



Projections of the Total Population of Texas and its Counties, 2020-2060

Produced by

The Texas Demographic Center at
UT San Antonio

September 2025



Introduction

The population projections for Texas were prepared by the Texas Demographic Center (referred to as TDC). The TDC Vintage 2024 Population Projections include the projections of the state and its counties' population for each year from 2020 to 2060, broken down by single year of age, sex, and race/ethnicity. The five race/ethnic groups are Non-Hispanic (NH) White alone, NH Black alone, Hispanic, NH Asian alone, and NH Other. The NH Other category primarily consists of NH American Indian and Alaskan Native alone, NH Pacific Islander alone, NH some other race alone, and NH two or more races.

These projections, like all forecasts, rely on specific assumptions about future events that may or may not happen. Users of these projections should understand that, while the projections have been developed using detailed methodologies and significant efforts to consider existing demographic trends, they may not accurately predict the future population of the state. It is important to approach these projections with a clear awareness of their inherent limitations and to have a thorough understanding of the procedures and assumptions outlined below.

Important User Notes

Significant changes have been made to the TDC Vintage 2024 Population Projections. Users will notice changes primarily in the following areas:

1. Total Population Projections for 2020-2024:
 - These projections are aligned with the July 1st Estimates from the Census Bureau's [Vintage 2024 Population Estimates](#).
 - Projections for subsequent years also reflect the July 1st population of the respective projection year.
 - Additionally, the counts from the April 1st, 2020 Decennial Census are provided as a reference. This results in two entries for the year 2020 in the downloadable files. Users should refer to the "year_month" column to differentiate between them.
2. Migration Scenarios:
 - The TDC Vintage 2024 Population Projections include three migration scenarios: mid, low, and high. These scenarios correspond to the three projection series produced by the [Census Bureau for national projections](#).

Projection Methodology

The projections were completed using a Cohort Component projection technique. As the name implies, the basic characteristics of this technique are the use of separate cohorts -- persons with one or more common characteristics -- and the separate projections of each of the major components of population change--fertility, mortality, and net migration--for each of the cohorts. These projections of components for each cohort are then combined in the familiar demographic bookkeeping equation as follows:

$$P_{t_2} = P_{t_1} + B_{t_1-t_2} - D_{t_1-t_2} + M_{t_1-t_2}$$

Where: P_{t_2} = the population projected at some future date t_1-t_2 years hence

P_{t_1} = the population at the base year t_1

$B_{t_1-t_2}$ = the number of births that occur during the interval t_1-t_2

$D_{t_1-t_2}$ = the number of deaths that occur during the interval t_1-t_2

$M_{t_1-t_2}$ = the amount of net migration that takes place t_1-t_2

When several cohorts are used, P_{t_2} may be seen as:

$$P_{t_2} = \sum_{i=1}^n P_{c_i, t_2}$$

Where: P_{t_2} is as in the equation above

P_{c_i, t_2} = population of a given cohort at time t_2 and

$$P_{c_i, t_2} = P_{c_i, t_1} + B_{c_i, t_1-t_2} - D_{c_i, t_1-t_2} + M_{c_i, t_1-t_2}$$

Where: all terms are as noted above but are specific to given cohorts c_i

In producing the current projections, as in any other use of the cohort-component technique, at least four major steps must be completed:

1. The selection of a baseline set of cohorts for the projection area or areas of interest for the baseline time period (usually the last census and for other dates for which detailed base data are available);
2. The determination of appropriate baseline migration, mortality, and fertility measures for each cohort for the baseline time period;
3. The determination of a method for projecting trends in fertility, mortality, and migration over the projection period;
4. The selection of a computational procedure for applying the rates to the baseline cohorts to project the population for the projection period.

Each of these steps, as performed for the current TDC population projections, is briefly discussed in the following sections.

Selection of the Baseline Cohort

In our previous projections, we have always used the most recent Decennial Census as the baseline for creating single-year age cohorts of males and females across major racial and ethnic groups. However, as we move further into the decade, our projections for the years following 2020 may increasingly deviate from the annual population estimates for those years. These differences are particularly significant when recent population trends differ considerably from those observed in the decade prior to the latest census, which serves as the primary foundation for our data.

For example, since 2020, we have witnessed significant events such as the outbreak and recovery from COVID-19, as well as a surge in immigration. Our research indicates that these events have substantially altered demographic patterns compared to those of the previous decade. Although we believe these trends are likely temporary and it is more sensible to rely on population trends from the past decade for our long-term projections, we believe it is necessary to adjust the base population to account for the effects of these recent trends. Therefore, we have made the following adjustments for our 2024 projections:

- 1) We begin with the April 1st, 2020, Decennial Census population counts by age, race, and sex and project them from 2021 to 2024.
- 2) Next, we control the projected population to the Census Bureau's Vintage 2024 Population Estimates for the State of Texas, ensuring that the projected total population from 2021 to 2024 matches the total population estimates for the corresponding years. This approach preserves the demographic composition informed by the 2020 Decennial Census, which is considered more accurate than the estimates, while accounting for the most recent population changes.
- 3) Finally, the projected population for 2024, adjusted with the July 1st, 2024 estimates, serves as the starting year for subsequent population projections in the following years through 2060

The Projection of the Components of Change

FERTILITY

Baseline age-sex-race/ethnicity-specific fertility rates were computed using births by age, race/ethnicity, and place of residence of the mother in Texas. The numerators for these rates represent the average number of births for mothers in each age and race/ethnicity group in 2019, 2020, and 2021. These birth data were obtained from the Texas Department of State Health Services. The denominators are the female population aged 15-49 from the 2020 Decennial Census, broken down by age and race/ethnicity.

The sum of the age-specific fertility rates (ASFRs) is the Total Fertility Rate (TFR). At the state level, the calculated TFRs in 2020 are 1.68 for NH Whites, 1.73 for NH Blacks, 2.06 for Hispanics, 1.25 for NH Asians, and 1.42 for NH Others.

Our study of fertility trends over the past two decades indicates that TFR has declined significantly while ASFR distributions have shifted to older ages. To project future ASFRs and TFRs for Texas, we assume that the ASFRs and TFRs of all race/ethnic groups will converge to the 2023 levels of NH females in the US, reflecting a lower and delayed fertility pattern (TFR = 1.52). NH Asians already exhibited a low TFR and a more delayed fertility pattern in 2020. We assume that their ASFRs and TFR will converge to those of 2023 US Asians (TFR = 1.33) by 2060.

In our previous projections and other research works that use race-specific fertility rates to estimate or project the zero-age population, an assumption has been made that the race/ethnicity of the newborn is the same as their mother. This has been demonstrated to be a reasonable approach in the past at the population level, when the estimated births were compared to the zero-year-old population in national surveys and the census counts. However, with the increase in inter-race and inter-ethnic marriage and the use of multi-race identification in the census and more surveys, the discrepancy between the estimated race/ethnic distribution of the newborns based on their mothers' race/ethnicity and the race distribution has increased. Thus, an additional step to adjust the race distribution of the projected new cohort is necessary.

We used the IPUMS USA data to link children with their mothers and found a significant number of children whose reported race/ethnicity differed from that of their mothers. We calculated the race/ethnicity distribution of the children born to mothers of each of the five race/ethnicity groups used in our projection. We then applied these distributions to our projected births based on the race/ethnicity of the mothers.

County Fertility

At the county level, improbable fertility rates were observed in counties with small populations and among race/ethnicity groups with small populations. To reduce random noises in the data, counties are pooled into groups to calculate their fertility rates in 2020, based on their similarity in fertility patterns and their rural/urban status. All counties are projected to converge to the state's projected fertility level.

MORTALITY/SURVIVAL RATES

The years 2020 and 2021 experienced elevated deaths due to the pandemic. Preliminary data from the Texas Department of State Health Services over the past couple of years indicate a decline in total deaths, suggesting that age-specific mortality and survival patterns may have returned to pre-pandemic levels. Using 2020 death data as the baseline may overproject future deaths. Therefore, we utilize the projected national survival rates from the 2023 Population Projections for the United States (2020-2060) produced by the U.S. Census Bureau. These rates were developed based on historical data from 1989 to 2019, thus avoiding bias from the COVID-19 years.

To account for Texas's differences from the nation, we used the 2021 life tables for the US and Texas compiled by NCHS (National Center for Health Statistics) to calculate the ratios of Texas survival rates to those of the US at each age. We then applied these ratios to the national projected age-specific survival rates for NH Whites, NH Blacks, Hispanics, NH Asians, and NH Others to obtain the projected survival rates for Texas.

County Mortality

Our research has not yielded reliable and reasonable county-specific mortality and survival rates for the baseline and for future projections. We use the same state-level projected age-, sex-, and race/ethnicity-specific survival rates for all counties.

MIGRATION

In previous projections, we used a standard residual migration formula to calculate the number of migrants between two censuses. For example, in calculating the migration between 2010-2020, births during this period were added and deaths subtracted from each corresponding age cohort of the 2010 population to produce an expected 2020 population for each cohort. The difference between this expected population and the 2020 population is considered the number of net migrants. These are divided by the mid-decade population, or the average of the 2010 and 2020 populations, to calculate migration rates. These rates are then used for post-2020 population projections.

In this vintage, we made significant improvements to the methodology. In calculating migration rates, we now consider the population of the sending place (both domestic and international). To project domestic migration, we use data from the American Community Survey Public Use Microdata Sample (PUMS) for the past 10 years to calculate the ratio of net migrants to Texas to the US population for each race, sex, and age group. We then apply these ratios to the national population projections by the Census Bureau to obtain the projected domestic migrants to Texas.

Similarly, using PUMS data, we determine the Texas share of net international migrants (NIM) as a proportion of the national total immigrants for each race, sex, and age group. We then apply these shares to the corresponding projected NIM in the national projection. The Census Bureau's NIM projections involve the calculations of foreign-born immigration, foreign-born emigration, and net native migration, defined as follows:

- Foreign-born immigration (also referred to as “non-U.S.-born immigration” in our methodology statement) – Foreign-born people moving into the United States.
- Foreign-born emigration – Foreign-born people moving out of the United States.
- Net native migration – The net of U.S.-born people moving into and out of the United States.

The Census Bureau's National Population Projections provide a mid, high, and low series for international migration and the corresponding population projections. Our Texas population projections also include three migration scenarios based on each of these series.

County Migration

We use the 10-year average of both net international migration and domestic migration data from the Census Bureau's Vintage 2020 Population Estimates to distribute the state projections for international and domestic migration across each county. Additionally, we compared the Vintage 2020 estimates with the Decennial Census to adjust for any potential underestimation or overestimation.

Computation of Future Populations

The computation of the projected population was completed using standard cohort-component techniques as described above, with all computations completed on an individual year and age basis. The 2020 Decennial Census population was used as the starting value, and populations were projected for 2020-2024 and then controlled to the Census Bureau's Vintage 2024 Population Estimates for the corresponding estimate years. The new 2024 projected population is then used as the starting point for projections through 2060.

To ensure data consistency, once the state and county population projections are independently conducted, the county population projections are adjusted to align with the state totals. This adjustment ensures that the sum of each age group and the breakdown by race/ethnicity at the county level matches the overall state population.

Limitations of the TDC Population Projections

The Cohort Component methodology used by the TDC is the most commonly used method by the federal and state governments and by demographers to project the future population. While demography textbooks and researchers well document the advantages, there are limitations associated with the method and the process of projecting the components.

One limitation is that the formula used in the method is a deterministic function with the assumption that all the inputs, that is, the base population, the births, the deaths, and the migrant population, are true without errors. Although projections of an area or a group with a small population size tend to be unreliable, there are no statistical measures available to indicate that. We do warn users of these projections to be cautious when interpreting and using projections of small populations. In these cases, we highly suggest the use of broader age groups, merging race groups, or shifting the geographic unit to a larger region.

There are limitations in our efforts to project future rates of demographic components. A wide range of socio-economic, environmental, policy, technological, and other factors can affect future trajectories of fertility, mortality, and migration. Due to constraints in resources and data availability, we cannot take all of these factors into consideration. We assume that the recent trends we observed were a result of a range of factors, and if these factors remain relatively stable, the demographic trends will continue into the future.

The full projections are available free on our website and may be requested in additional formats on a cost-recovery basis.

If you have any questions concerning these projections, please contact:



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