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Medical Center

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

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Updated January 18 with data as of January 15

About the Model

The following slides illustrate a model of how COVID-19 is spreading across the DFW region based on real patient data. This provides a snapshot based on data available as of January 15. 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, physical distancing, hand hygiene and others have limited the spread of COVID-19, and what might happen looking forward.

Model-building is an iterative process with inherent uncertainty in its predictions. It facilitates planning and should not be the sole basis for policies or management decisions for any emerging infection.

We thank the Dallas and Tarrant County health departments, the hospitals, and health systems that have contributed data to help us build this model.

Commentary

Hospitalizations for COVID-19 remain at record highs in North Texas, but the rate of growth has slowed. Total hospitalizations in Dallas and Tarrant Counties are projected to stay flat over the next two weeks, but slight increases and decreases are also possible. Sustained high levels of hospitalizations are placing increased stress on the collective capacity of regional health systems.

Other signals we monitor are mixed. While test positivity rates and emergency room visits for COVID-like symptoms are high, outpatient visits for COVID-like symptoms have decreased. Encouragingly, self-reported surveys indicate that fewer people are attending gatherings and spending time with those outside of their own households, and more people are wearing masks (slides 10-11). Such increased compliance with physical distancing, masking, hand hygiene, and crowd management policies is especially needed to ensure healthcare capacity remains available now that the more contagious variant of COVID-19 is confirmed to be circulating in Texas, including Dallas.

An increase in indoor gatherings over the Christmas holiday likely contributed to the most recent surge in admissions. The impact of New Year's Eve/Day appears to be less than previously expected, but it remains possible that there is undetected spread in younger populations, which could shift back to older groups in the coming weeks.

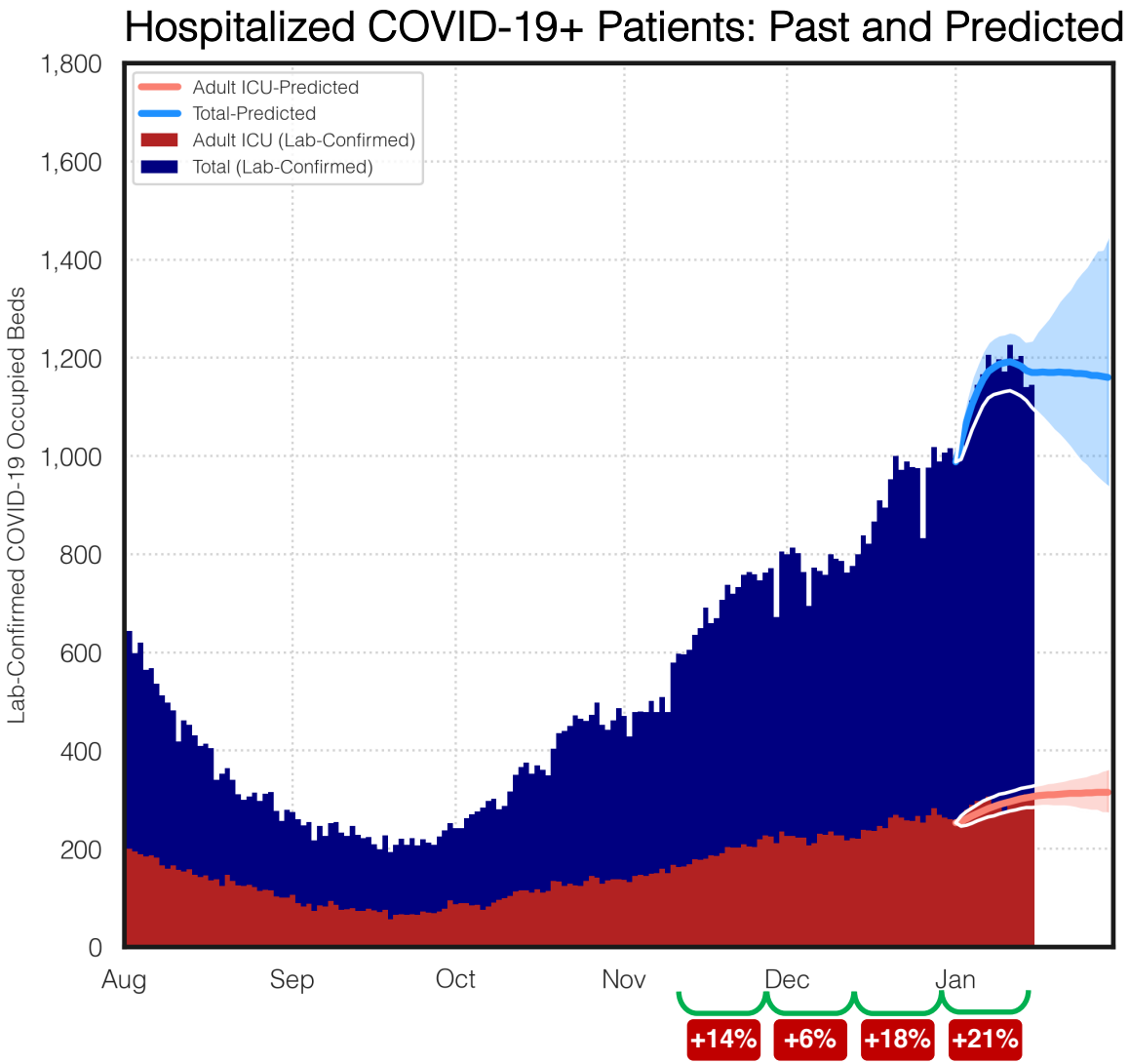
Everyone is encouraged to get the COVID-19 vaccine when eligible, as supplies permit. As a state-designated COVID-19 vaccination hub, UT Southwestern is pleased to announce that we are partnering with Dallas County Health and Human Services (DCHHS) to reach those members of our community who are at highest risk of severe illness from COVID-19 and vaccinate them. Please visit utswmed.org/vaccines for more information.

Visit the CDC website to see the ten key strategies they have recommended to "protect health care, essential businesses, and schools, bridging to a future with high community coverage of effective vaccines and safe return to more activities in a range of settings."

It is important to remember that people arriving at the hospital today were likely infected ~2 weeks ago. Our collective actions now are critical to changing the course of the outbreak in North Texas.

COVID-19 Hospitalizations in Dallas County: Past, Present, and Future Forecasting

Updated 1/18/21 with data from 1/15/21



- COVID-19 hospitalizations (vertical bars) have increased by 21% over the past two weeks.

Lines show how well our model predicted the past two weeks of hospitalizations, as well as our 14-day forecast starting from 1/15.

- Dallas County total COVID-19 hospitalizations (blue line) are predicted to reach 940-1,440 concurrent hospitalized cases by January 29.

- An increasing number of COVID-19 patients are predicted to be in the ICU (red line).

- **Roughly 2,700 new COVID-19 infections per day** are expected by January 29.

Source: NCTTRAC EMResource Master Data Set - County Level for data through 8/1-1/15
% increases compare trailing 7-day averages every two weeks
Shaded regions in the model's forecast represent 90% credible interval.
This model assumes the combined impact of nonpharmaceutical interventions (NPIs) is 65%.

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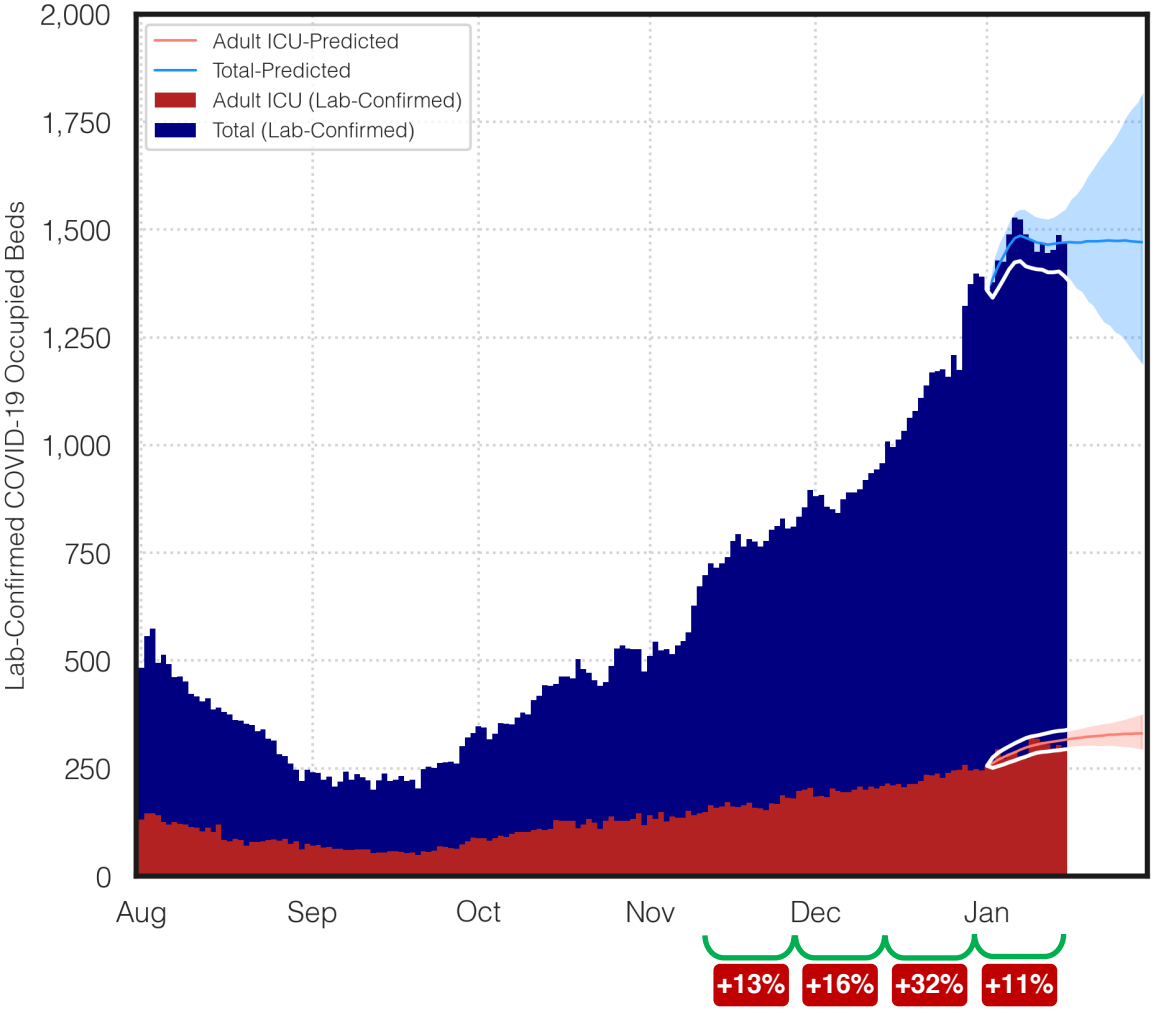
COVID-19 Hospitalizations in Tarrant County: Past, Present, and Future Forecasting

Updated 1/18/21 with data from 1/15/21

Hospitalized COVID-19+ Patients: Past and Predicted



- COVID-19 hospitalizations (vertical bars) have increased by 11% over the past two weeks.

Lines show how well our model predicted the past two weeks of hospitalizations, as well as our 14-day forecast starting from 1/15.

- Tarrant County total COVID-19 hospitalizations (blue line) are predicted to reach 1,200-1,800 concurrent hospitalized cases by January 29.

- An increasing number of COVID-19 patients are predicted to be in the ICU (red line).

- Roughly 2,500 new COVID-19 infections per day are expected by January 29.

Source: NCTTRAC EMResource Master Data Set - County Level for data through 8/1-1/15
% increases compare trailing 7-day averages every two weeks
Shaded regions in the model's forecast represent 90% credible interval.
This model assumes the combined impact of nonpharmaceutical interventions (NPIs) is 65%.

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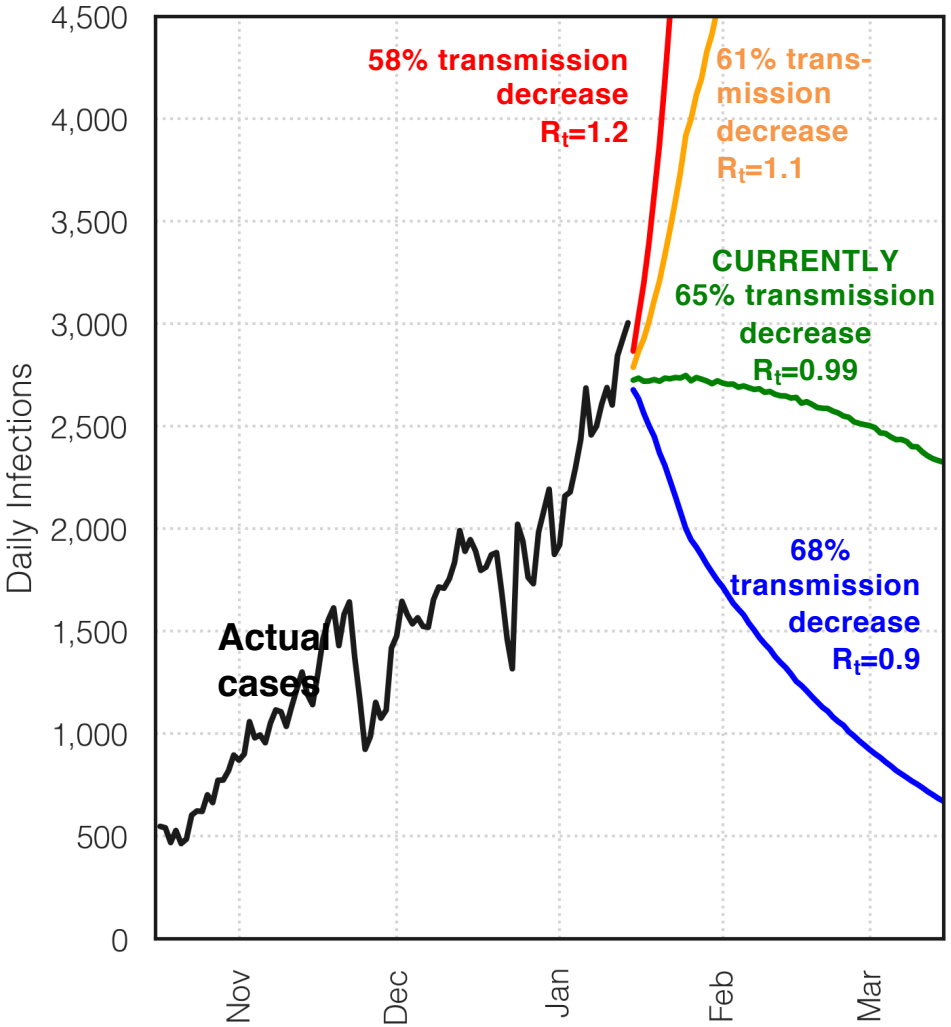
Preventative Measures Can Decrease the Future Spread in Dallas County

Updated 1/18/21 with data from 1/15/21

Actual and Predicted Daily New Infections in Dallas County



The **green line** shows the estimated trajectory of cases in Dallas County. To further decrease spread and achieve the **blue line**, we need improved physical distancing, mask wearing & other prevention measures.

Currently, these measures have decreased transmission of COVID-19 about **65%**. The **orange** and **red** lines show potential trajectories with looser restrictions and decreased compliance with prevention measures.

Actual cases shown with 7-day simple moving average
Note: model assumes perfect isolation of hospitalized cases, which has a dampening effect on effective R_t

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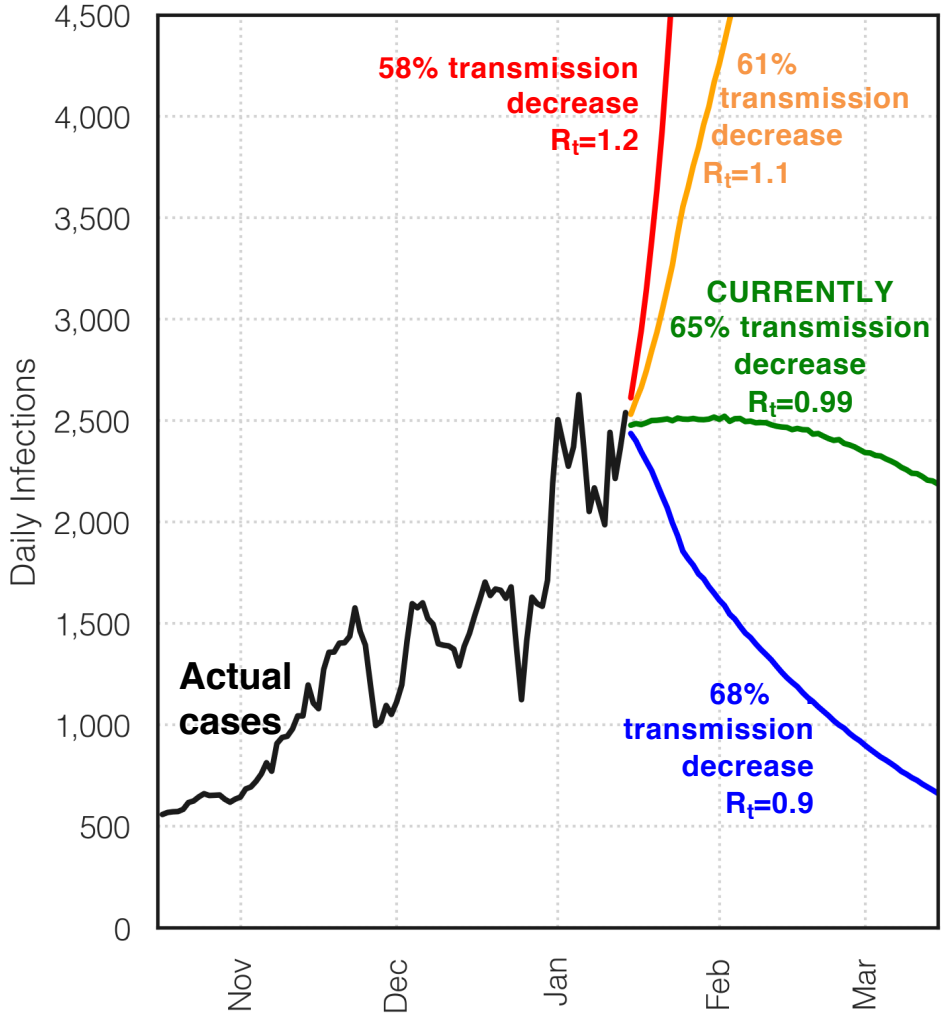
Preventative Measures Can Decrease the Future Spread in Tarrant County

Updated 1/18/21 with data from 1/15/21

Actual and Predicted Daily New Infections in Tarrant County



The **green line** shows the estimated trajectory of cases in Tarrant County. To further decrease spread and achieve the **blue line**, we need improved physical distancing, mask wearing & other prevention measures.

Currently, these measures have decreased transmission of COVID-19 about **65%**. The **orange** and **red** lines show potential trajectories with looser restrictions and decreased compliance with prevention measures.

Actual cases shown with 7-day simple moving average
Note: model assumes perfect isolation of hospitalized cases, which has a dampening effect on effective R_t

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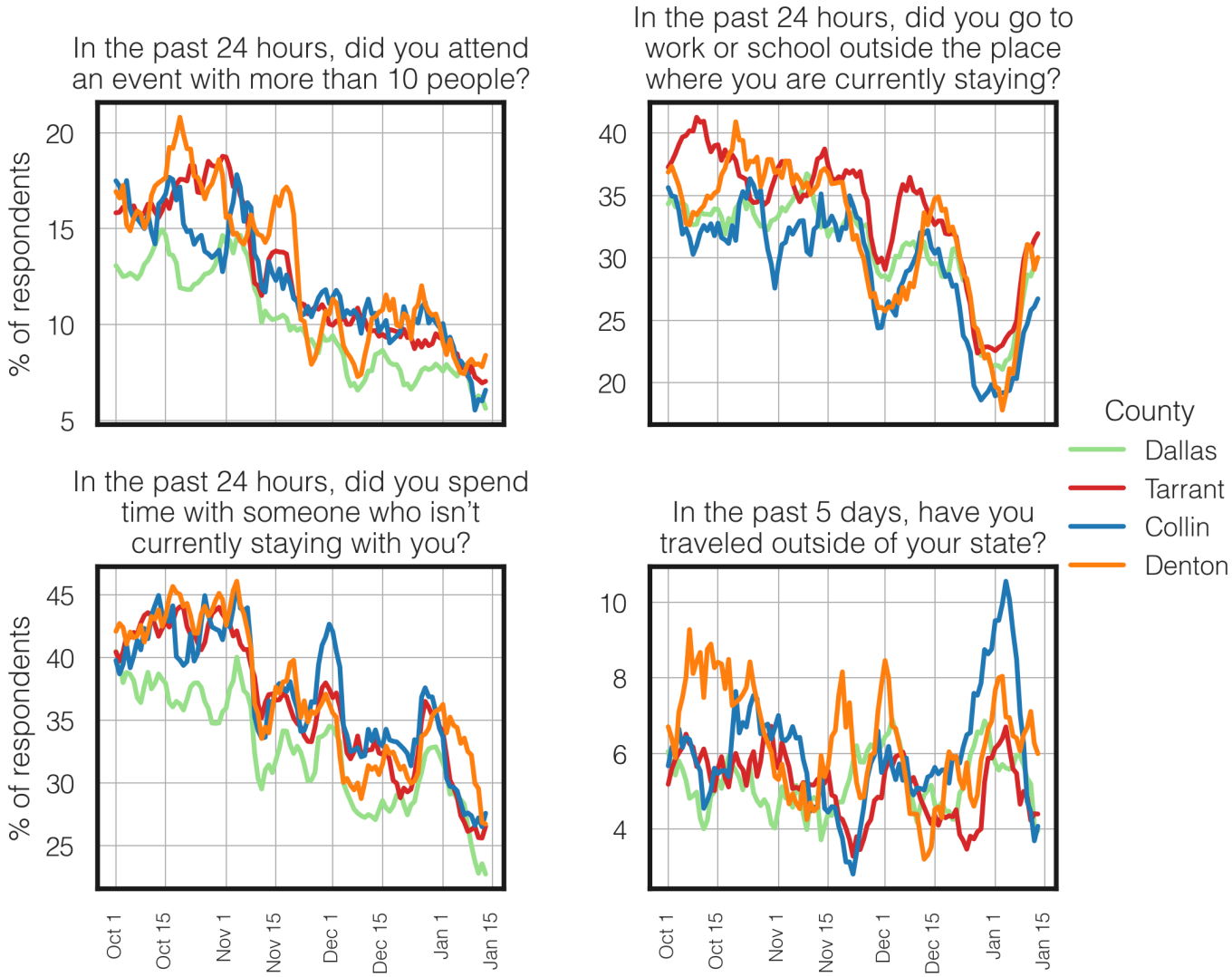
More About the Measures We Follow to Build the Model

- **Mobility** proxy measures indicate the degree to which residents are compliant with physical distancing, determined using data from cell phones and surveys.
- **Visits to the doctor** for COVID-like symptoms are a leading indicator that will likely rise ahead of hospitalizations.
- **Test percent (%) positivity** is a useful number to follow to make sure that enough tests are being done and to follow over time. If it goes up, then cases and hospitalizations follow. % positivity varies by the population tested. For example, the % positivity of samples from the emergency department would be different than that of a group of asymptomatic individuals.
- **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.
- Based on testing data, we calculate **infection rates,** which indicate how prevalent COVID-19 is within an age group or community, and $\mathbf{R_t}$, which represents how many people 1 individual is likely to infect under current conditions.

Updated 1/18/21 with data available 1/15/21

How Mobile and Physically Distant Are North Texans?



Survey-based mobility data indicate that out-of-state travel remains somewhat elevated, and people are returning to work and school.

Encouragingly, people report attending fewer gatherings and spending less time with those outside of their households.

Source: Facebook survey results from Carnegie Mellon University's Delphi Group. COVIDCast Real-Time Indicators, Accessed 1/15, data through 1/13

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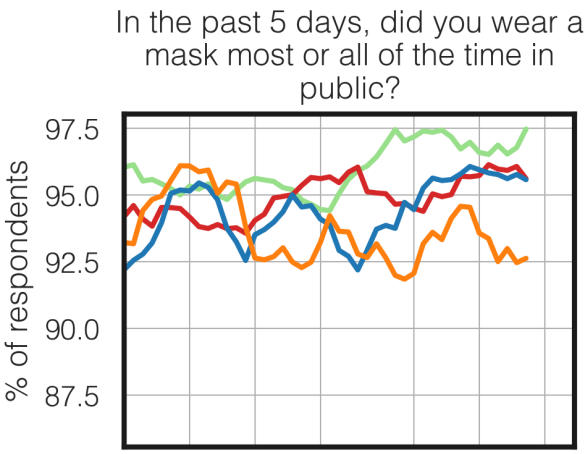
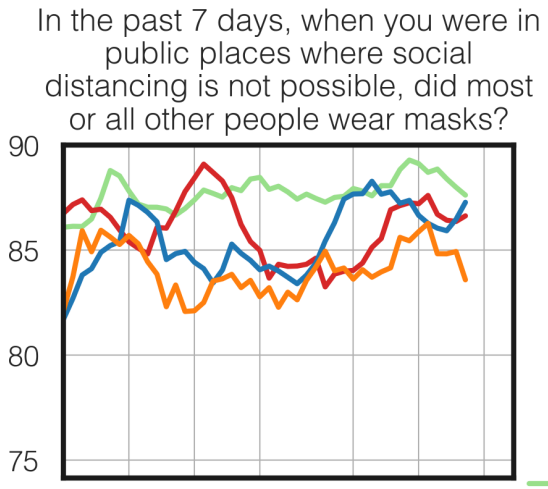
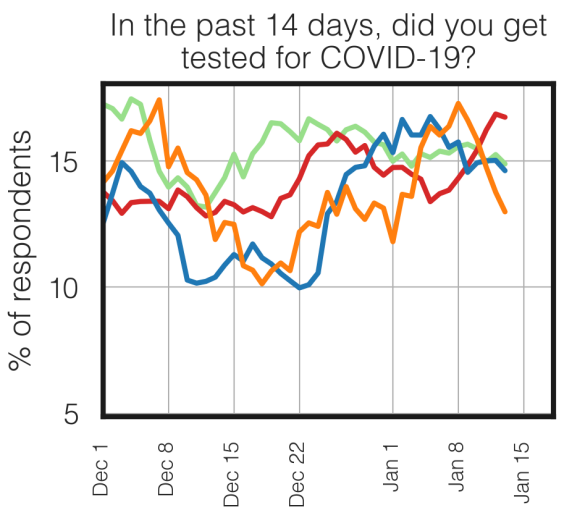
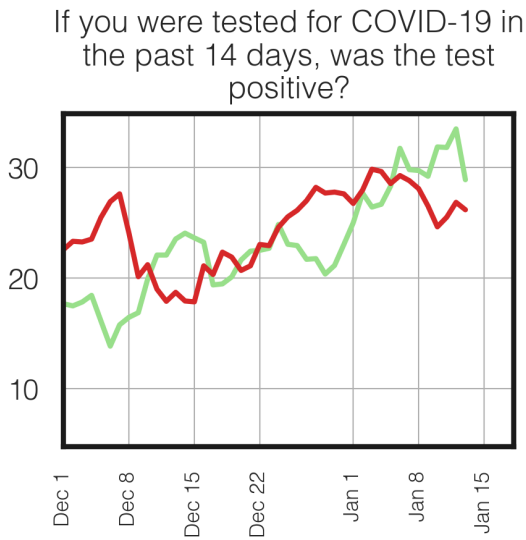
Updated 1/18/21 with data available 1/15/21

Masking and Testing Survey Responses in North Texas









Based on survey responses, mask usage has generally increased since January 1 in Dallas, Tarrant, and Collin Counties.

According to these surveys, the percentages of people seeking COVID-19 testing and receiving positive results are increasing in some counties and decreasing in others.

Source: Facebook survey results from Carnegie Mellon University's Delphi Group. COVIDCast Real-Time Indicators, Accessed 1/15, data through 1/13

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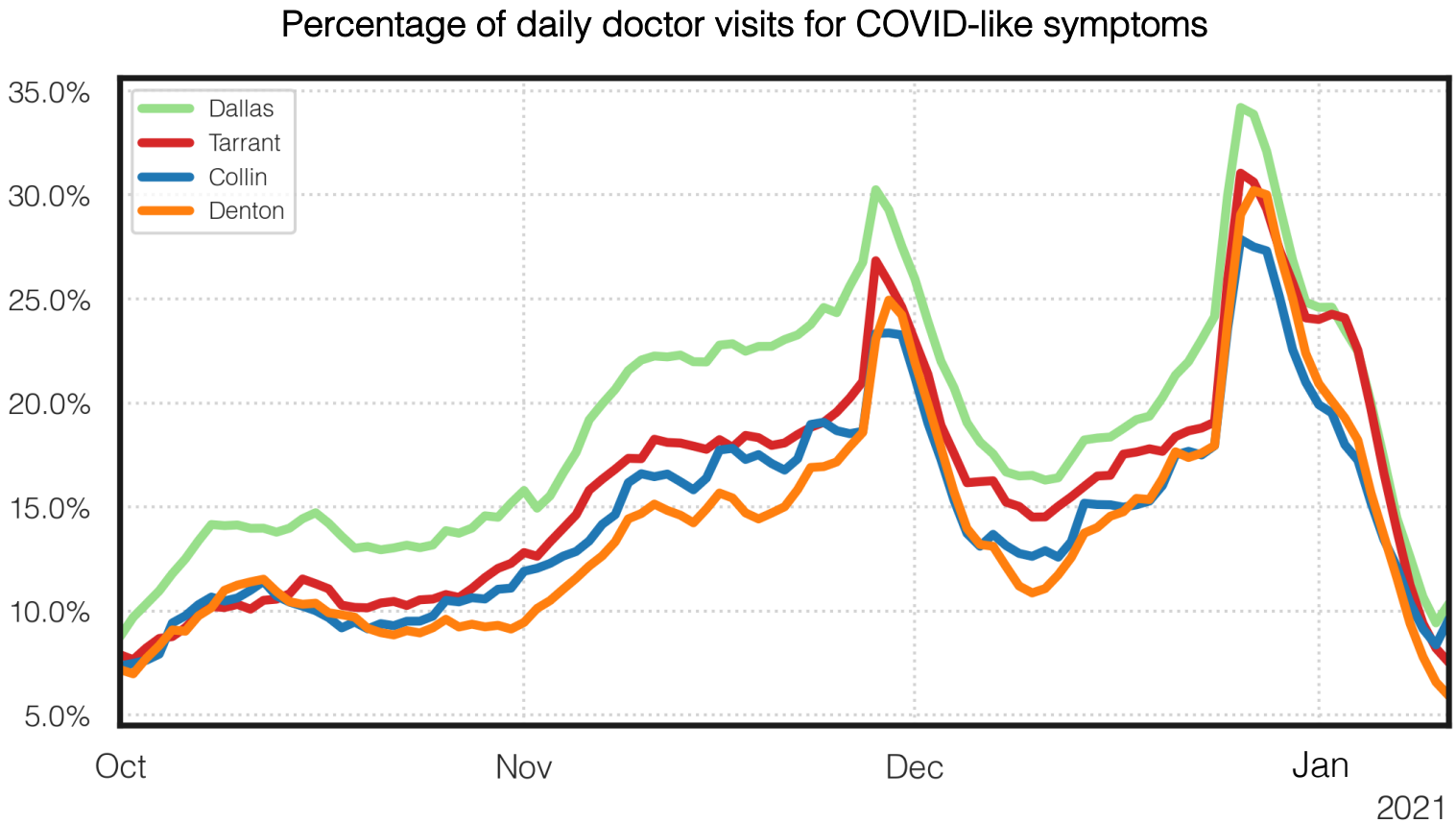
How Often Are People Visiting the Doctor for COVID-like Symptoms?



The percentage of visits to the doctor for COVID-like symptoms have fallen back to pre-holiday levels. However, visits to emergency departments for these symptoms (not shown) remain high in the region. These visits will likely rise ahead of hospitalizations.

Source: David C. Farrow, Logan C. Brooks, Aaron Rumack, Ryan J. Tibshirani, Roni Rosenfeld (2015). Delphi Epidata API. https://github.com/cmu-delphi/delphi-epidata. Accessed 1/15, data through 1/11.

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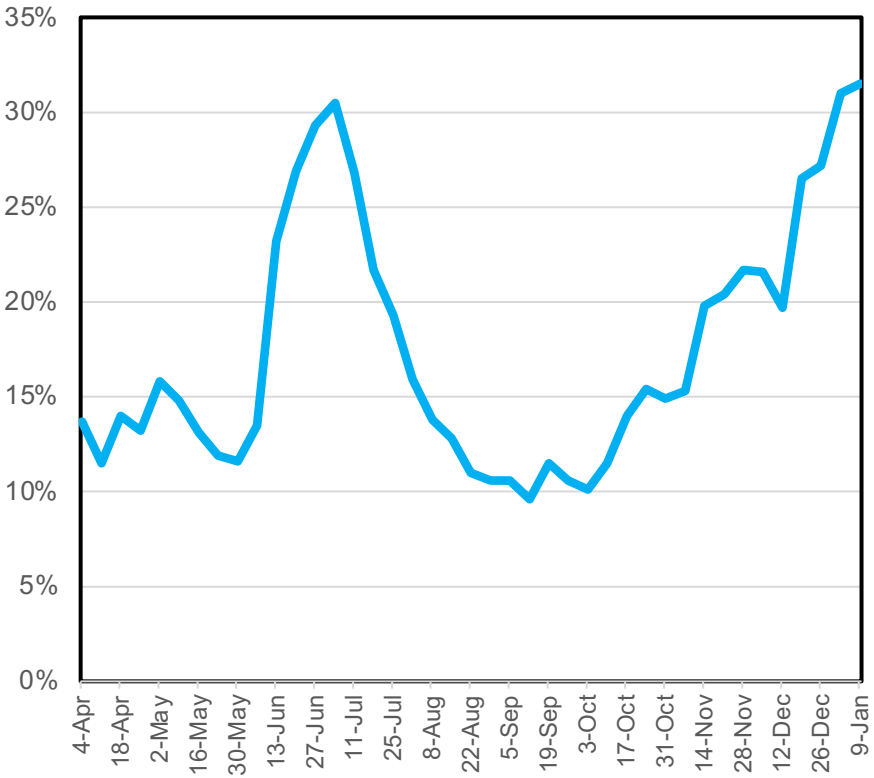
Cases of COVID-19 and Those That Require Hospitalization Are Increasing in North Texas

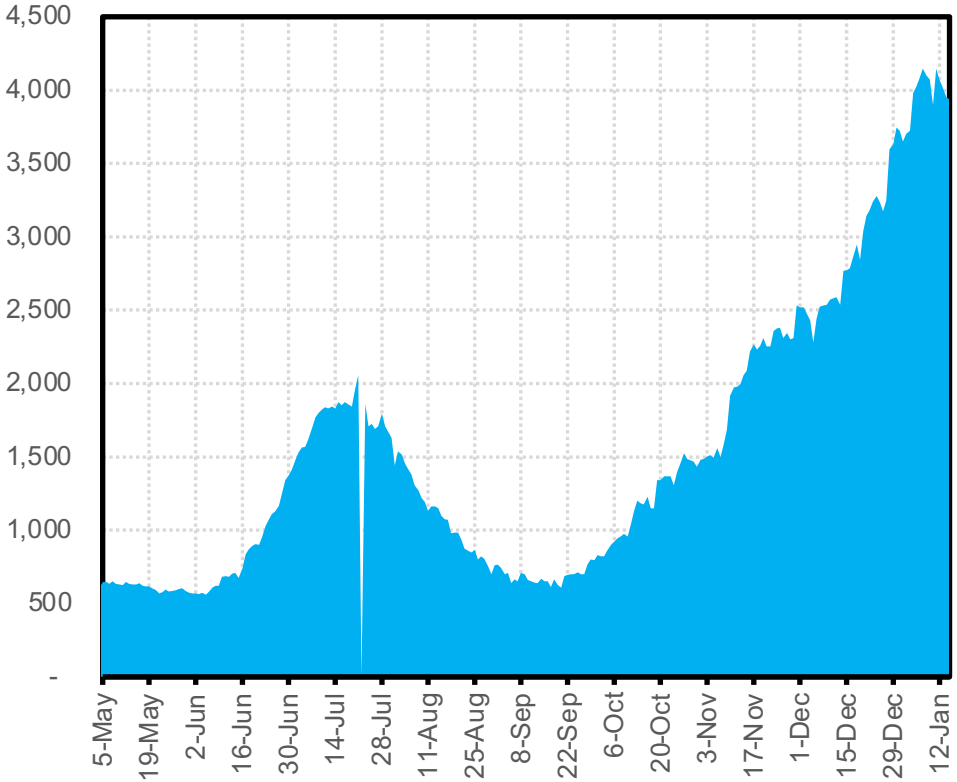
Updated 1/18/21 with data available 1/15/21

Percent positive COVID-19 tests in Dallas County Hospitals



32% of COVID-19 tests performed in Dallas County hospitals were positive in the week ending on January 9.

Confirmed COVID-19 Patients in North Texas Hospitals



Hospitalizations have far exceeded their late July peak. Volumes have increased 1% compared to one week ago, 13% compared to two weeks ago, and 53% compared to one month ago.

Source (left): Dallas County HHS 1/15 daily report, data as of 1/9
Source (right): NCTTRAC EMResource Data, Accessed 1/15/2021
"North Texas" is defined as Trauma Service Area E, % increases compare trailing 7-day averages

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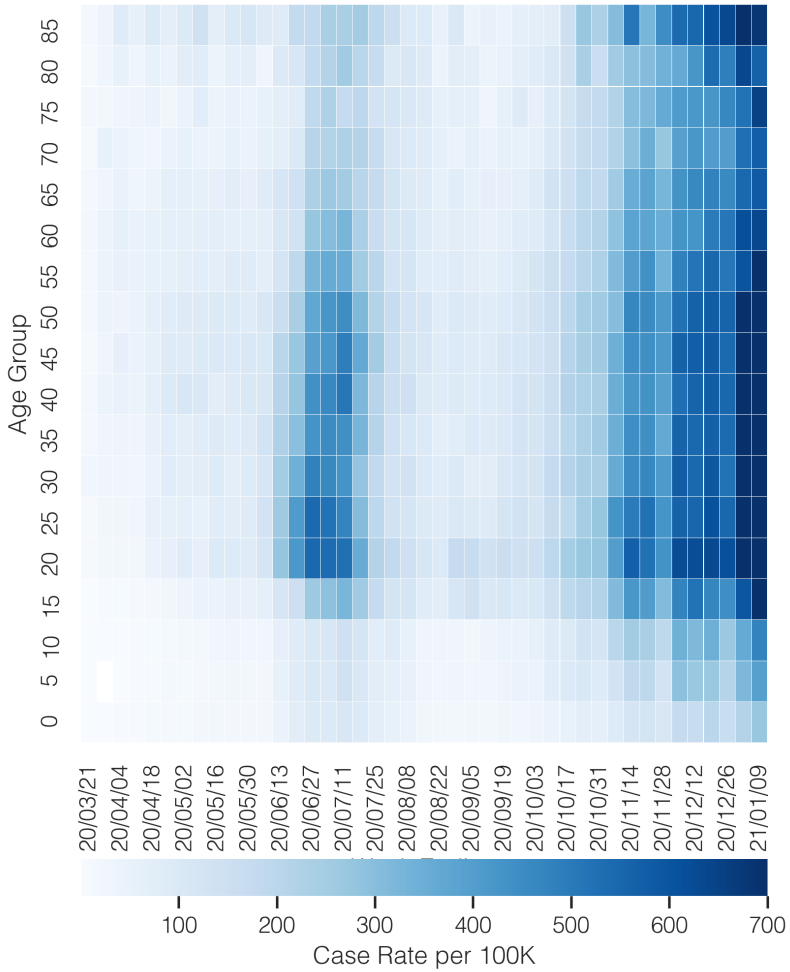
Dallas County Infection Rates Are High in All Age Groups

Dallas County Weekly Case Rate per 100K
By Age Bucket

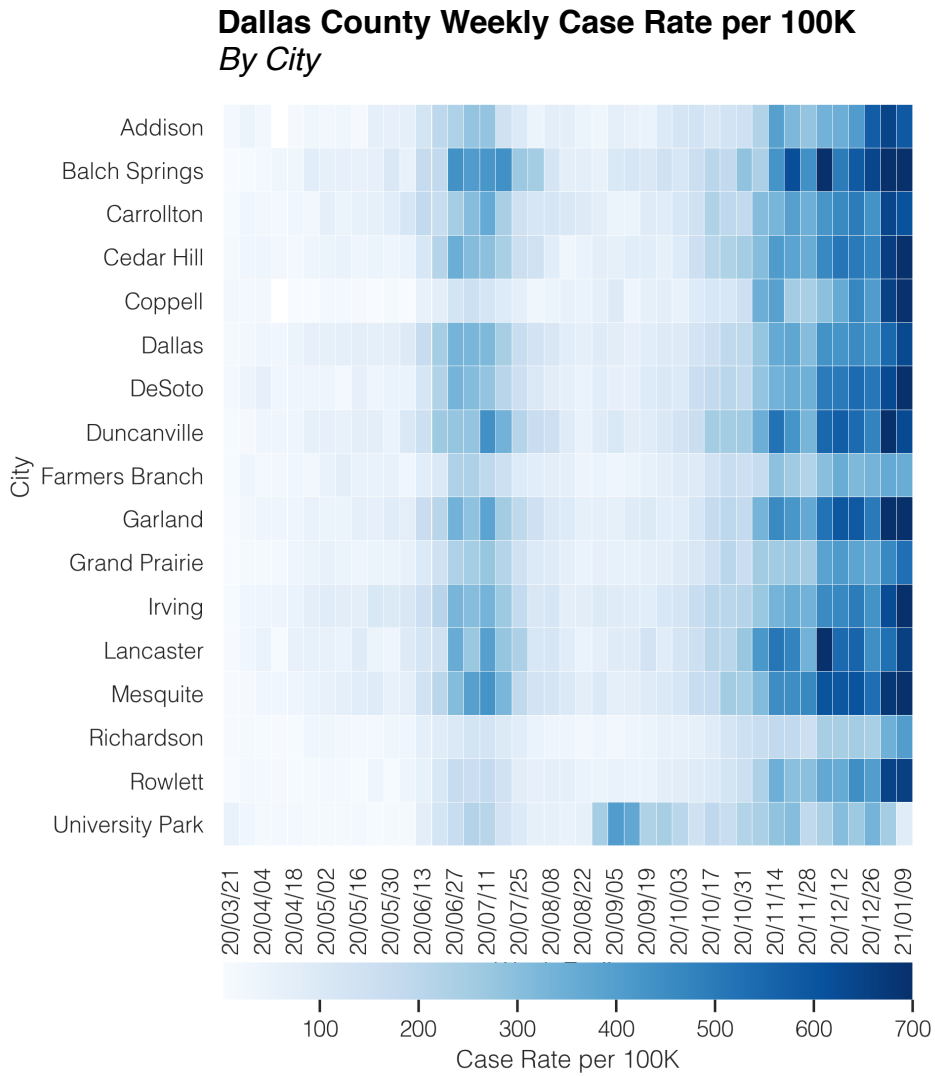


- The darker the blue rectangle, the more cases per 100,000 people.
- Infection rates remain very elevated in all age groups, including in those over 60, who tend to experience higher rates of severe disease and longer hospital stays.
- Please note that the upper bound of the color scale is now 700 cases per 100,000 people, as compared to earlier upper bounds of 300-600.

Source: Dallas County HHS, Accessed 1/15; data for positive tests with a specimen collection date of 1/9 or earlier

Updated 1/18/21 with data available 1/15/21

Cities In Dallas County With Rising Infection Rates



- The darker the blue rectangle, the more cases per 100,000 people.
- All cities in Dallas are experiencing high rates of infection.
- Please note that the upper bound of the color scale is now 700 cases per 100,000 people, as compared to earlier upper bounds of 300-600.

Source: Dallas County HHS, Accessed 1/15; data for positive tests with a specimen collection date of 1/9 or earlier

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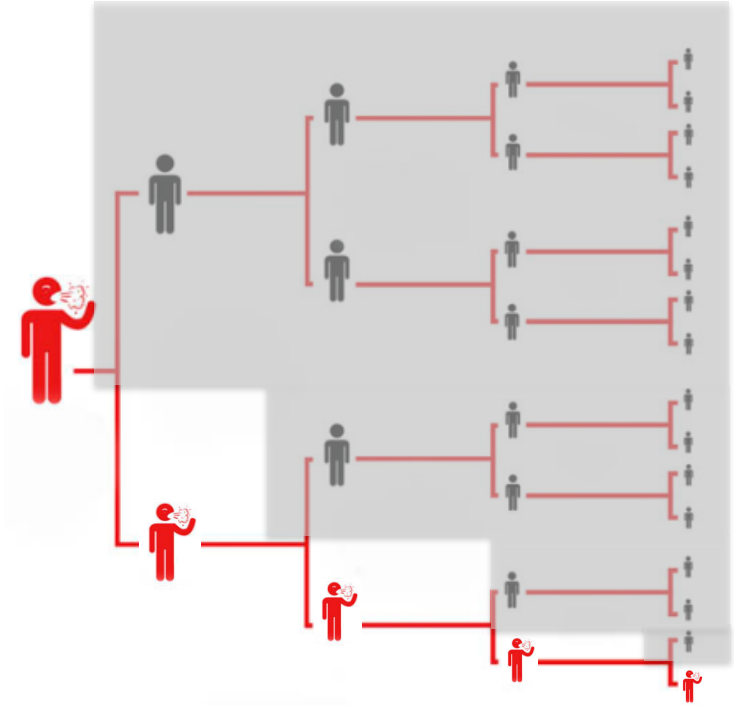
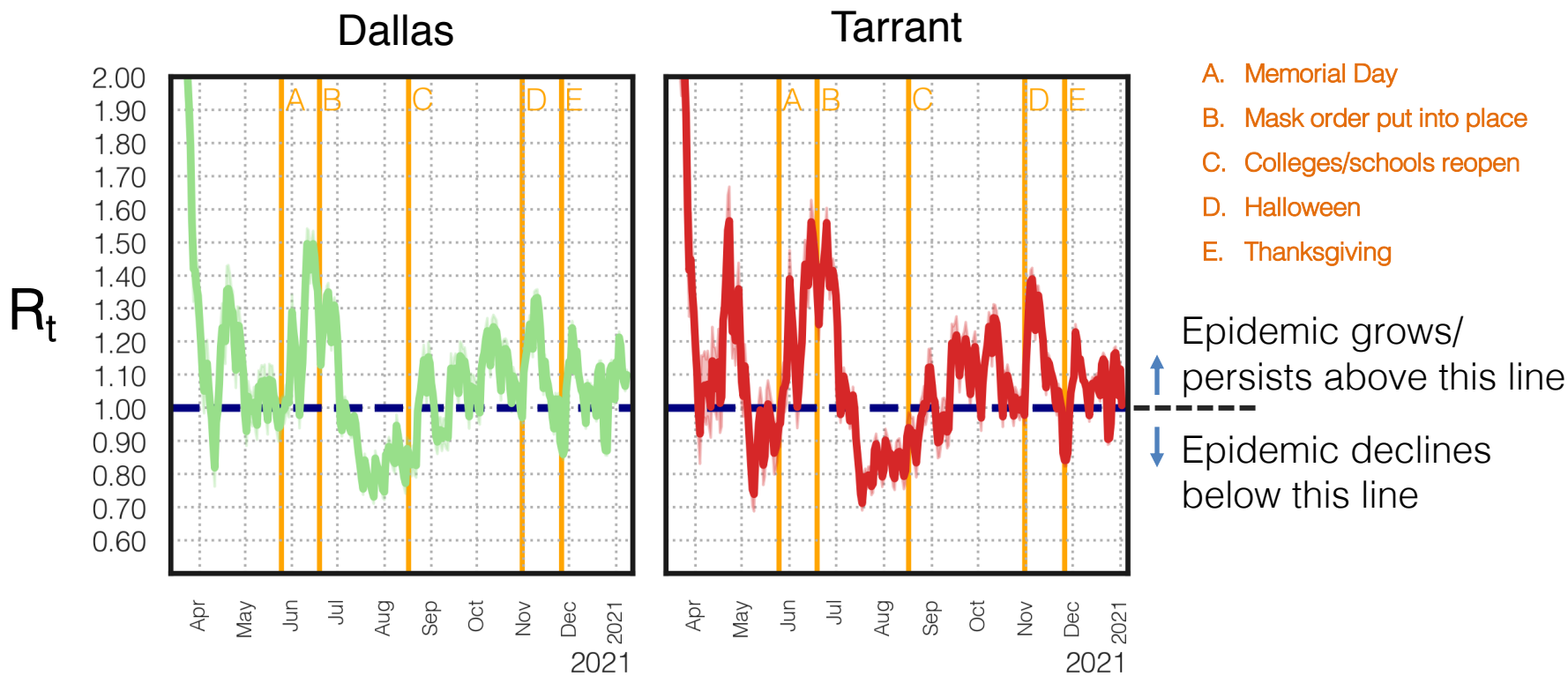
R_t Represents Contagiousness

- 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.



Updated 1/18/21 with data available 1/15/21*

How Contagious Is COVID-19 in DFW Now?



These graphs show the R_t value as of two weeks ago, calculated using the date positive tests were collected. The R_t value appears to be above 1 in Dallas County, but disruptions due to the holiday may limit the reliability of this calculation through mid-January. Data from Tarrant County is made available less frequently, but based on other signals we monitor, its R_t is above 1.

Source: Dallas County HHS, Accessed January 15 up to specimen collection date of 1/8; Tarrant County PH, Accessed January 11; data for positive tests with a specimen collection date of 1/2 or earlier

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.

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