Initial HHH4 Models: Meeting Notes

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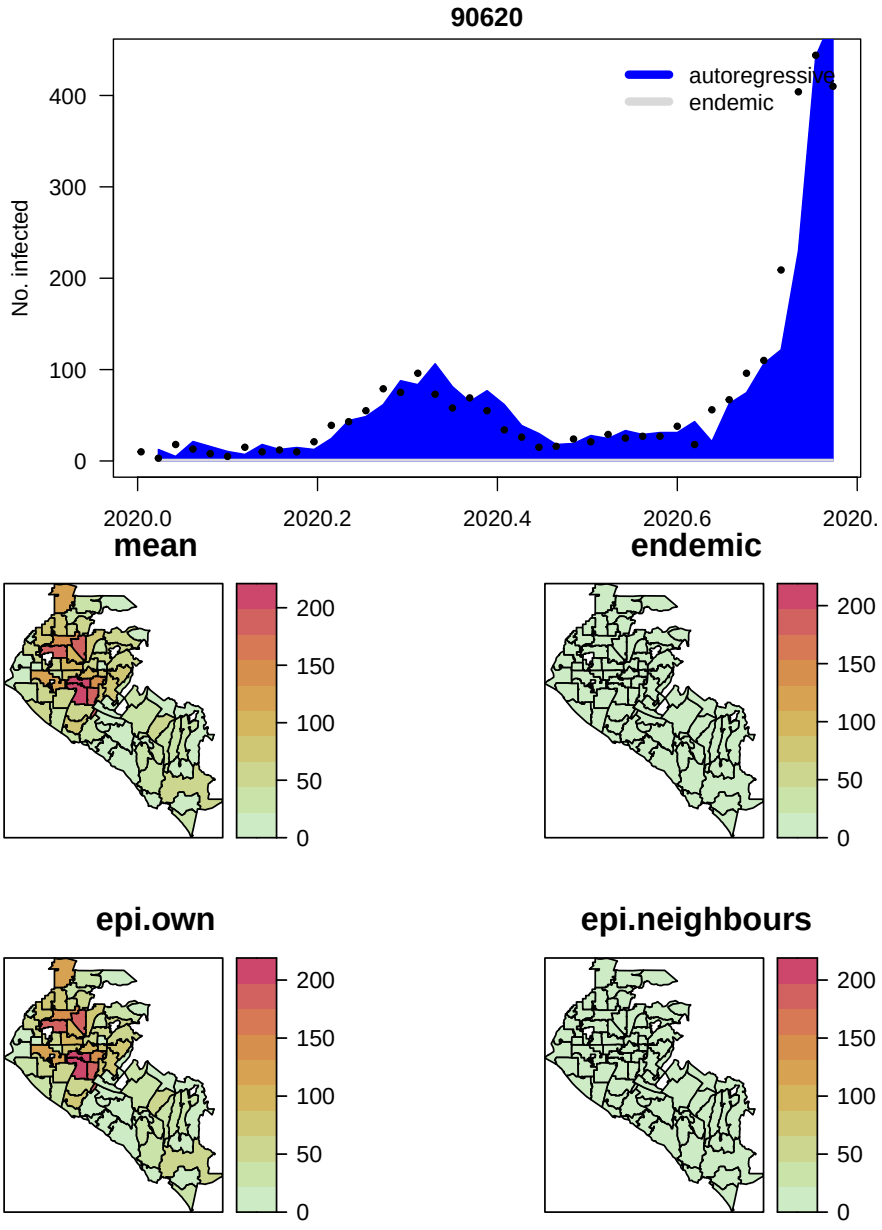
Summary and a few plots from the fitted models.

Model 1: no weights

```
fit_noweights <-
  surveillance::hhh4(oc_zip_covid)
```

```
##
## Call:
## surveillance::hhh4(stsObj = oc_zip_covid, control = list(ar = list(f = ~1)))
##
## Coefficients:
##        Estimate  Std. Error
## ar.1   0.087395  0.002721
## end.1  0.539704  0.034483
##
## Log-likelihood:   -19330.16
## AIC:              38664.32
## BIC:              38676.31
##
## Number of units:        74
## Number of time points:  40
```

Plots for the model:

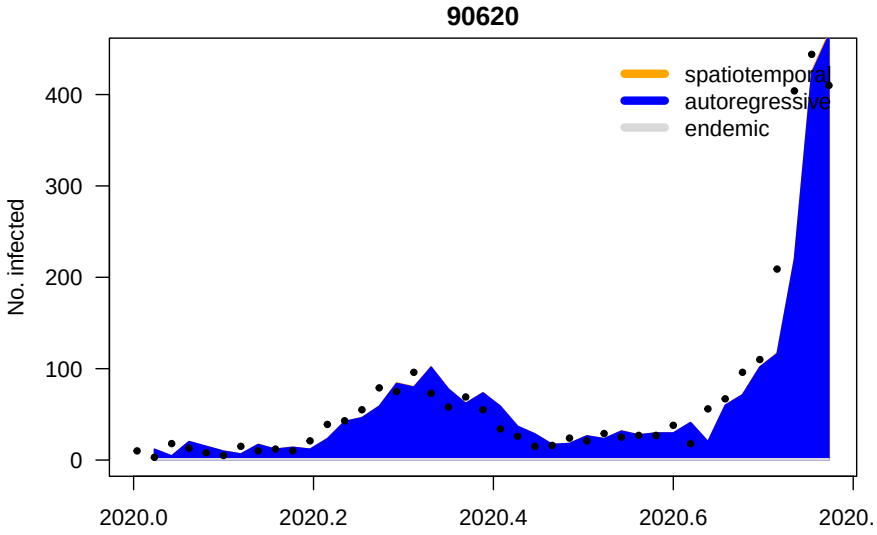


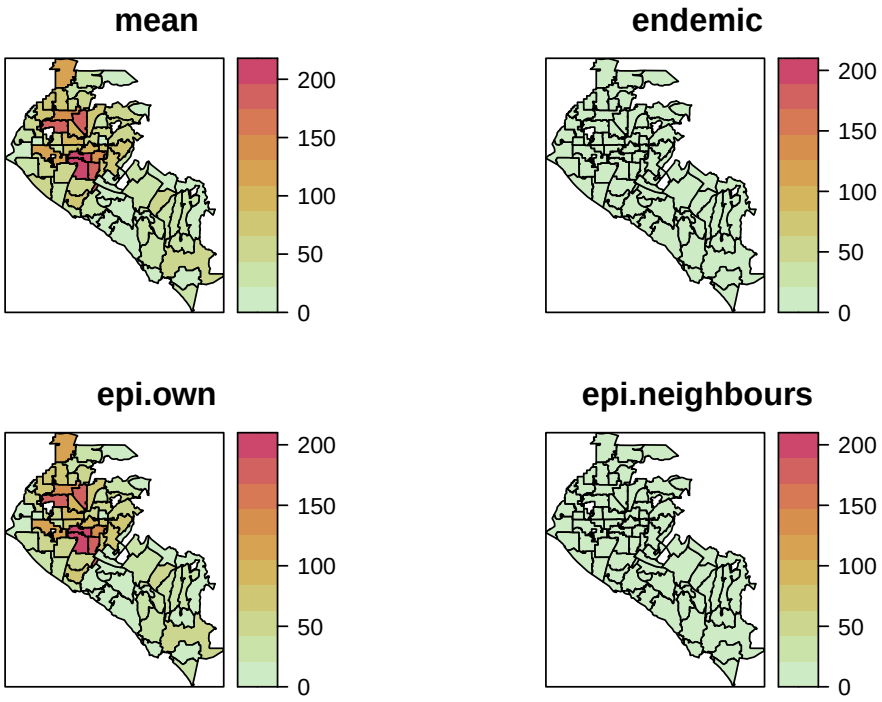
Model 2: Sum Weights of Out Visits from Safegraph

```
sumweights_nb <- surveillance::hhh4(
  oc_zip_covid,
  control = list(
    ne = list(
      f = ~1,
      weights = neighbourhood(oc_zip_covid),
      family = "NegBin1",
      normalize = TRUE
    )
  )
)
```

```
##
## Call:
## surveillance::hhh4(stsObj = oc_zip_covid, control = list(ar = list(f = ~1),
##     ne = list(f = ~1, weights = neighbourhood(oc_zip_covid),
##         family = "NegBin1", normalize = TRUE)))
##
## Coefficients:
##        Estimate   Std. Error
## ar.1    0.043648   0.004555
## ne.1   -2.969973   0.081085
## end.1   0.400258   0.040238
##
## Log-likelihood:   -19250.21
## AIC:              38506.42
## BIC:              38524.4
##
## Number of units:        74
## Number of time points:  40
```

Plots for the model:





Model 3: Binary Neighbours Weights Matrix

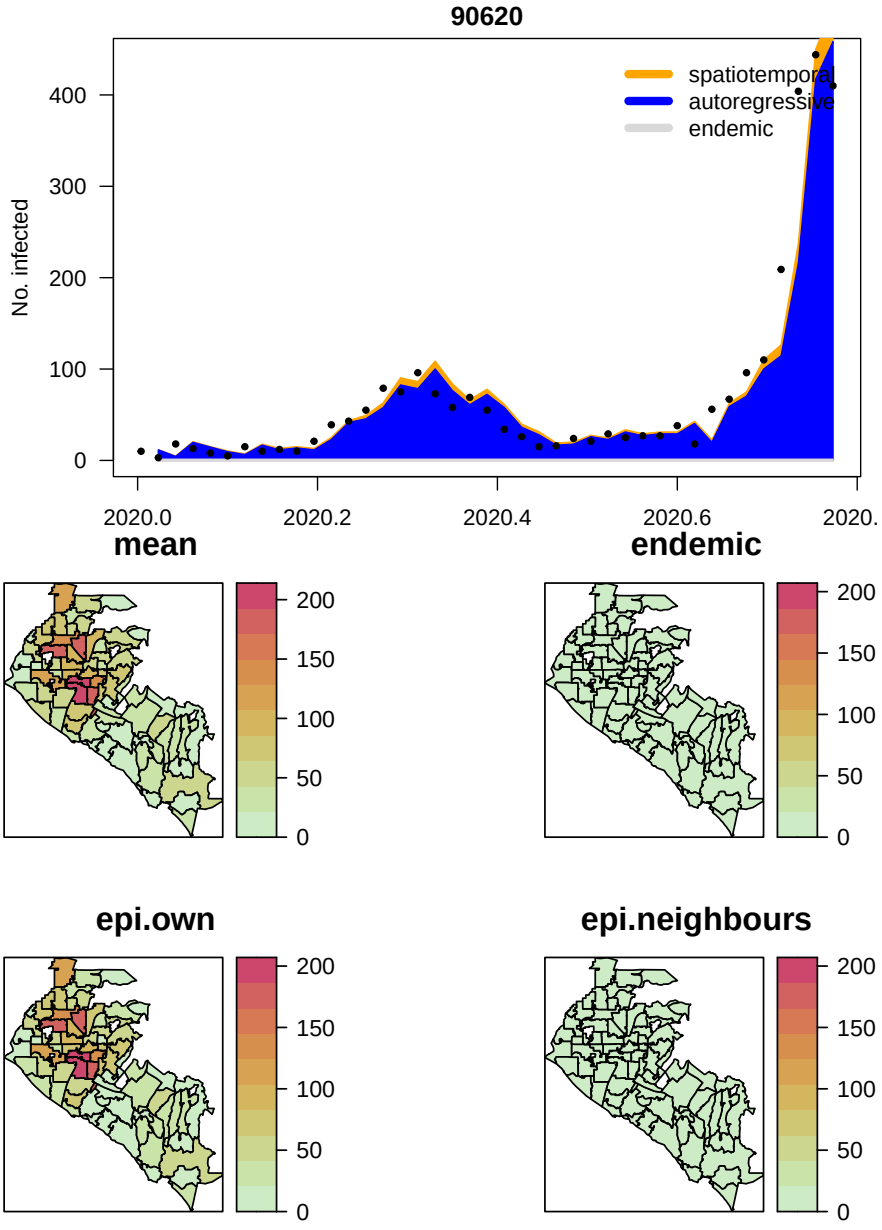
From Zip codes adjacency: 0 (not neighbours). 1 (neighbours).

```
binweights_nb <- surveillance::hhh4(
  oc_zip_covid,
  control = list(
    ne = list(
      f = ~ 1,
      weights = neighbourhood(oc_zip_covid),
      family = "NegBin1",
      normalize = TRUE
    )
  )
)
```

```
##
## Call:
## surveillance::hhh4(stsObj = oc_zip_covid, control = list(ar = list(f = ~1),
##     ne = list(f = ~1, weights = neighbourhood(oc_zip_covid),
##         family = "NegBin1", normalize = TRUE)))
##
## Coefficients:
##        Estimate   Std. Error
## ar.1    0.029056   0.004589
## ne.1   -2.649672   0.060562
## end.1   0.251688   0.048139
##
## Log-likelihood:   -19188.04
## AIC:              38382.08
```

```
## BIC:              38400.06
##
## Number of units:        74
## Number of time points:  40
```

Plots for the model:



Notes:

- Having issues with interpretation of the models.
- Not all 85 ZIP Codes due to incongruence between the data files. To be resolved. Currently, these models are based on 74 zip codes.
- To do:

- Time varying weights