

District of Columbia Office of Planning Single-age Population Forecast Methodology and Assumptions

Introduction

The population forecasts for the District of Columbia and its 46 neighborhood clusters were prepared by the Office of Planning State Data Center, with assistance from the Citywide Planning division. These forecasts involve the use of certain assumptions about future events that may or may not occur. Users of these forecasts should be aware that although they have been prepared with the use of detailed methodologies and with extensive attempts being made to account for existing demographic patterns, they may not accurately reflect the future population of the District, or of particular neighborhood clusters in the District, due to some degree of uncertainty in projecting future events. These forecasts should be used with full awareness of the inherent limitations in general and with specific knowledge of the procedures and assumptions delineated below which characterize the forecasts presented in this report.

These population forecasts comprise the District as a whole, including the 46 neighborhood clusters in the District, for each year from 2020-2035. They are by single year of age for ages 0 through 85 years of age and older, for males and females. This report describes the forecast methodologies for the upper (high) and lower (low) limits and discusses the basis for, and the assumptions used in its development. It concludes with a summary of the products available from the forecast process.

Forecast Methodology

The population from 2020-2035 for the District and its 46 neighborhood clusters is forecast using the cohort-component method. The basic logic of this method is that future population is a function of present (baseline) population plus the three components of demographic change: fertility, mortality, and migration.

The baseline populations are grouped into cohorts defined by age and sex, and the projection proceeds by updating the population of each age- and sex-specific group according to assumptions about the three components of population change. Each cohort survives forward to the next age group according to assumed age-specific mortality rates. This calculation is made for each age group and sex, and repeated for each time period as the forecast proceeds. The size of the youngest (zero) age group is affected by the number of births, which is calculated by applying assumed age-specific fertility rates to female cohorts in the reproductive age span (10-55 years). A calculated District-wide sex ratio at birth is used to divide total births into males and females. Migration is accounted for by applying age- and sex-specific net migration rates to each cohort.

The base formula used in the projection model to express this function is:

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

Where:

- P_{t_2} = population projected at some future date t_1-t_2 years
- P_{t_1} = population at the base year t_1
- $B_{t_1-t_2}$ = number of births that occur during the interval t_1-t_2
- $D_{t_1-t_2}$ = number of deaths that occur during the interval t_1-t_2
- $M_{t_1-t_2}$ = amount of net migration that takes place during the interval t_1-t_2

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

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

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

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

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

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

General Assumptions

- Fertility rates are expected to gradually decline throughout the projection period;
- Mortality rates are expected to decline slightly throughout the projection period;
- Life expectancy is not expected to change significantly;
- Migrants to the city are expected to maintain current health outcomes;
- Development activity indicated by planned and conceptual residential housing units are the best predictor of where the majority of new migrants to the city will reside; and
- The single-age distribution of migrants by neighborhood cluster will be similar to the single-age distribution of the existing population in each cluster.

Benchmarks

The Office of Planning State Data Center, the Citywide Planning division, and the Washington Council of Governments (COG) prepared a forecast of population, households, and jobs for five year increments from 2020 to 2050. These forecast numbers are based upon permits for current and future development. The population totals at these five-year increments served as benchmarks (control totals) for this forecast.

Step 1: Citywide single age forecast

Using the 2020 U.S. Census Population Estimates as the baseline population and the COG 10.0 forecast numbers as benchmarks for 2020, 2025 and 2035, the cohort method was used to derive citywide single age by sex populations for annual growth from 2020-2035. Migration rates from 2010 to 2020 were applied for births, survivorship, and migration each year. Weights were applied to some single-age groups and years in order to meet the population benchmarks.

Step 2: Apportioning population to neighborhood cluster

The 2020 U.S. Census (census tract geography) and the COG population derived from residential development activity (transportation analysis zone geography) were used to allocate the 2020 Population Estimates to the District's 46 neighborhood clusters.

Step 3: Deriving the 2025 to 2035 forecasts by neighborhood cluster

The single age population was derived for 2025 to 2035 by adding the COG population by cluster to the cluster population from step 2. Age apportionment for each age group was adjusted for each new time period but kept relatively consistent with the same proportions as the 2020 Population Estimates.

Products:

- District-wide age group summary, 2020-2035
- District-wide single-age forecast, 2020-2035
- District-wide age group forecast (0-17, 0-2, 3-10, 11-13, 14-17, 25-44, 65+), 2020-2035
- Neighborhood cluster by single age forecast, 2020-2035