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

Department of Internal Medicine
Lyda Hill Department of Bioinformatics
Department of Emergency Medicine
UTSW Health System Information Resources
Updated December 8 with data as of December 6-7
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 December 6-7. 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 vaccinations, 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

Most of the measures we track including new hospital admissions for COVID-19, COVID-related ER visits, and the total number of people hospitalized for COVID-19 in the region are now either flat or increasing, breaking the trends of robust declines observed in September and October. Test positivity rates are slowly increasing in several areas and among younger age groups. The number of people hospitalized in Dallas and Tarrant County are projected in the near term to remain stable or start to increase. However, hospitalization levels could increase over the holidays without increases in vaccination rates. Encouragingly, there was a sizable increase in first dose vaccination volumes across all age groups in the first week of December.

Unvaccinated individuals remain particularly susceptible to the highly contagious Delta variant, which currently represents 100 percent of all positive test samples at UT Southwestern. The Omicron variant has not yet been detected in North Texas but may already be present, as new data indicate that local transmission was occurring in Houston over the Thanksgiving holiday. A compelling study released by TX DSHS found that unvaccinated Texans were twenty times more likely to die from COVID-19 (link below). Vaccination remains our most powerful tool for preventing severe COVID-19. The vast majority of patients admitted to the hospital for COVID-19 in our area are unvaccinated. All Texans over the age of 5 are now eligible for vaccination.

The percent test positivity for influenza in Texas has sharply increased, and an increasing share of hospital visits are related to influenza like symptoms. These numbers for influenza remain below normal baselines but are much higher than last year.

Rates of self-reported mask wearing in public significantly increased starting in mid-July but may be declining once again. This simple but powerful intervention can help mitigate the spread of SARS-CoV-2 indoors as we head deeper into the cooler months. Increased personal adherence to masking recommendations is especially important during travel and holiday gatherings. Indoor masking should help limit the spread of other respiratory viral infections such as influenza and RSV, which incrementally strain the same local hospital resources as well. Practicing physical distancing and other interventions recommended by health experts will be necessary to protect the health of Texans who are currently unvaccinated or who may be immunocompromised. Anyone who is experiencing symptoms or exposed to someone with COVID-19 is encouraged to get tested and quarantine to break the chain of transmission.

As part of our ongoing commitment to an equitable, effective, and efficient vaccination rollout, Texans aged 12 and older can schedule a vaccination appointment using UT Southwestern’s online scheduling portal: utswmed.org/vaccines.

Visit the CDC website for guidance on which kinds of activities are safe once fully vaccinated, as well as which levels of prevention are recommended. It is important to remember that people arriving at the hospital today were likely infected ~2 weeks ago. Increasing compliance with prevention measures and increasing vaccination rates will help us control transmission in North Texas.
COVID-19 Hospitalizations in Dallas County: Past, Present, and Future Forecasting

Hospitalized COVID-19+ Patients: Past and Predicted

- COVID-19 hospitalizations (black squares) have increased by 2% over the past two weeks.
- The blue line shows the estimated number of hospitalizations for the last three weeks, as well as our 21-day forecast starting from 12/7.
- Dallas County total COVID-19 hospitalizations are predicted to reach 220 concurrent hospitalized cases by Dec 27.
- Roughly 370 new COVID-19 infections per day are expected by December 27.

Source: NCTTRAC EMResource Master Data Set - County Level for data through 8/1/20-12/6/21
Shaded regions in the model's forecast represent 90% credible interval.
Dallas County’s Trajectory Still Depends on our Behavior/ Vaccination Success

- COVID-19 appears to be rising after the holidays as hospitalization levels across the region are rising.

- Estimates from this model may be less reliable due to holiday-related reporting distortions.

- These scenarios do not include any potential impact from Omicron variant as it is too early to estimate any variant-specific parameters such as prevalence, transmissibility or immunity escape.

- Vaccination volumes appear to have increased last week across most age groups.

**Red** is if all behavior returns to unmitigated, pre-pandemic patterns (no masking/social distancing/business restrictions)

**Orange** is if we continue behaviors of November ’21 (current level of mask wearing/ social distancing/ business restrictions)

**Green** is if we return to behavior patterns of Jun/Jul ’20 (limited masking/social distancing/business restrictions)

**Blue** is if we return to behavior patterns of Oct/Nov ’20 (mask mandate/business restrictions; limited social distancing)
COVID-19 hospitalizations (black squares) have increased by 4% over the past two weeks.

The blue line shows the estimated number of hospitalizations for the last three weeks, as well as our 21-day forecast starting from 12/7.

Tarrant County total COVID-19 hospitalizations are predicted to reach 350 concurrent hospitalized cases by December 27.

Roughly 600 new COVID-19 infections per day are expected by December 27.
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.

- **Vaccinations** indicate the level of protection that is present in the community against severe disease.

- Based on testing and hospitalization data, we calculate **infection rates**, which indicate how prevalent COVID-19 is within an age group or community, and **$R_t$**, which represents how many people 1 individual is likely to infect under current conditions.
How Mobile Are North Texans?

The graphs above show mobility trends through November 27 based on cell phone data. Visits to retail, recreation, and transit are near pre-pandemic levels in some counties. Time spent at home and visits to workplaces have not returned to pre-pandemic levels, likely reflecting a stable shift to working from home for a subset of the population.

Source: Google COVID-19 Community Mobility Reports accessed 12/7, data through 12/4
Masking and Vaccination Survey Responses in North Texas

Based on survey responses, observed mask usage in public places and self-reported mask usage have declined since mid-February, with a steep decrease from May to July. Rates have risen since mid-July in all four major DFW counties but are now falling again. During the holiday travel season, masking is critically important in public.

The percentage of people reporting that they have been or are willing to be vaccinated remains high.

Source: Facebook survey results from Carnegie Mellon University’s Delphi Group. COVIDCast Real-Time Indicators, Accessed 12/7, data through 12/8
Cases of COVID-19 That Require Hospitalization and Test Positivity Rates Are Flat or Increasing in North Texas

Roughly 8% of COVID-19 tests are positive in the state of Texas.

Hospital volumes for COVID-19 have increased 10% compared to one week ago and 9% compared to two weeks ago but have decreased 2% compared to one month ago.

Source (left): TX DSHS data through 12/5/21, Accessed 12/7/21
Source (right): TX DSHS Combined Hospital Data by TSA Region data through 12/7/2021
“North Texas” is defined as Trauma Service Area E, % increases compare trailing 7-day averages
COVID-19 Hospital Admissions Are Flat or Increasing

- Hospital admissions for COVID-19 are flattening.
  - This is in contrast to several consecutive weeks of large decreases.

- Several counties seeing increases in certain age groups such as under 18 in Collin and 65+ in Dallas and Tarrant.

- Please note the differing scales for each county when reading the graphs at left. Data show location of hospital, not necessarily patients’ resident county.

Source: Admissions - NCTTRAC EMResource Master Data Set - County Level for data through 8/1/20-12/6/21
Undisclosed ages imputed using average regional age mix on the reported date
Includes both lab-confirmed and suspected COVID-19 admissions
Dallas County Infection Rates Are Flat or Growing Across Most Age Groups

The redder the rectangle, the more cases per 100,000 people.

Infection rates are flat in most groups but increasing week-over-week in younger age groups with lower vaccination rates.

Source: Dallas County HHS, Accessed 12/7; data for positive tests with a specimen collection date of 11/27 or earlier
Infection Rates in Several Dallas County Cities Are Climbing

- The redder the rectangle, the more cases per 100,000 people.
- Infection rates are now increasing in many cities in Dallas County.

Dallas County Weekly Case Rate per 100K
By City

- Addison
- Balch Springs
- Carrollton
- Cedar Hill
- Coppell
- Dallas
- DeSoto
- Duncanville
- Farmers Branch
- Garland
- Grand Prairie
- Irving
- Lancaster
- Mesquite
- Richardson
- Rowlett
- University Park

Updated 12/8/21 with data from 12/7/21

Source: Dallas County HHS, Accessed 12/7, data for positive tests with a specimen collection date of 11/27 or earlier
$R_t$ 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 Was COVID-19 in DFW Two Weeks Ago?

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 and Tarrant County as of mid-November.

Source: Dallas County HHS, Accessed 12/7; up to specimen collection date of 11/22; Tarrant County PH, Accessed 11/29; data for positive tests with a specimen collection date of 11/16 or earlier