UPDATED JUNE 19, 2020

UT Southwestern
Medical Center

COVID-19 Current State Analysis and Forecasting for the DFW Region

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Data as of June 19

About the Model

The following slides illustrate a model of how COVID-19 is spreading across the DFW region based on real patient data we have received from Collin, Dallas, Denton and Tarrant counties. The slides capture a snapshot based on data available as of June 19. Every time we receive new data, we re-run the model and refine the graphs.

In the following slides we examine how well preventive measures including masking, staying at home, social distancing, hand hygiene and others have limited the spread of infection, and what might happen looking forward.

Model-building is an iterative process with inherent uncertainty in its predictions. It is intended to provide help in formulating plans but should not be the sole basis for policies or management decisions addressing the COVID-19 challenge. Please do check back every few weeks to see how well the DFW region is doing to keep COVID-19 at bay.

We would like to thank the local health departments, hospitals, and health systems that have contributed data to help us build this model.

Notable Updates

The percent of COVID-19 tests coming back positive is increasing (i.e. a large percentage of tests are positive), suggesting more infection is present in the community. New cases and hospitalizations in the DFW area continue to rise. We are forecasting an approximate 20% increase in hospitalizations over the next two weeks.

If the current path continues, cases will grow significantly throughout the summer and autumn in the absence of increased adherence to recommended physical distancing guidelines (keeping 6 feet between people) and wide-spread use of masks (see final slide).

Holiday weekends, such as Easter and Memorial Day, resulted in increased hospitalizations two weeks later, so great caution must be exercised during any upcoming Independence Day celebrations.

The recent growth appears to be primarily due to increased cases in younger age groups, especially those aged 21-40. In June, 50% of hospitalized COVID-19 patients and 30% of ICU patients have been under 50 years old.

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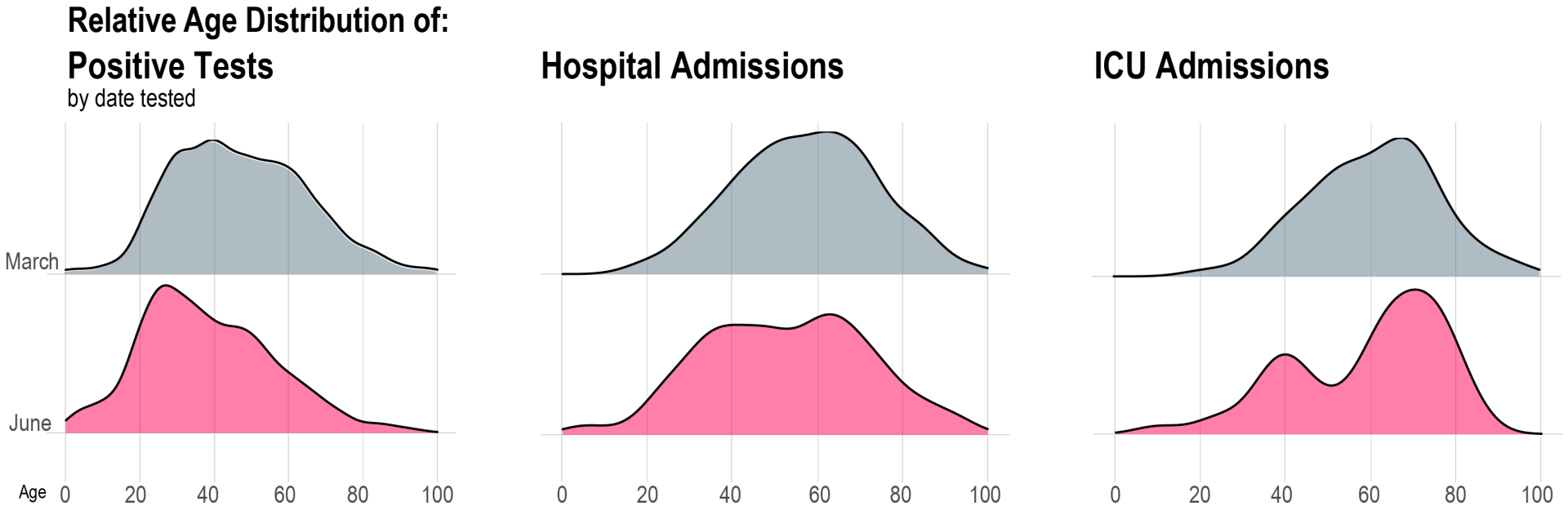
More Young People (21-40) Are Catching COVID-19



New daily COVID-19 cases have sharply jumped among those aged 21-40 while staying largely stable among other age groups. This rise in overall cases has been accompanied by younger trends in those requiring hospitalization (50% under 50) and critical care (30% under 50).

Source: Dallas County Health and Human Services, as of 6/19/2020
Credit: UT Southwestern

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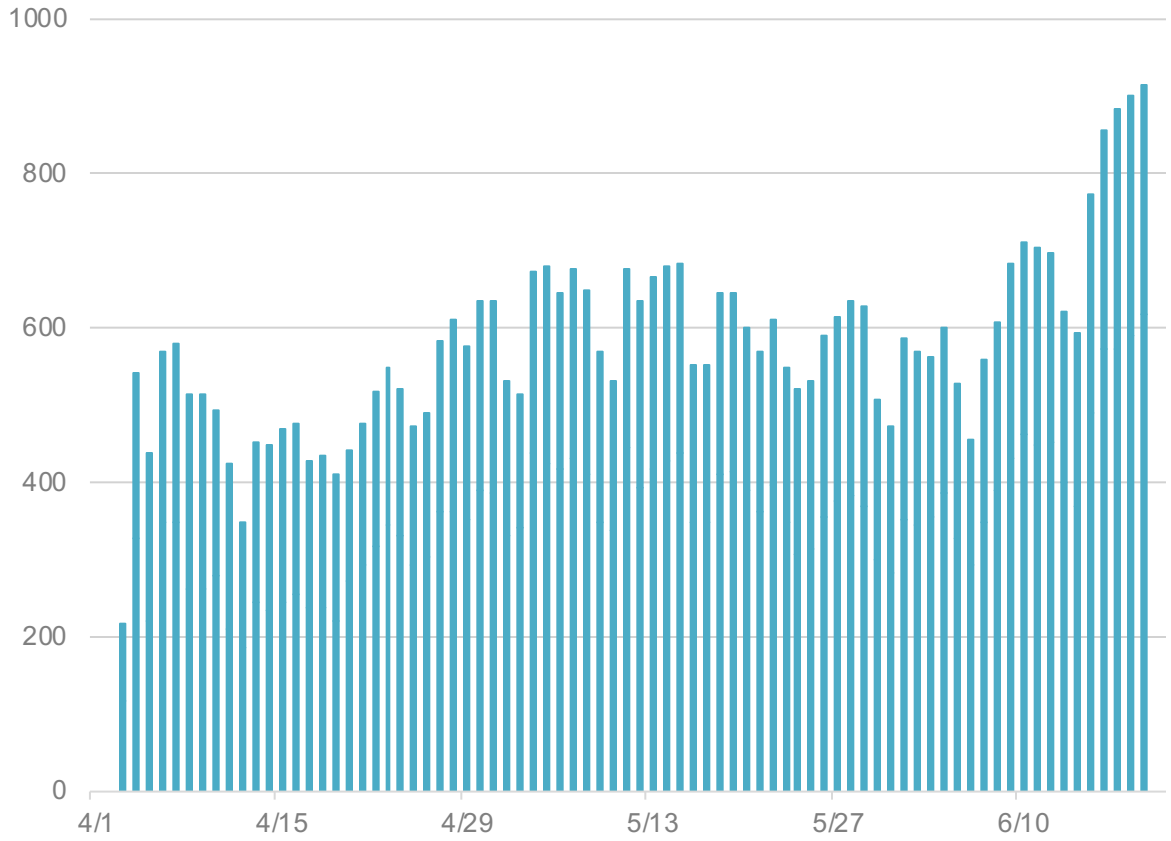
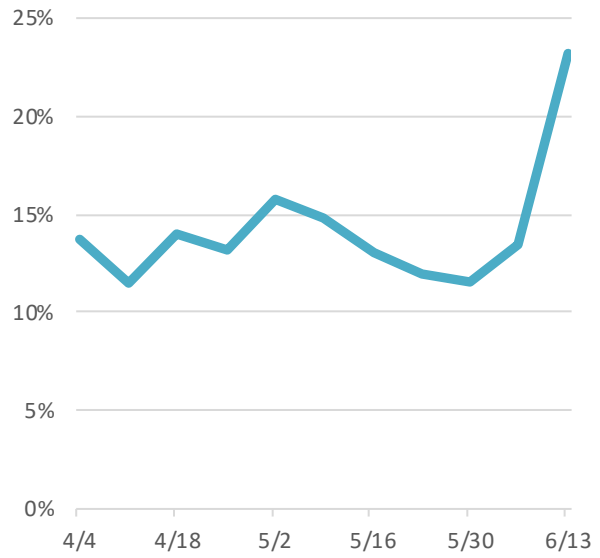
Severe Cases of COVID-19 Are Rapidly Rising in North Texas

Confirmed COVID-19 Patients in North Texas Hospitals



Percent positive COVID-19 tests in Dallas County Hospitals



Hospitalizations due to COVID-19 have increased by **24%** compared to one week ago.

Source (left): NCTTRAC COVID EMResource Data Set, Accessed 6/19/2020
"North Texas" is defined as Trauma Service Area E
Source (right): Dallas County HHS 6/19 report, data as of 6/13

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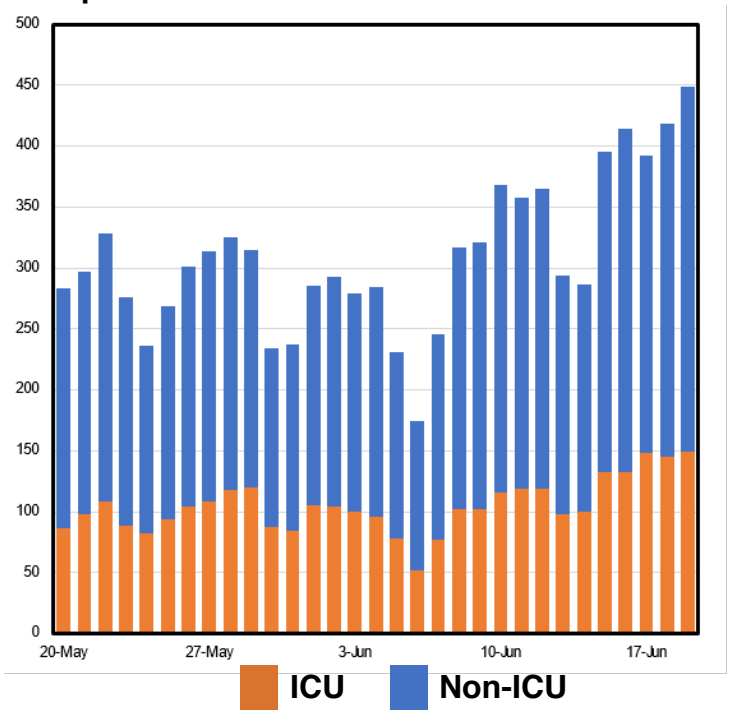
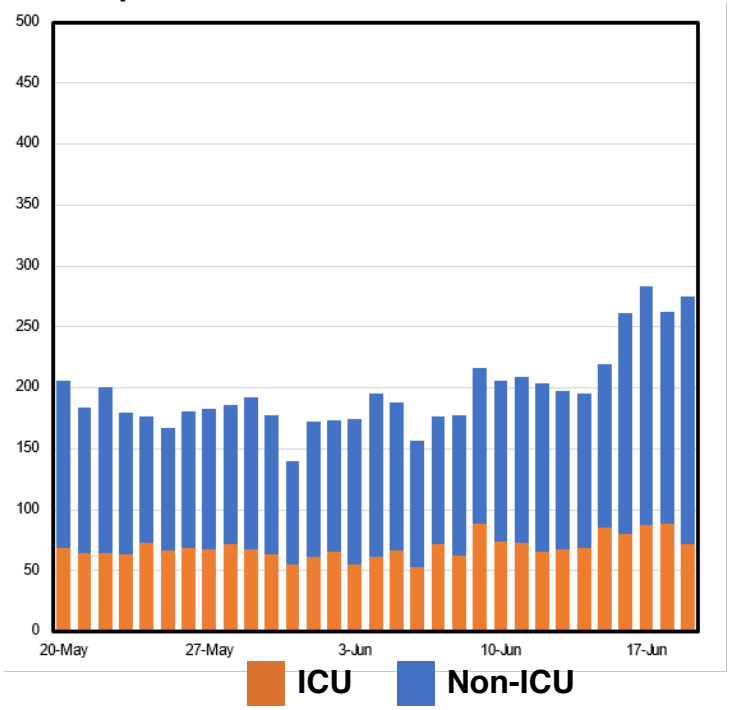
How many people with COVID-19 have been hospitalized in Dallas and Tarrant Counties in the past month?

Total Hospitalized COVID-19+ Patients in Dallas County



Total Hospitalized COVID-19+ Patients in Tarrant County



We closely track daily COVID -19 hospitalizations, as this indicator reliably monitors the severity of the outbreak in DFW. Hospitalizations trail new infections by 1-2 weeks but are not influenced by testing capacity or test reporting delays, thus giving us a clear picture of severe cases in the community.

Source: NCTTRAC COVID EMResource Data Set, Accessed 6/19/2020

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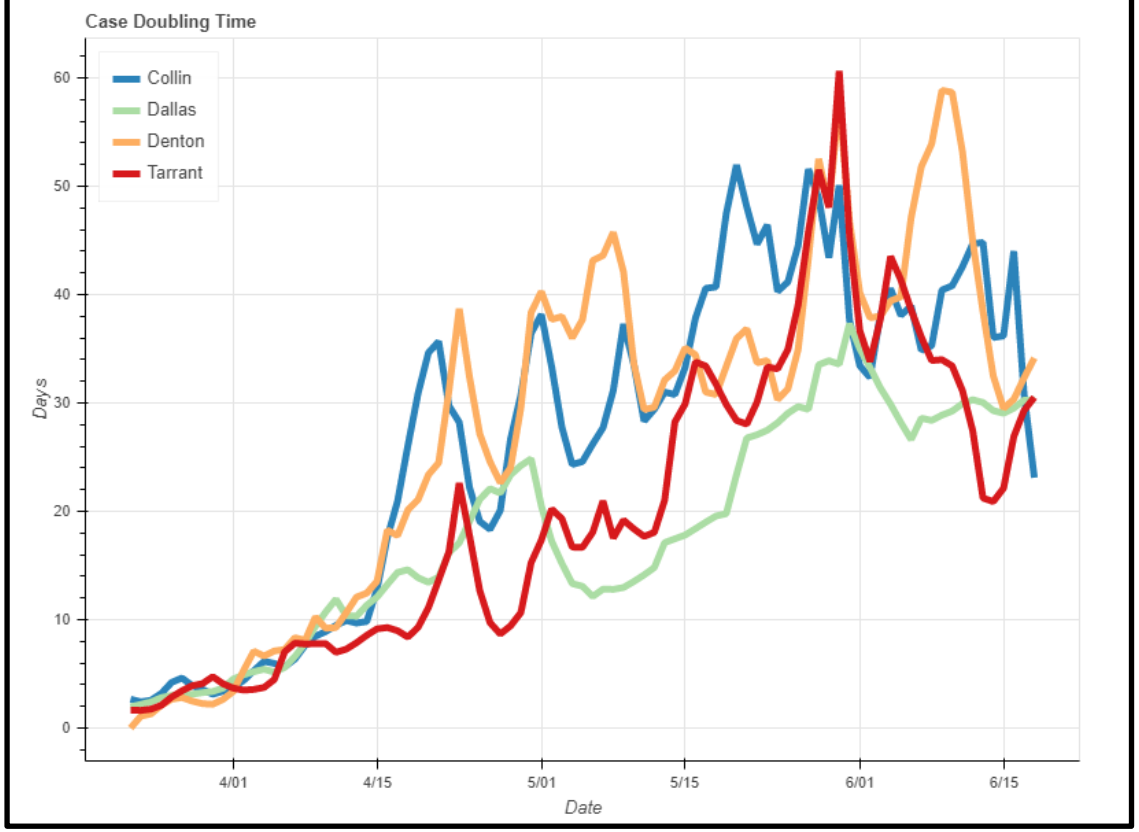
How quickly is COVID-19 spreading in North Texas?

The Number of Days It Has Taken for COVID-19 Cases to Double



Slower COVID-19 spread

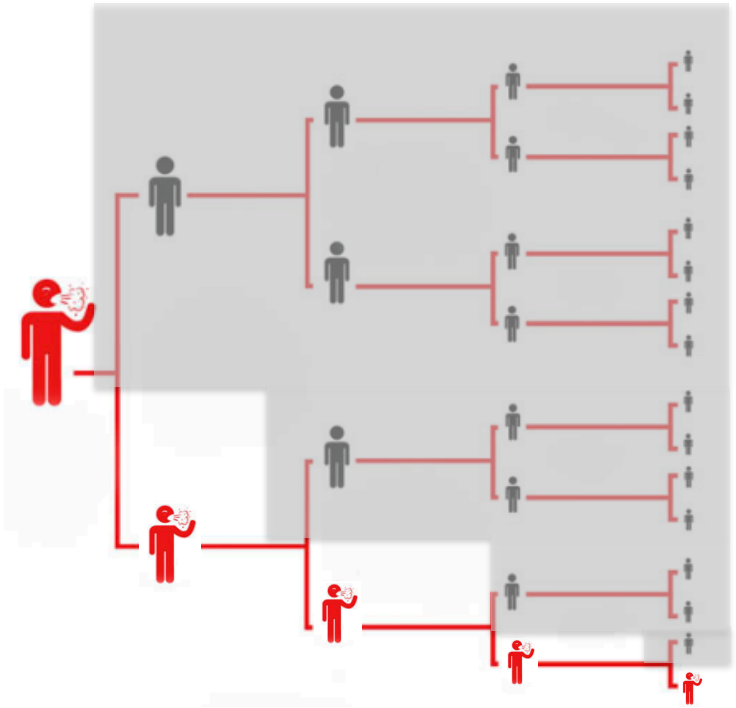
Faster COVID-19 spread

As the spread of disease slows, it takes longer for COVID-19 cases to double. The doubling time has decreased in all 4 counties, meaning the disease is spreading faster. This drop corresponds with Memorial Day weekend and may also reflect the increased contact individuals had with each other.

Source: JHU CSSE COVID-19 US Confirmed Case Data, Accessed June 19, data through June 18
Methods: Trailing 7-day log-linear regression; Note excludes 636 Ft Worth FMC cases for Tarrant County

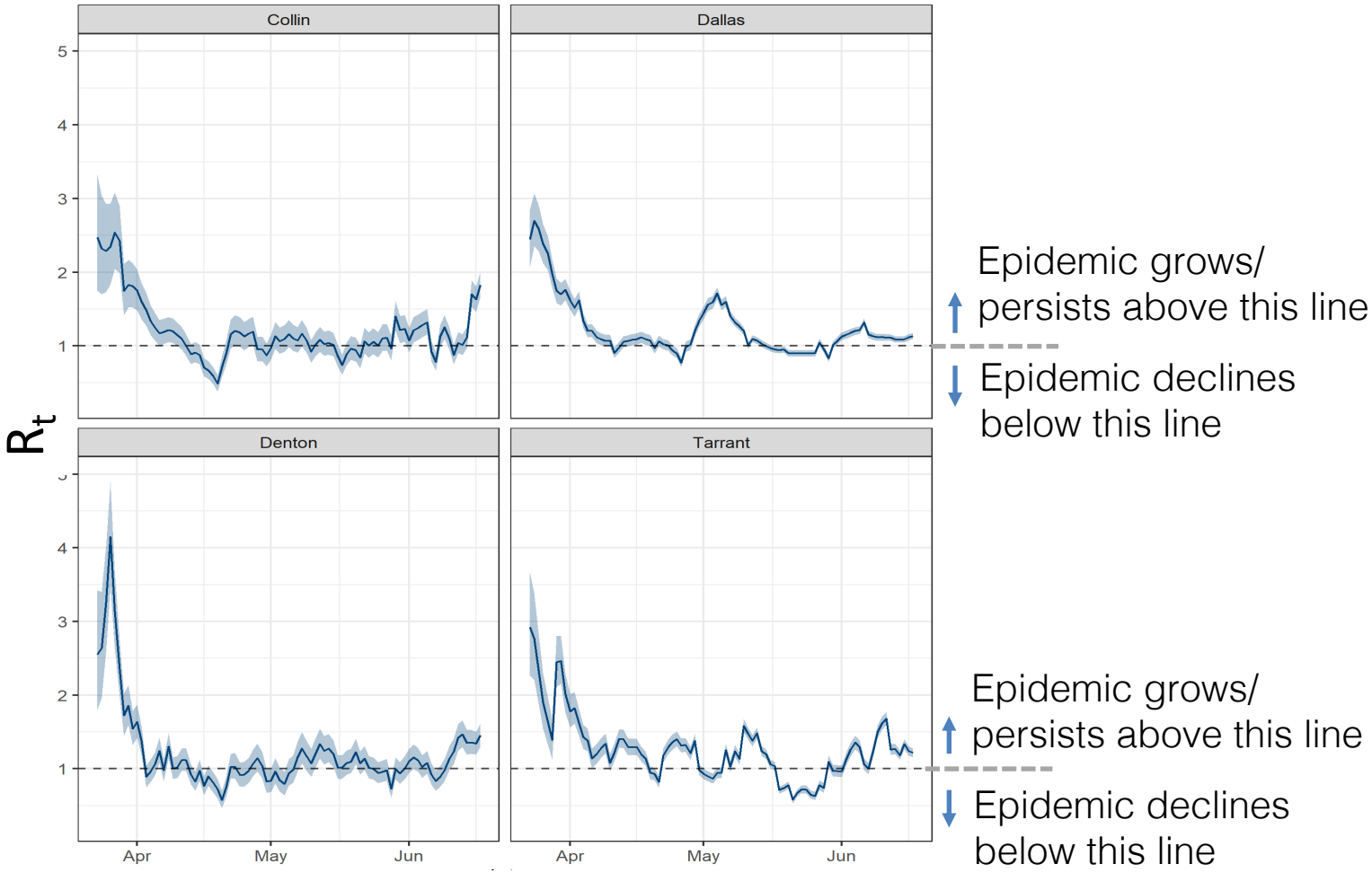
R_t Represents Contagiousness

- R_t helps us measure how effective social distancing measures are after they are put into place.
- If social distancing and measures like masking are effective, then the number of secondary infections is dramatically reduced.
- In this scenario where social distancing measures were 50% effective, then only five people end up infected, rather than the original 31.



How contagious is COVID-19 in DFW now?

Each line represents how contagious COVID-19 has been in DFW counties over the last few weeks.
Contagiousness depends on how well we social distance, wear masks, limit travel, clean high touch surfaces, etc.



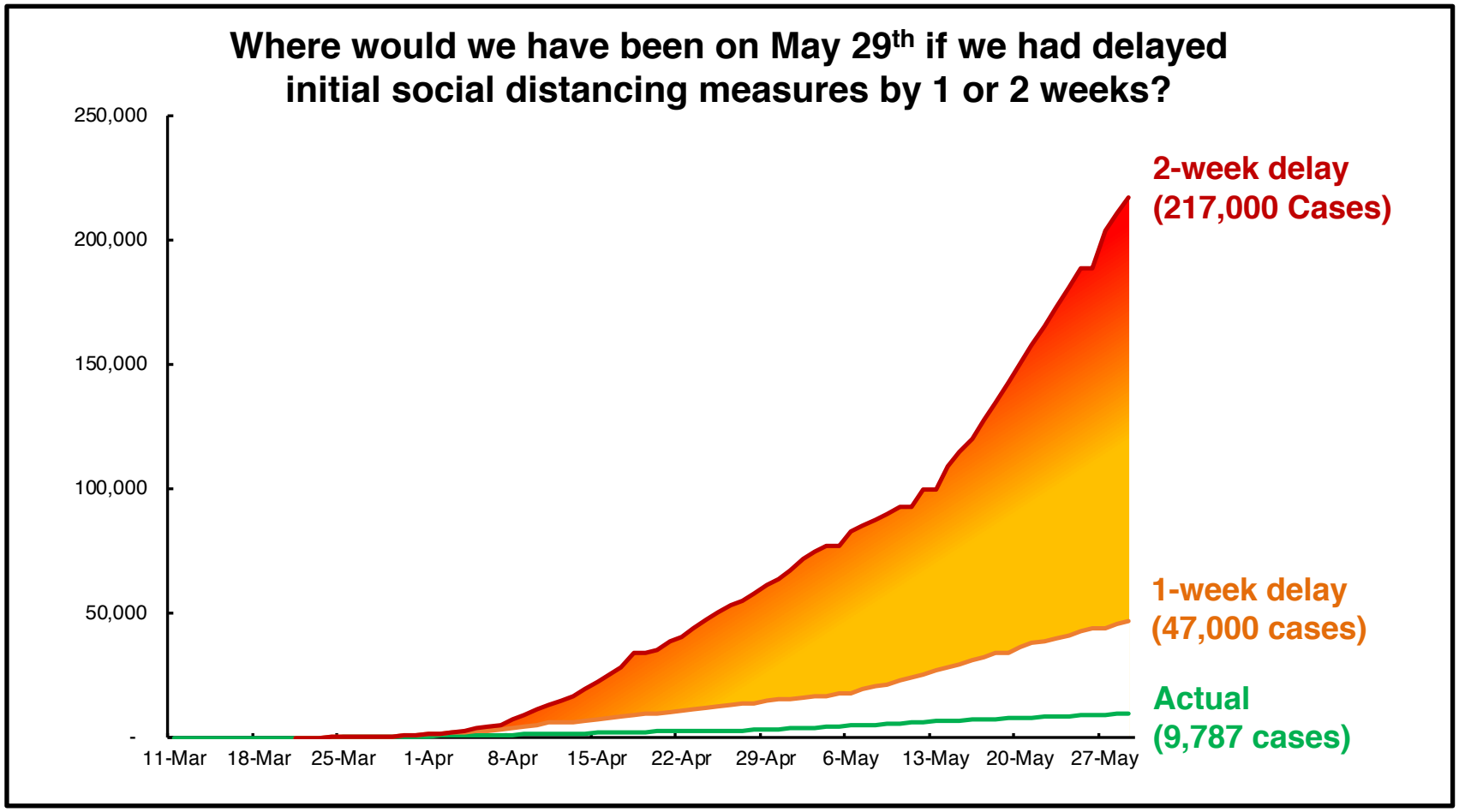
Source: JHU CSSE COVID-19 US Confirmed Case Data, Accessed June 19, data through June 18

1) Cori, A. et al. A new framework and software to estimate time-varying reproduction numbers during epidemics (AJE 2013).

2) Assumes serial interval follows gamma distribution as calculated in Nishiura, et al . "Serial interval of novel coronavirus (COVID-19) infections." Int J Infect Dis. 2020 Mar 4;93:284-286. doi: 10.1016/j.ijid.2020.02.060.

Did social distancing work? Yes!

This is a snapshot of what our cases counts might have been on May 29th if Dallas County had not put into place social distancing measures when it did.

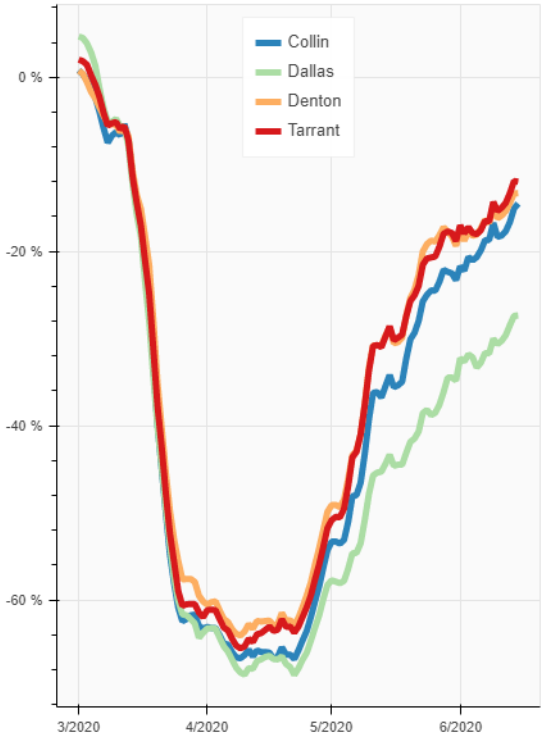


Source: JHU CSSE COVID-19 US Confirmed Case Data, Accessed May 29, 2020

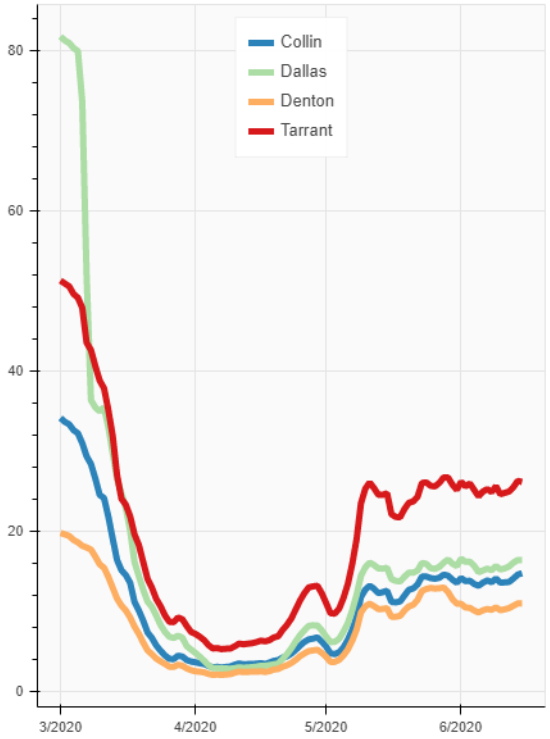
Methods: Hypothetical scenarios assume that Dallas County policies maintained pre-March 22 trajectory of doubling cases every 2.5 days for 1 week or 2 weeks respectively, then resumed its actual daily growth progression thereafter

Are North Texans on the move?

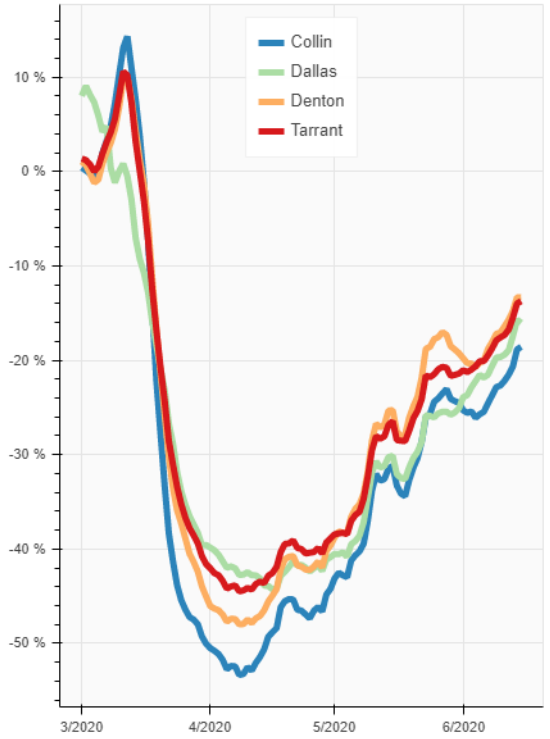
Non-Essential Retail Visits



Encounter Rate Difference*



Difference in Distance Traveled



More movement

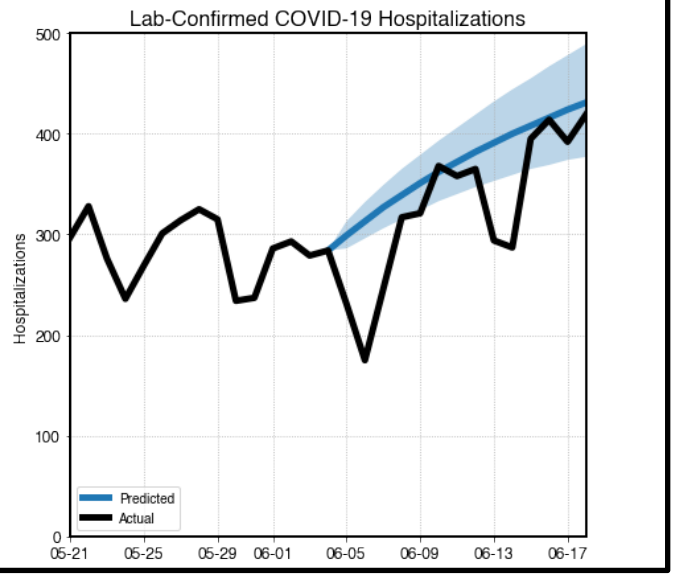
Less movement

To measure if residents are compliant with physical distancing, we use proxy measures for mobility. Three measures we follow are shown above. Visits to non-essential stores and the overall distance that people traveled rose in May and continue to rise now. Interestingly, the rate at which people's phones are uniquely encountering each other has remained relatively flat for the past four weeks. This may suggest that people are following physical distancing guidelines when they are out in public.

*The encounter rate difference is the rate of unique human encounters per km^2 relative to the national pre-COVID-19 baseline.
Source: UnaCast Mobility Data, showing trailing 7-day averages, accessed June 19, data through June 15.

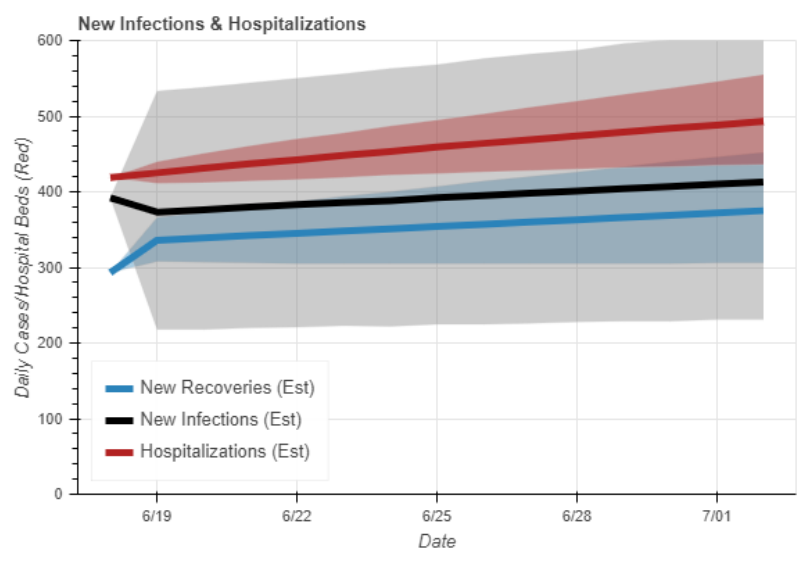
Dallas County – Past Model Accuracy and Future Forecasting

Dallas County 14-day forecast starting from 6/4 compared to actual data



- We have optimized our model to predict hospitalizations rather than total cases. How well would our current model have predicted the past two weeks of COVID-19 hospitalizations?
- Where the number of **reported hospitalizations (black line)** is inside the modeled range (shaded blue region), the model accurately predicted hospitalizations.

Dallas County 14-day forecast starting from 6/18

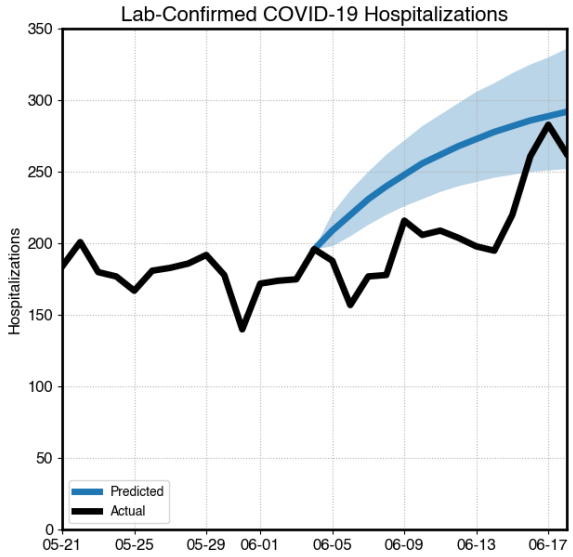


- Dallas County COVID-19 hospitalizations (red line) are predicted to increase to 440-560 concurrent hospitalized cases by July 2.
- **Roughly 410 new COVID-19 infections (black line) per day** are expected by July 2.

This model assumes the combined impact of nonpharmaceutical interventions (NPIs) is 63%.
Shaded regions represent 90% confidence interval.

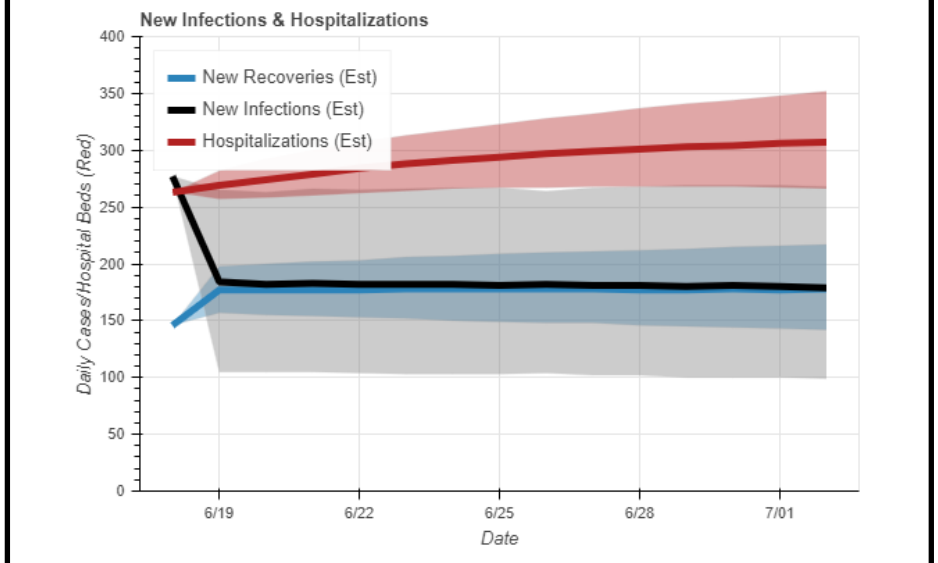
Tarrant County – Past Model Accuracy and Future Forecasting

Tarrant County 14-day forecast starting from 6/4 compared to actual data



- We have optimized our model to predict hospitalizations rather than total cases. How well would our current model have predicted the past two weeks of COVID-19 hospitalizations?
- Where the number of **reported hospitalizations (black line)** is inside the modeled range (shaded blue region), the model accurately predicted hospitalizations.

Tarrant County 14-day forecast starting from 6/18



- Tarrant County COVID-19 hospitalizations (red line) are predicted to increase to 270-350 concurrent hospitalized cases by July 2.
- **Roughly 180 new COVID-19 infections (black line) per day** are expected by July 2.
- This model **excludes** the impact of 636 cases at Federal Medical Center Ft. Worth (jail hospital).

This model assumes the combined impact of nonpharmaceutical interventions (NPIs) is 63%.
Shaded regions represent 90% confidence interval.

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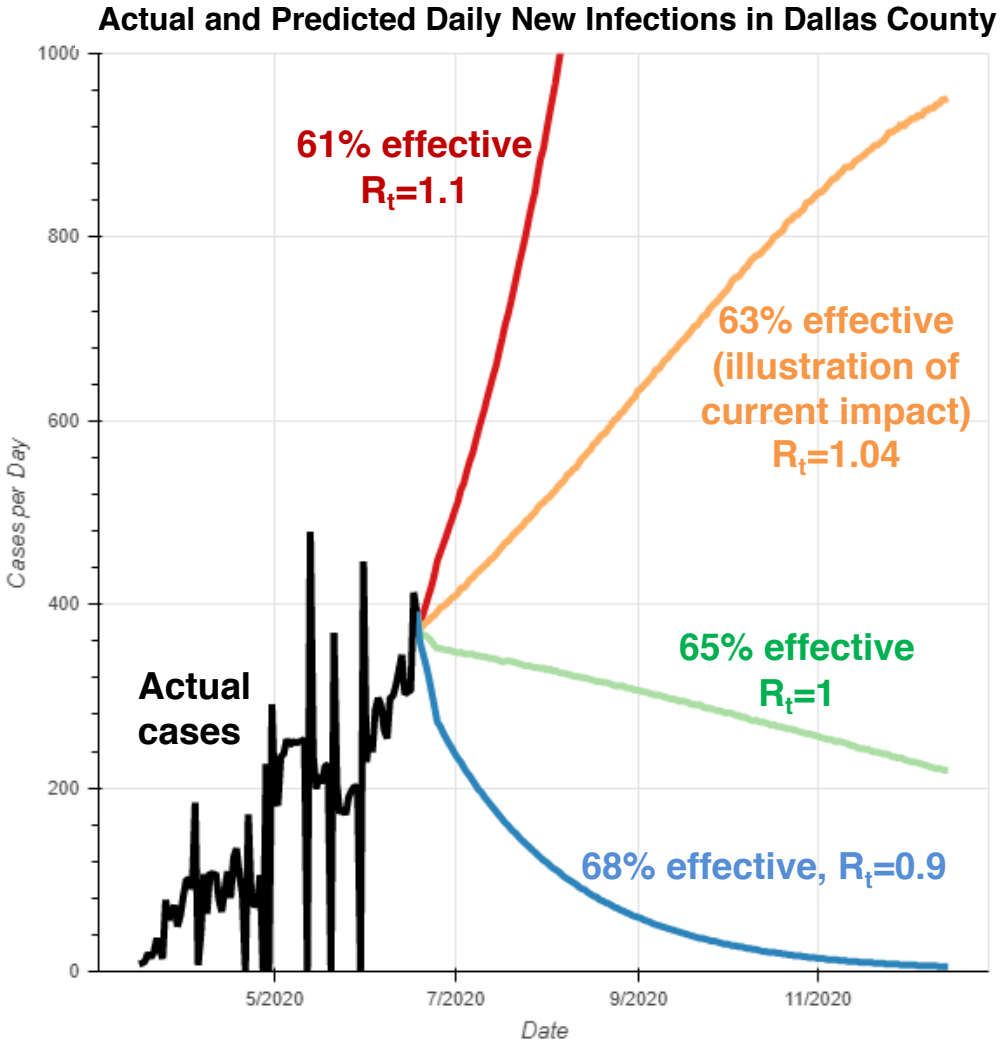
What is the impact of preventative measures on the future spread in Dallas County?



Social distancing & other prevention measures are currently ~63% effective at curbing the spread of COVID-19. The R_t value is exquisitely sensitive to the degree of compliance with these measures, and in turn, the projected course of the pandemic is exquisitely sensitive to R_t.

- If measures were 61% effective, the red line would happen.
- If measures remain 63% effective, the orange line will happen.
- If measures were 65% effective, the green line would happen.
- If measures were 68% effective, the blue line would happen.

There are limits to our ability to precisely determine compliance levels with prevention measures.

Note: model assumes perfect isolation of hospitalized cases, which has a dampening effect on effective R_t

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