PHIGHT COVID

Help better understand the impact of non-pharmaceutical interventions and model the changes in covid cases over time

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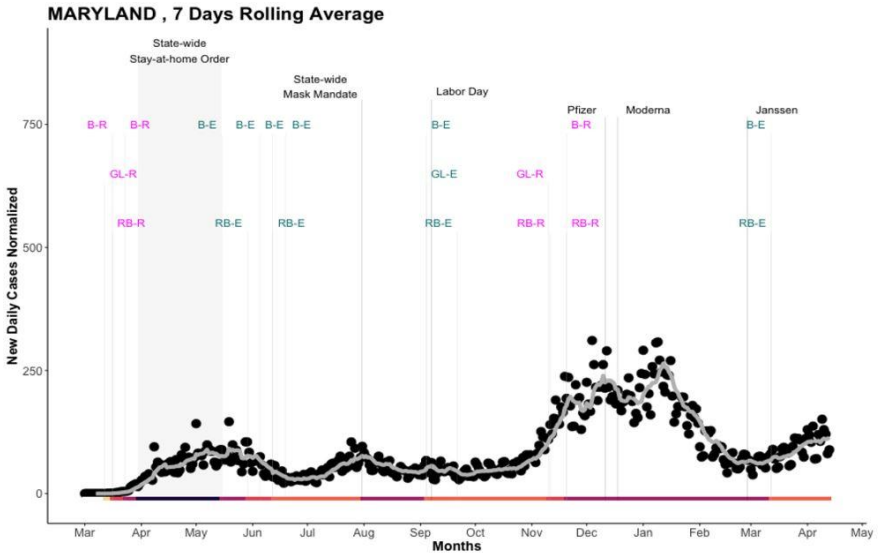
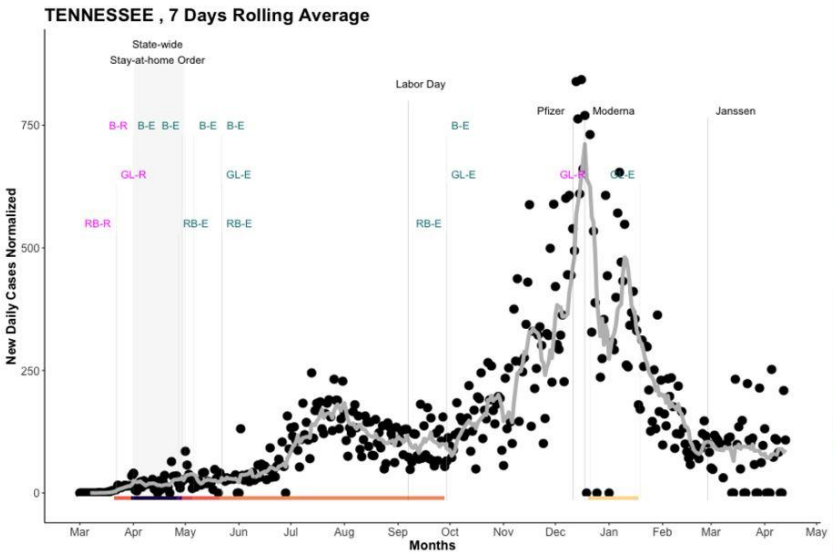
Overall Conclusion

- To combat the COVID-19 pandemic, each U.S. state has implemented different non-pharmaceutical interventions (NPI)
- Characterize the effectiveness of NPIs
  - Tighter the restrictions, lower the cases
  - Some NPIs lead to similar trends among different states
  - Took a while to see the positive impact of NPI restrictions
  - Covid cases trends are approximately grouped by regions

States with tighter restrictions have more cases under control





NPI

B-R: Business Restrictions

B-E: Business Restrictions Eased

GL-R: Gathering Limitation Restrictions

GL-E: Gathering Limitation Restrictions Eased

RB-R: Restaurant and/or Bar Restrictions

RB-E: Restaurant and/or Bar Restrictions Eased

Score

0

0.01 - 0.55

0.56 - 1.20

1.21 - 1.70

1.71 - 2.15

2.16 - 2.60

2.61 - 3.10

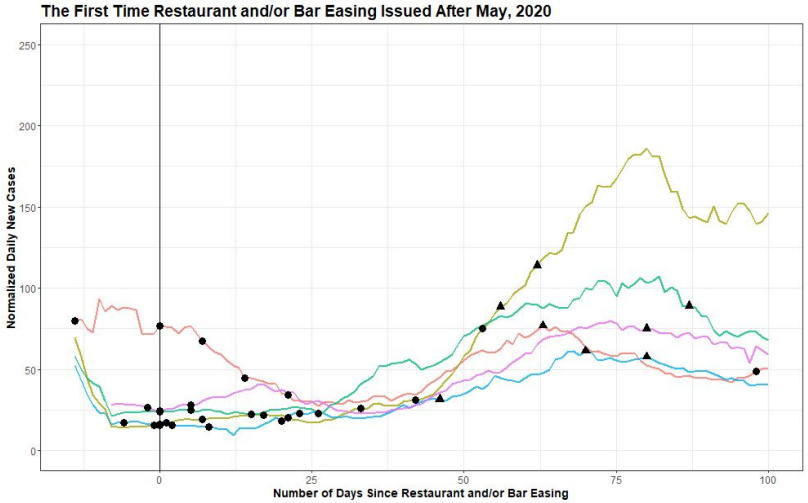
3.11 - 3.60

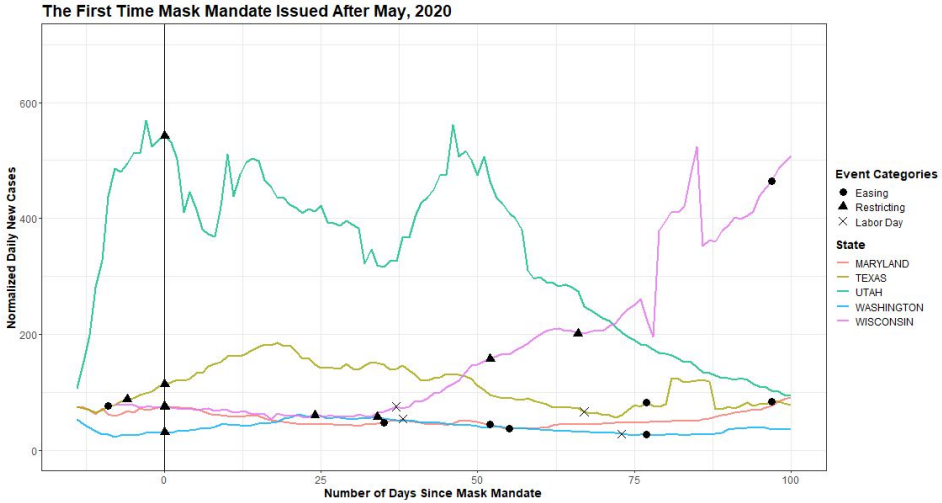
3.61 - 4.30

4.31 - 5.00

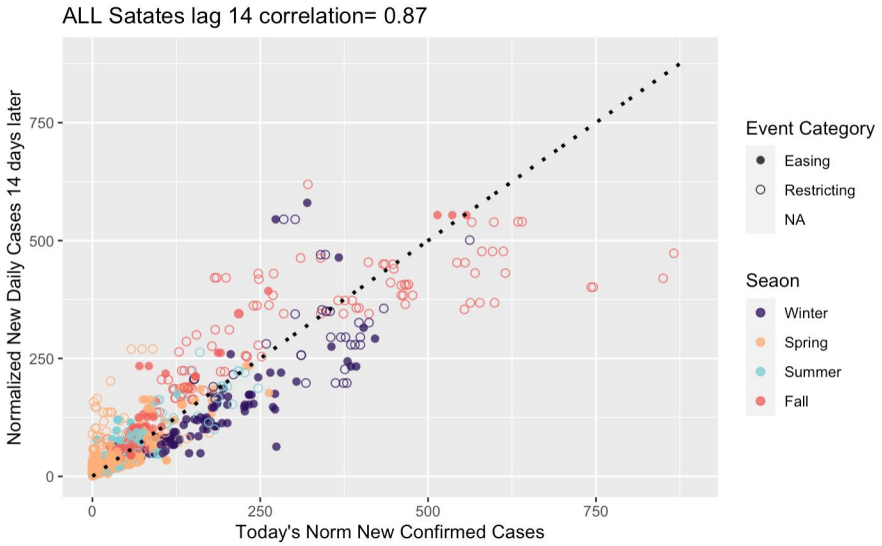
For interactive graphs of all states, visit https://phightcovid.org/Graphs.html for interactive graphs for all states

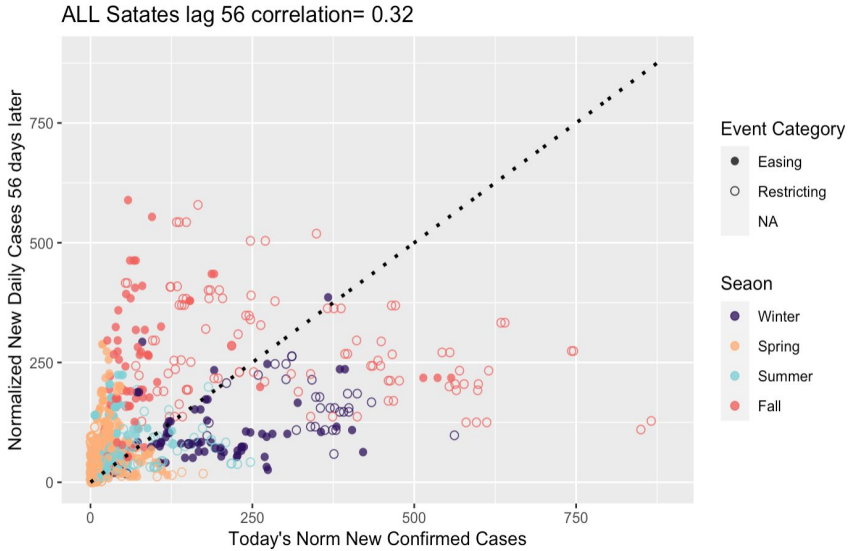
States experienced similar trends after the onset of restaurant and/or bar easing





It took 40 days to see the impact of restriction, but even longer for winter



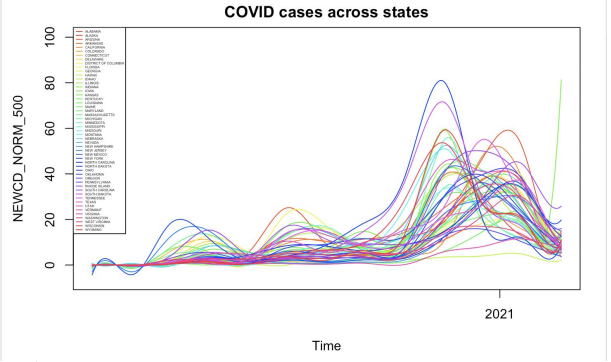


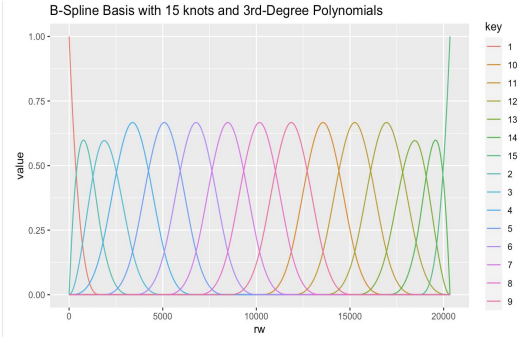
Bspline explanation

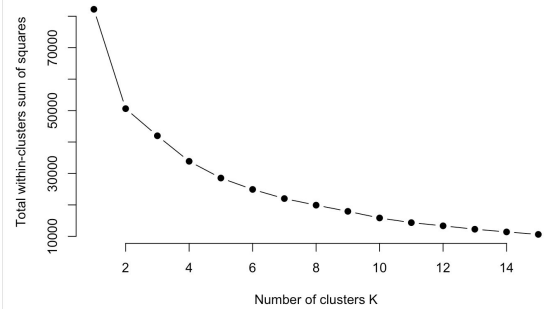
Basis: 15 cubic polynomials
Model(independent of covid data)

Weighted sum of polynomials w.r.t. 15 estimated coefficients by de Boor's algorithm using our covid data(i.e. Time & Normalised covid cases)

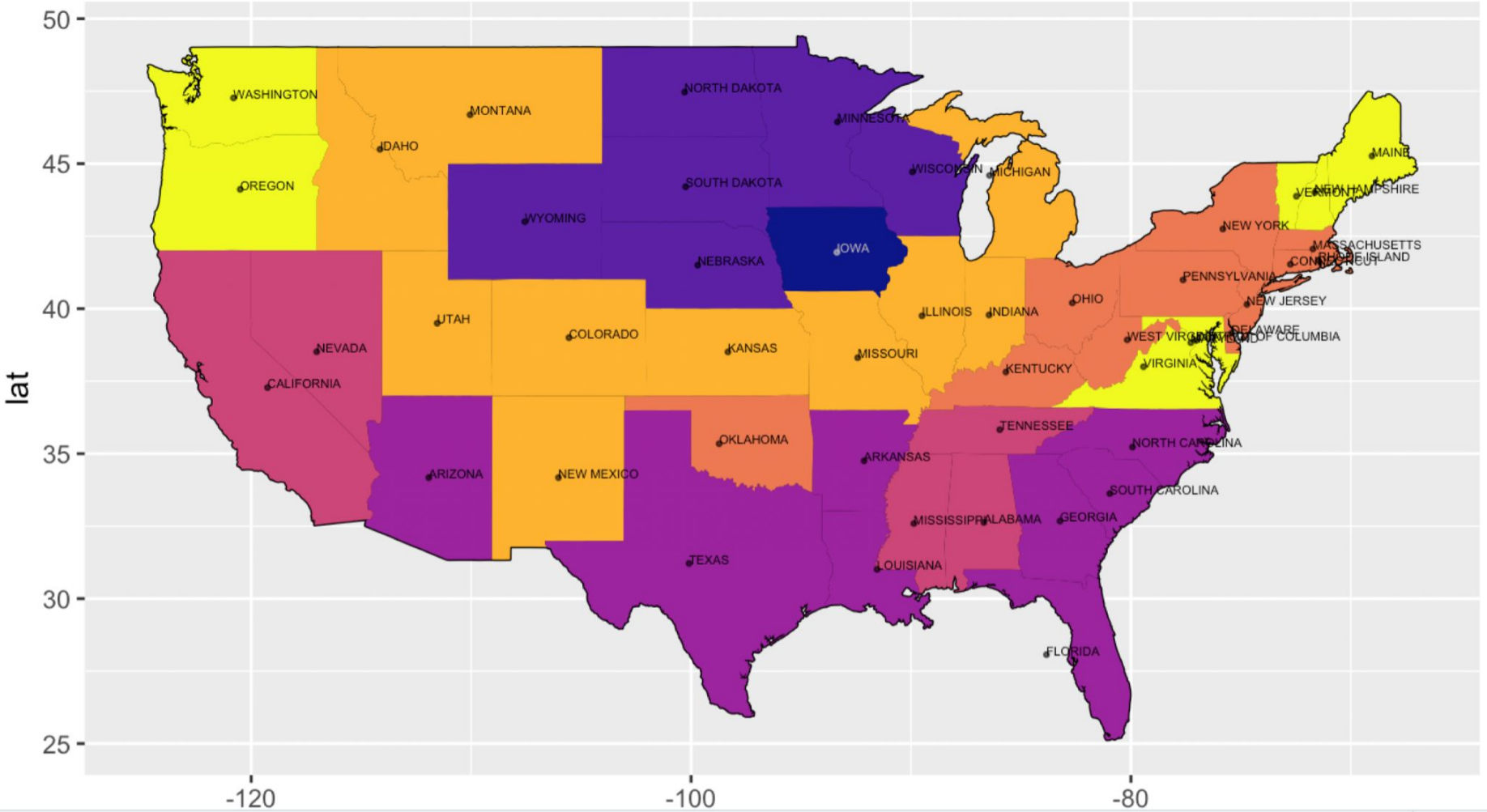
Kmeans: Create k clusters(centers) and assign each state(a set of 15 coefficients) to its closest center based on its b-spline coefficients.







U.S. Map spline knots kmeans covid cases k=7



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