.07e-03 8.64e-02)	3.57e-02 (1.11e-03 8.62e-02)
R_0	Lognormal(M=1.5, SD=0.5, MIN=1.0)	3.15 (2.77 3.53)	2.57 (2.32 2.84)	2.20 (1.98 2.44)	2.06 (1.84 2.32)	1.94 (1.70 2.30)	2.07 (1.79 2.36)
α	Uniform(0.0, 2.0)	0.30 (0.08 0.81)	0.27 (0.13 0.51)	0.27 (0.12 0.49)	0.24 (0.11 0.47)	0.21 (0.12 0.36)	0.21 (0.10 0.40)
E_{init}	Exponential(M=1.0)	8.41 (5.17 14.35)	8.98 (5.18 13.40)	10.20 (5.42 16.84)	7.38 (4.43 10.23)	3.96 (1.25 6.39)	3.43 (0.78 5.47)
Y_{init}	Exponential(M=1.0)	1.18e-02 (6.39e-03 2.03e-02)	8.61e-03 (4.53e-03 1.44e-02)	5.91e-03 (3.89e-03 1.05e-02)	5.87e-03 (3.52e-03 1.00e-02)	6.36e-03 (4.12e-03 9.45e-03)	8.74e-03 (4.48e-03 1.69e-02)

Supplementary Table 11: Model parameter priors and estimated values (η = 2500)

		Posterior (Median (95% HPD))					
Parameter	**Prior**	p_h **= 0.02**	p_h **= 0.05**	p_h **= 0.10**	p_h **= 0.20**	p_h **= 0.50**	p_h **= 0.80**
Posterior		-46338 (-46385 -46296)	-46323 (-46371 -46275)	-46335 (-46400 -46275)	-46335 (-46412 -46262)	-46452 (-46525 -46388)	-46448 (-46510 -46390)
Tree height		0.348 (0.326 0.369)	0.341 (0.323 0.362)	0.340 (0.323 0.366)	0.340 (0.325 0.359)	0.417 (0.391 0.443)	0.417 (0.391 0.444)
Clock rate	Uniform(5.0e-4, 2.0e-3)	7.70e-04 (6.52e-04 8.90e-04)	7.81e-04 (6.84e-04 8.94e-04)	7.82e-04 (6.62e-04 9.20e-04)	7.68e-04 (6.39e-04 8.91e-04)	5.19e-04 (5.00e-04 5.79e-04)	5.15e-04 (5.00e-04 5.54e-04)
κ	Lognormal(M=1.0, SD=1.25)	3.739 (3.015 4.377)	3.721 (3.105 4.471)	3.713 (3.055 4.429)	3.686 (3.076 4.435)	3.681 (3.046 4.429)	3.688 (2.975 4.359)
γ	Exponential(M=1.0)	3.53e-02 (1.17e-03 8.13e-02)	3.56e-02 (1.05e-03 9.57e-02)	3.78e-02 (1.01e-03 9.14e-02)	3.79e-02 (1.23e-03 9.21e-02)	3.68e-02 (1.02e-03 9.42e-02)	3.75e-02 (1.08e-03 8.69e-02)
R_0	Lognormal(M=1.5, SD=0.5, MIN=1.0)	2.83 (2.58 3.17)	2.44 (2.18 2.69)	2.17 (1.91 2.38)	2.05 (1.79 2.37)	1.01 (1.00 1.05)	1.06 (1.00 1.14)
α	Uniform(0.0, 2.0)	0.27 (0.11 0.54)	0.27 (0.14 0.48)	0.30 (0.15 0.50)	0.29 (0.17 0.44)	0.55 (0.38 0.74)	0.41 (0.25 0.59)
E_{init}	Exponential(M=1.0)	10.88 (6.51 15.44)	10.56 (6.93 15.36)	9.31 (4.64 13.16)	4.80 (2.38 8.79)	2.01 (1.40 2.63)	1.82 (1.27 2.39)
Y_{init}	Exponential(M=1.0)	1.46e-02 (8.50e-03 2.38e-02)	1.10e-02 (6.63e-03 1.60e-02)	1.01e-02 (5.00e-03 1.75e-02)	9.90e-03 (5.06e-03 1.87e-02)	8.67e-02 (4.53e-02 1.38e-01)	9.12e-02 (5.60e-02 1.36e-01)

Supplementary Table 12: Model parameter priors and estimated values (η = 5000)

Parameter	Prior	Posterior (Median (95% HPD))					
		p_h = 0.02	p_h = 0.05	p_h = 0.10	p_h = 0.20	p_h = 0.50	p_h = 0.80
Posterior		-46335 (-46377 -46289)	-46327 (-46379 -46279)	-46326 (-46382 -46263)	-46306 (-46363 -46253)	-46365 (-46424 -46315)	-46428 (-46478 -46380)
Tree height		0.355 (0.327 0.381)	0.348 (0.328 0.370)	0.344 (0.326 0.364)	0.444 (0.425 0.466)	0.436 (0.412 0.464)	0.439 (0.414 0.463)
Clock rate	Uniform(5.0e-4, 2.0e-3)	7.21e-04 (6.21e-04 8.30e-04)	7.66e-04 (6.57e-04 8.80e-04)	7.87e-04 (6.71e-04 9.08e-04)	5.07e-04 (5.00e-04 5.30e-04)	5.07e-04 (5.00e-04 5.29e-04)	5.05e-04 (5.00e-04 5.22e-04)
κ	Lognormal(M=1.0, SD=1.25)	3.712 (3.017 4.416)	3.726 (3.050 4.425)	3.725 (3.073 4.472)	3.696 (3.057 4.427)	3.682 (3.055 4.400)	3.700 (3.058 4.495)
γ	Exponential(M=1.0)	3.96e-02 (1.12e-03 9.39e-02)	3.38e-02 (1.15e-03 8.39e-02)	3.49e-02 (1.26e-03 8.90e-02)	3.69e-02 (1.16e-03 9.11e-02)	3.67e-02 (1.02e-03 8.53e-02)	3.47e-02 (1.01e-03 8.95e-02)
R_0	Lognormal(M=1.5, SD=0.5, MIN=1.0)	2.86 (2.58 3.19)	2.39 (2.14 2.68)	2.25 (1.95 2.52)	1.02 (1.00 1.06)	1.03 (1.00 1.09)	1.11 (1.03 1.18)
α	Uniform(0.0, 2.0)	0.27 (0.11 0.52)	0.32 (0.16 0.54)	0.32 (0.19 0.54)	0.82 (0.62 0.99)	0.68 (0.49 0.88)	0.49 (0.34 0.68)
E_{init}	Exponential(M=1.0)	11.61 (6.50 17.27)	10.88 (4.52 17.09)	5.95 (2.84 9.63)	2.55 (2.12 2.82)	2.04 (1.51 2.60)	1.57 (1.14 2.10)
Y_{init}	Exponential(M=1.0)	2.22e-02 (1.37e-02 3.43e-02)	1.79e-02 (9.95e-03 2.86e-02)	1.27e-02 (8.02e-03 1.83e-02)	1.65e-01 (1.09e-01 2.48e-01)	1.49e-01 (9.60e-02 2.29e-01)	1.49e-01 (9.54e-02 2.21e-01)

Supplementary Table 13. Sequencing primer list

name	seq	length
nCoV-2019_1_LEFT	ACCAACCAACTTTCGATCTCTTGT	24
nCoV-2019_1_RIGHT	CATCTTTAAGATGTTGACGTGCCTC	25
nCoV-2019_2_LEFT	CTGTTTTACAGGTTCGCGACGT	22
nCoV-2019_2_RIGHT	TAAGGATCAGTGCCAAGCTCGT	22
nCoV-2019_3_LEFT	CGGTAATAAAGGAGCTGGTGGC	22
nCoV-2019_3_RIGHT	AAGGTGTCTGCAATTCATAGCTCT	24
nCoV-2019_4_LEFT	GGTGTATACTGCTGCCGTGAAC	22
nCoV-2019_4_RIGHT	CACAAGTAGTGGCACCTTCTTTAGT	25
nCoV-2019_5_LEFT	TGGTGAAACTTCATGGCAGACG	22
nCoV-2019_5_RIGHT	ATTGATGTTGACTTTCTCTTTTTGGAGT	28
nCoV-2019_6_LEFT	GGTGTTGTTGGAGAAGGTTCCG	22
nCoV-2019_6_RIGHT	TAGCGGCCTTCTGTAAAACACG	22
nCoV-2019_7_LEFT	ATCAGAGGCTGCTCGTGTTGTA	22
nCoV-2019_7_LEFT_alt0	CATTTGCATCAGAGGCTGCTCG	22
nCoV-2019_7_RIGHT	TGCACAGGTGACAATTTGTCCA	22
nCoV-2019_7_RIGHT_alt5	AGGTGACAATTTGTCCACCGAC	22
nCoV-2019_8_LEFT	AGAGTTTCTTAGAGACGGTTGGGA	24
nCoV-2019_8_RIGHT	GCTTCAACAGCTTCACTAGTAGGT	24
nCoV-2019_9_LEFT	TCCCACAGAAGTGTTAACAGAGGA	24
nCoV-2019_9_LEFT_alt4	TTCCCACAGAAGTGTTAACAGAGG	24
nCoV-2019_9_RIGHT	ATGACAGCATCTGCCACAACAC	22
nCoV-2019_9_RIGHT_alt2	GACAGCATCTGCCACAACACAG	22
nCoV-2019_10_LEFT	TGAGAAGTGCTCTGCCTATACAGT	24
nCoV-2019_10_RIGHT	TCATCTAACCAATCTTCTTCTTGCTCT	27
nCoV-2019_11_LEFT	GGAATTTGGTGCCACTTCTGCT	22
nCoV-2019_11_RIGHT	TCATCAGATTCAACTTGCATGGCA	24
nCoV-2019_12_LEFT	AAACATGGAGGAGGTGTTGCAG	22
nCoV-2019_12_RIGHT	TTCACTCTTCATTTCCAAAAAGCTTGA	27
nCoV-2019_13_LEFT	TCGCACAAATGTCTACTTAGCTGT	24
nCoV-2019_13_RIGHT	ACCACAGCAGTTAAAACACCCT	22
nCoV-2019_14_LEFT	CATCCAGATTCTGCCACTCTTGT	23
nCoV-2019_14_LEFT_alt4	TGGCAATCTTCATCCAGATTCTGC	24
nCoV-2019_14_RIGHT	AGTTTCCACACAGACAGGCATT	22
nCoV-2019_14_RIGHT_alt2	TGCGTGTTTCTTCTGCATGTGC	22
nCoV-2019_15_LEFT	ACAGTGCTTAAAAAGTGTAAAAGTGCC	27
nCoV-2019_15_LEFT_alt1	AGTGCTTAAAAAGTGTAAAAGTGCCT	26
nCoV-2019_15_RIGHT	AACAGAAACTGTAGCTGGCACT	22
nCoV-2019_15_RIGHT_alt3	ACTGTAGCTGGCACTTTGAGAGA	23
nCoV-2019_16_LEFT	AATTTGGAAGAAGCTGCTCGGT	22
nCoV-2019_16_RIGHT	CACAACTTGCGTGTGGAGGTTA	22
nCoV-2019_17_LEFT	CTTCTTTCTTTGAGAGAAGTGAGGACT	27
nCoV-2019_17_RIGHT	TTTGTTGGAGTGTTAACAATGCAGT	25
nCoV-2019_18_LEFT	TGGAAATACCCACAAGTTAATGGTTTAAC	29
nCoV-2019_18_LEFT_alt2	ACTTCTATTAAATGGGCAGATAACAACTGT	30
nCoV-2019_18_RIGHT	AGCTTGTTTACCACACGTACAAGG	24

nCoV-2019_18_RIGHT_alt1	GCTTGTTTACCACACGTACAAGG	23
nCoV-2019_19_LEFT	GCTGTTATGTACATGGGCACACT	23
nCoV-2019_19_RIGHT	TGTCCAACTTAGGGTCAATTTCTGT	25
nCoV-2019_20_LEFT	ACAAAGAAAACAGTTACACAACAACCA	27
nCoV-2019_20_RIGHT	ACGTGGCTTTATTAGTTGCATTGTT	25
nCoV-2019_21_LEFT	TGGCTATTGATTATAAACACTACACACCC	29
nCoV-2019_21_LEFT_alt2	GGCTATTGATTATAAACACTACACACCCT	29
nCoV-2019_21_RIGHT	TAGATCTGTGTGGCCAACCTCT	22
nCoV-2019_21_RIGHT_alt0	GATCTGTGTGGCCAACCTCTTC	22
nCoV-2019_22_LEFT	ACTACCGAAGTTGTAGGAGACATTATACT	29
nCoV-2019_22_RIGHT	ACAGTATTCTTTGCTATAGTAGTCGGC	27
nCoV-2019_23_LEFT	ACAACTACTAACATAGTTACACGGTGT	27
nCoV-2019_23_RIGHT	ACCAGTACAGTAGGTTGCAATAGTG	25
nCoV-2019_24_LEFT	AGGCATGCCTTCTTACTGTACTG	23
nCoV-2019_24_RIGHT	ACATTCTAACCATAGCTGAAATCGGG	26
nCoV-2019_25_LEFT	GCAATTGTTTTTCAGCTATTTTGCAGT	27
nCoV-2019_25_RIGHT	ACTGTAGTGACAAGTCTCTCGCA	23
nCoV-2019_26_LEFT	TTGTGATACATTCTGTGCTGGTAGT	25
nCoV-2019_26_RIGHT	TCCGCACTATCACCAACATCAG	22
nCoV-2019_27_LEFT	ACTACAGTCAGCTTATGTGTCAACC	25
nCoV-2019_27_RIGHT	AATACAAGCACCAAGGTCACGG	22
nCoV-2019_28_LEFT	ACATAGAAGTTACTGGCGATAGTTGT	26
nCoV-2019_28_RIGHT	TGTTTAGACATGACATGAACAGGTGT	26
nCoV-2019_29_LEFT	ACTTGTGTTCCTTTTTGTTGCTGC	24
nCoV-2019_29_RIGHT	AGTGTACTCTATAAGTTTTGATGGTGTGT	29
nCoV-2019_30_LEFT	GCACAACTAATGGTGACTTTTTGCA	25
nCoV-2019_30_RIGHT	ACCACTAGTAGATACACAAACACCAG	26
nCoV-2019_31_LEFT	TTCTGAGTACTGTAGGCACGGC	22
nCoV-2019_31_RIGHT	ACAGAATAAACACCAGGTAAGAATGAGT	28
nCoV-2019_32_LEFT	TGGTGAATACAGTCATGTAGTTGCC	25
nCoV-2019_32_RIGHT	AGCACATCACTACGCAACTTTAGA	24
nCoV-2019_33_LEFT	ACTTTTGAAGAAGCTGCGCTGT	22
nCoV-2019_33_RIGHT	TGGACAGTAAACTACGTCATCAAGC	25
nCoV-2019_34_LEFT	TCCCATCTGGTAAAGTTGAGGGT	23
nCoV-2019_34_RIGHT	AGTGAAATTGGGCCTCATAGCA	22
nCoV-2019_35_LEFT	TGTTCGCATTCAACCAGGACAG	22
nCoV-2019_35_RIGHT	ACTTCATAGCCACAAGGTTAAAGTCA	26
nCoV-2019_36_LEFT	TTAGCTTGGTTGTACGCTGCTG	22
nCoV-2019_36_RIGHT	GAACAAAGACCATTGAGTACTCTGGA	26
nCoV-2019_37_LEFT	ACACACCACTGGTTGTTACTCAC	23
nCoV-2019_37_RIGHT	GTCCACACTCTCCTAGCACCAT	22
nCoV-2019_38_LEFT	ACTGTGTTATGTATGCATCAGCTGT	25
nCoV-2019_38_RIGHT	CACCAAGAGTCAGTCTAAAGTAGCG	25
nCoV-2019_39_LEFT	AGTATTGCCCTATTTTCTTCATAACTGGT	29
nCoV-2019_39_RIGHT	TGTAACTGGACACATTGAGCCC	22
nCoV-2019_40_LEFT	TGCACATCAGTAGTCTTACTCTCAGT	26
nCoV-2019_40_RIGHT	CATGGCTGCATCACGGTCAAAT	22
nCoV-2019_41_LEFT	GTTCCCTTCCATCATATGCAGCT	23

nCoV-2019_41_RIGHT	TGGTATGACAACCATTAGTTTGGCT	25
nCoV-2019_42_LEFT	TGCAAGAGATGGTTGTGTTCCC	22
nCoV-2019_42_RIGHT	CCTACCTCCCTTTGTTGTGTTGT	23
nCoV-2019_43_LEFT	TACGACAGATGTCTTGTGCTGC	22
nCoV-2019_43_RIGHT	AGCAGCATCTACAGCAAAAGCA	22
nCoV-2019_44_LEFT	TGCCACAGTACGTCTACAAGCT	22
nCoV-2019_44_LEFT_alt3	CCACAGTACGTCTACAAGCTGG	22
nCoV-2019_44_RIGHT	AACCTTTCCACATACCGCAGAC	22
nCoV-2019_44_RIGHT_alt0	CGCAGACGGTACAGACTGTGTT	22
nCoV-2019_45_LEFT	TACCTACAACTTGTGCTAATGACCC	25
nCoV-2019_45_LEFT_alt2	AGTATGTACAAATACCTACAACTTGTGCT	29
nCoV-2019_45_RIGHT	AAATTGTTTCTTCATGTTGGTAGTTAGAGA	30
nCoV-2019_45_RIGHT_alt7	TTCATGTTGGTAGTTAGAGAAAGTGTGTC	29
nCoV-2019_46_LEFT	TGTCGCTTCCAAGAAAAGGACG	22
nCoV-2019_46_LEFT_alt1	CGCTTCCAAGAAAAGGACGAAGA	23
nCoV-2019_46_RIGHT	CACGTTCACCTAAGTTGGCGTA	22
nCoV-2019_46_RIGHT_alt2	CACGTTCACCTAAGTTGGCGTAT	23
nCoV-2019_47_LEFT	AGGACTGGTATGATTTTGTAGAAAACCC	28
nCoV-2019_47_RIGHT	AATAACGGTCAAAGAGTTTTAACCTCTC	28
nCoV-2019_48_LEFT	TGTTGACACTGACTTAACAAAGCCT	25
nCoV-2019_48_RIGHT	TAGATTACCAGAAGCAGCGTGC	22
nCoV-2019_49_LEFT	AGGAATTACTTGTGTATGCTGCTGA	25
nCoV-2019_49_RIGHT	TGACGATGACTTGGTTAGCATTAATACA	28
nCoV-2019_50_LEFT	GTTGATAAGTACTTTGATTGTTACGATGGT	30
nCoV-2019_50_RIGHT	TAACATGTTGTGCCAACCACCA	22
nCoV-2019_51_LEFT	TCAATAGCCGCCACTAGAGGAG	22
nCoV-2019_51_RIGHT	AGTGCATTAACATTGGCCGTGA	22
nCoV-2019_52_LEFT	CATCAGGAGATGCCACAACTGC	22
nCoV-2019_52_RIGHT	GTTGAGAGCAAAATTCATGAGGTCC	25
nCoV-2019_53_LEFT	AGCAAAATGTTGGACTGAGACTGA	24
nCoV-2019_53_RIGHT	AGCCTCATAAAACTCAGGTTCCC	23
nCoV-2019_54_LEFT	TGAGTTAACAGGACACATGTTAGACA	26
nCoV-2019_54_RIGHT	AACCAAAAACTTGTCCATTAGCACA	25
nCoV-2019_55_LEFT	ACTCAACTTTACTTAGGAGGTATGAGCT	28
nCoV-2019_55_RIGHT	GGTGTACTCTCCTATTTGTACTTTACTGT	29
nCoV-2019_56_LEFT	ACCTAGACCACCACTTAACCGA	22
nCoV-2019_56_RIGHT	ACACTATGCGAGCAGAAGGGTA	22
nCoV-2019_57_LEFT	ATTCTACACTCCAGGGACCACC	22
nCoV-2019_57_RIGHT	GTAATTGAGCAGGGTCGCCAAT	22
nCoV-2019_58_LEFT	TGATTTGAGTGTTGTCAATGCCAGA	25
nCoV-2019_58_RIGHT	CTTTTCTCCAAGCAGGGTTACGT	23
nCoV-2019_59_LEFT	TCACGCATGATGTTTCATCTGCA	23
nCoV-2019_59_RIGHT	AAGAGTCCTGTTACATTTTCAGCTTG	26
nCoV-2019_60_LEFT	TGATAGAGACCTTTATGACAAGTTGCA	27
nCoV-2019_60_RIGHT	GGTACCAACAGCTTCTCTAGTAGC	24
nCoV-2019_61_LEFT	TGTTTATCACCCGCGAAGAAGC	22
nCoV-2019_61_RIGHT	ATCACATAGACAACAGGTGCGC	22
nCoV-2019_62_LEFT	GGCACATGGCTTTGAGTTGACA	22

nCoV-2019_62_RIGHT	GTTGAACCTTTCTACAAGCCGC	22
nCoV-2019_63_LEFT	TGTTAAGCGTGTTGACTGGACT	22
nCoV-2019_63_RIGHT	ACAAACTGCCACCATCACAACC	22
nCoV-2019_64_LEFT	TCGATAGATATCCTGCTAATTCCATTGT	28
nCoV-2019_64_RIGHT	AGTCTTGTAAAAGTGTTCCAGAGGT	25
nCoV-2019_65_LEFT	GCTGGCTTTAGCTTGTGGGTTT	22
nCoV-2019_65_RIGHT	TGTCAGTCATAGAACAAACACCAATAGT	28
nCoV-2019_66_LEFT	GGGTGTGGACATTGCTGCTAAT	22
nCoV-2019_66_RIGHT	TCAATTTCCATTTGACTCCTGGGT	24
nCoV-2019_67_LEFT	GTTGTCCAACAATTACCTGAAACTTACT	28
nCoV-2019_67_RIGHT	CAACCTTAGAAACTACAGATAAATCTTGGG	30
nCoV-2019_68_LEFT	ACAGGTTCATCTAAGTGTGTGTGT	24
nCoV-2019_68_RIGHT	CTCCTTTATCAGAACCAGCACCA	23
nCoV-2019_69_LEFT	TGTCGCAAAATATACTCAACTGTGTCA	27
nCoV-2019_69_RIGHT	TCTTTATAGCCACGGAACCTCCA	23
nCoV-2019_70_LEFT	ACAAAAGAAAATGACTCTAAAGAGGGTTT	29
nCoV-2019_70_RIGHT	TGACCTTCTTTTAAAGACATAACAGCAG	28
nCoV-2019_71_LEFT	ACAAATCCAATTCAGTTGTCTTCCTATTC	29
nCoV-2019_71_RIGHT	TGGAAAAGAAAGGTAAGAACAAGTCCT	27
nCoV-2019_72_LEFT	ACACGTGGTGTTTATTACCCTGAC	24
nCoV-2019_72_RIGHT	ACTCTGAACTCACTTTCCATCCAAC	25
nCoV-2019_73_LEFT	CAATTTTGTAATGATCCATTTTTGGGTGT	29
nCoV-2019_73_RIGHT	CACCAGCTGTCCAACCTGAAGA	22
nCoV-2019_74_LEFT	ACATCACTAGGTTTCAAACTTTACTTGC	28
nCoV-2019_74_RIGHT	GCAACACAGTTGCTGATTCTCTTC	24
nCoV-2019_75_LEFT	AGAGTCCAACCAACAGAATCTATTGT	26
nCoV-2019_75_RIGHT	ACCACCAACCTTAGAATCAAGATTGT	26
nCoV-2019_76_LEFT	AGGGCAAACTGGAAAGATTGCT	22
nCoV-2019_76_LEFT_alt3	GGGCAAACTGGAAAGATTGCTGA	23
nCoV-2019_76_RIGHT	ACACCTGTGCCTGTTAAACCAT	22
nCoV-2019_76_RIGHT_alt0	ACCTGTGCCTGTTAAACCATTGA	23
nCoV-2019_77_LEFT	CCAGCAACTGTTTGTGGACCTA	22
nCoV-2019_77_RIGHT	CAGCCCCTATTAAACAGCCTGC	22
nCoV-2019_78_LEFT	CAACTTACTCCTACTTGGCGTGT	23
nCoV-2019_78_RIGHT	TGTGTACAAAAACTGCCATATTGCA	25
nCoV-2019_79_LEFT	GTGGTGATTCAACTGAATGCAGC	23
nCoV-2019_79_RIGHT	CATTTCATCTGTGAGCAAAGGTGG	24
nCoV-2019_80_LEFT	TTGCCTTGGTGATATTGCTGCT	22
nCoV-2019_80_RIGHT	TGGAGCTAAGTTGTTTAACAAGCG	24
nCoV-2019_81_LEFT	GCACTTGGAAAACTTCAAGATGTGG	25
nCoV-2019_81_RIGHT	GTGAAGTTCTTTTCTTGTGCAGGG	24
nCoV-2019_82_LEFT	GGGCTATCATCTTATGTCCTTCCCT	25
nCoV-2019_82_RIGHT	TGCCAGAGATGTCACCTAAATCAA	24
nCoV-2019_83_LEFT	TCCTTTGCAACCTGAATTAGACTCA	25
nCoV-2019_83_RIGHT	TTTGACTCCTTTGAGCACTGGC	22
nCoV-2019_84_LEFT	TGCTGTAGTTGTCTCAAGGGCT	22
nCoV-2019_84_RIGHT	AGGTGTGAGTAAACTGTTACAAACAAC	27
nCoV-2019_85_LEFT	ACTAGCACTCTCCAAGGGTGTT	22

nCoV-2019_85_RIGHT	ACACAGTCTTTTACTCCAGATTCCC	25
nCoV-2019_86_LEFT	TCAGGTGATGGCACAACAAGTC	22
nCoV-2019_86_RIGHT	ACGAAAGCAAGAAAAAGAAGTACGC	25
nCoV-2019_87_LEFT	CGACTACTAGCGTGCCTTTGTA	22
nCoV-2019_87_RIGHT	ACTAGGTTCCATTGTTCAAGGAGC	24
nCoV-2019_88_LEFT	CCATGGCAGATTCCAACGGTAC	22
nCoV-2019_88_RIGHT	TGGTCAGAATAGTGCCATGGAGT	23
nCoV-2019_89_LEFT	GTACGCGTTCCATGTGGTCATT	22
nCoV-2019_89_LEFT_alt2	CGCGTTCCATGTGGTCATTCAA	22
nCoV-2019_89_RIGHT	ACCTGAAAGTCAACGAGATGAAACA	25
nCoV-2019_89_RIGHT_alt4	ACGAGATGAAACATCTGTTGTCACT	25
nCoV-2019_90_LEFT	ACACAGACCATTCCAGTAGCAGT	23
nCoV-2019_90_RIGHT	TGAAATGGTGAATTGCCCTCGT	22
nCoV-2019_91_LEFT	TCACTACCAAGAGTGTGTTAGAGGT	25
nCoV-2019_91_RIGHT	TTCAAGTGAGAACCAAAAGATAATAAGCA	29
nCoV-2019_92_LEFT	TTTGTGCTTTTTAGCCTTTCTGCT	24
nCoV-2019_92_RIGHT	AGGTTCCTGGCAATTAATTGTAAAAGG	27
nCoV-2019_93_LEFT	TGAGGCTGGTTCTAAATCACCCA	23
nCoV-2019_93_RIGHT	AGGTCTTCCTTGCCATGTTGAG	22
nCoV-2019_94_LEFT	GGCCCCAAGGTTTACCCAATAA	22
nCoV-2019_94_RIGHT	TTTGGCAATGTTGTTCCTTGAGG	23
nCoV-2019_95_LEFT	TGAGGGAGCCTTGAATACACCA	22
nCoV-2019_95_RIGHT	CAGTACGTTTTTGCCGAGGCTT	22
nCoV-2019_96_LEFT	GCCAACAACAACAAGGCCAAAC	22
nCoV-2019_96_RIGHT	TAGGCTCTGTTGGTGGGAATGT	22
nCoV-2019_97_LEFT	TGGATGACAAAGATCCAAATTTCAAAGA	28
nCoV-2019_97_RIGHT	ACACACTGATTAAAGATTGCTATGTGAG	28
nCoV-2019_98_LEFT	AACAATTGCAACAATCCATGAGCA	24
nCoV-2019_98_RIGHT	TTCTCCTAAGAAGCTATTAAAATCACATGG	30