METHODOLOGY FOR THE SUBCOUNTY TOTAL RESIDENT POPULATION ESTIMATES (VINTAGE 2022): APRIL 1, 2020 TO JULY 1, 2022[1]

OVERVIEW

The U.S. Census Bureau produces estimates of total resident population for all areas of general-purpose government on an annual basis. The subcounty areas consist of both incorporated places (such as cities, boroughs, and villages) and minor civil divisions (such as towns and townships). We use updated housing unit estimates to distribute county household population to subcounty areas based on housing unit change. We produce county-level population estimates with a cohort-component method. This method measures change since the date of the last census using administrative data on births, deaths, and domestic and international migration. A more detailed description of the state and county population and housing unit estimates methods can be found at: https://www.census.gov/programs-surveys/popest/technical-documentation/methodology.html.

METHOD

The 2020 Census base counts of housing units and associated population of each governmental unit are geographically updated each year to reflect legal boundary changes reported in the Boundary and Annexation Survey (BAS), from other geographic program revisions, and from 2020 Census corrections when available.

The subcounty population estimates may include revisions from accepted challenges to the estimates and special censuses for full jurisdictions.[2,3] Both types of revisions are incorporated through the population components. There were no accepted challenges or special censuses for inclusion in the Vintage 2022 population estimates.

The Census Bureau develops the subcounty population estimates for the household and group quarters populations separately, and then combines them to calculate the resident population. We estimate the household population by applying the "Distributive Housing Unit Method" to the county-level household population to distribute it to each subcounty area as illustrated by the following steps:

Step 1 - Producing an Uncontrolled Subcounty Household Population Estimate

The Vintage 2022 uncontrolled subcounty household population estimate begins with the July 1, 2022 housing unit estimate. We multiply this estimate by the Household Population Per Housing Unit ratio, which is the quotient of the 2020 Census household population[4] and the 2020 Census housing units. This produces the final uncontrolled population estimate.[5]

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[1] Vintage 2022 data products are associated with Data Management System projects P-6000042, P-7501659, and P-7527355. The U.S. Census Bureau reviewed these data products for unauthorized disclosure of confidential information and approved the disclosure avoidance practices applied to this release (CBDRB-FY23-0063).

[2] Population Estimates Challenge Program results are available here: https://www.census.gov/programs-surveys/popest/about/challenge-program/results.html.

[3] Special Census Program results are available at https://www.census.gov/programs-surveys/specialcensus/data_products/official_counts.html and special census areas included in previous series of estimates are available here: https://www.census.gov/programs-surveys/popest/about/special-census.html.

[4] The 2020 Census household population totals feature confidentiality protections applied using the 2020 Census Disclosure Avoidance System prior to the processing of the subcounty estimates.

[5] We apply a national-level Household Population Per Housing Unit ratio to new housing estimates in areas with zero values for population or housing as of the 2020 Census.

Step 2 - Producing a Controlled Subcounty Household Population Estimate

We then control the subcounty estimates of household population from Step 1 so that they sum to the published county totals. To do this, we divide the 2022 county-level household population estimate by the sum of the uncontrolled subcounty household population estimates within the county.[6] We multiply this adjustment or "rake factor" by the uncontrolled subcounty household population estimates calculated in Step 1. This calculation produces the controlled subcounty household population estimate. We round this controlled estimate using a variation of the greatest mantissa methodology.[7]

Step 3 – Estimating the Group Quarters Population

The group quarters (GQ) component of the total estimate is a combination of persons residing in institutional facilities and non-institutional facilities.

The institutional facilities include four types:

- Correctional facilities
- Juvenile facilities
- Nursing homes
- Other institutional group quarters.

The non-institutional facilities include three types:

- College dormitories
- Military barracks
- Other non-institutional group quarters.

We use GQ population data from two sources to estimate subcounty populations:

- 2020 Census counts of the GQ population by facility type for each subcounty area,[8] including any post-2020 additions to the GQ population when available, and

- A time series of individual group quarters records from the Group Quarters Report (GQR) that the Population Estimates Program (PEP) prepares based upon annual updates from state representatives of the Federal-State Cooperative for Population Estimates (FSCPE).

These two sets of GQ population data are used to derive a time series of GQ population through the following process:

   Part 1 – Aggregate the GQ population from the 2020 Census to the subcounty level by the seven facility types.

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[6] For more information on the methodology used to develop the Vintage 2022 county-level population estimates, see: https://www2.census.gov/programs-surveys/popest/technical-documentation/methodology/2020-2022/methods-statement-v2022.pdf.

[7] Greatest mantissa rounding subtracts the integer values from the controlled total and then adds ones, one row at a time (i.e., smallest geographic parts within county) until the rounded total reaches the controlled total.

[8] The 2020 Census counts of the GQ population by facility type feature confidentiality protections applied using the 2020 Census Disclosure Avoidance System prior to the processing of the subcounty estimates.

Part 2 – Sum the facility-level GQ populations from the GQR to the subcounty level by the seven facility types for each estimate date in the time series.

Part 3 – Calculate the year-to-year change indicated by the aggregated GQR time series of population and add this time series of change to the aggregated 2020 Census data. This creates a census-based time series of GQ population at the subcounty level for each of the seven facility types.

Step 4 – Producing the Final Subcounty Population Estimate

To produce the final subcounty resident population estimate, we add the controlled household population estimate to the total GQ population estimate.