

# COVID-19 Cases And Deaths by Vaccination Status

Texas Department of State Health Services

*Technical Notes*

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TEXAS  
Health and Human  
Services

Texas Department of State  
Health Services

## Methods

### Data Sources

- ImmTrac2, Texas Immunization Registry
- Death Registry, Vital Statistics
- COVID-19 ELR, National Electronic Disease Surveillance System Electronic Laboratory Reporting

Rates are calculated using the state population distribution based on the 2019 U.S. Census standard population estimates. Calculations include only the 12 years and older population, except for boosted deaths which include only the population 18 years of age and older. The analysis start was chosen because January 15, 2021 represents the first day a Texan could be fully vaccinated and died. Note that deaths can occur days or weeks after a person is infected with COVID-19. Data are provisional and are subject to the change, particularly in more recent time periods.

### Definitions

- Fully vaccinated cases: cases who received their last recommended dose of an FDA-authorized COVID-19 vaccine, with the appropriate interdose interval if they received a 2-dose series and have had at least 14 days to establish protection. Fully vaccinated cases have not received a booster/additional dose.
- Unvaccinated cases: cases who did not receive any doses of an FDA-authorized COVID-19 vaccine.
- Boosted cases: cases who are fully vaccinated and have received an FDA-authorized or approved booster or additional dose and have had at least 14 days between booster/additional dose and positive specimen collection. Because data on the immune status of cases and deaths are not available, booster doses cannot be distinguished from additional doses.
- A COVID-19–associated death occurred in an individual with a documented COVID-19 diagnosis who died, or whose death local health authorities reviewed using vital records and public health investigation. A COVID-19– associated death is defined as a case with no period of complete recovery between illness and death. Classification must align with the Council of State and Territorial Epidemiologists (CSTE) case definitions. A death should not be reported if there is an alternative agreed upon cause of death which is unrelated to an infectious process (E.g., an adult with a positive SARS-CoV-2 test whose death clearly resulted from trauma after a car accident would not qualify as a COVID-19—associated death.)
- A fully vaccinated case is a COVID-19 case (either PCR or an antigen) in a vaccinated person that occurred  $\geq 14$  days after completion of their vaccination series.
- A COVID-19 case in a person who was unvaccinated occurred when the person did not receive an FDA-authorized COVID-19 vaccine before the specimen collection date.

## Timeframes

- The first COVID-19 vaccines were administered in Texas in mid-December 2020. Full protection from the vaccine in those vaccinated early would occur in mid-January. Therefore, we are reporting cases and deaths beginning with January 15, 2021. Data are graphed starting the week including September 24, 2021, when a COVID-19 booster dose was first recommended by CDC for adults 65+ years old and people in certain populations and high risk occupational and institutional settings.

## Linking methods

- All information on COVID-19 cases and deaths provided by this report use ELR and death registry data linked to vaccination data. The links are based on a comparison of the first name, last name, and date of birth of cases to the first name, last name, and date of birth of those with COVID-19 vaccination in ImmTrac2. Only exact matches on all three items are considered the same person. Missing or misspelled names and incorrect dates of birth may lead to some vaccinated people being incorrectly classified as unvaccinated. COVID-19 cases with vaccines not reported to ImmTrac2 as described above are considered unvaccinated in this report.

## Rate Calculations

- The fully vaccinated population is defined as the number of cases who are determined to be fully vaccinated in Texas in the specified age group at the end of the time period.
- The boosted population is defined as the number of cases who are determined to be boosted in Texas in the specified age group at the end of the time period.
- The unvaccinated population is defined by subtracting the number of fully vaccinated and boosted for the specified age group and time period from the entire Texas state population 12 years and older.
- When considering rates, it's important to adjust for age. For example, older adults are both more likely to be vaccinated than younger people and more likely to have underlying health conditions that may increase their risk for dying if they get COVID. In order to compare most accurately, we compare vaccinated and unvaccinated people of similar ages. This is called adjusting for age.
- "Impact" in the report tables was calculated as the Incidence Rate Ratio: incidence rate among unvaccinated cases / incidence rate among vaccinated cases.

- The estimate for unvaccinated Texans begins to near zero as more Texans get vaccinated. Reasons for this can include 2019 population estimates that consider models using 2010 US Census data and dramatic growth of the Texas population. This analysis adds a correction factor to unvaccinated estimates. Assuming no more than 95% of the Texas population becomes vaccinated, 5% of each age group will remain unvaccinated in rate calculations. As our data evolves, new data collection, measurement, and analysis challenges will present themselves. We continue to explore ways to improve the precision of our population estimates.

## Limitations

- Duplicates among exact matches were hand checked. Those who had outliers such as a vaccine dose date after a date of death were classified as unvaccinated. However variable linkage of case, vaccination, and mortality data might have resulted in misclassifications that could influence IRR estimates.
- ELR data and death registry are updated on an ongoing basis, lags in reporting may have led to some information being incomplete at the time of analysis.
- Immunization data for COVID-19 are dependent on clinician report of status to ImmTrac2.