

United States Population Estimates by Age, Sex, Race, and Hispanic Origin Method: July 1, 2006

The U.S. Census Bureau produces estimates of resident population for the United States on an annual basis. We revise the estimates time series each year as final input data become available. These postcensal estimates from April 1, 2000 through July 1, 2006 supersede all previous estimates produced since Census 2000. The estimate for the total national resident population is obtained by summing the resident population estimates across all age, sex, race, and Hispanic origin categories for each month in the time series. The following documentation describes the work that was carried out in the production of the July 1, 2006 resident population estimates at the national level.

Population Universe

Estimates of the U.S. resident population include persons resident in the 50 states and the District of Columbia. They exclude residents of the Commonwealth of Puerto Rico, and residents of the Island areas under U.S. sovereignty or jurisdiction (principally American Samoa, Guam, Virgin Islands of the United States, and the Commonwealth of the Northern Mariana Islands). The definition of residence conforms to the criterion used in Census 2000, which defines a resident of a specified area as a person "usually resident" in that area. Estimates of resident population exclude the U.S. Armed Forces overseas, as well as civilian U.S. citizens whose usual place of residence is outside the United States.

Estimates of the resident population plus Armed Forces overseas include U.S. residents and members of the Armed Forces on active duty stationed outside the United States, but do not include military dependents and other U.S. citizens living abroad.

Civilian population estimates include U.S. residents not in the active duty Armed Forces. The difference between resident population and civilian population is the Armed Forces population residing in the United States.

Estimates of the civilian noninstitutional population differ from the civilian population. Civilian noninstitutional population estimates exclude persons residing in institutions, primarily nursing homes, prisons and jails, mental hospitals, and juvenile facilities.

The Census 2000 Base Population

The enumerated resident population in Census 2000 is the base for the post-2000 population estimates. We modified the enumerated population in two ways to produce our April 1, 2000 population estimates base. First, we reconciled the Census 2000 race categories with the race categories that appear in our administrative records data by recoding the "Some other race" responses to one or more of the five Office of Management and Budget (OMB) race categories: White; Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander.¹

Second, we updated the population estimates base to reflect changes to the Census 2000 population due to the Count Question Resolution program and other administrative changes.

Postcensal estimation of resident population by age, sex, race, and Hispanic origin

We produced quarterly estimates of the U.S. population by age, sex, race, and Hispanic origin by updating the modified Census 2000 base population with data on the components of population change. For each age, sex, race, and Hispanic origin group, we applied the following formula:

- (1) updated 2000 enumeration of resident population,
- (2) + births to U.S. resident women,
- (3) - deaths to U.S. residents,
- (4) + net international migration,
- (5) + net movement of U.S. Armed Forces overseas

Estimation of the components of population change by age, sex, race, and Hispanic origin

Births

We estimated births to U.S. resident women based on data collected by the National Center for Health Statistics (NCHS). NCHS provided final data on births by birth month, sex of child, age of mother, and race and Hispanic origin of both mother and father through 2004. NCHS also provided preliminary birth data for the calendar year of 2005.

NCHS provided the birth certificate data in the 1977 race categories of White; Black; American Indian, Eskimo or Aleut; and Asian or Pacific Islander, under the "mark one race" scenario. To produce post-2000 population estimates in the new race categories, we modeled births by child's sex, race, and Hispanic origin in the full 31 possible single and multiple race combinations.

To model the NCHS births by birth month, sex, and race and Hispanic origin of the mother and father from the file, we used information from Census 2000 on race and Hispanic origin reporting within households for the age zero (under 1 year of age) population and their parent(s). First, we tabulated the NCHS births for each combination of parents' race and Hispanic origin. Then, we distributed these births according to the matching Census 2000 race and Hispanic origin distribution for the age zero population. We completed this race and Hispanic origin modeling separately for mother-only and two parent households and birth certificates.

To estimate the distribution of births for calendar year 2005, we distributed preliminary 2005 births received from NCHS according to the 2004 births by birth month, sex and modeled race and Hispanic origin.

To estimate the distribution of births by race and Hispanic origin of mother for the first half of 2006, we calculated calendar year, age-specific birth rates for women by race and Hispanic origin for 2004 (the last year of final data from NCHS) and applied these rates to a projected 2006 population of resident women by age, race, and Hispanic origin.

Deaths

We estimated deaths to U.S. residents based on data collected by NCHS. NCHS provided final data on deaths by death month, age, sex, race, and Hispanic origin through 2004. NCHS also provided preliminary death data for the calendar year of 2005 by Hispanic origin.

As with birth certificate data, NCHS provided death certificate data in the 1977 race categories of White; Black; American Indian, Eskimo or Aleut; and Asian or Pacific Islander, under the "mark one race" scenario. Therefore, it was again necessary to model deaths by age, sex, race, and Hispanic origin in the full 31 possible single and multiple race combinations.

We calculated separate death rates for the NCHS race categories by age, sex, and Hispanic origin using the 1998 deaths and 1998 population estimates.² We applied the death rates for the White, Black, and American Indian, Eskimo or Aleut groups to the corresponding White alone, Black alone, and American Indian and Alaska Native alone populations. In addition, we applied the Asian and Pacific Islander death rate to both the Asian alone population and the Native Hawaiian and Other Pacific Islander alone population. We estimated multiple race deaths as the difference between total 2004 deaths reported by NCHS and the sum of deaths estimated for the single race groups. Consequently, we applied a constant death rate to each of the 26 multiple race groups.

To estimate the distribution of deaths for calendar year 2005, we distributed preliminary 2005 deaths by Hispanic origin received from NCHS according to the 2004 deaths by death month, sex, and modeled race.

To estimate the distribution of deaths by age, sex, race, and Hispanic origin for the first half of 2006, we calculated calendar year, age-specific mortality rates by sex, race, and Hispanic origin for 2004 (the last year of final data from NCHS) and applied the rates to a projected 2006 population by age, sex, race, and Hispanic origin.

International Migration

For the purposes of estimates production, international migration, in its simplest form, is any change of residence across United States (50 states and District of Columbia) borders. The net international component combines three parts: (1) net migration of the foreign-born, (2) net emigration of natives, and (3) net movement from Puerto Rico to the United States. In an effort to maximize the use of available data, we used 2000-2005 American Community Survey (ACS) data as the basis for the level of net migration of the foreign born. After determining the net change of the foreign-born population, we accounted for deaths to the entire foreign-born population during the periods of interest. In order to account for variability due to small sample sizes of the foreign born, we then used a moving average for the period changes to produce the final net foreign-born migration estimate. We applied the age-sex-race-Hispanic origin distribution of the noncitizen foreign-born population from Census 2000 who entered in 1995 or later to the national-level estimate of net migration of the foreign born.

We produced the two remaining parts of the net international migration component, the net movement between Puerto Rico and the United States and the net emigration of natives, in

similar ways.³ For both pieces, current annually-updated information is not available. Therefore, we used the previous vintage's levels of movement and applied the distributions from Census 2000 that were most similar to the population of interest.⁴ For the net movement between Puerto Rico and the United States, we based the distribution on the characteristics (age, sex, race, and Hispanic origin) of the Census 2000 population born in Puerto Rico and who entered the United States in 1995 or later. For native emigration, we assumed these emigrants were likely to have the same characteristics distributions as natives who currently reside in the United States. Therefore, we applied the age, sex, race, and Hispanic origin distribution of natives residing in the 50 states and the District of Columbia to the native emigrant population.

Finally, we combined the three types of international migration (net migration of the foreign born plus net migration between Puerto Rico and the United States minus net emigration of natives) to produce the net international migration component.

Armed Forces

We derived the Armed Forces movement overseas estimates (by age, sex, race, and Hispanic origin) from a combination of data from individual Armed Forces branches in the Department of Defense (DOD), data from the Defense Manpower Data Center (DMDC), and demographic distributions from Census 2000.

Estimation of the Population by Quarter and Month

The calendar quarter is the basic time interval for estimating the national population by age, sex, race, and Hispanic origin, but we are also required to produce national population estimates by age, sex, race, and Hispanic origin for each month of the time series. To do this, we needed components of change (births, deaths, international migration, and Armed Forces data) by month.

NCHS, the individual branches of the Armed Forces, DOD, and DMDC each supplied their data by month. No seasonal information was available for net migration of the foreign-born, emigration of natives, and net movement between Puerto Rico and the United States, so we assumed that each part of the international migration component occurred at the same level throughout the year.

Once we produced the quarterly population estimates as described above, we used the monthly components of change and the component method to produce population estimates for the intervening months.

Data Notes

In our ongoing evaluation of these population estimates, research indicates that the coverage of vital statistics administrative record data and decennial census data differ, with Census 2000 enumerating a smaller young child (including age zero) population than expected from birth data collected by NCHS.

As stated in the method described above, we base our estimates in large part on these Census 2000 population counts. As the population ages over the time series and we use the administrative records to update the census population, the level of the young child population is increasingly based on birth records. Therefore, in the annual estimates by age, there is a discontinuity between the population based mainly on administrative record birth data and the population based mainly on census data.

In addition, our research shows that the administrative record data and decennial census data differ in coverage and consistency of race and Hispanic origin reporting. Consequently, the discontinuities described above are most pronounced in the estimates by race and Hispanic origin.

¹ Detailed information on the race modification is available at <http://www.census.gov/popest/archives/files/MRSF-01-US1.html>. The modified race data summary file is available at <http://www.census.gov/popest/archives/files/MR-CO.txt>.

² We use the race distribution for the 1998 deaths from the processing of the national estimates here because it adjusts for NCHS/Census race inconsistencies. In the production of national population estimates in the 1990s, we projected preliminary deaths to the American Indian, and Asian and Pacific Islander populations by sex using life tables, with proportional adjustment to sum to the other races total. We estimated Hispanic origin deaths by sex and race for all years using life tables applied to a distribution of the Hispanic population by age, sex, and race. We use the 1998 population estimate from the vintage 2000 population estimates.

³ For more information on the net movement from Puerto Rico and native emigration, see Kevin E. Deardorff and Lisa Blumberman, 2001, "Evaluating Components of International Migration: Estimates of the Foreign-Born Population by Migrant Status in 2000," Population Division Working Paper Series No. 58

⁴ For more information on the estimate of 11,133 for the net movement from Puerto Rico see Christenson, M. "Evaluating Components of International Migration: Migration Between Puerto Rico and the United States," Population Division Technical Working Paper No. 64. For information on estimates of native emigration, see Gibbs, J., G. Harper, M. Rubin, and H. Shin, "Evaluating Components of International Migration: Native-Born Emigrants," Population Division Technical Working Paper No. 63.