Primary_Analysis_A

JLee

5/23/2020

The death rate by state with the start of stay-at-home order and the end of it

```
## Warning: Removed 43 rows containing missing values (geom_vline).
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## Warning: Removed 43 rows containing missing values (geom_vline).
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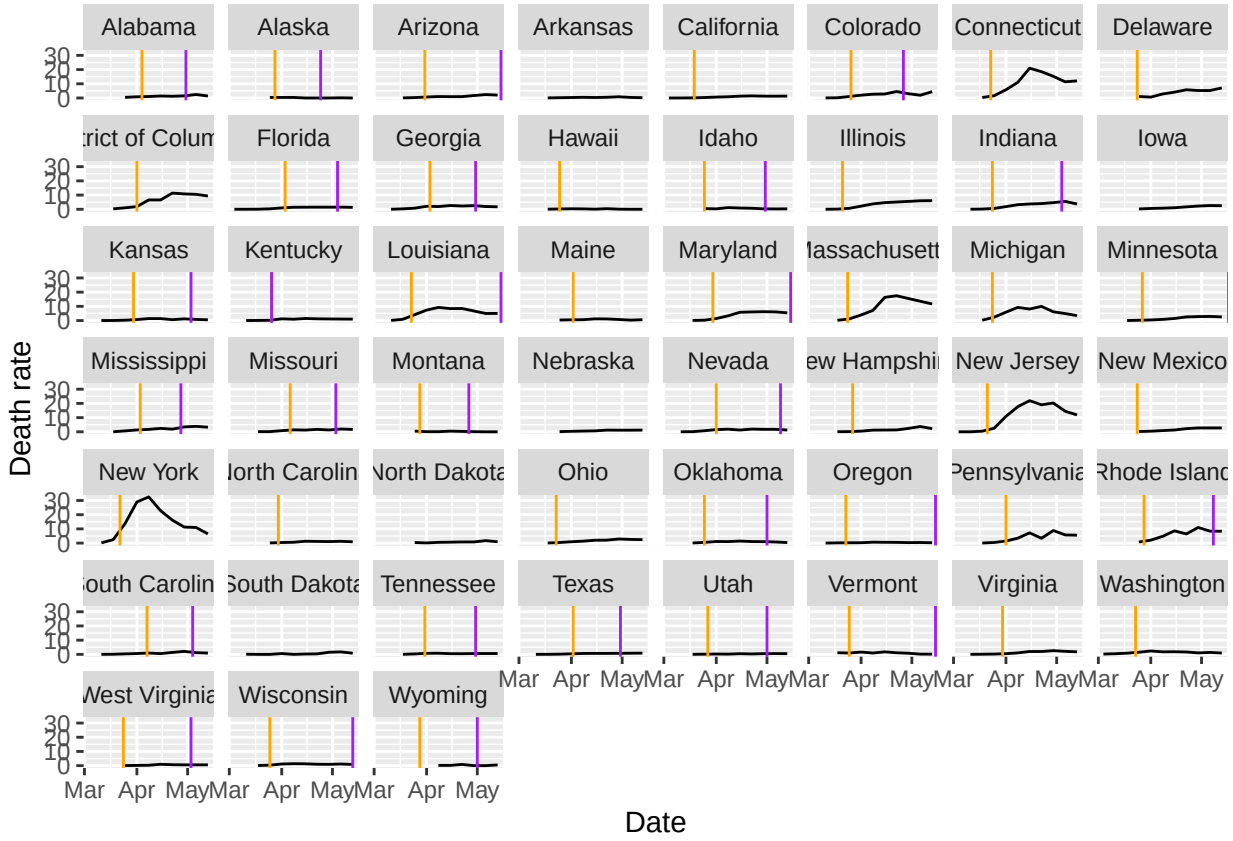

The residential movement by state with the start of stay-at-home order and the end of it

```
## Warning: Removed 43 rows containing missing values (geom_vline).
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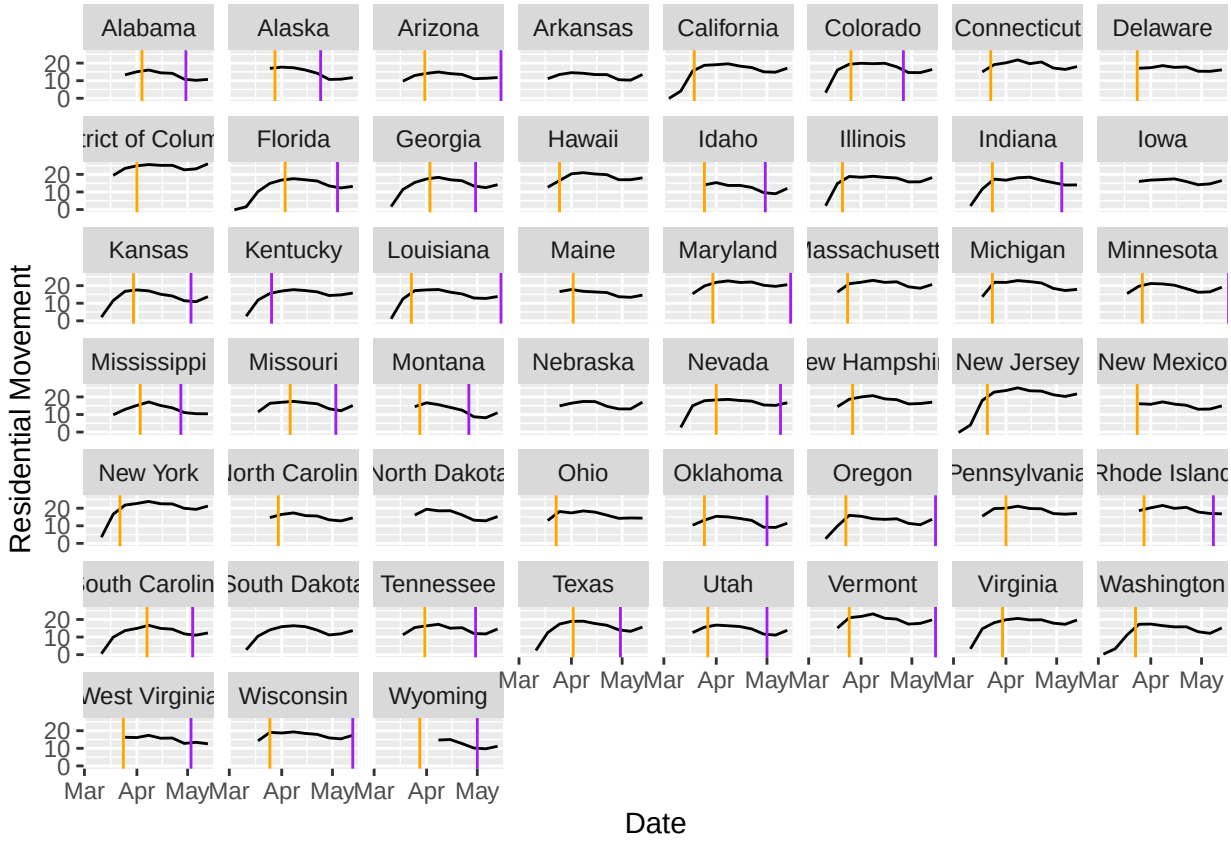
```
## Warning: Removed 43 rows containing missing values (geom_vline).
```



PCA

```
## Standard deviations (1, .., p=6):
## [1] 2.1487103 0.8943853 0.4409785 0.4295747 0.3574441 0.2763266
##
## Rotation (n x k) = (6 x 6):
##                             PC1         PC2         PC3         PC4         PC5
## retail_rec            0.4365716  0.04814422 -0.08435262  0.51487766 -0.72515090
## grocery_pharmacy      0.4332143 -0.06205922  0.42181600  0.52442617  0.59066180
## parks                 0.2662343 -0.90180099 -0.31116130 -0.12973339  0.04590047
## transit               0.4288027 -0.02275934  0.63884543 -0.58595706 -0.24304397
## work                  0.4237436  0.32626372 -0.40553423 -0.30363840  0.19327468
## residential          -0.4329198 -0.27132962  0.38151415  0.08663414 -0.16353129
##                             PC6
## retail_rec            0.09502170
## grocery_pharmacy      0.08149332
## parks                 0.01073956
## transit              -0.07120920
## work                  0.64806171
## residential           0.74776978

## Importance of components:
##                           PC1    PC2     PC3     PC4     PC5     PC6
## Standard deviation     2.1487 0.8944 0.44098 0.42957 0.35744 0.27633
```

```
## Proportion of Variance 0.7695 0.1333 0.03241 0.03076 0.02129 0.01273
## Cumulative Proportion  0.7695 0.9028 0.93522 0.96598 0.98727 1.00000
```

Model 1

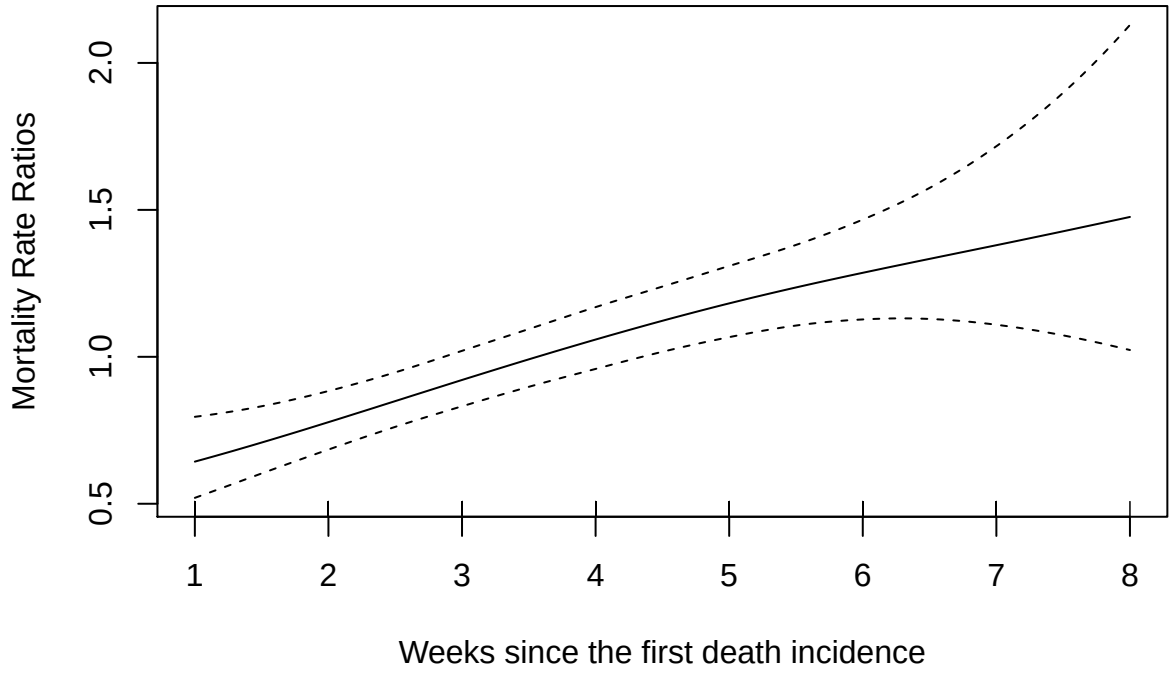
(1) Weekly_death ~ s(days_since_first) + scaled independent variables

```
##
## Family: Negative Binomial(1)
## Link function: log
##
## Formula:
## weekly_death ~ s(weeks_since_first, k = 8, bs = "cr") + factor(q_popdensity) +
##     scale(Age_gp1) + scale(Age_gp3) + scale(Age_gp4) + scale(poverty_perc) +
##     scale(Black.perc) + scale(Hispanic.or.Latino.perc) + scale(temp) +
##     scale(perc) + scale(Bachelor_orhigher_perc) + scale(bed_rate) +
##     scale(smoke_perc) + scale(obese_perc) + offset(log(population))
##
## Parametric coefficients:
##                                Estimate Std. Error z value Pr(>|z|)
## (Intercept)                   -12.23149    0.31860 -38.392  < 2e-16 ***
## factor(q_popdensity)2           0.99844    0.35015   2.851 0.004352 **
## factor(q_popdensity)3           1.41554    0.42343   3.343 0.000829 ***
## factor(q_popdensity)4           1.28553    0.44326   2.900 0.003730 **
## factor(q_popdensity)5           2.48084    0.56043   4.427 9.57e-06 ***
## scale(Age_gp1)                  0.65096    0.25657   2.537 0.011176 *
## scale(Age_gp3)                  0.55682    0.21234   2.622 0.008734 **
## scale(Age_gp4)                  0.15214    0.25708   0.592 0.553981
## scale(poverty_perc)             0.26344    0.20500   1.285 0.198761
## scale(Black.perc)               0.51545    0.23132   2.228 0.025861 *
## scale(Hispanic.or.Latino.perc)  0.22561    0.21126   1.068 0.285553
## scale(temp)                    -0.43190    0.24524  -1.761 0.078223 .
## scale(perc)                    -0.23036    0.23927  -0.963 0.335668
## scale(Bachelor_orhigher_perc)   0.26992    0.23871   1.131 0.258154
## scale(bed_rate)                 0.21043    0.12338   1.706 0.088080 .
## scale(smoke_perc)              -0.14061    0.20775  -0.677 0.498525
## scale(obese_perc)              -0.04001    0.20368  -0.196 0.844265
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Approximate significance of smooth terms:
##                         edf Ref.df Chi.sq p-value
## s(weeks_since_first) 2.222  2.222  9.417  0.0129 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## R-sq.(adj) =  0.554
## glmer.ML = 97.731  Scale est. = 1         n = 346
```

(2) Weekly_death ~ s(days_since_first) + scaled independent variables + positive_test_ratio with 3 weeks lag + random intercept

```
##
## Family: Negative Binomial(1)
## Link function: log
##
## Formula:
## weekly_death ~ s(weeks_since_first, k = 8, bs = "cr") + factor(q_popdensity) +
##     scale(Age_gp1) + scale(Age_gp3) + scale(Age_gp4) + scale(poverty_perc) +
##     scale(Black.perc) + scale(Hispanic.or.Latino.perc) + scale(temp) +
##     scale(perc) + scale(Bachelor_orhigher_perc) + scale(bed_rate) +
##     scale(smoke_perc) + scale(obese_perc) + rptest + ptest_weeks_ago1 +
##     ptest_weeks_ago2 + ptest_weeks_ago3 + offset(log(population))
##
## Parametric coefficients:
##                                 Estimate Std. Error z value Pr(>|z|)
## (Intercept)                   -12.385932   0.247949 -49.954  < 2e-16 ***
## factor(q_popdensity)2           0.527582   0.277114   1.904  0.05693 .
## factor(q_popdensity)3           0.861812   0.335801   2.566  0.01027 *
## factor(q_popdensity)4           0.693843   0.350377   1.980  0.04767 *
## factor(q_popdensity)5           1.335857   0.468040   2.854  0.00432 **
## scale(Age_gp1)                  0.255404   0.207248   1.232  0.21781
## scale(Age_gp3)                  0.323160   0.169301   1.909  0.05629 .
## scale(Age_gp4)                  0.032811   0.197470   0.166  0.86803
## scale(poverty_perc)             0.268980   0.157923   1.703  0.08852 .
## scale(Black.perc)               0.341005   0.179239   1.903  0.05710 .
## scale(Hispanic.or.Latino.perc)  0.177011   0.162025   1.092  0.27462
## scale(temp)                    -0.372552   0.187839  -1.983  0.04733 *
## scale(perc)                    -0.028278   0.187854  -0.151  0.88035
## scale(Bachelor_orhigher_perc)   0.039966   0.187591   0.213  0.83129
## scale(bed_rate)                 0.124039   0.095904   1.293  0.19588
## scale(smoke_perc)              -0.143336   0.159811  -0.897  0.36977
```

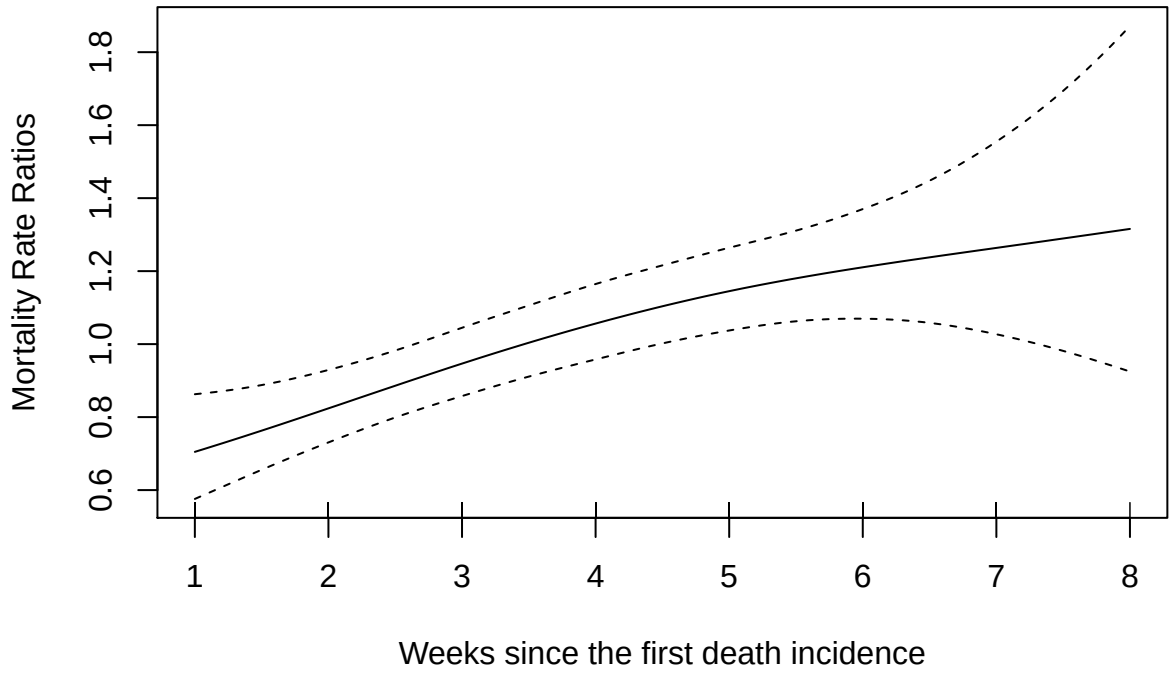
```
## scale(obese_perc)               -0.114435   0.156742  -0.730  0.46534
## rptest                           0.024577   0.009693   2.535  0.01123 *
## ptest_weeks_ago1                 0.024174   0.009031   2.677  0.00743 **
## ptest_weeks_ago2                 0.003738   0.004918   0.760  0.44715
## ptest_weeks_ago3                 0.005001   0.003842   1.302  0.19303
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Approximate significance of smooth terms:
##                          edf Ref.df Chi.sq p-value
## s(weeks_since_first) 1.622  1.622  14.46 0.00031 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## R-sq.(adj) =  0.728
## glmer.ML = 113.25  Scale est. = 1         n = 346
```



(3) Weekly_death ~ s(days_since_first) + scaled independent variables + positive test ratio with only 1-3 weeks lag without the current postive test ratio + random intercept

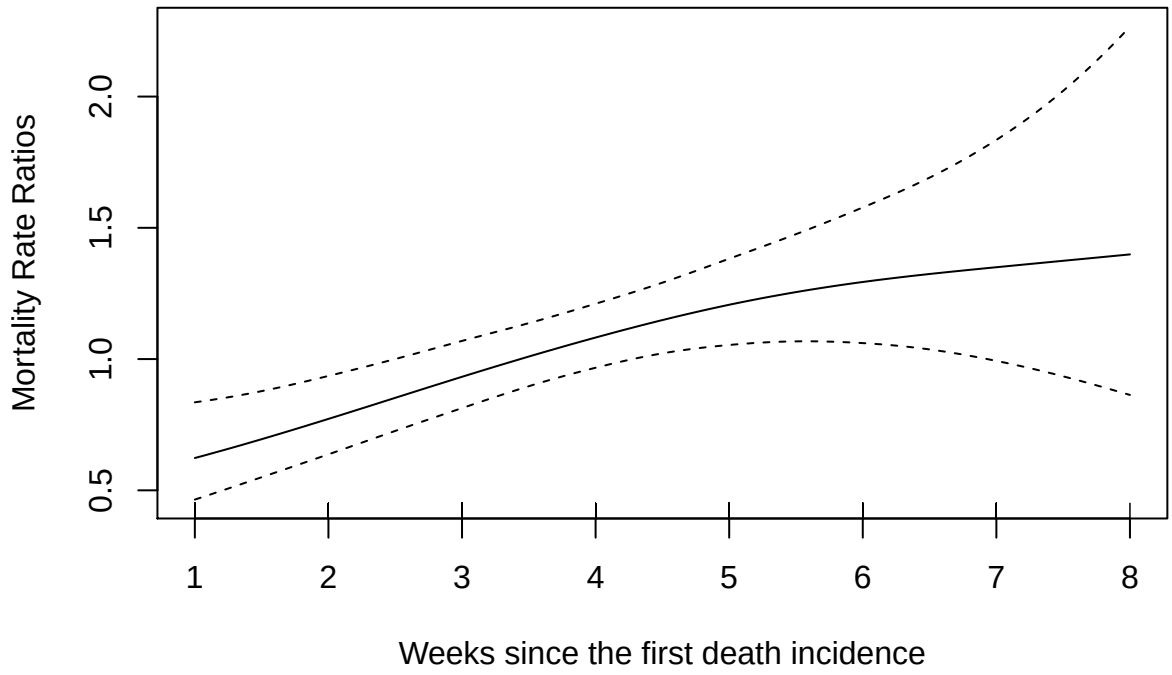
```
##
## Family: Negative Binomial(1)
## Link function: log
##
## Formula:
## weekly_death ~ s(weeks_since_first, k = 8, bs = "cr") + factor(q_popdensity) +
##     scale(Age_gp1) + scale(Age_gp3) + scale(Age_gp4) + scale(poverty_perc) +
##     scale(Black.perc) + scale(Hispanic.or.Latino.perc) + scale(temp) +
##     scale(perc) + scale(Bachelor_orhigher_perc) + scale(bed_rate) +
##     scale(smoke_perc) + scale(obese_perc) + ptest_weeks_ago1 +
##     ptest_weeks_ago2 + ptest_weeks_ago3 + offset(log(population))
##
## Parametric coefficients:
```

```
##                                 Estimate Std. Error z value Pr(>|z|)
## (Intercept)                   -12.358357   0.255069 -48.451  < 2e-16 ***
## factor(q_popdensity)2           0.587946   0.285482   2.059  0.03945 *
## factor(q_popdensity)3           0.930671   0.346005   2.690  0.00715 **
## factor(q_popdensity)4           0.766416   0.361238   2.122  0.03387 *
## factor(q_popdensity)5           1.465902   0.479298   3.058  0.00222 **
## scale(Age_gp1)                  0.315924   0.211280   1.495  0.13484
## scale(Age_gp3)                  0.343618   0.174330   1.971  0.04872 *
## scale(Age_gp4)                  0.066278   0.203690   0.325  0.74489
## scale(poverty_perc)             0.248088   0.163032   1.522  0.12808
## scale(Black.perc)               0.381290   0.184713   2.064  0.03900 *
## scale(Hispanic.or.Latino.perc)  0.197403   0.167469   1.179  0.23850
## scale(temp)                    -0.392465   0.194312  -2.020  0.04341 *
## scale(perc)                    -0.053250   0.193997  -0.274  0.78371
## scale(Bachelor_orhigher_perc)   0.080582   0.192445   0.419  0.67541
## scale(bed_rate)                 0.139330   0.098745   1.411  0.15824
## scale(smoke_perc)              -0.132404   0.165267  -0.801  0.42305
## scale(obese_perc)              -0.093118   0.161686  -0.576  0.56467
## ptest_weeks_ago1                0.039309   0.007352   5.347 8.94e-08 ***
## ptest_weeks_ago2                0.003430   0.004918   0.697  0.48562
## ptest_weeks_ago3                0.005446   0.003850   1.415  0.15721
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Approximate significance of smooth terms:
##                         edf Ref.df Chi.sq p-value
## s(weeks_since_first) 1.602  1.602  9.436 0.00337 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## R-sq.(adj) =  0.751
## glmer.ML = 111.62  Scale est. = 1         n = 346
```



(4) Weekly_death ~ s(days_since_first) + scaled independent variables + positive test ratio with 3 weeks lag + the PCA of movement + random intercept

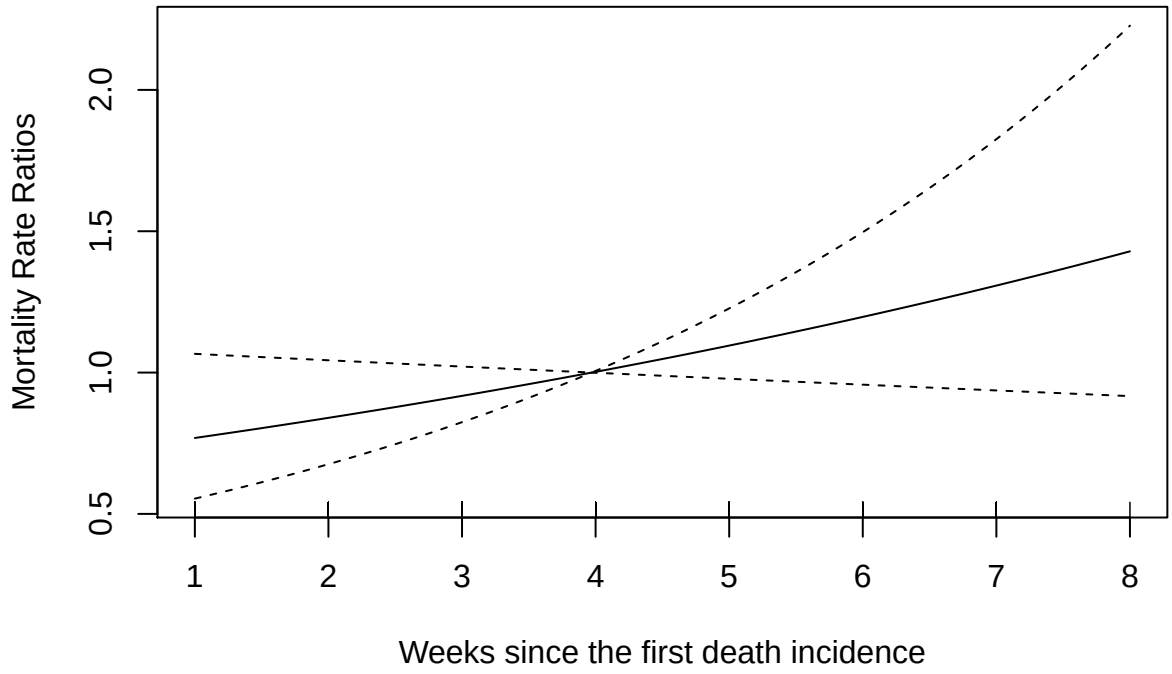
```
##
## Family: Negative Binomial(1)
## Link function: log
##
## Formula:
## weekly_death ~ s(weeks_since_first, k = 8, bs = "cr") + factor(q_popdensity) +
##     scale(Age_gp1) + scale(Age_gp3) + scale(Age_gp4) + scale(poverty_perc) +
##     scale(Black.perc) + scale(Hispanic.or.Latino.perc) + scale(temp) +
##     scale(perc) + scale(Bachelor_orhigher_perc) + scale(bed_rate) +
##     scale(smoke_perc) + scale(obese_perc) + rptest + ptest_weeks_ago1 +
##     ptest_weeks_ago2 + ptest_weeks_ago3 + PC1 + PC2 + offset(log(population))
##
## Parametric coefficients:
##                                 Estimate Std. Error z value Pr(>|z|)
## (Intercept)                   -12.296082   0.260976 -47.116  < 2e-16 ***
## factor(q_popdensity)2           0.482963   0.283760   1.702  0.08875 .
## factor(q_popdensity)3           0.756368   0.352962   2.143  0.03212 *
## factor(q_popdensity)4           0.624076   0.361116   1.728  0.08395 .
## factor(q_popdensity)5           1.266775   0.475910   2.662  0.00777 **
## scale(Age_gp1)                  0.154532   0.243936   0.633  0.52641
## scale(Age_gp3)                  0.304752   0.171290   1.779  0.07521 .
## scale(Age_gp4)                 -0.023066   0.207333  -0.111  0.91142
## scale(poverty_perc)             0.259720   0.161094   1.612  0.10691
## scale(Black.perc)               0.324316   0.183309   1.769  0.07686 .
## scale(Hispanic.or.Latino.perc)  0.170569   0.164343   1.038  0.29932
## scale(temp)                    -0.244276   0.218771  -1.117  0.26417
## scale(perc)                    -0.067840   0.192450  -0.353  0.72446
## scale(Bachelor_orhigher_perc)  -0.031147   0.197551  -0.158  0.87472
## scale(bed_rate)                 0.118355   0.097151   1.218  0.22313
## scale(smoke_perc)              -0.120642   0.166691  -0.724  0.46922
## scale(obese_perc)              -0.114014   0.158002  -0.722  0.47054
## rptest                          0.023333   0.009716   2.401  0.01633 *
## ptest_weeks_ago1                0.023324   0.009156   2.547  0.01085 *
## ptest_weeks_ago2                0.003417   0.004940   0.692  0.48911
## ptest_weeks_ago3                0.004455   0.003878   1.149  0.25067
## PC1                            -0.023429   0.064651  -0.362  0.71706
## PC2                            -0.156794   0.125358  -1.251  0.21102
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Approximate significance of smooth terms:
##                         edf Ref.df Chi.sq p-value
## s(weeks_since_first) 1.788  1.788  7.233   0.012 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## R-sq.(adj) =  0.778
## glmer.ML = 109.52  Scale est. = 1         n = 346
```



(5) Weekly_death ~ s(days_since_first) + scaled independent variables + positive test ratio with 3 weeks lag + the PCA of movement + Mask indicator + random intercept

```
##
## Family: Negative Binomial(1)
## Link function: log
##
## Formula:
## weekly_death ~ s(weeks_since_first, k = 8, bs = "cr") + factor(q_popdensity) +
##     scale(Age_gp1) + scale(Age_gp3) + scale(Age_gp4) + scale(poverty_perc) +
##     scale(Black.perc) + scale(Hispanic.or.Latino.perc) + scale(temp) +
##     scale(perc) + scale(Bachelor_orhigher_perc) + scale(bed_rate) +
##     scale(smoke_perc) + scale(obese_perc) + rptest + ptest_weeks_ago1 +
##     ptest_weeks_ago2 + ptest_weeks_ago3 + PC1 + PC2 + factor(Mask) +
##     offset(log(population))
##
## Parametric coefficients:
##                                Estimate Std. Error z value Pr(>|z|)
## (Intercept)                  -12.580701   0.326298 -38.556  < 2e-16 ***
## factor(q_popdensity)2          0.468489   0.281545   1.664  0.09611 .
## factor(q_popdensity)3          0.773788   0.350434   2.208  0.02724 *
## factor(q_popdensity)4          0.609987   0.358274   1.703  0.08865 .
## factor(q_popdensity)5          1.229045   0.472594   2.601  0.00931 **
## scale(Age_gp1)                 0.112846   0.244749   0.461  0.64475
## scale(Age_gp3)                 0.288152   0.170282   1.692  0.09061 .
## scale(Age_gp4)                -0.029172   0.205699  -0.142  0.88722
## scale(poverty_perc)            0.251740   0.159850   1.575  0.11529
## scale(Black.perc)              0.328012   0.181751   1.805  0.07112 .
## scale(Hispanic.or.Latino.perc) 0.183641   0.163334   1.124  0.26087
## scale(temp)                   -0.256712   0.217028  -1.183  0.23687
## scale(perc)                   -0.049280   0.190930  -0.258  0.79633
## scale(Bachelor_orhigher_perc) -0.029613   0.195976  -0.151  0.87989
## scale(bed_rate)                0.108026   0.096551   1.119  0.26320
```

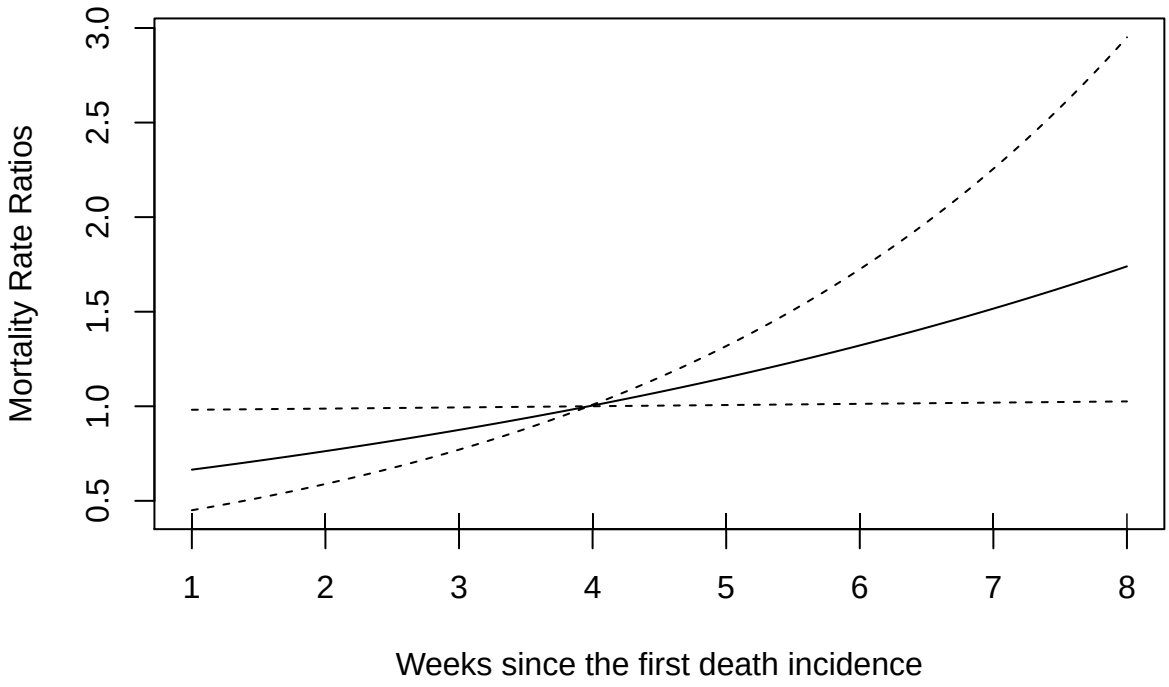
```
## scale(smoke_perc)               -0.128555   0.165193  -0.778  0.43645
## scale(obese_perc)               -0.115250   0.156672  -0.736  0.46197
## rptest                           0.024803   0.009721   2.552  0.01072 *
## ptest_weeks_ago1                 0.022730   0.009189   2.474  0.01337 *
## ptest_weeks_ago2                 0.004439   0.005023   0.884  0.37681
## ptest_weeks_ago3                 0.004869   0.003892   1.251  0.21098
## PC1                              0.002035   0.066299   0.031  0.97552
## PC2                             -0.153537   0.124992  -1.228  0.21930
## factor(Mask)1                    0.307763   0.219394   1.403  0.16068
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Approximate significance of smooth terms:
##                       edf Ref.df Chi.sq p-value
## s(weeks_since_first)   1      1  2.586   0.108
##
## R-sq.(adj) =  0.755
## glmer.ML = 112.13  Scale est. = 1         n = 346
```



(6) Weekly_death ~ s(days_since_first) + scaled independent variables + positive test ratio with 3 weeks lag + the residential movement with 3 weeks lag + random intercept

```
##
## Family: Negative Binomial(1)
## Link function: log
##
## Formula:
## weekly_death ~ s(weeks_since_first, k = 8, bs = "cr") + factor(q_popdensity) +
##     scale(Age_gp1) + scale(Age_gp3) + scale(Age_gp4) + scale(poverty_perc) +
##     scale(Black.perc) + scale(Hispanic.or.Latino.perc) + scale(temp) +
##     scale(perc) + scale(Bachelor_orhigher_perc) + scale(bed_rate) +
##     scale(smoke_perc) + scale(obese_perc) + rptest + ptest_weeks_ago1 +
##     ptest_weeks_ago2 + ptest_weeks_ago3 + residential + resident_weeks_ago1 +
```

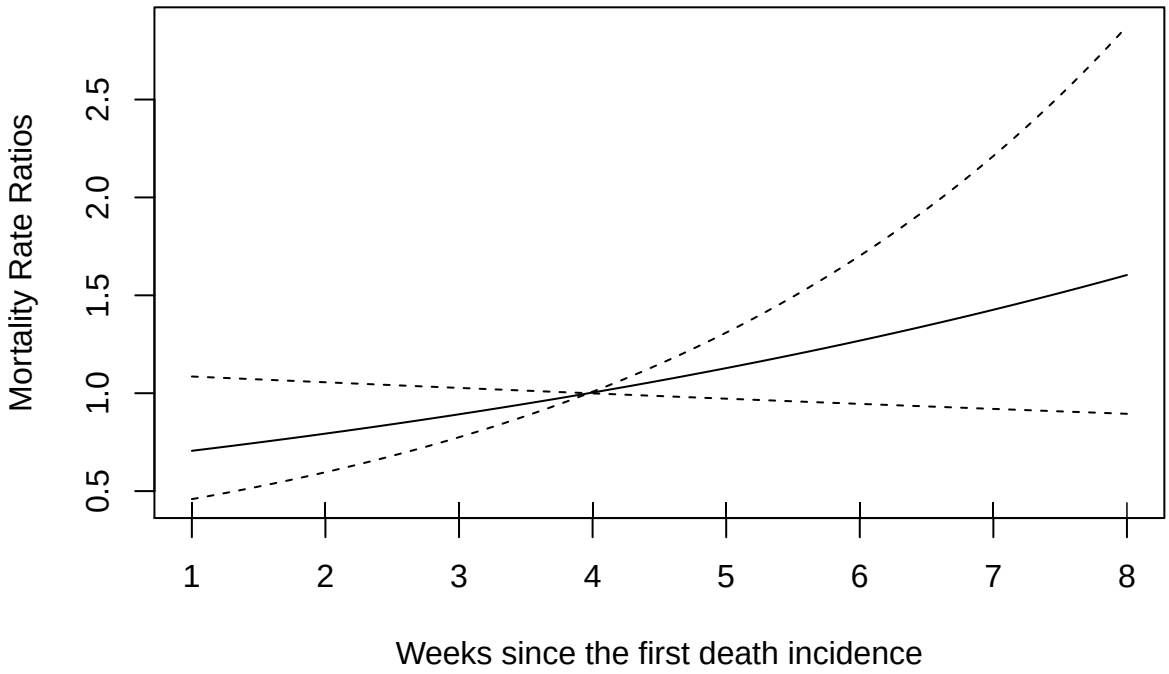
```
##     resident_weeks_ago2 + resident_weeks_ago3 + offset(log(population))
##
## Parametric coefficients:
##                                 Estimate Std. Error z value Pr(>|z|)
## (Intercept)                   -13.516175   0.607468 -22.250  < 2e-16 ***
## factor(q_popdensity)2           0.489068   0.278016   1.759  0.07855 .
## factor(q_popdensity)3           0.740708   0.348998   2.122  0.03381 *
## factor(q_popdensity)4           0.638014   0.352425   1.810  0.07024 .
## factor(q_popdensity)5           1.221602   0.469735   2.601  0.00931 **
## scale(Age_gp1)                  0.257252   0.206618   1.245  0.21311
## scale(Age_gp3)                  0.257326   0.170177   1.512  0.13051
## scale(Age_gp4)                  0.057025   0.197021   0.289  0.77225
## scale(poverty_perc)             0.301372   0.159242   1.893  0.05842 .
## scale(Black.perc)               0.276278   0.181469   1.522  0.12790
## scale(Hispanic.or.Latino.perc)  0.155798   0.164414   0.948  0.34334
## scale(temp)                    -0.326071   0.190595  -1.711  0.08712 .
## scale(perc)                    -0.016327   0.187862  -0.087  0.93074
## scale(Bachelor_orhigher_perc)   0.009502   0.188609   0.050  0.95982
## scale(bed_rate)                 0.083511   0.097415   0.857  0.39129
## scale(smoke_perc)              -0.065781   0.162043  -0.406  0.68478
## scale(obese_perc)              -0.125298   0.156204  -0.802  0.42247
## rptest                          0.024961   0.009764   2.556  0.01058 *
## ptest_weeks_ago1                0.019647   0.009204   2.135  0.03278 *
## ptest_weeks_ago2                0.003432   0.005004   0.686  0.49281
## ptest_weeks_ago3                0.005125   0.003895   1.316  0.18830
## residential                    -0.009177   0.043353  -0.212  0.83235
## resident_weeks_ago1             0.066930   0.065696   1.019  0.30831
## resident_weeks_ago2             0.005964   0.054804   0.109  0.91334
## resident_weeks_ago3             0.012165   0.028746   0.423  0.67217
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Approximate significance of smooth terms:
##                       edf Ref.df Chi.sq p-value
## s(weeks_since_first)   1      1  4.393  0.0361 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## R-sq.(adj) =  0.684
## glmer.ML = 108.41  Scale est. = 1         n = 346
```



(7) Weekly_death ~ s(days_since_first) + scaled independent variables + positive test ratio with 3 weeks lag + the residential movement with 3 weeks lag + Mask indicator + random intercept

```
##
## Family: Negative Binomial(1)
## Link function: log
##
## Formula:
## weekly_death ~ s(weeks_since_first, k = 8, bs = "cr") + factor(q_popdensity) +
##     scale(Age_gp1) + scale(Age_gp3) + scale(Age_gp4) + scale(poverty_perc) +
##     scale(Black.perc) + scale(Hispanic.or.Latino.perc) + scale(temp) +
##     scale(perc) + scale(Bachelor_orhigher_perc) + scale(bed_rate) +
##     scale(smoke_perc) + scale(obese_perc) + rptest + ptest_weeks_ago1 +
##     ptest_weeks_ago2 + ptest_weeks_ago3 + residential + resident_weeks_ago1 +
##     resident_weeks_ago2 + resident_weeks_ago3 + factor(Mask) +
##     offset(log(population))
##
## Parametric coefficients:
##                                 Estimate Std. Error z value Pr(>|z|)
## (Intercept)                   -1.341e+01  6.278e-01 -21.367  < 2e-16 ***
## factor(q_popdensity)2          4.797e-01  2.765e-01   1.735  0.08269 .
## factor(q_popdensity)3          7.175e-01  3.473e-01   2.066  0.03882 *
## factor(q_popdensity)4          6.235e-01  3.503e-01   1.780  0.07509 .
## factor(q_popdensity)5          1.185e+00  4.675e-01   2.535  0.01123 *
## scale(Age_gp1)                 2.546e-01  2.054e-01   1.240  0.21503
## scale(Age_gp3)                 2.415e-01  1.697e-01   1.423  0.15474
## scale(Age_gp4)                 6.831e-02  1.964e-01   0.348  0.72794
## scale(poverty_perc)            3.048e-01  1.583e-01   1.925  0.05422 .
## scale(Black.perc)              2.714e-01  1.804e-01   1.505  0.13233
## scale(Hispanic.or.Latino.perc) 1.544e-01  1.634e-01   0.945  0.34471
## scale(temp)                   -3.213e-01  1.894e-01  -1.697  0.08976 .
## scale(perc)                   -9.240e-03  1.867e-01  -0.049  0.96053
```

```
## scale(Bachelor_orhigher_perc)  -2.053e-03  1.876e-01  -0.011  0.99127
## scale(bed_rate)                 7.209e-02  9.755e-02   0.739  0.45992
## scale(smoke_perc)              -5.731e-02  1.615e-01  -0.355  0.72276
## scale(obese_perc)              -1.259e-01  1.552e-01  -0.811  0.41725
## rptest                          2.516e-02  9.762e-03   2.578  0.00995 **
## ptest_weeks_ago1                2.021e-02  9.210e-03   2.195  0.02819 *
## ptest_weeks_ago2                2.897e-03  5.039e-03   0.575  0.56542
## ptest_weeks_ago3                5.246e-03  3.897e-03   1.346  0.17827
## residential                    -4.316e-04  4.486e-02  -0.010  0.99232
## resident_weeks_ago1             4.398e-02  7.247e-02   0.607  0.54392
## resident_weeks_ago2             1.135e-02  5.491e-02   0.207  0.83617
## resident_weeks_ago3             3.634e-02  4.465e-02   0.814  0.41572
## factor(Mask)1                  -3.465e-01  4.632e-01  -0.748  0.45444
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Approximate significance of smooth terms:
##                       edf Ref.df Chi.sq p-value
## s(weeks_since_first)   1      1  2.622   0.105
##
## R-sq.(adj) =  0.654
## glmer.ML = 108.99  Scale est. = 1         n = 346
```



(8) Weekly_death ~ linear days_since_first + scaled independent variables + positive test ratio with 3 weeks lag + random intercept + random slope for days_since_first

```
##
## Family: Negative Binomial(1)
## Link function: log
##
## Formula:
## weekly_death ~ weeks_since_first + factor(q_popdensity) + scale(Age_gp1) +
##     scale(Age_gp3) + scale(Age_gp4) + scale(poverty_perc) + scale(Black.perc) +
```

```
##     scale(Hispanic.or.Latino.perc) + scale(temp) + scale(perc) +
##     scale(Bachelor_orhigher_perc) + scale(bed_rate) + scale(smoke_perc) +
##     scale(obese_perc) + rptest + ptest_weeks_ago1 + ptest_weeks_ago2 +
##     ptest_weeks_ago3 + offset(log(population))
##
## Parametric coefficients:
##                                 Estimate Std. Error z value Pr(>|z|)
## (Intercept)                   -12.892257   0.280838 -45.906  < 2e-16 ***
## weeks_since_first               0.127487   0.030417   4.191 2.77e-05 ***
## factor(q_popdensity)2           0.517029   0.276025   1.873  0.06105 .
## factor(q_popdensity)3           0.841953   0.334445   2.517  0.01182 *
## factor(q_popdensity)4           0.677136   0.348995   1.940  0.05235 .
## factor(q_popdensity)5           1.313709   0.466248   2.818  0.00484 **
## scale(Age_gp1)                  0.242799   0.206465   1.176  0.23960
## scale(Age_gp3)                  0.319620   0.168659   1.895  0.05808 .
## scale(Age_gp4)                  0.025311   0.196707   0.129  0.89761
## scale(poverty_perc)             0.273218   0.157308   1.737  0.08242 .
## scale(Black.perc)               0.331516   0.178537   1.857  0.06333 .
## scale(Hispanic.or.Latino.perc)  0.168202   0.161376   1.042  0.29727
## scale(temp)                    -0.361347   0.187071  -1.932  0.05341 .
## scale(perc)                    -0.028175   0.187149  -0.151  0.88033
## scale(Bachelor_orhigher_perc)   0.033458   0.186813   0.179  0.85786
## scale(bed_rate)                 0.122160   0.095535   1.279  0.20101
## scale(smoke_perc)              -0.140060   0.159166  -0.880  0.37888
## scale(obese_perc)              -0.122450   0.156137  -0.784  0.43289
## rptest                          0.024829   0.009686   2.564  0.01036 *
## ptest_weeks_ago1                0.025820   0.008965   2.880  0.00398 **
## ptest_weeks_ago2                0.003684   0.004904   0.751  0.45252
## ptest_weeks_ago3                0.004684   0.003831   1.223  0.22148
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##
## R-sq.(adj) =   0.73
## glmer.ML =    116  Scale est. = 1         n = 346
```

(9) Weekly_death ~ linear days_since_first + scaled independent variables + positive test ratio with 3 weeks lag + the PCA of movement + random intercept + random slope for days_since_first

```
##
## Family: Negative Binomial(1)
## Link function: log
##
## Formula:
## weekly_death ~ weeks_since_first + factor(q_popdensity) + scale(Age_gp1) +
##     scale(Age_gp3) + scale(Age_gp4) + scale(poverty_perc) + scale(Black.perc) +
##     scale(Hispanic.or.Latino.perc) + scale(temp) + scale(perc) +
##     scale(Bachelor_orhigher_perc) + scale(bed_rate) + scale(smoke_perc) +
##     scale(obese_perc) + rptest + ptest_weeks_ago1 + ptest_weeks_ago2 +
##     ptest_weeks_ago3 + PC1 + PC2 + offset(log(population))
##
## Parametric coefficients:
##                                 Estimate Std. Error z value Pr(>|z|)
## (Intercept)                   -12.825384   0.314452 -40.786  < 2e-16 ***
## weeks_since_first               0.131812   0.045501   2.897  0.00377 **
```

```
## factor(q_popdensity)2            0.471091   0.282584   1.667  0.09550 .
## factor(q_popdensity)3            0.736384   0.351539   2.095  0.03619 *
## factor(q_popdensity)4            0.604296   0.359670   1.680  0.09293 .
## factor(q_popdensity)5            1.240557   0.474159   2.616  0.00889 **
## scale(Age_gp1)                   0.152972   0.242587   0.631  0.52831
## scale(Age_gp3)                   0.303217   0.170607   1.777  0.07552 .
## scale(Age_gp4)                  -0.026887   0.206392  -0.130  0.89635
## scale(poverty_perc)              0.268908   0.160377   1.677  0.09360 .
## scale(Black.perc)                0.309990   0.182426   1.699  0.08927 .
## scale(Hispanic.or.Latino.perc)   0.157716   0.163582   0.964  0.33497
## scale(temp)                     -0.244392   0.217547  -1.123  0.26127
## scale(perc)                     -0.061196   0.191682  -0.319  0.74953
## scale(Bachelor_orhigher_perc)   -0.029898   0.196703  -0.152  0.87919
## scale(bed_rate)                  0.116507   0.096708   1.205  0.22831
## scale(smoke_perc)               -0.114215   0.165821  -0.689  0.49096
## scale(obese_perc)               -0.127370   0.157327  -0.810  0.41818
## rptest                           0.023894   0.009700   2.463  0.01377 *
## ptest_weeks_ago1                 0.025516   0.009076   2.811  0.00493 **
## ptest_weeks_ago2                 0.003380   0.004922   0.687  0.49218
## ptest_weeks_ago3                 0.004036   0.003864   1.045  0.29620
## PC1                             -0.024705   0.063828  -0.387  0.69871
## PC2                             -0.135075   0.124223  -1.087  0.27688
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##
## R-sq.(adj) =  0.776
## glmer.ML = 113.25  Scale est. = 1         n = 346
```

(10) Weekly_death ~ linear days_since_first + scaled independent variables + positive test ratio with 3 weeks lag + the PCA of movement + Mask indicator + random intercept + random slope for days_since_first

```
##
## Family: Negative Binomial(1)
## Link function: log
##
## Formula:
## weekly_death ~ weeks_since_first + factor(q_popdensity) + scale(Age_gp1) +
##     scale(Age_gp3) + scale(Age_gp4) + scale(poverty_perc) + scale(Black.perc) +
##     scale(Hispanic.or.Latino.perc) + scale(temp) + scale(perc) +
##     scale(Bachelor_orhigher_perc) + scale(bed_rate) + scale(smoke_perc) +
##     scale(obese_perc) + rptest + ptest_weeks_ago1 + ptest_weeks_ago2 +
##     ptest_weeks_ago3 + PC1 + PC2 + factor(Mask) + offset(log(population))
##
## Parametric coefficients:
##                                 Estimate Std. Error z value Pr(>|z|)
## (Intercept)                   -12.924804   0.322896 -40.028  < 2e-16 ***
## weeks_since_first               0.088082   0.055106   1.598  0.10995
## factor(q_popdensity)2           0.463652   0.281903   1.645  0.10003
## factor(q_popdensity)3           0.768425   0.350921   2.190  0.02854 *
## factor(q_popdensity)4           0.601607   0.358734   1.677  0.09354 .
## factor(q_popdensity)5           1.221475   0.473306   2.581  0.00986 **
## scale(Age_gp1)                  0.109016   0.244894   0.445  0.65621
## scale(Age_gp3)                  0.287042   0.170543   1.683  0.09235 .
```

```
## scale(Age_gp4)                  -0.031407   0.205929  -0.153  0.87878
## scale(poverty_perc)              0.251819   0.160050   1.573  0.11563
## scale(Black.perc)                0.326325   0.181931   1.794  0.07287 .
## scale(Hispanic.or.Latino.perc)   0.183070   0.163535   1.119  0.26295
## scale(temp)                     -0.254282   0.217138  -1.171  0.24158
## scale(perc)                     -0.047610   0.191251  -0.249  0.80341
## scale(Bachelor_orhigher_perc)   -0.030056   0.196197  -0.153  0.87824
## scale(bed_rate)                  0.106806   0.096655   1.105  0.26915
## scale(smoke_perc)               -0.126268   0.165396  -0.763  0.44521
## scale(obese_perc)               -0.116761   0.156877  -0.744  0.45670
## rptest                           0.024860   0.009716   2.559  0.01051 *
## ptest_weeks_ago1                 0.022729   0.009185   2.475  0.01334 *
## ptest_weeks_ago2                 0.004424   0.005020   0.881  0.37817
## ptest_weeks_ago3                 0.004831   0.003891   1.242  0.21437
## PC1                              0.001700   0.066380   0.026  0.97956
## PC2                             -0.154823   0.125072  -1.238  0.21577
## factor(Mask)1                    0.307046   0.219327   1.400  0.16153
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##
## R-sq.(adj) =  0.756
## glmer.ML = 111.89  Scale est. = 1         n = 346
```

(11) Weekly_death ~ linear days_since_first + scaled independent variables + positive test ratio with 3 weeks lag + the residential movement with 3 weeks lag + random intercept + random slope for days_since_first

```
##
## Family: Negative Binomial(1)
## Link function: log
##
## Formula:
## weekly_death ~ weeks_since_first + factor(q_popdensity) + scale(Age_gp1) +
##     scale(Age_gp3) + scale(Age_gp4) + scale(poverty_perc) + scale(Black.perc) +
##     scale(Hispanic.or.Latino.perc) + scale(temp) + scale(perc) +
##     scale(Bachelor_orhigher_perc) + scale(bed_rate) + scale(smoke_perc) +
##     scale(obese_perc) + rptest + ptest_weeks_ago1 + ptest_weeks_ago2 +
##     ptest_weeks_ago3 + residential + resident_weeks_ago1 + resident_weeks_ago2 +
##     resident_weeks_ago3 + offset(log(population))
##
## Parametric coefficients:
##                                 Estimate Std. Error z value Pr(>|z|)
## (Intercept)                   -14.060537   0.757906 -18.552  < 2e-16 ***
## weeks_since_first               0.137230   0.065569   2.093  0.03636 *
## factor(q_popdensity)2           0.488492   0.278050   1.757  0.07894 .
## factor(q_popdensity)3           0.740356   0.349037   2.121  0.03391 *
## factor(q_popdensity)4           0.637200   0.352460   1.808  0.07063 .
## factor(q_popdensity)5           1.220765   0.469799   2.598  0.00936 **
## scale(Age_gp1)                  0.256734   0.206634   1.242  0.21407
## scale(Age_gp3)                  0.257172   0.170202   1.511  0.13079
## scale(Age_gp4)                  0.056818   0.197042   0.288  0.77308
## scale(poverty_perc)             0.301362   0.159258   1.892  0.05845 .
## scale(Black.perc)               0.276207   0.181481   1.522  0.12802
## scale(Hispanic.or.Latino.perc)  0.155747   0.164431   0.947  0.34354
```

```
## scale(temp)                     -0.325920   0.190616  -1.710  0.08730 .
## scale(perc)                     -0.016161   0.187894  -0.086  0.93146
## scale(Bachelor_orhigher_perc)    0.009377   0.188621   0.050  0.96035
## scale(bed_rate)                  0.083372   0.097424   0.856  0.39213
## scale(smoke_perc)               -0.065472   0.162059  -0.404  0.68621
## scale(obese_perc)               -0.125658   0.156221  -0.804  0.42119
## rptest                           0.024983   0.009764   2.559  0.01050 *
## ptest_weeks_ago1                 0.019633   0.009203   2.133  0.03290 *
## ptest_weeks_ago2                 0.003431   0.005004   0.686  0.49287
## ptest_weeks_ago3                 0.005123   0.003895   1.315  0.18841
## residential                     -0.009149   0.043355  -0.211  0.83286
## resident_weeks_ago1              0.066936   0.065697   1.019  0.30827
## resident_weeks_ago2              0.005849   0.054803   0.107  0.91500
## resident_weeks_ago3              0.012242   0.028745   0.426  0.67021
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##
## R-sq.(adj) =  0.684
## glmer.ML = 108.39  Scale est. = 1         n = 346
```

(12) Weekly_death ~ linear days_since_first + scaled independent variables + positive test ratio with 3 weeks lag + the residential movement with 3 weeks lag + Mask indicator + random intercept + random slope for days_since_first

```
##
## Family: Negative Binomial(1)
## Link function: log
##
## Formula:
## weekly_death ~ weeks_since_first + factor(q_popdensity) + scale(Age_gp1) +
##     scale(Age_gp3) + scale(Age_gp4) + scale(poverty_perc) + scale(Black.perc) +
##     scale(Hispanic.or.Latino.perc) + scale(temp) + scale(perc) +
##     scale(Bachelor_orhigher_perc) + scale(bed_rate) + scale(smoke_perc) +
##     scale(obese_perc) + rptest + ptest_weeks_ago1 + ptest_weeks_ago2 +
##     ptest_weeks_ago3 + residential + resident_weeks_ago1 + resident_weeks_ago2 +
##     resident_weeks_ago3 + factor(Mask) + offset(log(population))
##
## Parametric coefficients:
##                                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)                    -1.388e+01  8.091e-01 -17.152  < 2e-16 ***
## weeks_since_first               1.170e-01  7.242e-02   1.615  0.10626
## factor(q_popdensity)2           4.779e-01  2.766e-01   1.728  0.08397 .
## factor(q_popdensity)3           7.161e-01  3.474e-01   2.061  0.03928 *
## factor(q_popdensity)4           6.210e-01  3.504e-01   1.772  0.07636 .
## factor(q_popdensity)5           1.183e+00  4.677e-01   2.530  0.01142 *
## scale(Age_gp1)                  2.533e-01  2.054e-01   1.233  0.21750
## scale(Age_gp3)                  2.409e-01  1.698e-01   1.418  0.15606
## scale(Age_gp4)                  6.772e-02  1.964e-01   0.345  0.73025
## scale(poverty_perc)             3.050e-01  1.584e-01   1.926  0.05415 .
## scale(Black.perc)               2.709e-01  1.804e-01   1.501  0.13324
## scale(Hispanic.or.Latino.perc)  1.542e-01  1.634e-01   0.944  0.34529
## scale(temp)                    -3.211e-01  1.894e-01  -1.695  0.09008 .
## scale(perc)                    -8.414e-03  1.868e-01  -0.045  0.96407
## scale(Bachelor_orhigher_perc)  -2.123e-03  1.877e-01  -0.011  0.99097
```

```
## scale(bed_rate)                7.152e-02  9.758e-02   0.733  0.46363
## scale(smoke_perc)             -5.647e-02  1.616e-01  -0.350  0.72670
## scale(obese_perc)             -1.265e-01  1.553e-01  -0.815  0.41531
## rptest                         2.519e-02  9.760e-03   2.580  0.00987 **
## ptest_weeks_ago1               2.021e-02  9.208e-03   2.195  0.02815 *
## ptest_weeks_ago2               2.894e-03  5.038e-03   0.574  0.56564
## ptest_weeks_ago3               5.234e-03  3.897e-03   1.343  0.17922
## residential                   -4.443e-04  4.487e-02  -0.010  0.99210
## resident_weeks_ago1            4.406e-02  7.247e-02   0.608  0.54319
## resident_weeks_ago2            1.127e-02  5.490e-02   0.205  0.83737
## resident_weeks_ago3            3.639e-02  4.466e-02   0.815  0.41511
## factor(Mask)1                 -3.467e-01  4.632e-01  -0.749  0.45416
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##
## R-sq.(adj) =  0.655
## glmer.ML = 108.93  Scale est. = 1         n = 346
```