

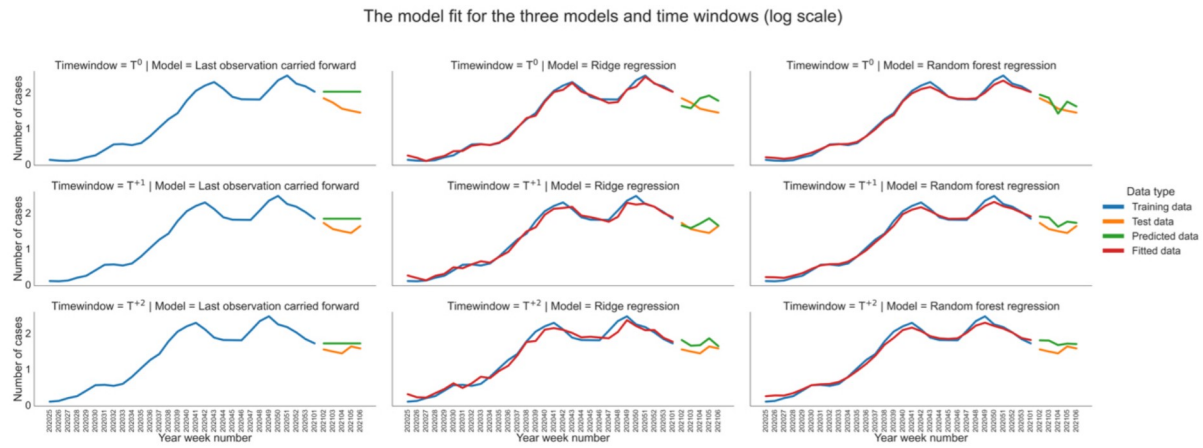
Supporting information

Supplementary Figure 1: The spatial coverage of the postal code areas included in the current study



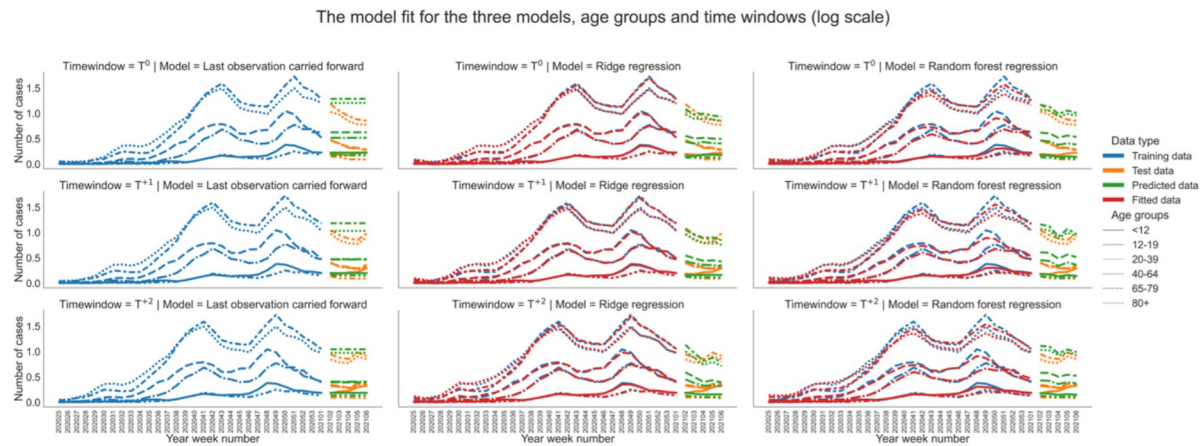
In black the postal code areas included in the current analysis, whereas in white the postal code areas are shown which were not part of the analysis. The postal code areas are provided by the © Centraal Bureau voor de Statistiek and © ESRI Nederland.

Supplementary Figure 2: The average training, test and predicted number of COVID-19 cases per model and time window for the log-transformed data



The first row shows the model fits for time window T^0 , the second row shows the model fits for time window T^{+1} (i.e., +1 week), and the third row shows the model fits for time window T^{+2} (i.e., +2 weeks). The separate columns correspond to the three different models used (resp. last observation carried forward, ridge regression and random forest regression). The blue line represents the training data, the orange line shows the test data, the red line visualizes the model fit and finally the green line shows the model predictions. Since no model was fitted for the last observation model, the fitted data line is absent.

Supplementary Figure 3: The average training, test and predicted number of COVID-19 cases per model, time window and age group for the log-transformed data



The first row shows the model fits for time window T^0 , the second row shows the model fits for time window T^{+1} (+1 week), and the third row shows the model fits for time window T^{+2} (+2 weeks). The separate columns correspond to the three different models used (resp. last observation carried forward, ridge regression and random forest regression). The blue line represents the training data, the orange line shows the test data, the red line visualizes the model fit and finally the green line shows the model predictions. Since no model was fitted for the last observation model, the fitted data line is absent.

Supplementary Table 1: The last observation carried forward, ridge regression and random forest regression model performance for all age groups collapsed (log-transformed data)

Model	Time Window	MSE mean (std.)	Top 100 correctly predicted
LOCF	T^0	0.72 (0.68)	41%
	T^{+1}	0.62 (0.61)	33%
	T^{+2}	0.58 (0.56)	33%
RR	T^0	0.6 (0.21)	42%
	T^{+1}	0.79 (0.49)	37%
	T^{+2}	1.24 (1.13)	37%
RFR	T^0	0.75 (0.47)	47%
	T^{+1}	0.76 (0.41)	41%
	T^{+2}	0.75 (0.50)	46%

The average Mean Squared Error (MSE), percentage correctly predicted top 100 over all postal code areas and rank mismatch per model type and time window. The MSE indicates the average difference in observed and predicted values. The top 100 correctly predicted postal code areas indicate what percentage of predicted top 100 postal code areas with the highest number of COVID-19 cases were correctly predicted irrespective of absolute rank.

LOCF: Last Observation Carried Forward; RR: Ridge Regression; RFR: Random Forest; std: standard deviation.



Supplementary Table 2: The last observation carried forward, ridge regression and random forest regression model performance per age group (log-transformed data)

Model	Time Window	MSE mean (std.)	Age group (years)	Top 100 Correctly predicted
LOCF	T^0	0.45 (0.39)	<12	15%
			12-19	21%
			20-39	38%
			40-64	34%
			65-79	27%
			≥ 80	19%
	T^{+1}	0.40 (0.37)	<12	13%
			12-19	20%
			20-39	46%
			40-64	32%
			65-79	22%
			≥ 80	18%
	T^{+2}	0.38 (0.35)	<12	24%
			12-19	16%
			20-39	35%
			40-64	19%
			65-79	21%
			≥ 80	13%
RR	T^0	0.28 (0.07)	<12	17%
			12-19	25%
			20-39	43%
			40-64	35%
			65-79	25%
			≥ 80	19%
	T^{+1}	0.31 (0.08)	<12	20%
			12-19	17%
			20-39	45%
			40-64	30%
			65-79	24%
			≥ 80	18%
	T^{+2}	0.40 (0.16)	<12	24%
			12-19	26%
			20-39	32%
			40-64	30%
			65-79	25%
			≥ 80	14%
RFR	T^0	0.32 (0.13)	<12	18%
			12-19	31%
			20-39	57%
			40-64	40%
			65-79	28%
			≥ 80	25%
	T^{+1}	0.32 (0.08)	<12	18%
			12-19	22%
			20-39	54%
			40-64	34%
			65-79	34%
			≥ 80	22%
	T^{+2}	0.32 (0.08)	<12	28%
			12-19	32%
			20-39	46%
			40-64	36%
			65-79	32%
			≥ 80	17%

The average Mean Squared Error (MSE), percentage correctly predicted top 100 over all postal code areas and rank mismatch per model type and time window. The MSE indicates the average difference in observed and predicted values. The top 100 correctly predicted postal code areas indicate what percentage of predicted top 100 postal code areas with the highest number of COVID-19 cases were correctly predicted irrespective of absolute rank.

LOCF.: Last Observation Carried Forward; RR: Ridge Regression; RFR: Random Forest; std: standard deviation.

Supplementary Table 3: The last observation carried forward, ridge regression and random forest regression model comparison predicting the top 100 postal codes per age group (all models)

Models	P(M)	P(M data)	BFM	BF10	error %
MT+TW+AG+MT*TW+MT*AG+TW*AG+MT*TW*AG	0.006	0.554	205.986	1.000	**
MT+S+TW+AG+MT*TW+MT*AG+TW*AG+MT*TW*AG	0.006	0.152	29.806	0.275	11.160
MT+S+TW+AG+MT*TW+MT*AG+S*AG+TW*AG+MT*TW*AG	0.006	0.113	21.200	0.205	3.150
MT+S+TW+AG+MT*TW+S*TW+MT*AG+S*AG+TW*AG+MT*TW*AG	0.006	0.037	6.453	0.068	20.527
MT+S+TW+AG+MT*TW+S*TW+MT*AG+TW*AG+MT*TW*AG	0.006	0.035	6.013	0.063	3.965
MT+S+TW+AG+MT*MT*TW+MT*AG+TW*AG+MT*TW*AG	0.006	0.023	3.832	0.041	4.393
MT+S+TW+AG+MT*MT*TW+MT*AG+S*AG+TW*AG+MT*TW*AG	0.006	0.018	3.114	0.033	2.981
MT+S+TW+AG+MT*MT*TW+MT*AG+S*AG+TW*AG+MT*S*AG+MT*TW*AG	0.006	0.018	2.967	0.032	2.884
MT+S+TW+AG+MT*MT*TW+S*TW+MT*AG+S*AG+TW*AG+MT*TW*AG+S*TW*AG	0.006	0.012	1.981	0.021	3.353
MT+S+TW+AG+MT*MT*TW+S*TW+MT*AG+TW*AG+MT*TW*AG	0.006	0.009	1.511	0.016	40.181
MT+S+TW+AG+MT*MT*TW+S*TW+MT*AG+S*AG+TW*AG+MT*S*AG+MT*TW*AG	0.006	0.006	1.002	0.011	4.252
MT+S+TW+AG+MT*MT*TW+S*TW+MT*AG+S*AG+TW*AG+MT*S*TW*AG	0.006	0.005	0.900	0.010	4.054
MT+S+TW+AG+MT*MT*TW+S*TW+MT*AG+TW*AG+MT*S*TW+MT*TW*AG	0.006	0.005	0.899	0.010	69.000
MT+S+TW+AG+MT*MT*TW+S*TW+MT*AG+S*AG+TW*AG+MT*S*AG+MT*TW*AG+S*TW*AG	0.006	0.003	0.538	0.006	3.446
MT+S+TW+AG+MT*MT*TW+S*TW+MT*AG+S*AG+TW*AG+MT*S*TW+MT*S*AG+MT*TW*AG	0.006	0.002	0.368	0.004	3.880
MT+S+TW+AG+MT*MT*TW+S*TW+MT*AG+S*AG+TW*AG+MT*TW*AG+S*TW*AG	0.006	0.002	0.341	0.004	3.255
MT+S+TW+AG+MT*MT*TW+S*TW+MT*AG+S*AG+TW*AG+MT*S*TW+MT*TW*AG	0.006	0.002	0.291	0.003	3.398
MT+S+TW+AG+MT*MT*TW+S*TW+MT*AG+S*AG+TW*AG+MT*S*TW+MT*S*AG+MT*TW*AG+S*TW*AG	0.006	0.002	0.258	0.003	5.894
MT+S+TW+AG+MT*MT*TW+S*TW+MT*AG+S*AG+TW*AG+MT*S*TW+MT*TW*AG+S*TW*AG	0.006	7.16E-01	0.119	0.001	3.061
MT+S+TW+AG+MT*MT*TW+S*TW+MT*AG+S*AG+TW*AG+MT*S*TW+MT*S*AG+MT*TW*AG	0.006	7.12E-01	0.118	0.001	4.859
+S*TW*AG+MT*S*TW*AG					
MT+TW+AG+MT*TW+MT*AG+TW*AG	0.006	2.34E-02	0.004	4.23E-02	2.274
MT+TW+AG+MT*AG+TW*AG	0.006	8.82E-03	0.001	1.59E-02	2.069
MT+S+TW+AG+MT*TW+MT*AG+TW*AG	0.006	5.09E-03	8.45E-01	9.19E-03	2.946
MT+S+TW+AG+MT*AG+TW*AG	0.006	1.93E-03	3.20E-01	3.48E-03	2.651
MT+S+TW+AG+MT*TW+S*TW+MT*AG+TW*AG	0.006	9.18E-04	1.53E-01	1.66E-03	3.725
MT+S+TW+AG+MT*TW+MT*AG+S*AG+TW*AG	0.006	9.07E-04	1.51E-01	1.64E-03	2.792
MT+S+TW+AG+MT*S*TW+MT*AG+TW*AG	0.006	7.54E-04	1.25E-01	1.36E-03	2.622
MT+S+TW+AG+S*TW+MT*AG+TW*AG	0.006	3.40E-04	5.64E-02	6.14E-04	3.124
MT+S+TW+AG+MT*AG+S*AG+TW*AG	0.006	3.32E-04	5.51E-02	6.00E-04	5.095
MT+S+TW+AG+MT*S*TW+MT*AG+TW*AG	0.006	2.88E-04	4.78E-02	5.20E-04	3.785
MT+S+TW+AG+MT*TW+S*TW+MT*AG+S*AG+TW*AG	0.006	1.79E-04	2.97E-02	3.23E-04	3.964
MT+S+TW+AG+MT*MT*TW+MT*AG+S*AG+TW*AG	0.006	1.54E-04	2.55E-02	2.77E-04	8.976
MT+S+TW+AG+MT*S*TW+S*TW+MT*AG+TW*AG	0.006	1.43E-04	2.37E-02	2.57E-04	2.964
MT+S+TW+AG+S*TW+MT*AG+S*AG+TW*AG	0.006	5.94E-05	9.86E-03	1.07E-04	5.401
MT+S+TW+AG+MT*MT*TW+S*AG+TW*AG	0.006	5.39E-05	8.95E-03	9.74E-05	11.457
MT+S+TW+AG+MT*S*TW+MT*AG+TW*AG	0.006	5.37E-05	8.92E-03	9.70E-05	3.170
MT+S+TW+AG+MT*MT*TW+S*TW+MT*AG+S*AG+TW*AG	0.006	2.76E-05	4.59E-03	4.99E-05	4.589
MT+S+TW+AG+MT*MT*TW+MT*AG+S*AG+TW*AG+MT*S*AG	0.006	2.76E-05	4.58E-03	4.99E-05	7.507
MT+S+TW+AG+MT*S*TW+S*TW+MT*AG+TW*AG+MT*S*TW	0.006	2.63E-05	4.37E-03	4.75E-05	2.622
MT+S+TW+AG+MT*TW+S*TW+MT*AG+S*AG+TW*AG+S*TW*AG	0.006	2.61E-05	4.33E-03	4.71E-05	6.599
MT+S+TW+AG+MT*S*S*TW+MT*AG+S*AG+TW*AG	0.006	8.58E-06	1.43E-03	1.55E-05	2.822
MT+S+TW+AG+MT*S*TW+MT*AG+S*AG+TW*AG+MT*S*AG	0.006	8.39E-06	1.39E-03	1.52E-05	6.177
MT+S+TW+AG+S*TW+MT*AG+S*AG+TW*AG+S*TW*AG	0.006	7.58E-06	1.26E-03	1.37E-05	3.228
MT+S+TW+AG+MT*MT*TW+S*TW+MT*AG+S*AG+TW*AG+MT*S*TW	0.006	5.25E-06	8.72E-04	9.48E-06	3.658
MT+S+TW+AG+MT*S*TW+S*TW+MT*AG+S*AG+TW*AG+MT*S*AG	0.006	5.10E-06	8.46E-04	9.21E-06	6.232
MT+TW+AG+TW*AG	0.006	3.85E-06	6.39E-04	6.95E-06	2.186
MT+S+TW+AG+MT*MT*S*TW+MT*AG+S*AG+TW*AG+S*TW*AG	0.006	3.81E-06	6.33E-04	6.88E-06	3.143
MT+TW+AG+MT*TW+TW*AG	0.006	2.67E-06	4.43E-04	4.82E-06	3.385
MT+S+TW+AG+MT*S*S*TW+MT*AG+S*AG+TW*AG+MT*S*AG	0.006	1.59E-06	2.63E-04	2.87E-06	7.302
MT+S+TW+AG+MT*S*S*TW+MT*AG+S*AG+TW*AG+S*TW*AG	0.006	1.13E-06	1.88E-04	2.05E-06	3.025
MT+S+TW+AG+MT*TW+TW*AG	0.006	1.02E-06	1.69E-04	1.83E-06	48.071
MT+S+TW+AG+MT*MT*S*TW+S*TW+MT*AG+S*AG+TW*AG+MT*S*TW+MT*S*AG	0.006	9.48E-07	1.57E-04	1.71E-06	4.092
MT+S+TW+AG+TW*AG	0.006	8.53E-07	1.42E-04	1.54E-06	6.447
MT+S+TW+AG+MT*S*TW+S*TW+MT*AG+S*AG+TW*AG+MT*S*AG+S*TW*AG	0.006	7.46E-07	1.24E-04	1.35E-06	4.088
MT+S+TW+AG+MT*S*TW+S*TW+MT*AG+S*AG+TW*AG+MT*S*TW+S*TW*AG	0.006	7.20E-07	1.19E-04	1.30E-06	4.871
MT+S+TW+AG+MT*S*S*TW+MT*AG+S*AG+TW*AG+MT*S*AG+S*TW*AG	0.006	1.91E-07	3.17E-05	3.45E-07	3.160
MT+S+TW+AG+MT*S*TW+S*TW+MT*AG+S*AG+TW*AG+MT*S*TW+MT*S*AG+S*TW*AG	0.006	1.36E-07	2.26E-05	2.46E-07	3.836
MT+S+TW+AG+S*TW+TW*AG	0.006	1.32E-07	2.19E-05	2.38E-07	2.838
MT+S+TW+AG+MT*S*TW*AG	0.006	1.22E-07	2.03E-05	2.21E-07	3.514
MT+S+TW+AG+MT*TW+S*TW+TW*AG	0.006	9.60E-08	1.59E-05	1.73E-07	5.848
MT+S+TW+AG+S*AG+TW*AG	0.006	9.55E-08	1.59E-05	1.72E-07	2.878
MT+S+TW+AG+MT*S*TW+TW*AG	0.006	8.42E-08	1.40E-05	1.52E-07	4.585
MT+S+TW+AG+MT*TW+S*AG+TW*AG	0.006	6.75E-08	1.12E-05	1.22E-07	2.548
MT+S+TW+AG+MT*S*S*TW+TW*AG	0.006	1.98E-08	3.29E-06	3.58E-08	3.117
MT+S+TW+AG+S*TW+S*AG+TW*AG	0.006	1.61E-08	2.68E-06	2.91E-08	3.504
MT+S+TW+AG+MT*S*S*AG+TW*AG	0.006	1.57E-08	2.60E-06	2.83E-08	7.322
MT+S+TW+AG+MT*S*TW+S*TW+TW*AG	0.006	1.37E-08	2.27E-06	2.47E-08	3.304
MT+S+TW+AG+MT*TW+S*TW+S*AG+TW*AG	0.006	1.19E-08	1.97E-06	2.15E-08	3.070
MT+S+TW+AG+MT*S*TW+S*AG+TW*AG	0.006	1.06E-08	1.75E-06	1.91E-08	3.638
MT+S+TW+AG+MT*S*S*TW+S*AG+TW*AG	0.006	2.45E-09	4.07E-07	4.42E-09	3.376
MT+S+TW+AG+MT*S*TW+S*TW+TW*AG+MT*S*TW	0.006	2.36E-09	3.92E-07	4.27E-09	3.288
MT+S+TW+AG+MT*S*TW+S*TW+S*AG+TW*AG	0.006	1.90E-09	3.16E-07	3.44E-09	6.149
MT+S+TW+AG+S*TW+S*AG+TW*AG+S*TW*AG	0.006	1.77E-09	2.93E-07	3.19E-09	2.801
MT+S+TW+AG+MT*TW+S*TW+S*AG+TW*AG+S*TW*AG	0.006	1.39E-09	2.31E-07	2.51E-09	3.456
MT+S+TW+AG+MT*S*TW+S*TW+S*AG+TW*AG+MT*S*TW	0.006	2.90E-10	4.81E-08	5.24E-10	3.147
MT+S+TW+AG+MT*S*S*TW+S*AG+TW*AG+S*TW*AG	0.006	2.64E-10	4.38E-08	4.76E-10	2.684

Continued

Supplementary Table 3: Continued

Models	P(M)	P(M data)	BFM	BF10	error %
MT+S+TW+AG+MT*S+MT*TW+S*TW+S*AG+TW*AG+S*TW*AG	0.006	2.21E-10	3.67E-08	4.00E-10	8.032
MT+S+TW+AG+MT*S+MT*TW+S*TW+S*AG+TW*AG+MT*S*TW+S*TW*AG	0.006	3.18E-11	5.28E-09	5.74E-11	2.664
MT+TW+AG+MT*AG	0.006	1.20E-13	1.99E-11	2.17E-13	2.847
MT+AG+MT*AG	0.006	1.08E-13	1.79E-11	1.95E-13	2.038
MT+AG	0.006	6.94E-14	1.15E-11	1.25E-13	1.965
MT+TW+AG	0.006	5.99E-14	9.94E-12	1.08E-13	2.849
MT+TW+AG+MT*TW+MT*AG	0.006	3.06E-14	5.07E-12	5.52E-14	2.141
MT+S+TW+AG+MT*AG	0.006	2.46E-14	4.09E-12	4.45E-14	3.437
MT+S+AG+MT*AG	0.006	2.18E-14	3.62E-12	3.94E-14	2.645
MT+S+AG	0.006	1.46E-14	2.42E-12	2.63E-14	2.867
MT+TW+AG+MT*TW	0.006	1.32E-14	2.19E-12	2.38E-14	2.421
MT+S+TW+AG	0.006	1.24E-14	2.07E-12	2.25E-14	3.141
MT+S+TW+AG+MT*TW+MT*AG	0.006	6.38E-15	1.06E-12	1.15E-14	3.649
MT+S+TW+AG+MT*S+MT*AG	0.006	4.23E-15	7.02E-13	7.63E-15	15.750
MT+S+TW+AG+S*TW+MT*AG	0.006	3.78E-15	6.28E-13	6.83E-15	2.581
MT+S+AG+MT*S+MT*AG	0.006	3.26E-15	5.41E-13	5.88E-15	2.560
MT+S+TW+AG+MT*TW	0.006	2.74E-15	4.55E-13	4.95E-15	3.575
MT+S+TW+AG+MT*AG+S*AG	0.006	2.26E-15	3.75E-13	4.08E-15	2.562
MT+S+AG+MT*AG+S*AG	0.006	2.11E-15	3.50E-13	3.81E-15	3.686
MT+S+AG+MT*S	0.006	2.11E-15	3.50E-13	3.80E-15	2.535
MT+S+TW+AG+S*TW	0.006	2.02E-15	3.36E-13	3.66E-15	7.089
MT+S+TW+AG+MT*S	0.006	1.79E-15	2.98E-13	3.24E-15	2.737
MT+S+AG+S*AG	0.006	1.28E-15	2.12E-13	2.31E-15	2.481
MT+S+TW+AG+S*AG	0.006	1.11E-15	1.85E-13	2.01E-15	2.594
MT+S+TW+AG+MT*TW+S*TW+MT*AG	0.006	9.84E-16	1.63E-13	1.78E-15	2.725
MT+S+TW+AG+MT*S+MT*TW+MT*AG	0.006	9.32E-16	1.55E-13	1.68E-15	4.532
MT+S+TW+AG+MT*TW+MT*AG+S*AG	0.006	6.00E-16	9.97E-14	1.08E-15	2.471
MT+S+TW+AG+MT*S+S*TW+MT*AG	0.006	5.38E-16	8.93E-14	9.72E-16	2.629
MT+S+TW+AG+MT*TW+S*TW	0.006	4.44E-16	7.37E-14	8.02E-16	3.049
MT+S+TW+AG+MT*S+MT*TW	0.006	4.12E-16	6.84E-14	7.44E-16	5.341
MT+S+TW+AG+S*TW+MT*AG+S*AG	0.006	3.66E-16	6.07E-14	6.61E-16	3.087
MT+S+TW+AG+MT*S+MT*AG+S*AG	0.006	3.56E-16	5.91E-14	6.43E-16	3.898
MT+S+AG+MT*S+MT*AG+S*AG	0.006	3.00E-16	4.98E-14	5.42E-16	2.696
MT+S+TW+AG+MT*S+S*TW	0.006	2.85E-16	4.73E-14	5.15E-16	3.735
MT+S+TW+AG+MT*TW+S*AG	0.006	2.51E-16	4.17E-14	4.54E-16	2.713
MT+S+AG+MT*S+S*AG	0.006	1.90E-16	3.16E-14	3.44E-16	2.968
MT+S+TW+AG+MT*S+S*AG	0.006	1.74E-16	2.89E-14	3.14E-16	6.020
MT+S+TW+AG+S*TW+S*AG	0.006	1.72E-16	2.86E-14	3.11E-16	2.896
MT+S+TW+AG+MT*S+MT*TW+S*TW+MT*AG	0.006	1.69E-16	2.80E-14	3.05E-16	5.685
MT+S+TW+AG+MT*TW+S*TW+MT*AG+S*AG	0.006	9.77E-17	1.62E-14	1.76E-16	4.028
MT+S+TW+AG+MT*S+MT*TW+MT*AG+S*AG	0.006	9.20E-17	1.53E-14	1.66E-16	6.108
MT+S+TW+AG+MT*S+MT*TW+S*TW	0.006	6.80E-17	1.13E-14	1.23E-16	5.595
MT+S+TW+AG+MT*S+S*TW+MT*AG+S*AG	0.006	5.41E-17	8.98E-15	9.76E-17	3.924
MT+S+TW+AG+MT*TW+S*TW+S*AG	0.006	3.86E-17	6.41E-15	6.98E-17	2.598
MT+S+TW+AG+MT*S+MT*AG+S*AG+MT*S*AG	0.006	3.77E-17	6.27E-15	6.82E-17	3.418
MT+S+TW+AG+MT*S+MT*TW+S*AG	0.006	3.70E-17	6.15E-15	6.69E-17	3.458
MT+S+AG+MT*S+MT*AG+S*AG+MT*S*AG	0.006	3.24E-17	5.38E-15	5.85E-17	2.618
MT+S+TW+AG+MT*S+S*TW+S*AG	0.006	2.66E-17	4.42E-15	4.80E-17	3.490
MT+S+TW+AG+MT*S+MT*TW+S*TW+MT*AG+MT*S*TW	0.006	2.21E-17	3.67E-15	3.99E-17	2.838
MT+S+TW+AG+MT*S+MT*TW+S*TW+MT*AG+S*AG	0.006	1.45E-17	2.41E-15	2.62E-17	4.014
MT+S+TW+AG+MT*S+MT*TW+MT*AG+S*AG+MT*S*AG	0.006	1.07E-17	1.78E-15	1.94E-17	7.818
MT+S+TW+AG+MT*S+MT*TW+S*TW+MT*S*TW	0.006	9.80E-18	1.63E-15	1.77E-17	3.301
MT+S+TW+AG+MT*S+S*TW+MT*AG+S*AG+MT*S*AG	0.006	5.64E-18	9.37E-16	1.02E-17	2.919
MT+S+TW+AG+MT*S+MT*TW+S*TW+S*AG	0.006	5.51E-18	9.14E-16	9.94E-18	2.968
MT+S+TW+AG+MT*S+MT*TW+S*TW+MT*AG+S*AG+MT*S*TW	0.006	2.25E-18	3.74E-16	4.07E-18	3.576
MT+S+TW+AG+MT*S+MT*TW+S*TW+MT*AG+S*AG+MT*S*AG	0.006	1.52E-18	2.52E-16	2.74E-18	3.209
MT+S+TW+AG+MT*S+MT*TW+S*TW+S*AG+MT*S*TW	0.006	9.17E-19	1.52E-16	1.66E-18	3.564
TW+AG+TW*AG	0.006	4.20E-19	6.97E-17	7.58E-19	1.970
MT+S+TW+AG+MT*S+MT*TW+S*TW+MT*AG+S*AG+MT*S*TW+MT*S*AG	0.006	2.54E-19	4.21E-17	4.58E-19	4.118
S+TW+AG+TW*AG	0.006	8.49E-20	1.41E-17	1.53E-19	2.221
S+TW+AG+S*TW+TW*AG	0.006	1.45E-20	2.40E-18	2.61E-20	5.993
S+TW+AG+S*AG+TW*AG	0.006	7.48E-21	1.24E-18	1.35E-20	2.401
AG	0.006	2.18E-21	3.62E-19	3.94E-21	1.809
S+TW+AG+S*TW+S*AG+TW*AG	0.006	1.12E-21	1.86E-19	2.02E-21	2.326
TW+AG	0.006	8.27E-22	1.37E-19	1.49E-21	2.338
S+AG	0.006	4.48E-22	7.43E-20	8.08E-22	2.502
S+TW+AG	0.006	1.65E-22	2.74E-20	2.99E-22	2.219
S+TW+AG+S*TW+S*AG+TW*AG+S*TW*AG	0.006	1.07E-22	1.78E-20	1.93E-22	2.691
S+AG+S*AG	0.006	3.63E-23	6.02E-21	6.55E-23	3.535
S+TW+AG+S*TW	0.006	2.49E-23	4.14E-21	4.50E-23	2.614
S+TW+AG+S*AG	0.006	1.33E-23	2.21E-21	2.40E-23	2.330
S+TW+AG+S*TW+S*AG	0.006	2.13E-24	3.54E-22	3.85E-24	5.487
MT	0.006	3.18E-44	5.28E-42	5.75E-44	1.809
MT+S	0.006	7.44E-45	1.23E-42	1.34E-44	13.594
MT+TW	0.006	4.37E-45	7.25E-43	7.89E-45	2.449
Nullmodel	0.006	3.68E-45	6.10E-43	6.64E-45	1.809
MT+S+MT*S	0.006	9.42E-46	1.56E-43	1.70E-45	2.757
MT+S+TW	0.006	9.07E-46	1.51E-43	1.64E-45	2.639
S	0.006	7.52E-46	1.25E-43	1.36E-45	1.809
TW	0.006	4.84E-46	8.03E-44	8.73E-46	1.809
MT+TW+MT*TW	0.006	3.82E-46	6.34E-44	6.90E-46	2.364
MT+S+TW+S*TW	0.006	1.27E-46	2.10E-44	2.28E-46	2.651
MT+S+TW+MT*S	0.006	1.26E-46	2.10E-44	2.28E-46	3.427
S+TW	0.006	9.71E-47	1.61E-44	1.75E-46	2.622
MT+S+TW+MT*TW	0.006	7.47E-47	1.24E-44	1.35E-46	2.657
MT+S+TW+MT*S+S*TW	0.006	1.82E-47	3.03E-45	3.29E-47	3.282

Continued

Supplementary Table 3: Continued

Models	P(M)	P(M data)	BFM	BF10	error %
S+TW+S*TW	0.006	1.39E-47	2.31E-45	2.52E-47	2.496
MT+S+TW+MT*S+MT*TW	0.006	1.08E-47	1.80E-45	1.96E-47	2.610
MT+S+TW+MT*TW+S*TW	0.006	1.07E-47	1.78E-45	1.94E-47	2.584
MT+S+TW+MT*S+MT*TW+S*TW	0.006	1.54E-48	2.56E-46	2.79E-48	2.711
MT+S+TW+MT*S+MT*TW+S*TW+MT*S*TW	0.006	2.28E-49	3.78E-47	4.11E-49	3.915

MT: Model Type; TW: Time Window; S: natural or log Scale; AG: Age group; P(M): Prior model probability; P(M|data): posterior model probability; BFM: the change from prior odds to posterior odds; BF10: the Bayes factor relative to the best model; error %: indicates the precision of the numerical approximation. ** As the estimated Bayes factors are relative to the best performing model, there is no relative error associated with the best performing model.



Supplementary Table 4: The feature importance for the T⁰ RFR model predicting the top 100 postal codes with the highest number of COVID-19 cases

	Feature	Feature importance
All age groups together	GT COVID-19	0.00014
	GT Reuk	0.00009
	Temporal lag 1	0.00008
	Temporal lag 2	0.00007
	Local Moran I	0.00005
	Global Moran I	0.00004
	Stringency index	0.00002
	SIR	0.00002
	GT COVID-19 Testen	0.00002
	GT COVID-19 vaccine	0.00001
	GT Loss of smell	0.00001
	GT Coronavirus disease 2019	0.00001
	GT Symptoms of COVID-19	0.00001
	GT COVID-19 Testing	0.00001
	GT Symptomen van COVID-	0.00000
	Total number of inhabitants in a postal code	0.00000
	Average size of household in a postal code	0.00000
	Population density of a postal code	0.00000
	Total number of households in a postal code	0.00000
Per age group	GT Reuk	0.00008
	GT COVID-19	0.00006
	Temporal lag 1 (40-64)	0.00003
	Local Moran I (20-39)	0.00003
	Temporal lag 2 (40-64)	0.00002
	Global Moran I (20-39)	0.00002
	Local Moran I (>=80)	0.00002
	Local Moran I (65-79)	0.00002
	Local Moran I (40-64)	0.00002
	Global Moran I (40-64)	0.00002
	Temporal lag 1 (20-39)	0.00002
	Local Moran I (12-19)	0.00002
	Local Moran I (<12)	0.00002
	Temporal lag 2 (20-39)	0.00002
	Global Moran I (12-19)	0.00002
	SIR	0.00002
	Global Moran I (65-79)	0.00001
	Stringency index	0.00001
	Temporal lag 1 (12-19)	0.00001
	Global Moran I (<12)	0.00001
	Temporal lag 2 (12-19)	0.00001
	Global Moran I (>=80)	0.00001
	GT COVID-19 Testen	0.00001
	GT COVID-19 Vaccine	0.00001
	Temporal lag 1 (65-79)	0.00001
	GT Loss of smell	0.00000
	GT Coronavirus disease 2019	0.00000
	Temporal lag 2 (65-79)	0.00000
	GT COVID-19 Testing	0.00000
	GT Symptoms of COVID-19	0.00000
	GT Symptomen van COVID-19	0.00000
	Temporal lag 1 (<12)	0.00000
	Temporal lag 2 (<12)	0.00000
	Temporal lag 1 (>=80)	0.00000
	Temporal lag 2 (>=80)	0.00000
	Total number of inhabitants in a postal code	0.00000
	Average size of household in a postal code	0.00000
	Population density of a postal code	0.00000
	Total number of households in a postal code	0.00000

GT: Google Trends; SIR: Standardized Incidence Ratio.