



HSC COVID-19 report #2

What we have learned and looking ahead

May 28, 2020

Key observations at the time of reopening

When we made our first report on the impact of the COVID-19 on Tarrant County, we were able to make these observations:

- In Tarrant county, we were at a plateau in terms of new cases (or already had reached a peak).
- It was unclear if there would be another surge with easing of lockdown restrictions and, if so, how big that surge might be.
- The lockdown appeared to have been effective in controlling the spread of the virus.
- Healthcare facilities had been working below surge capacities to offer proper treatment to COVID-19 patients, but the question remained if hospitals would have enough capacity in the event of a surge.

Key questions after reopening

In this, our second report, we seek to answer these questions after lockdown restrictions have been eased:

- What was the impact of the government-imposed lockdown on community mobility?
- What was the impact of reopening in terms of community mobility?
- Have we seen any impact on the transmission of the disease?
- Is the recurrence of a big surge in new cases likely with the easing of restrictions?
- What can we learn from the available data in the county, state and elsewhere since the easing of restrictions?
- What is the path forward?

Key conclusions of present study

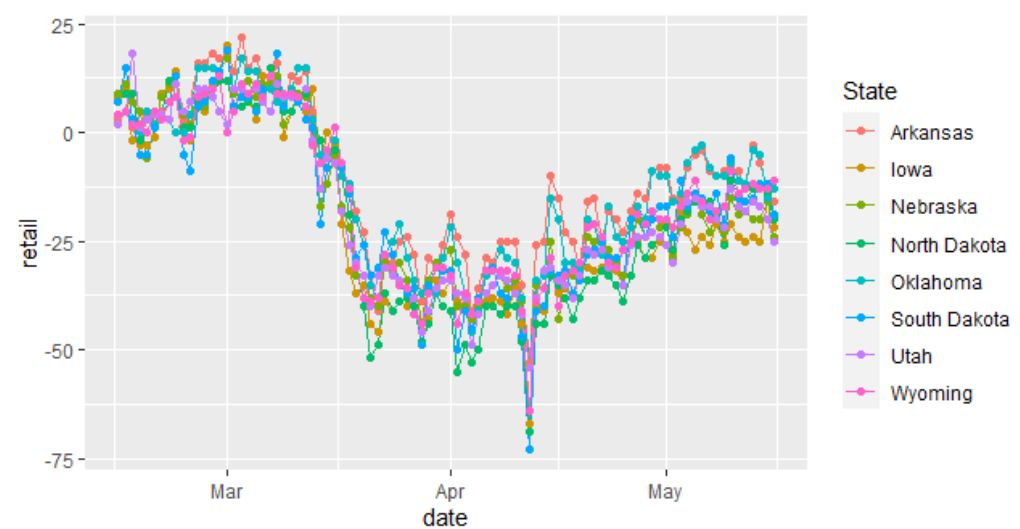
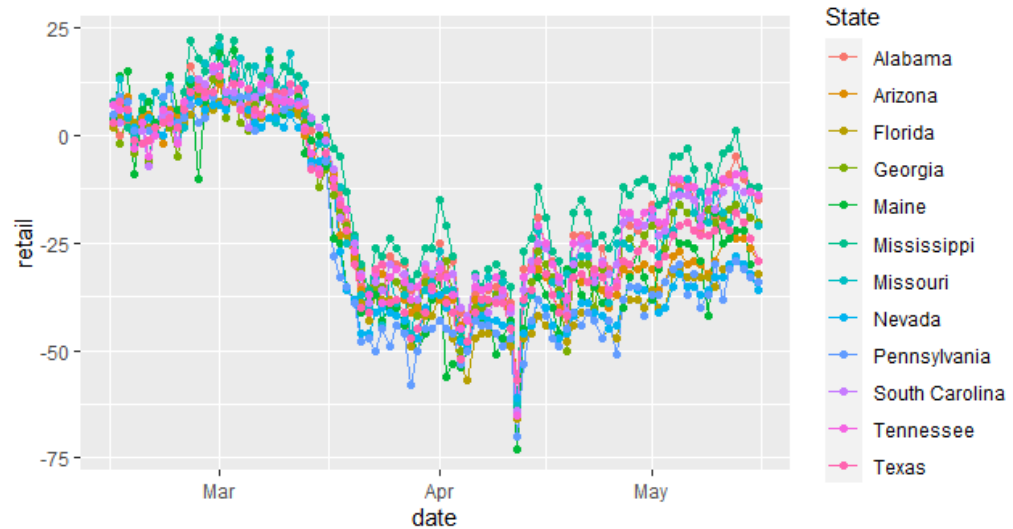
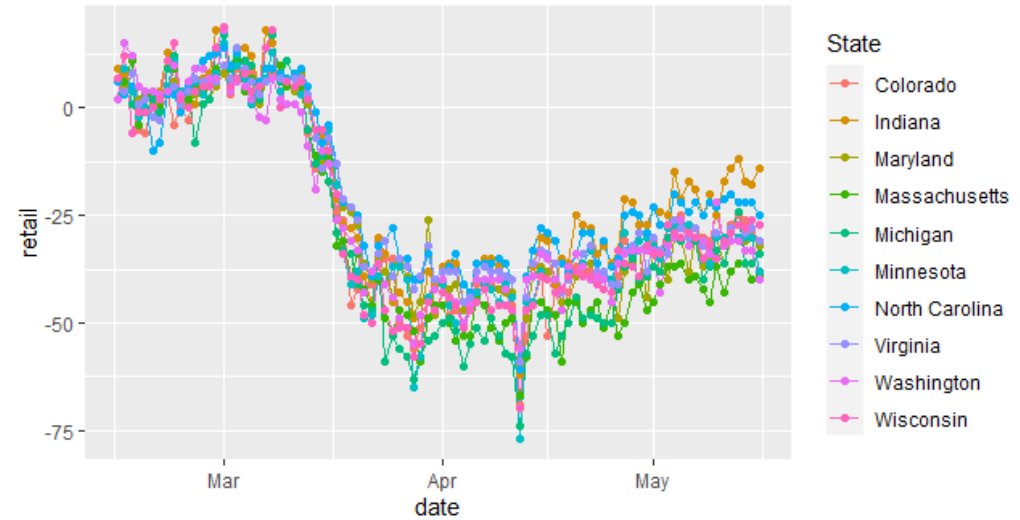
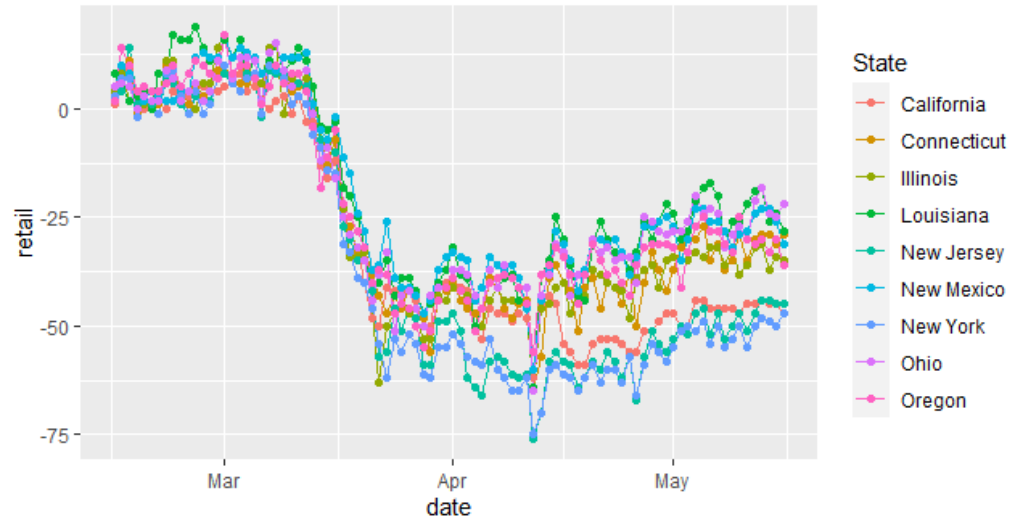
- We have not experienced a surge since the lifting of lockdown restrictions and the trend does not indicate a big surge in the short term.
- People have made pragmatic decisions on social distancing behavior irrespective of government intervention, which gives us hope in the event of a second surge.
- Hospitals are operating at below surge capacity.
- Even though the transmission of disease is currently under control, the end of the crisis is not in sight.
- Vigilance is of utmost importance and social-distancing guidelines (including wearing mask) need to be followed strictly.

Impact of lockdown on Community Mobility

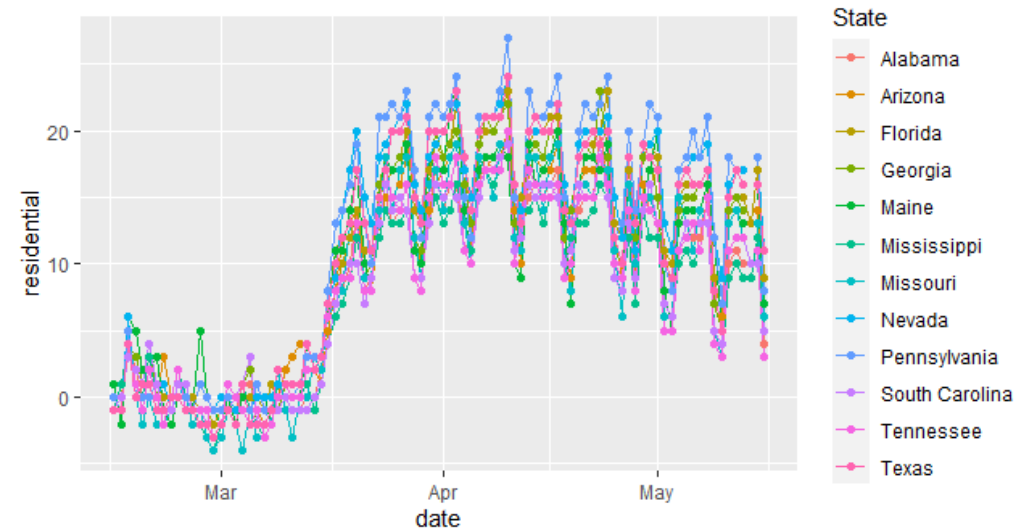
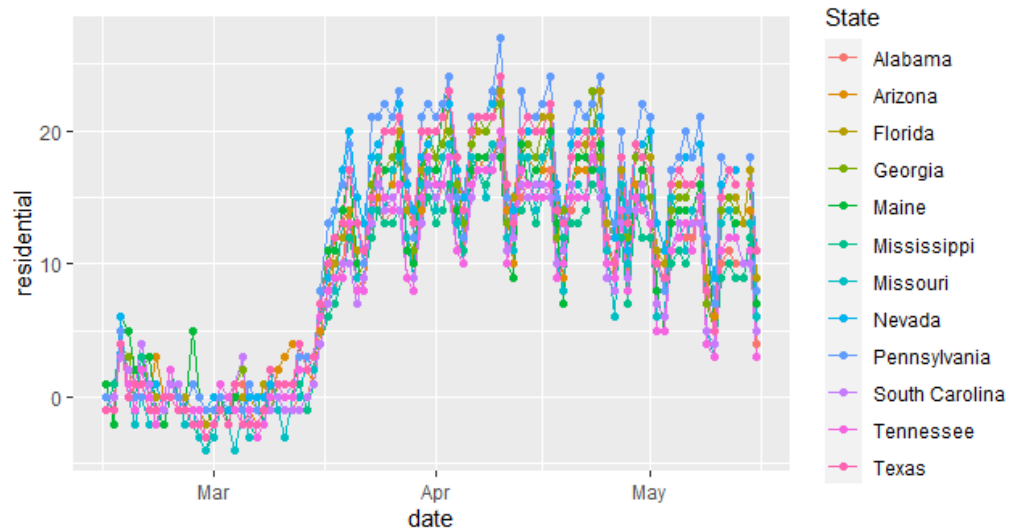
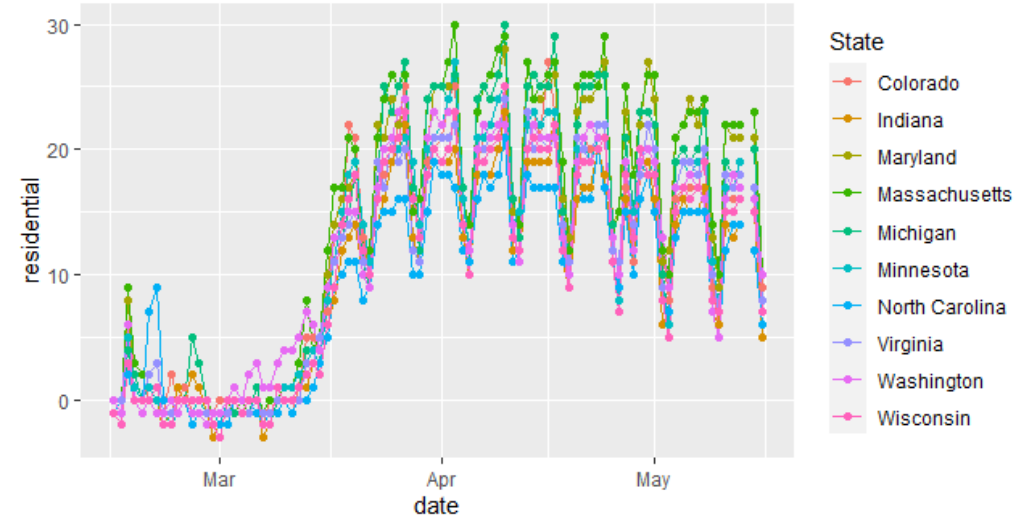
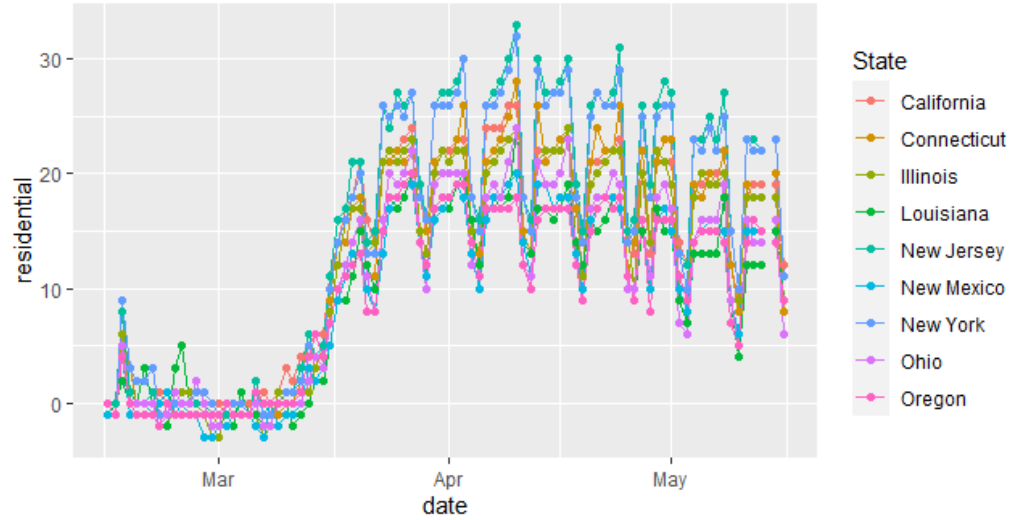


- We first studied U.S. mobility trends at the state level and classified the states into four groups based on lockdown dates: Group 1: statewide stay-at-home orders in place by March 23, Group 2: statewide stay-at-home orders in place by March 30, Group 3: statewide stay-at-home orders in place by April 7 and Group 4: no statewide stay-at-home orders.
- We then looked at the trend for counties in Texas and added smoothing to eliminate weekly cyclic behavior.
- Finally, we compared the U.S. trend with the hardest hit countries in Europe.

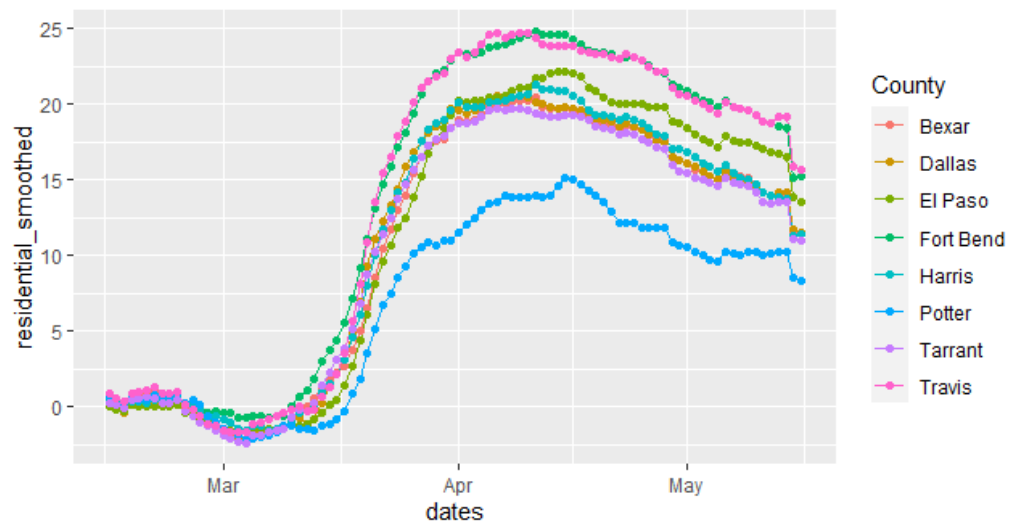
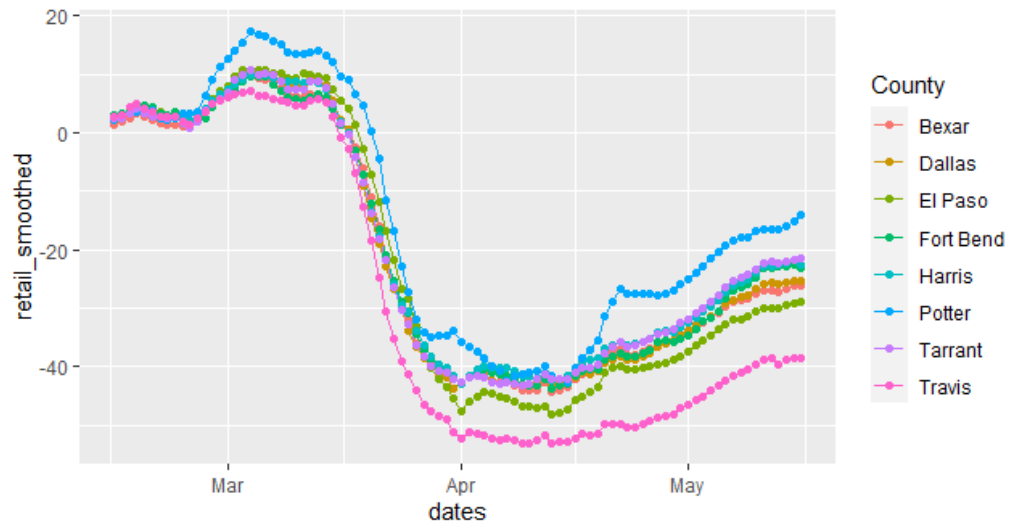
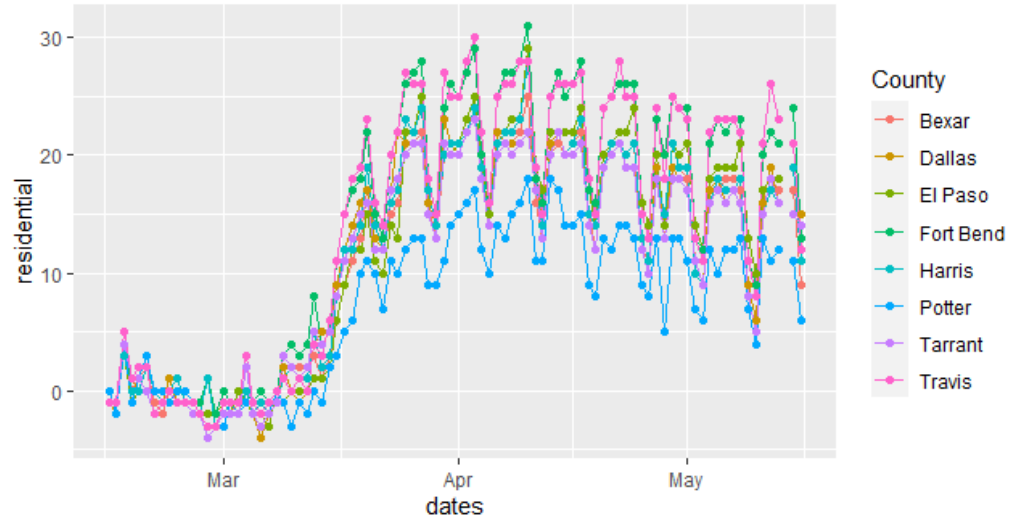
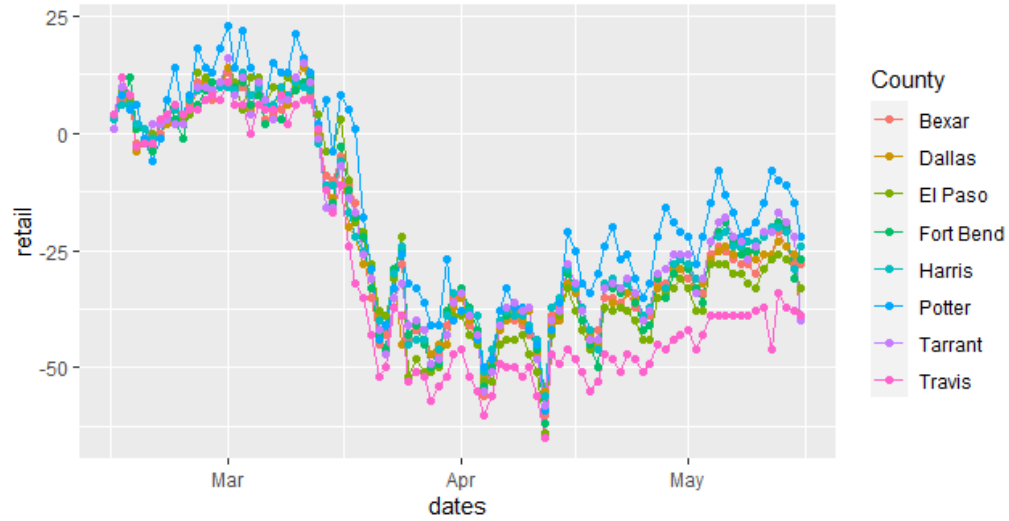
Percent mobility change in retail/recreation



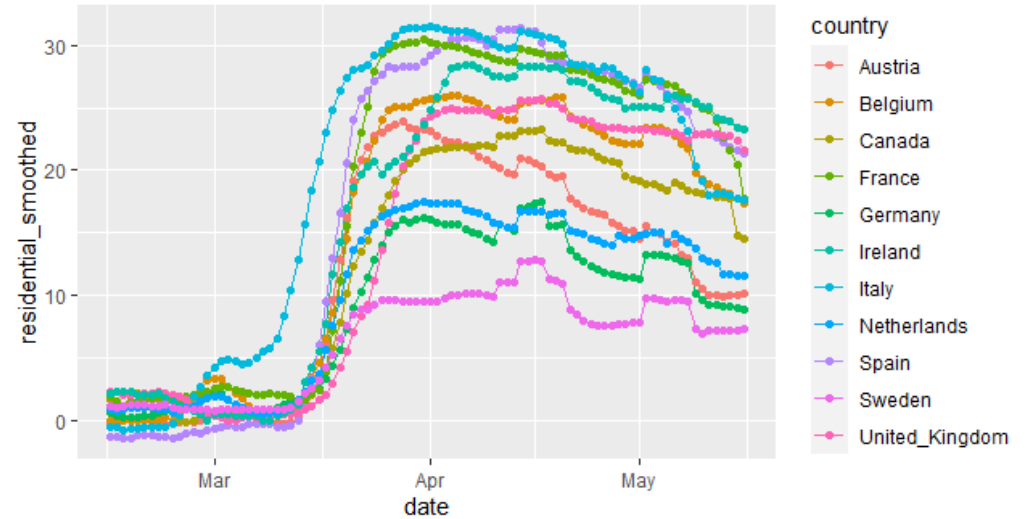
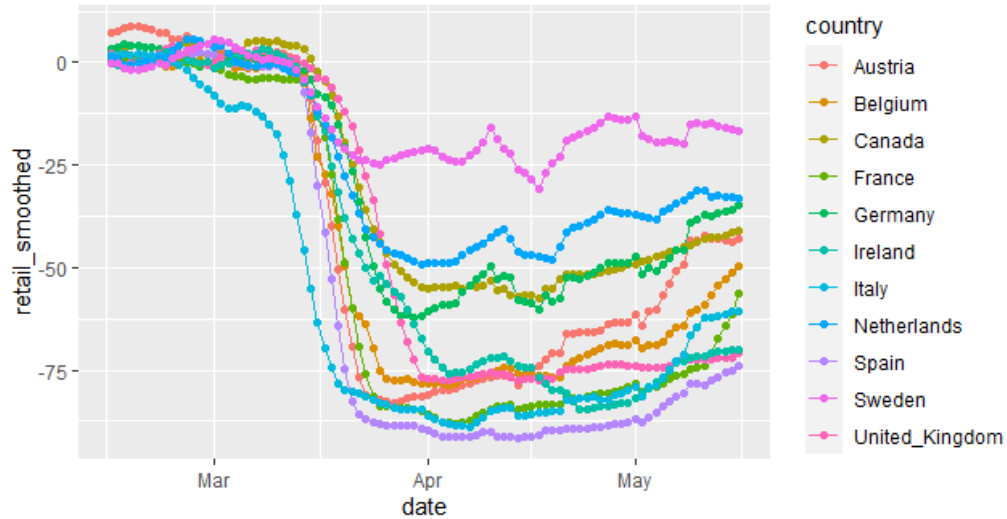
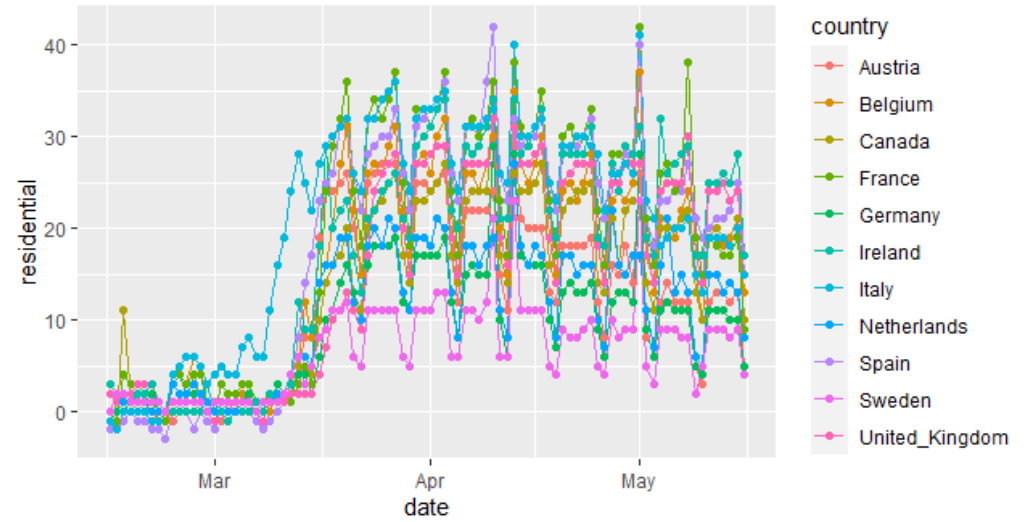
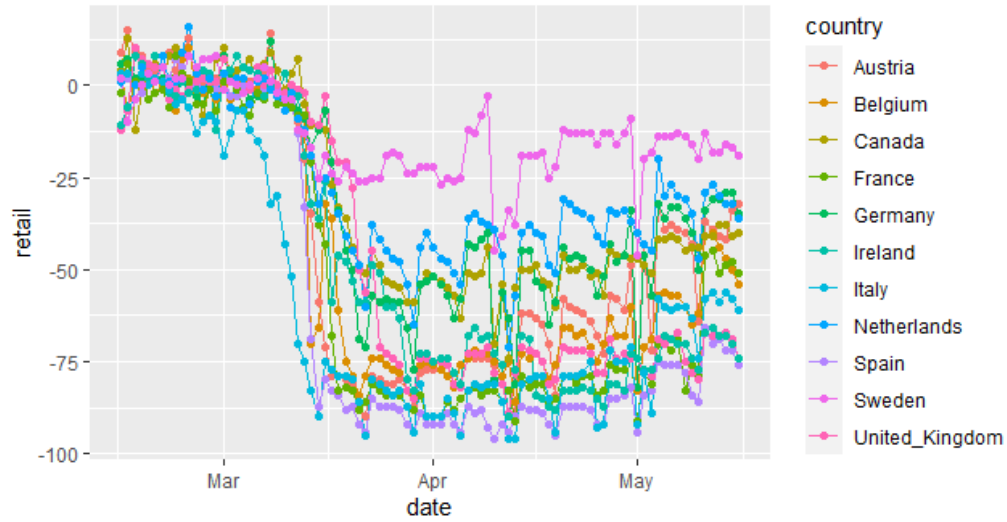
Percent mobility change in residential



Mobility for Texas counties with smoothing



European countries with smoothing



Takeaways from community mobility trend

- The community trends in the U.S. show remarkable consistency across states and counties.
- It almost appears that people across the nation collectively decided to lock down as soon as the threat from COVID-19 was perceived to be imminent in the middle of March, irrespective of intervention from state and federal authorities.
- The actual date of implementation of lockdown orders appear to have little effect on the trend as evidenced by almost identical trends on the four groups of states classified based on lockdown implementation date.
- This is clearly different from the trend observed in Europe where the countries differ on when the effect of lockdown is observed.

Takeaways from community mobility trend

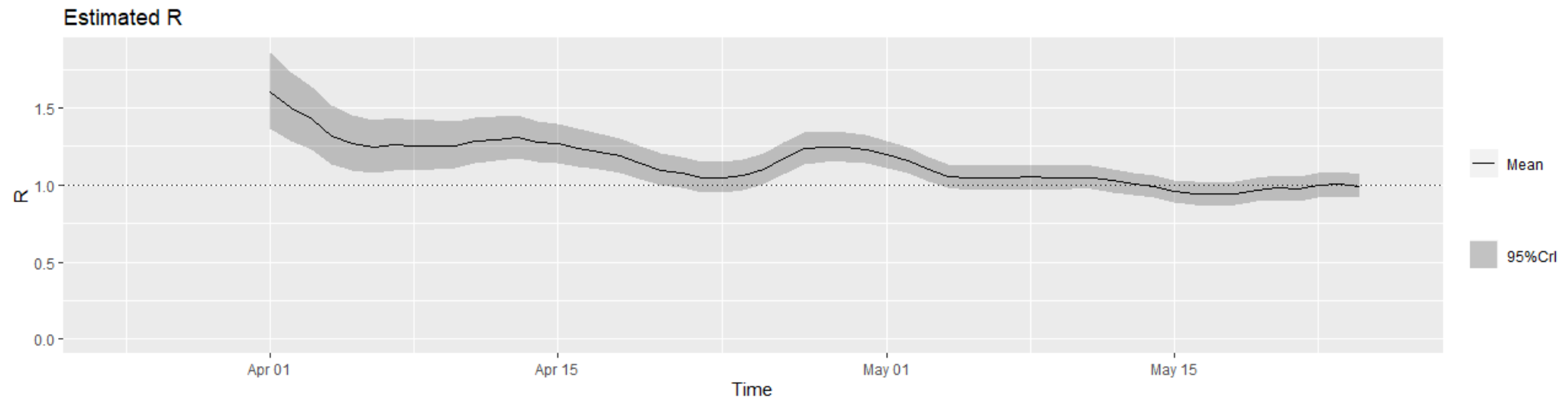
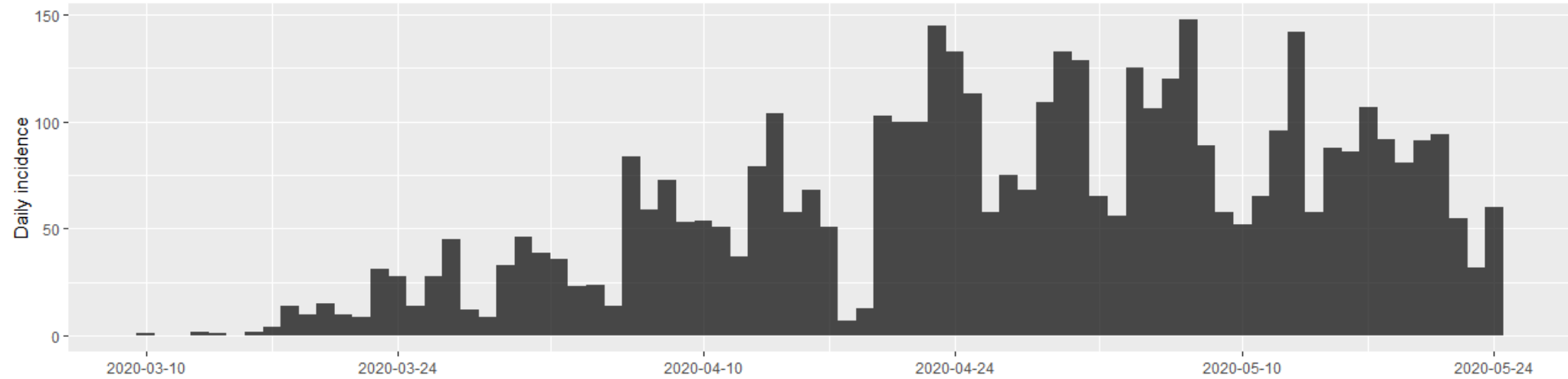


- In the U.S., the retail mobility trend is slowly but steadily increasing since mid-April.
- As expected, the opposite is true for residential mobility trend, which is slowly but steadily decreasing since mid-April.
- It is noteworthy that there is no discernible change in this trend irrespective of whether lockdown is in effect or lifted across the nation.
- Again it appears that people's collective action is dictated by perceived threat rather than formal government proclamations.
- Specifically, in Texas, there is no obvious change in mobility trend on or after the lockdown is lifted.

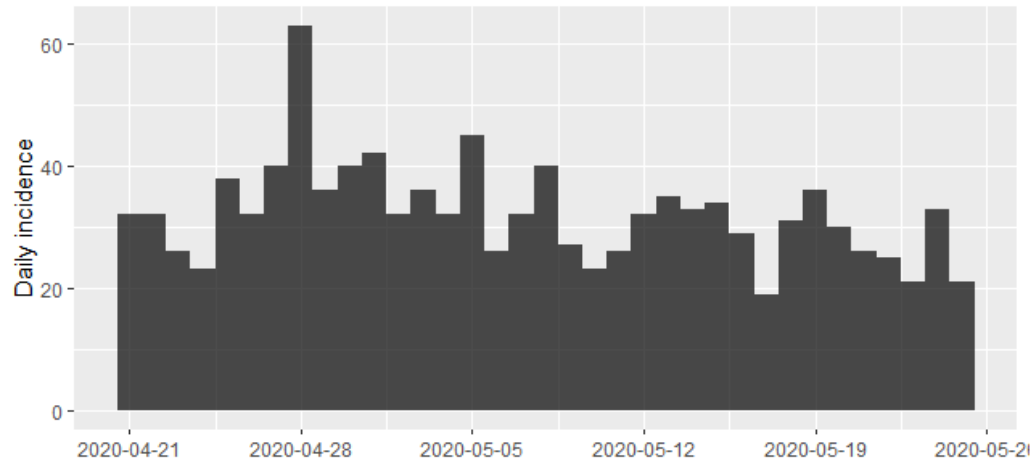
Current transmission rate of the disease

- In epidemiology, the basic reproduction number R_0 , of an infection can be thought of as the expected number of cases directly generated by one case in a population where all individuals are susceptible to infection.
- R_0 is time-varying and, if it goes significantly above 1, there will be a surge in number of cases.
- We will estimate the trend in R_0 for Tarrant county and neighboring counties using various data sources.

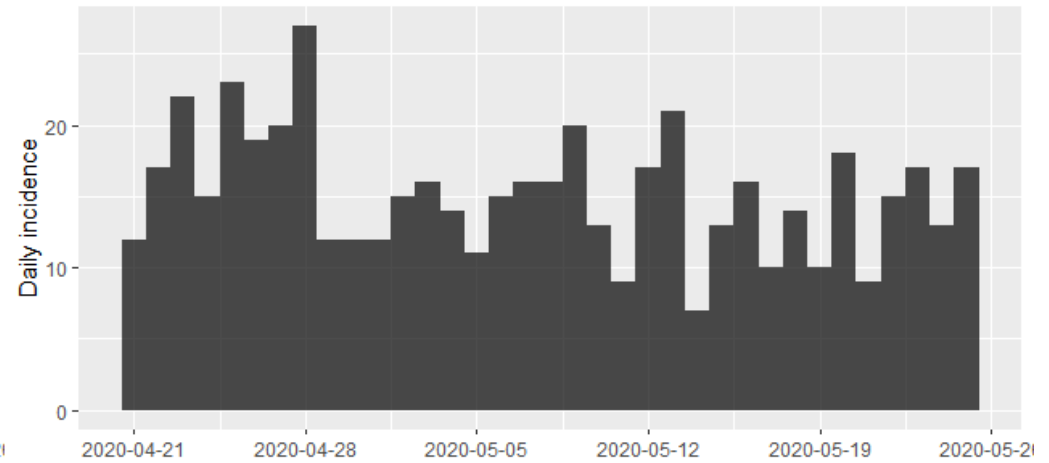
Tarrant county R_0 using case counts (TCPH)



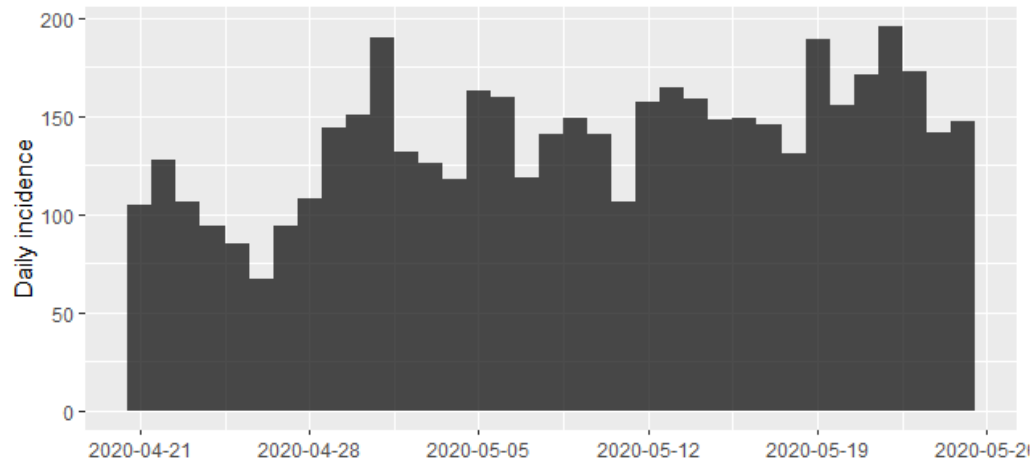
R₀ using hospital admits (NCTTRAC)



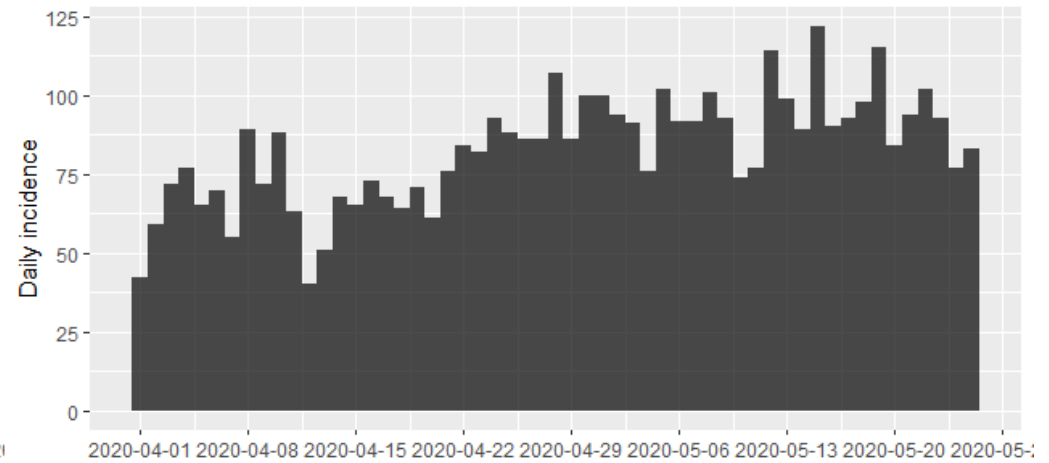
Collin



Denton

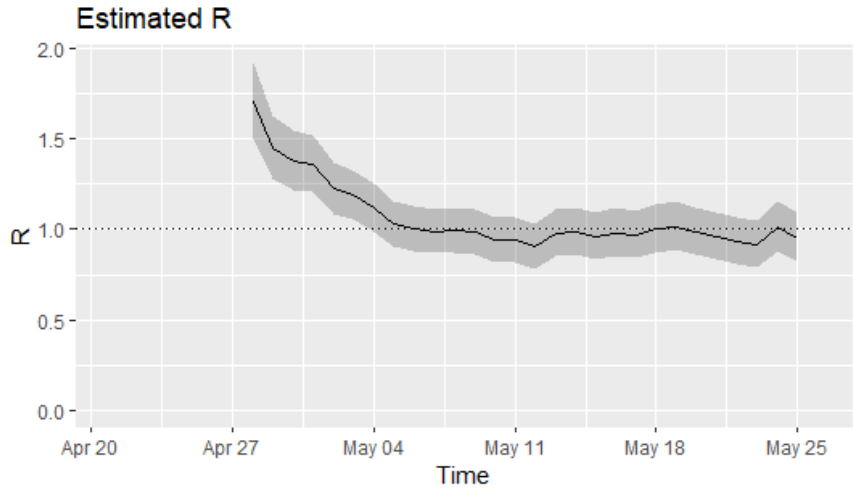


Dallas

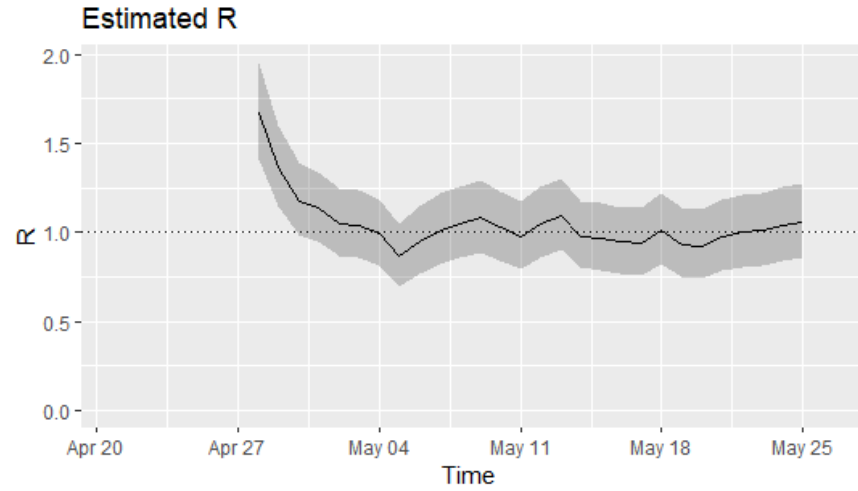


Tarrant

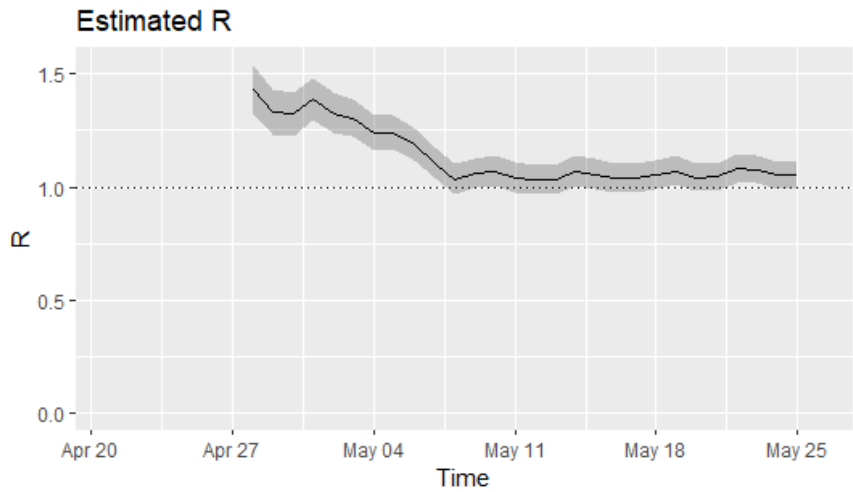
R_0 using hospital admits (NCTTRAC)



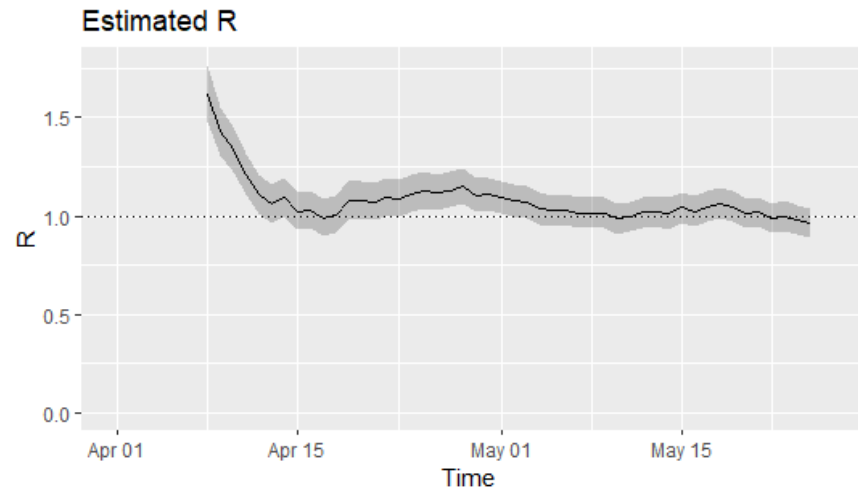
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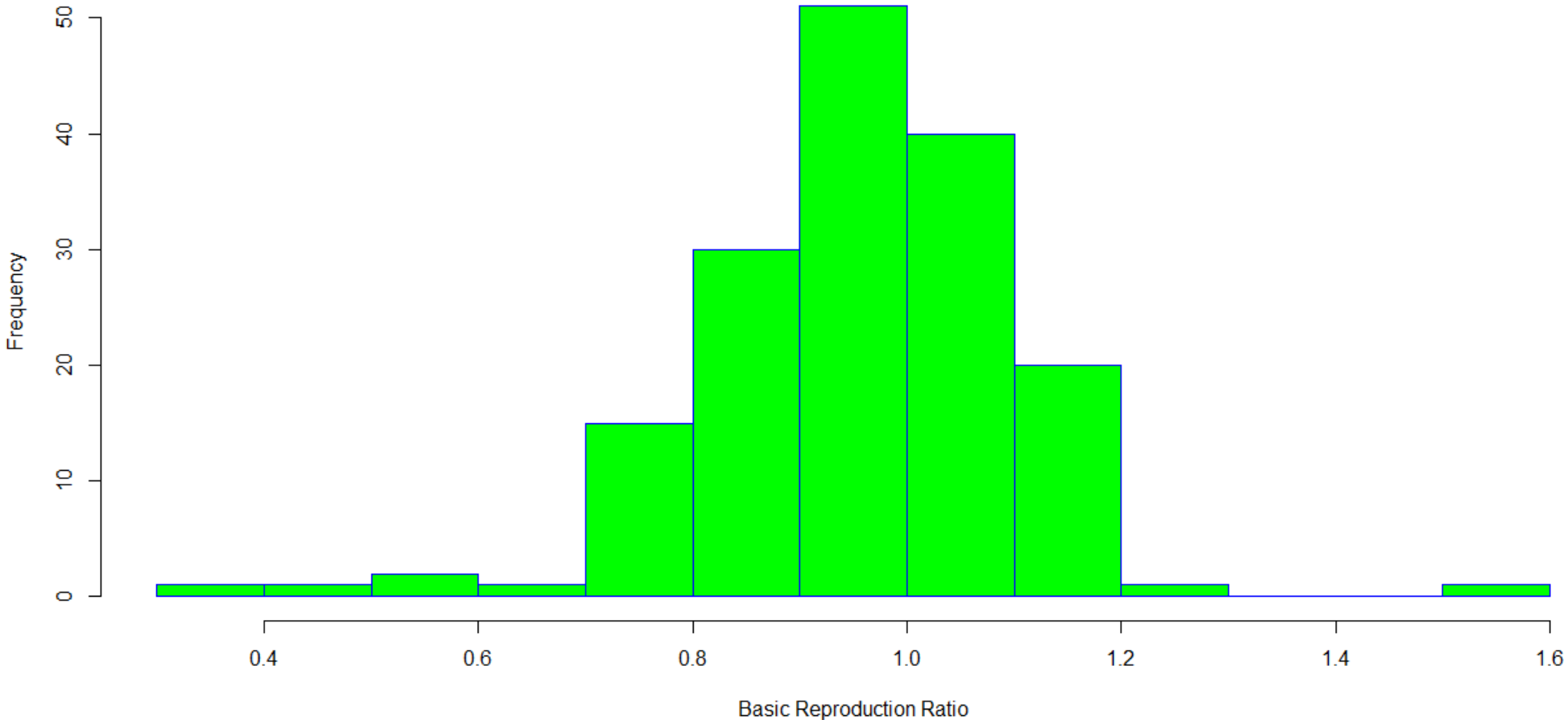


— Mean
■ 95%CrI

Distribution of current R_0 in impacted counties



Histogram for R_0 in 163 most affected counties



Takeaways from time-varying R_0 trend

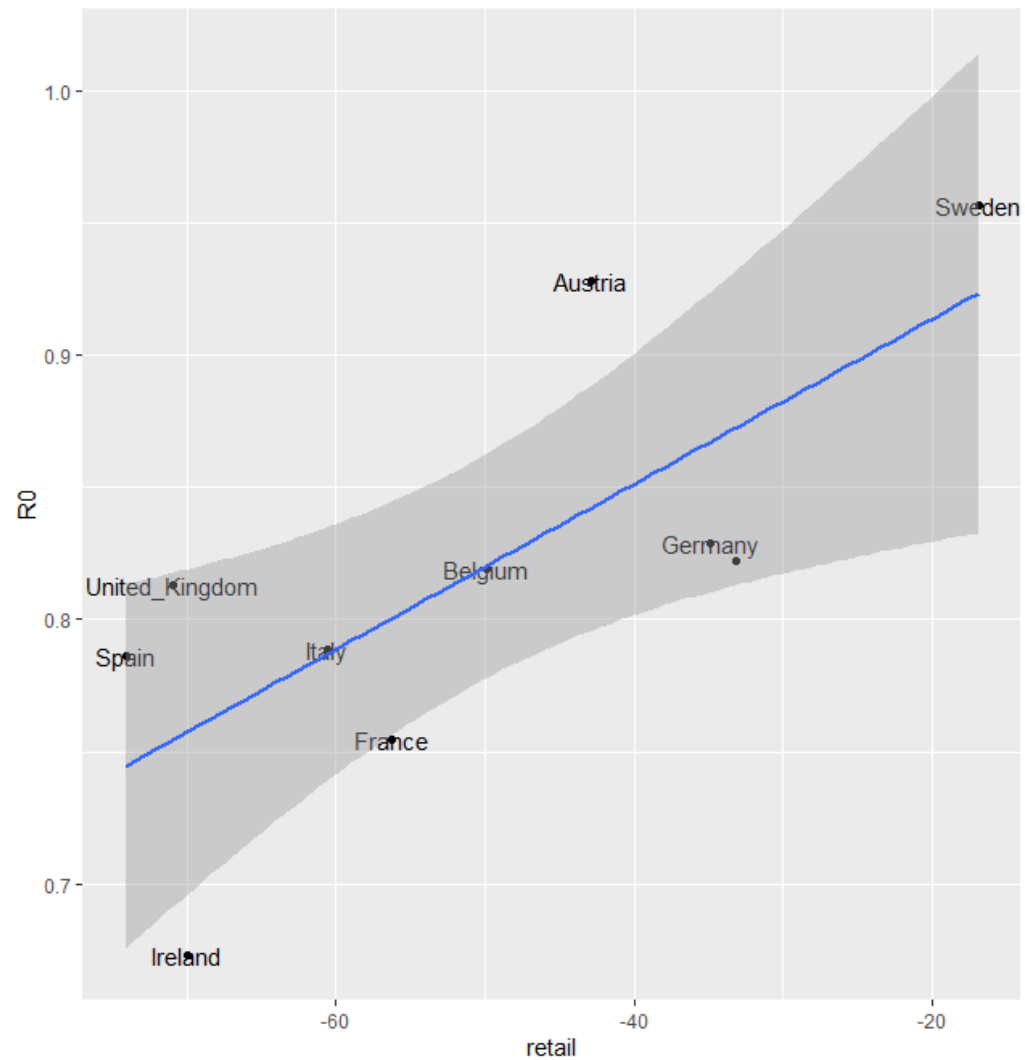
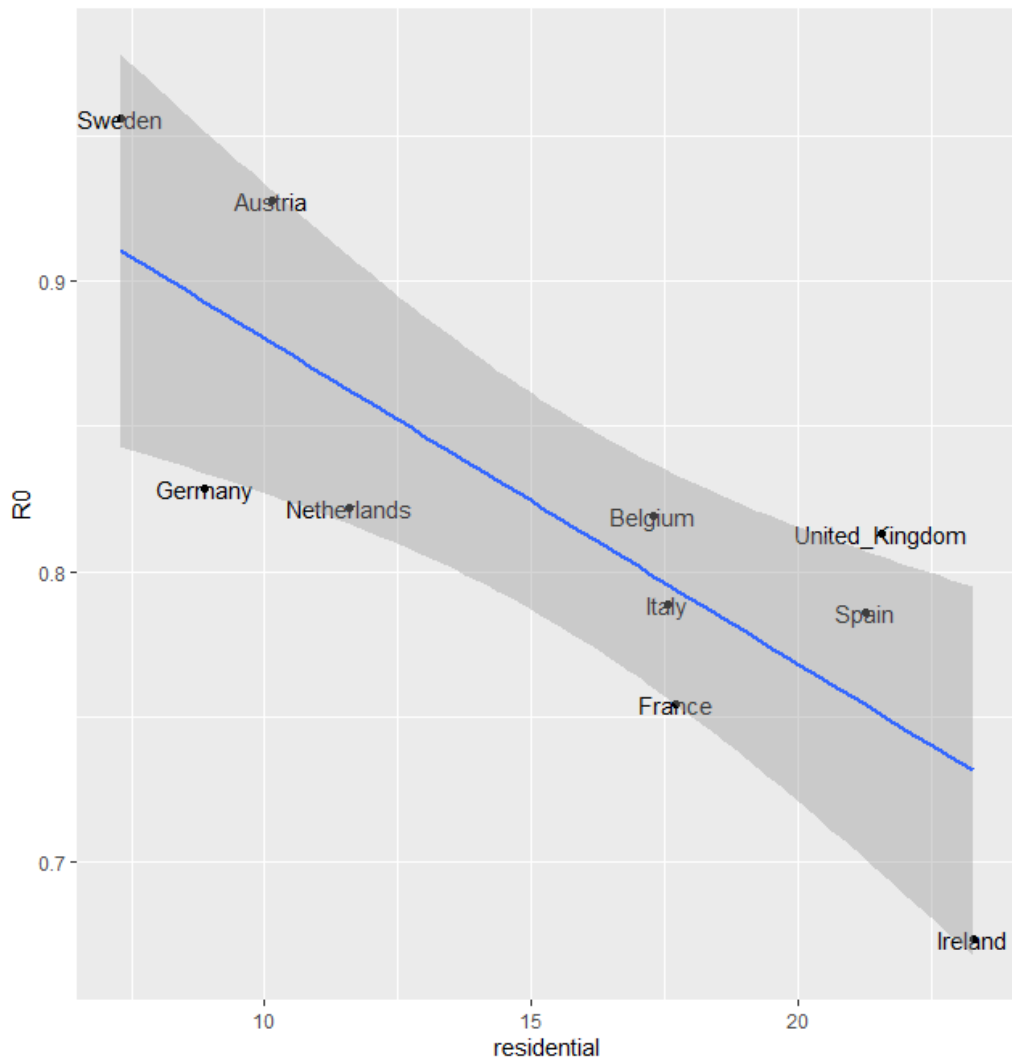
- So far, Tarrant county is holding up well after the lifting of stay-at-home orders.
- Typically, there is a lag of 10 days to observe any discernible effect of an event on R_0 , due to delay in onset of symptoms and subsequent testing.
- R_0 was at or around 1 at the time of lifting of stay-at-home order and is currently stable at or just below 1.
- A big surge in the short run seems unlikely for Tarrant County.
- Collin County is exhibiting similar pattern.
- However, there is some cause of concern for Dallas County, as the R_0 is consistently staying at a level just above 1.
- Results from Denton County are volatile due to smaller sample size.

What we can learn from the available data

- We calculated the current R_0 for all counties with cumulative case counts over 1,500.
- The histogram shows a sharp peak just below 1 (mean=0.95, sd=0.14), indicating that the transmission is not out of control.
- However, an R_0 just below 1 also indicates that it is unlikely to go away anytime soon and emergency preparedness is of utmost importance.
- The mobility trend also indicates a potential of collective self-corrective behavior in the presence of a perceived imminent threat.
- In the event of a second wave, it is possible that people will decrease external mobility irrespective of issuance of a mandate.

What we can learn from Europe

- In extrapolating what to expect in the future, it is instructive to look at Western European countries that were impacted quite heavily much earlier than the U.S. and that also opened up earlier.
- Among the 11 most heavily impacted nations, the current R_0 ranges from 0.67 in Ireland to 0.96 in Sweden.
- The corresponding decrease in retail mobility from baseline in percentage ranges from 74 in Spain to 17 in Sweden.
- The corresponding increase in residential mobility from baseline in percentage ranges from 23 in Ireland to 7 in Sweden.



What we can learn from Europe

- Although the sample size is small, the scatterplots show a strong linear relationship of R_0 with both retail and residential mobility (highly significant statistically).
- Sweden has the highest R_0 value of 0.96 with current retail mobility -17% and residential mobility 7%.
- This provides us a benchmark in terms of concern based on mobility data.
- Anytime the mobility metric approaches these numbers, there is reason to be concerned.
- Currently, Tarrant and Dallas counties are close to these numbers and should be monitored.

Data sources used for this analysis

- Case and mortality counts in US counties - Johns Hopkins Coronavirus Resource Center
- Global case and mortality counts - European Centre for Disease Prevention and Control
- Global mobility data (including US counties) – Google COVID-19 community mobility report
- Case and mortality counts in Tarrant County – Tarrant County Public Health (TCPH)
- ER visits, hospital admits, ICU admits in North Texas counties - North Central Texas Trauma Regional Advisory Council (NCTTRAC)
- New York Times on how States shut down and reopened (or will reopen)



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