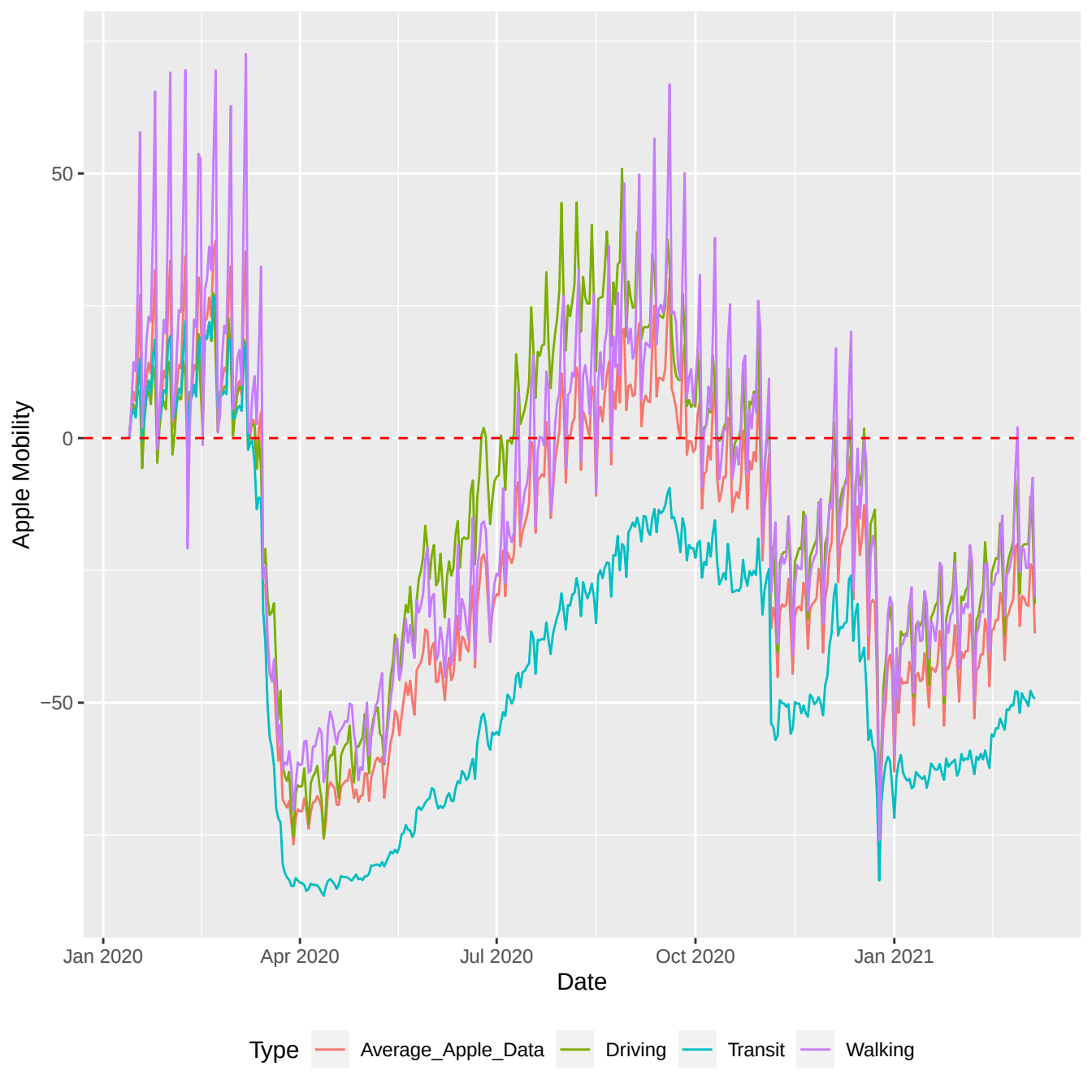
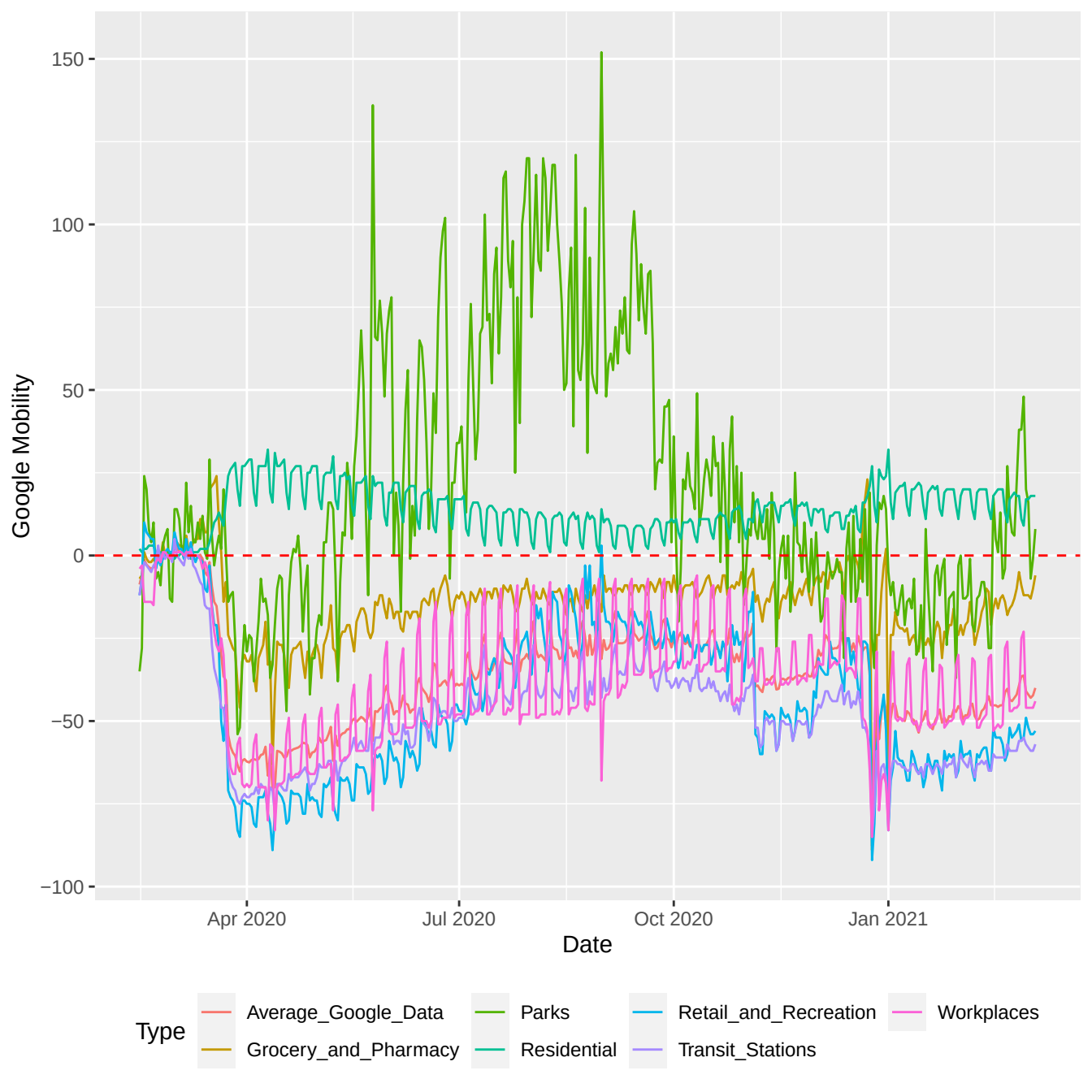
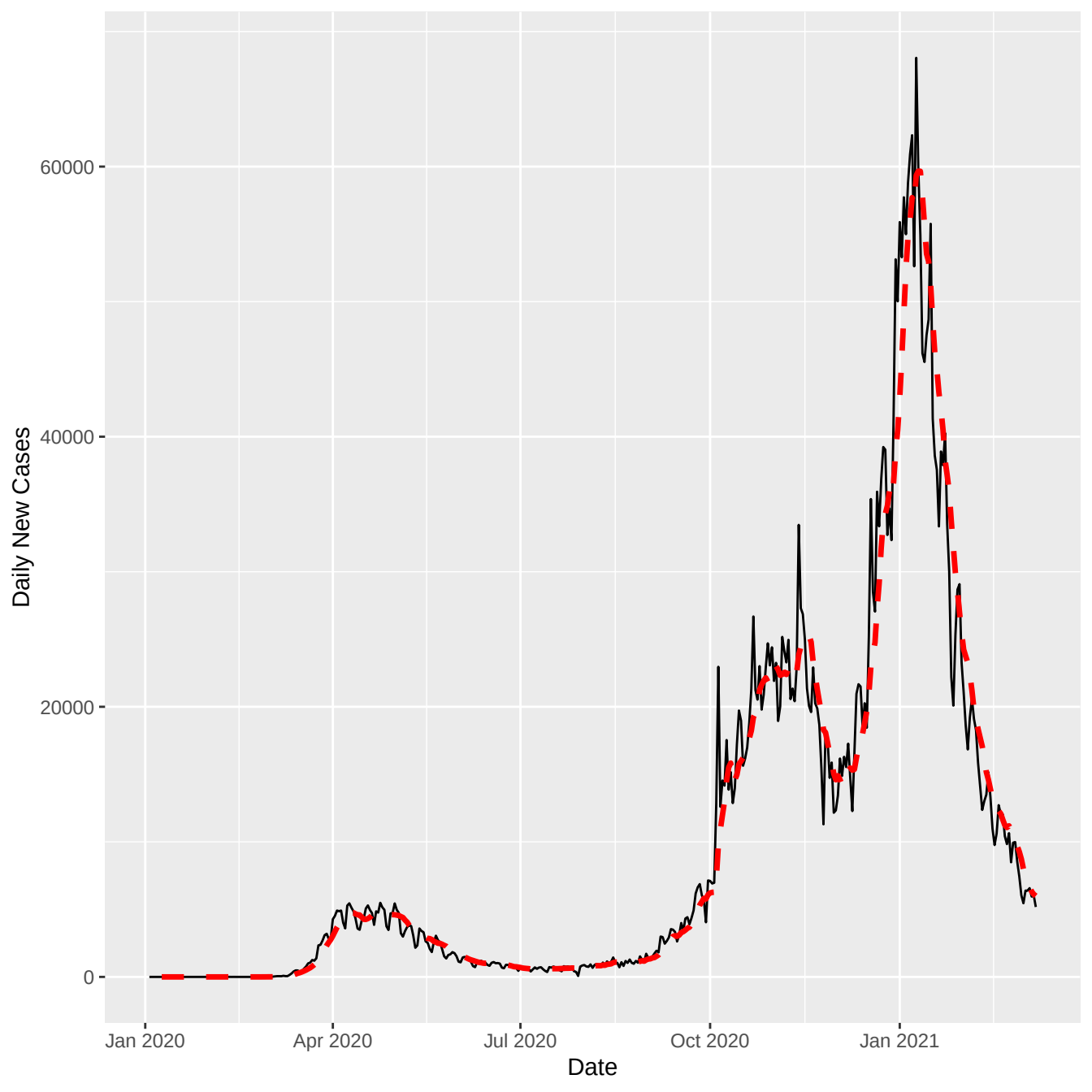
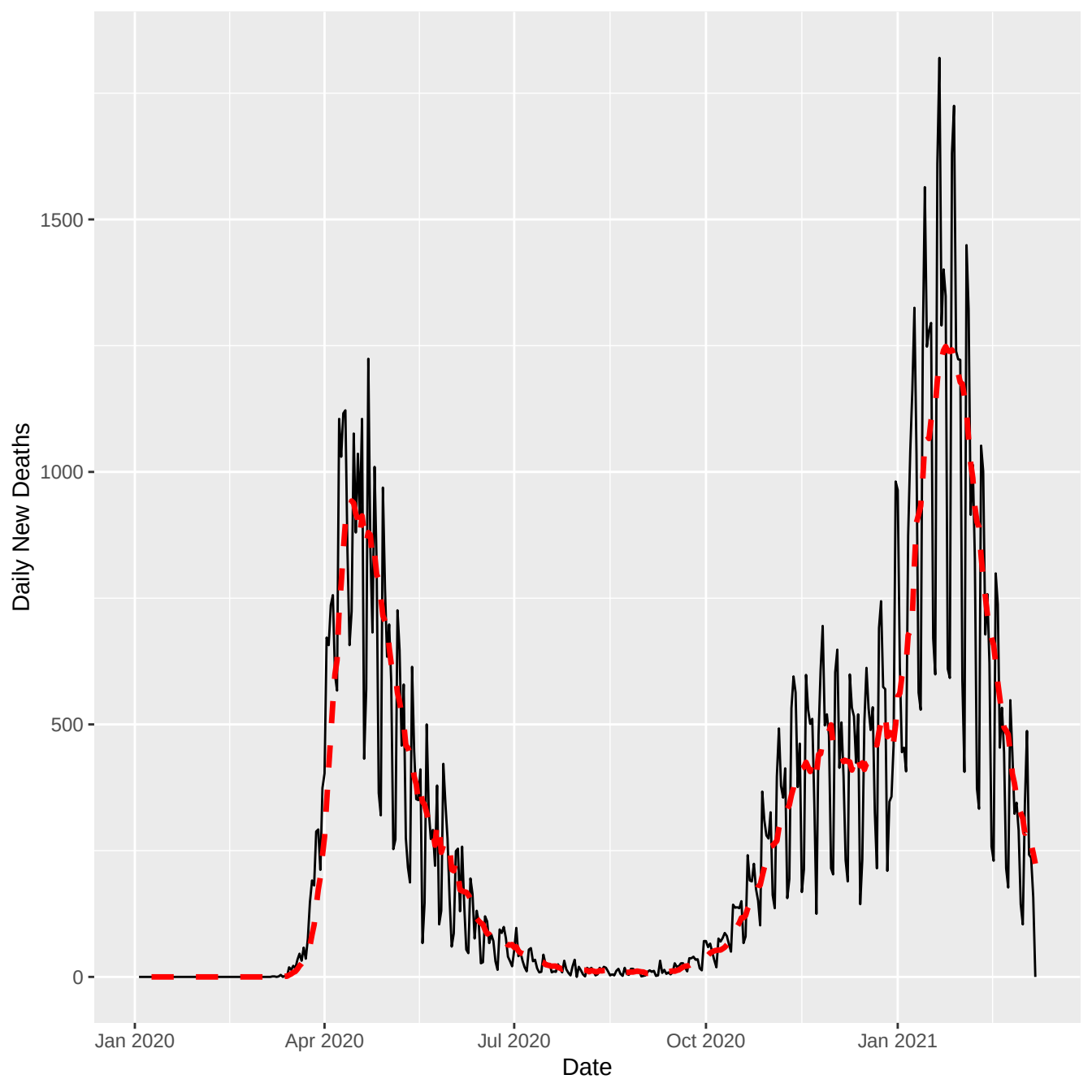
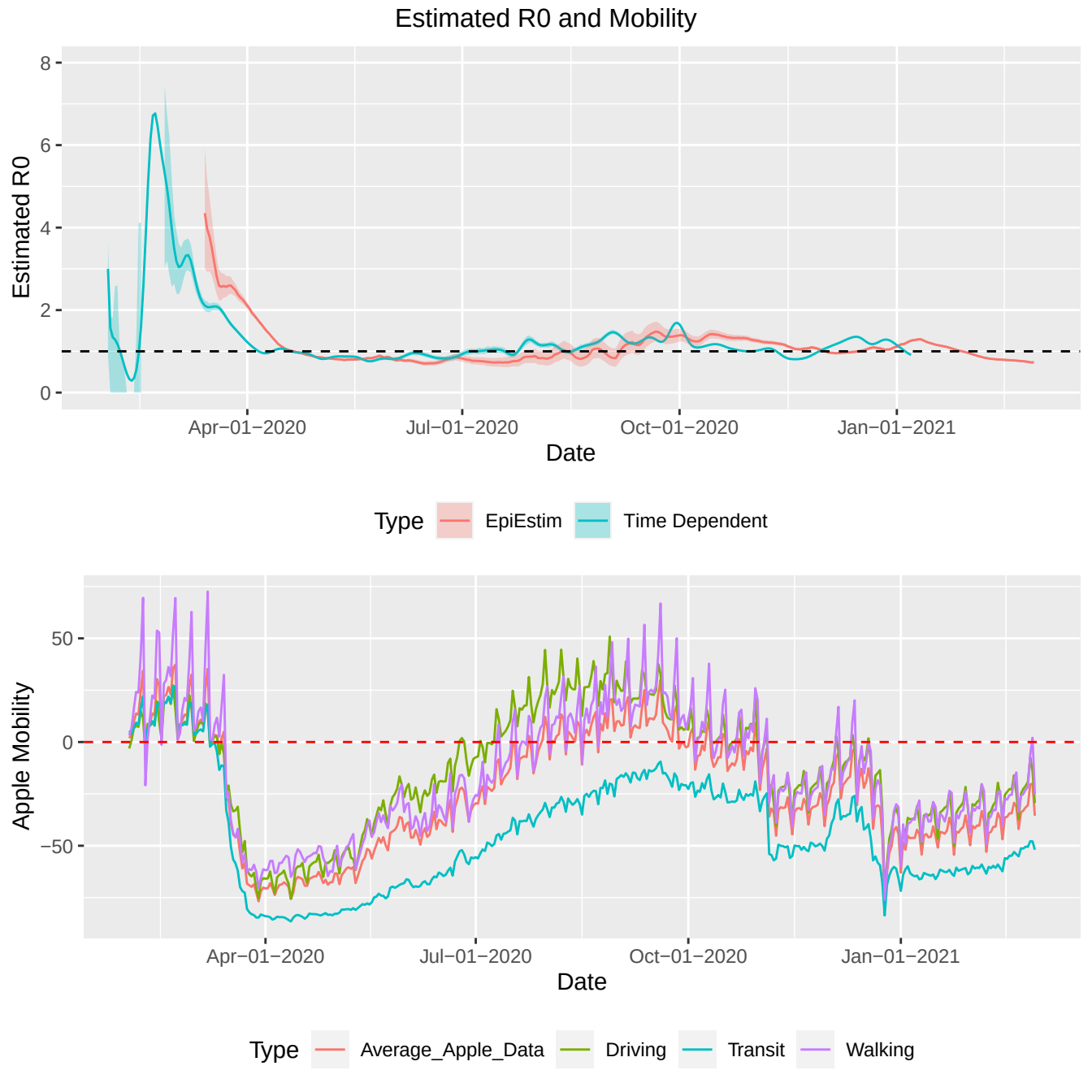

50
0
−50
Apple Mobility
Jan 2020
Apr 2020
Jul 2020
Oct 2020
Jan 2021
Date
Type
Average_Apple_Data
Driving
Transit
Walking

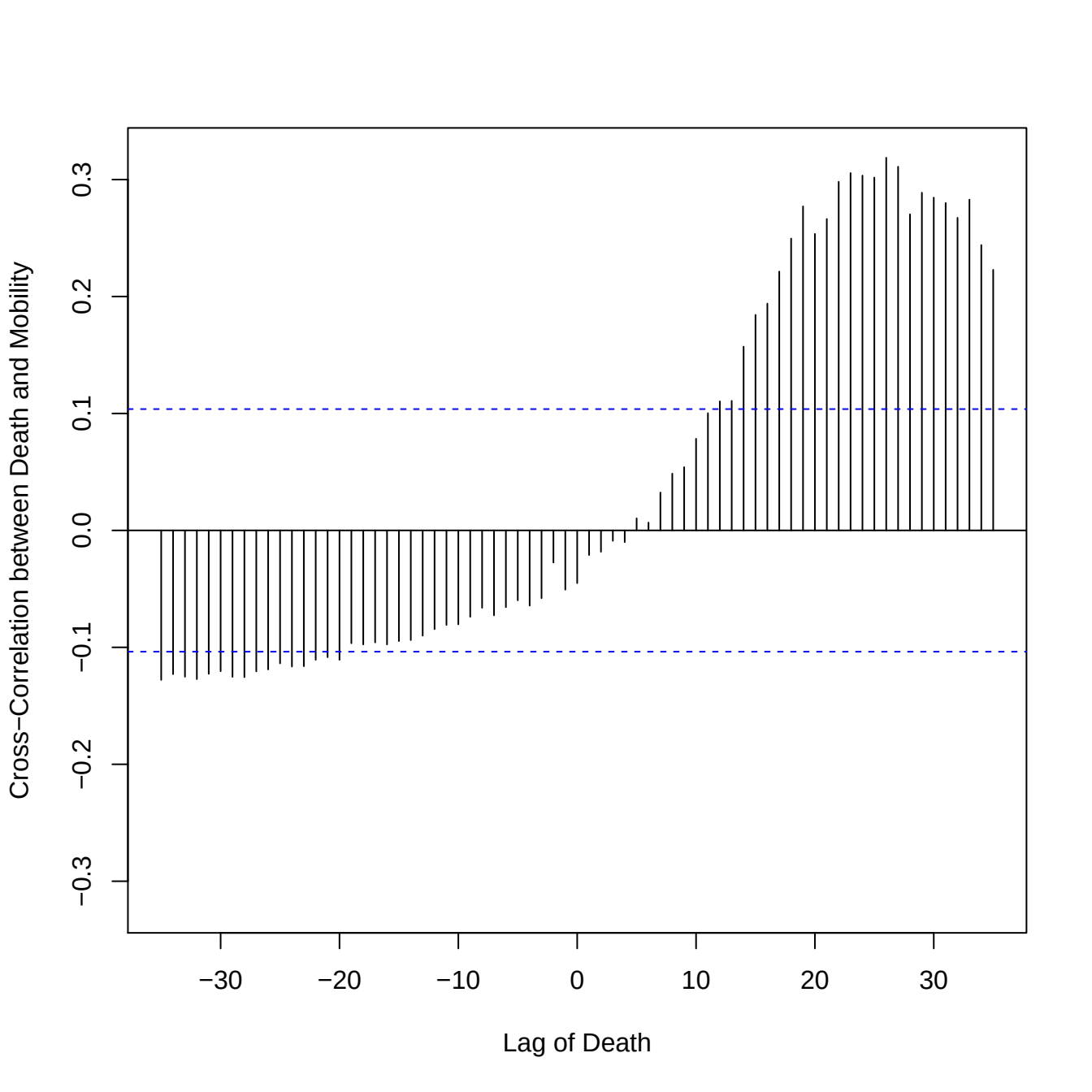

150
100
50
0
−50
−100
Google Mobility
Apr 2020
Jul 2020
Oct 2020
Jan 2021
Date
Type
Average_Google_Data
Grocery_and_Pharmacy
Parks
Residential
Retail_and_Recreation
Transit_Stations
Workplaces

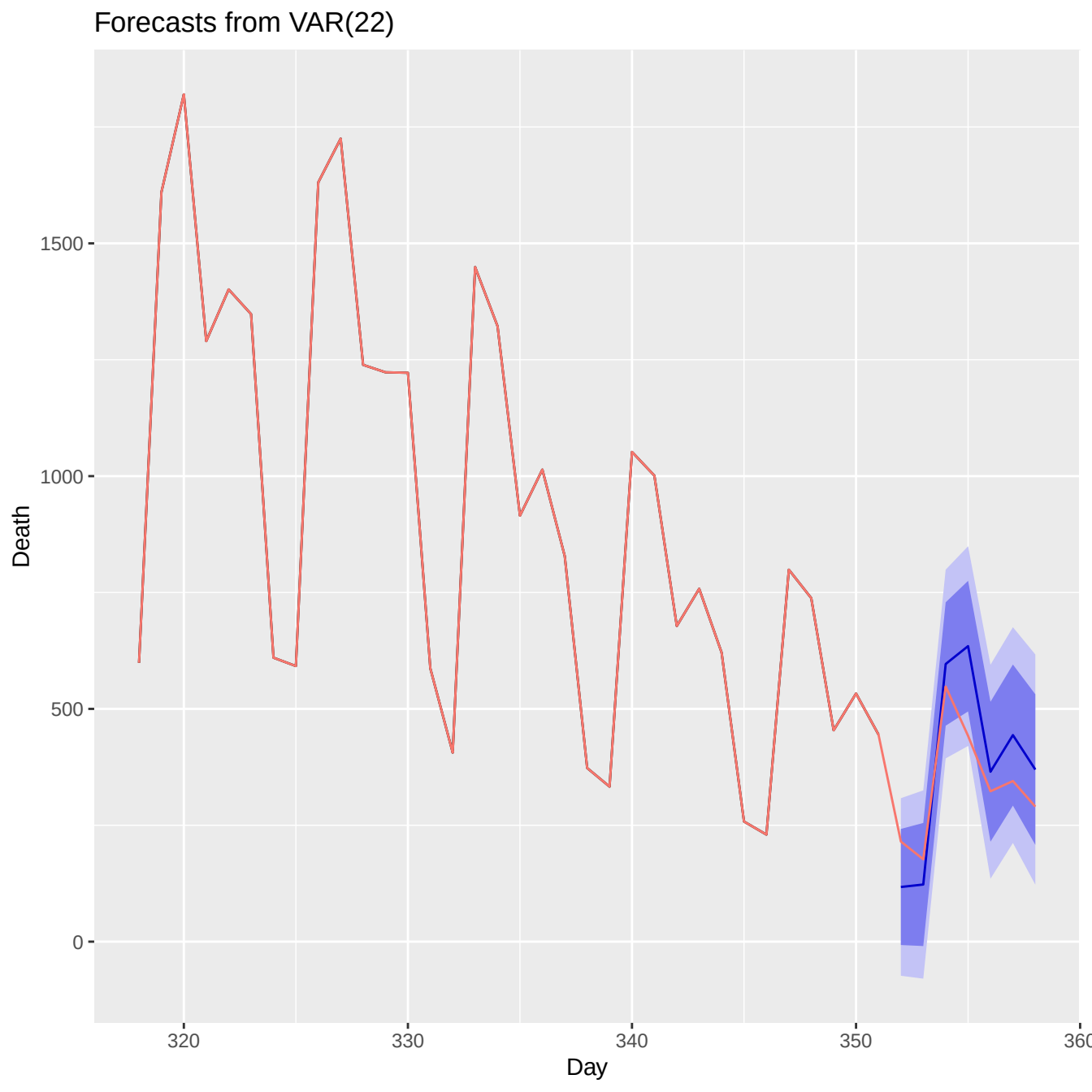

60000
40000
20000
0
Daily New Cases
Jan 2020
Apr 2020
Jul 2020
Oct 2020
Jan 2021
Date

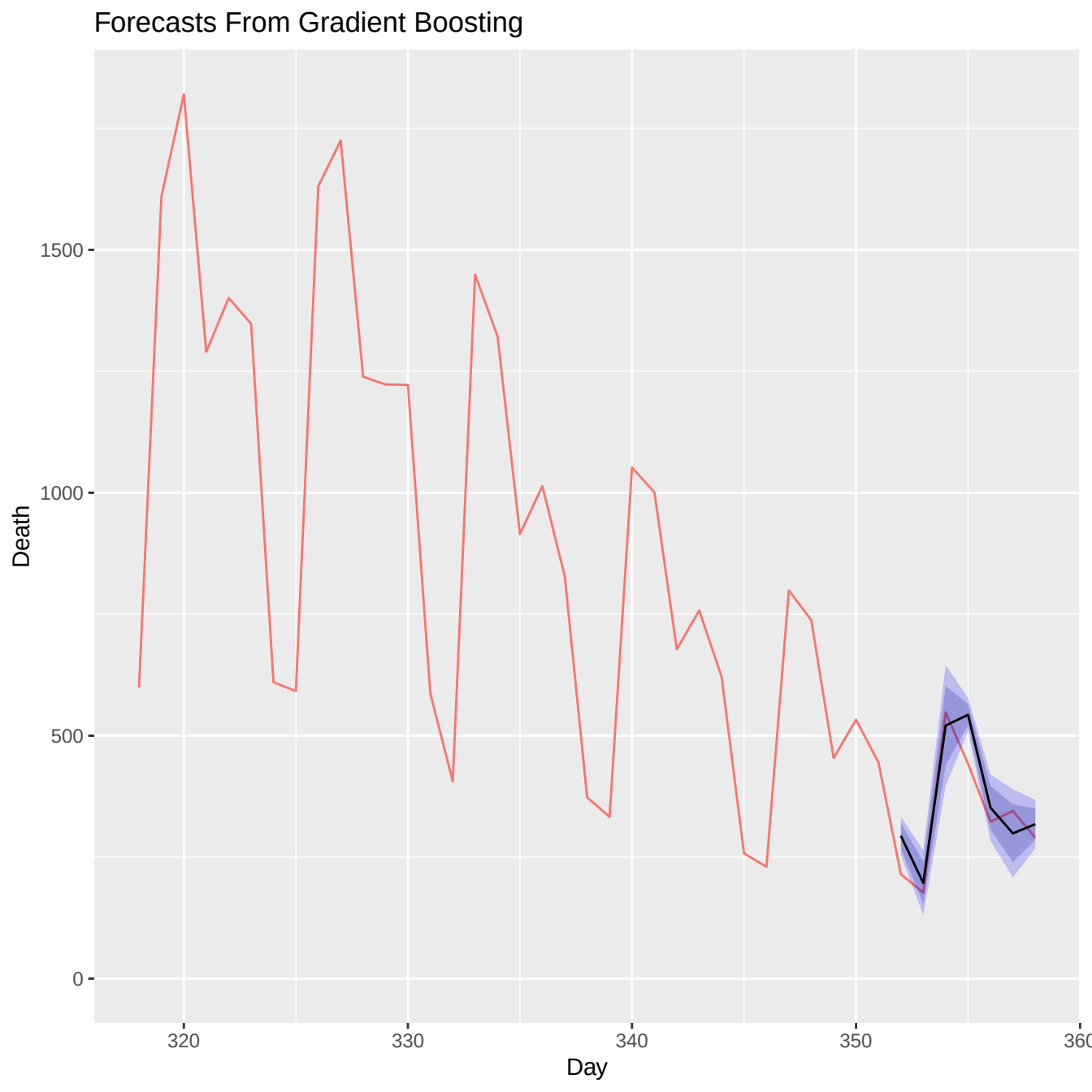

Daily New Deaths
1500
1000
500
0
Jan 2020
Apr 2020
Jul 2020
Oct 2020
Jan 2021
Date

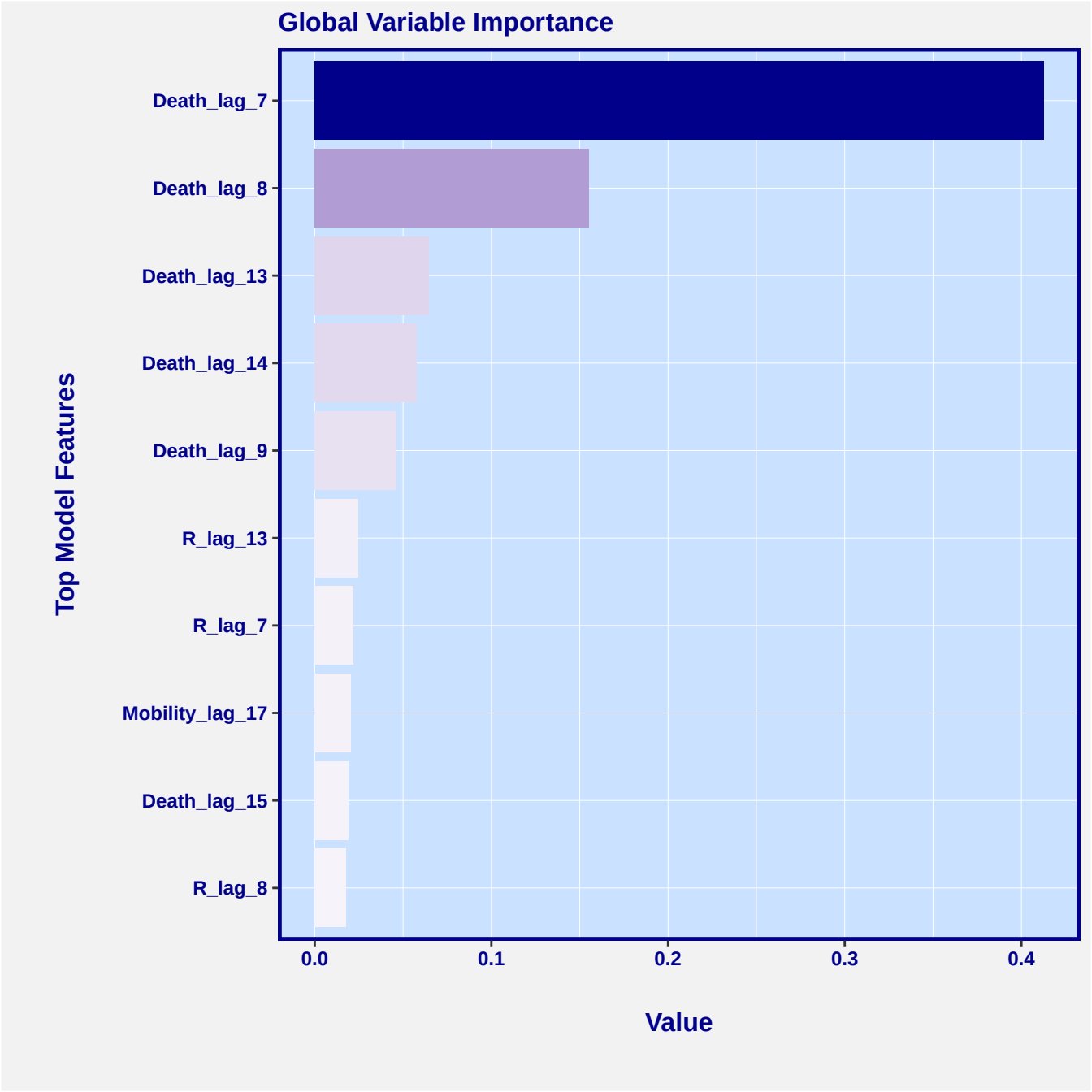
	RMSE	MAE	Death_obs (last week)	Death_pred (this week)	Model
1	55.17764	47	2340	2524	Boosting
2	67.63663	54	2340	2465	Ensemble
3	105.99505	83	2340	2225	ARIMAX
4	99.88917	88	2340	2650	VAR

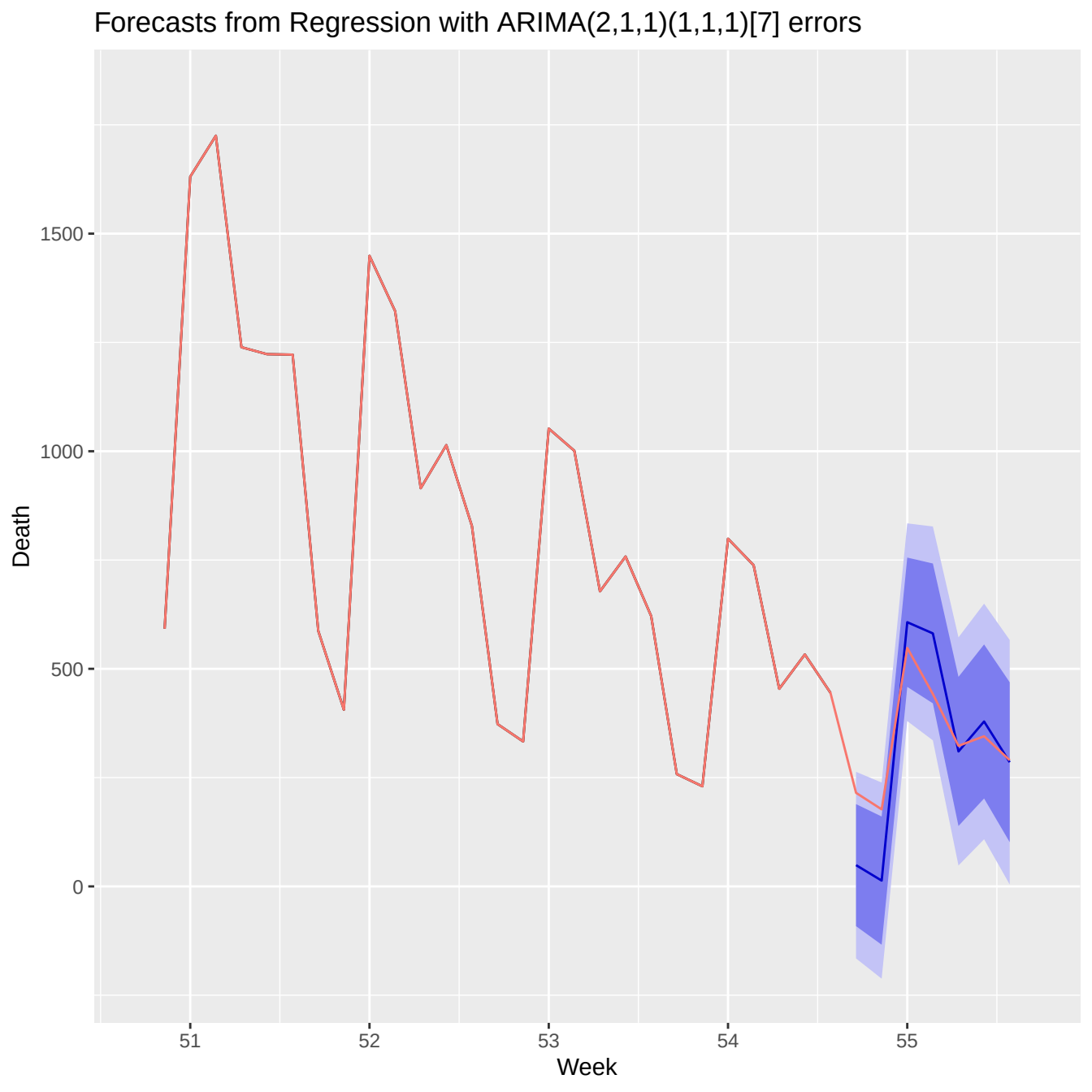

Estimated R0 and Mobility
Estimated R0
8
6
4
2
0
Apr−01−2020
Jul−01−2020
Oct−01−2020
Jan−01−2021
Date
Type
EpiEstim
Time Dependent
Apple Mobility
50
0
−50
Apr−01−2020
Jul−01−2020
Oct−01−2020
Jan−01−2021
Date
Type
Average_Apple_Data
Driving
Transit
Walking

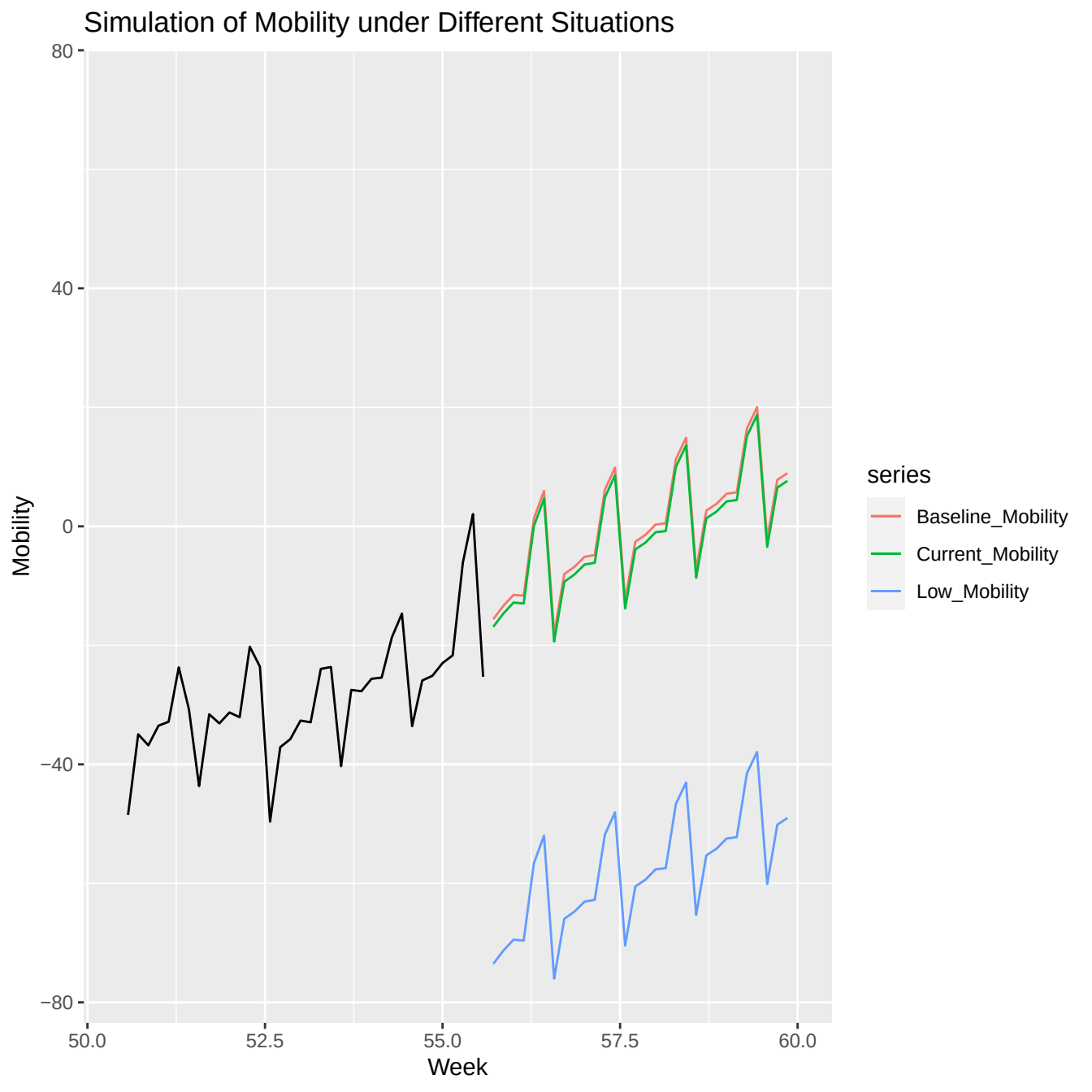

Cross−Correlation between Death and Mobility
0.3
0.2
0.1
0.0
−0.1
−0.2
−0.3
−30
−20
−10
0
10
20
30
Lag of Death

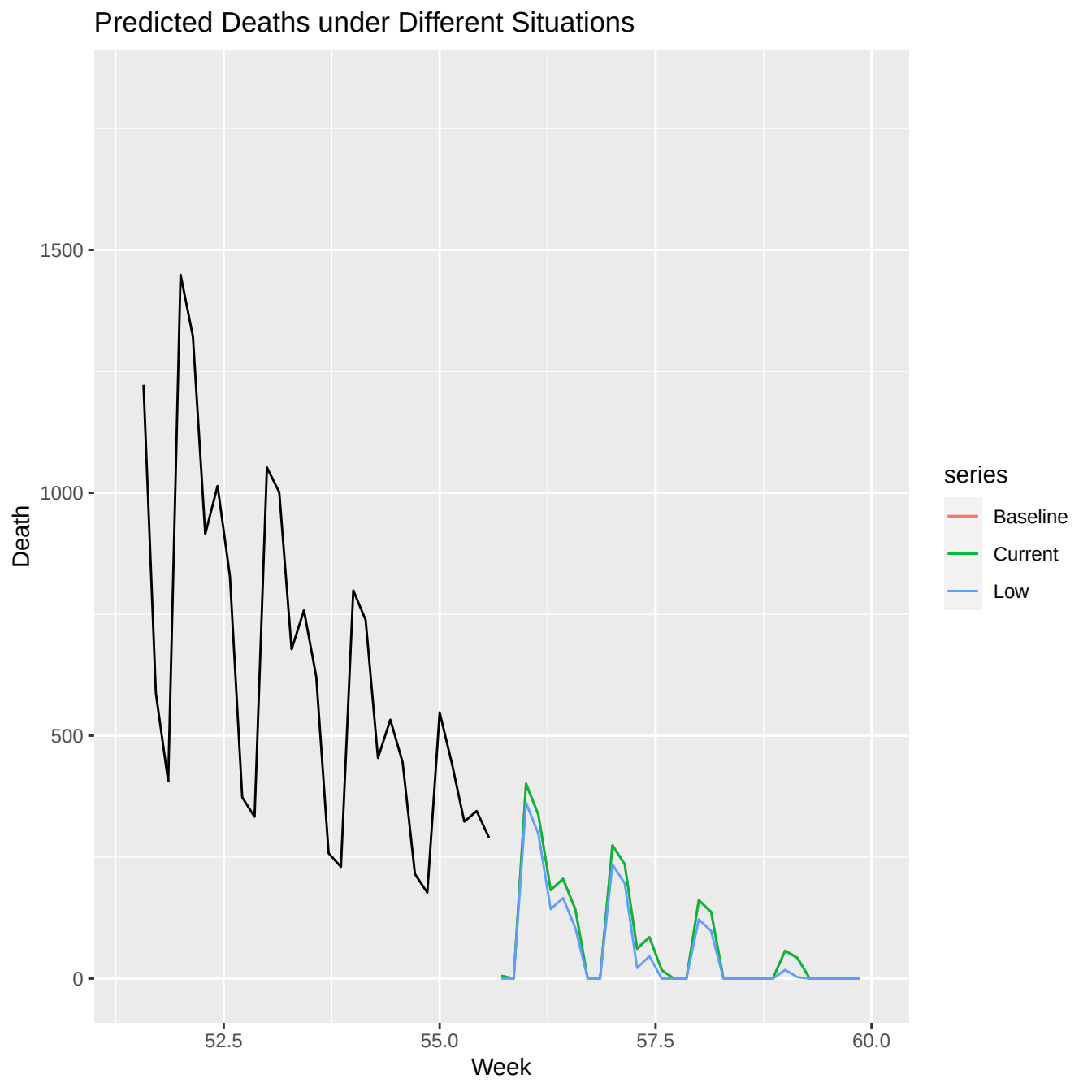

Forecasts from VAR(22)
Death
1500
1000
500
0
320
330
340
350
360
Day


Forecasts From Gradient Boosting
Death
1500
1000
500
0
320
330
340
350
360
Day


Global Variable Importance
Top Model Features
Death_lag_7
Death_lag_8
Death_lag_13
Death_lag_14
Death_lag_9
R_lag_13
R_lag_7
Mobility_lag_17
Death_lag_15
R_lag_8
0.0
0.1
0.2
0.3
0.4
Value


Forecasts from Regression with ARIMA(2,1,1)(1,1,1)[7] errors
Death
1500
1000
500
0
51
52
53
54
55
Week


Simulation of Mobility under Different Situations
80
40
0
−40
−80
Mobility
50.0
52.5
55.0
57.5
60.0
Week
series
Baseline_Mobility
Current_Mobility
Low_Mobility


Predicted Deaths under Different Situations
Death
1500
1000
500
0
52.5
55.0
57.5
60.0
Week
series
Baseline
Current
Low

	Type	Death
1	Baseline	2356
2	Current	2342
3	Low	1813