

## 2002 Methodology

### General Methodology

U.S. Population Estimates by Age, Sex, Race, and Hispanic Origin: July 1, 2002

The "vintage 2002" population estimates (the postcensal population estimates for dates in 2002 and earlier dates after the April 1, 2000 census date) supersede all previous estimates after April 1, 2000. The population estimates are subject to revision as final input data become available. The revisions normally occur once a year.

### 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 outlying 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 plus Armed Forces overseas and civilian population is the worldwide Armed Forces population.

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

### The Census 2000 Base Population

The enumerated resident population in Census 2000 is the base for the post-2000 population estimates. The enumerated population was modified in two ways for purposes of developing these estimates. First, the race data were modified to eliminate the "Some other race" category in order to be more consistent with race categories that appear on the administrative records used to produce the population estimates. Second, the April 1, 2000 population estimates base reflects modifications to the Census 2000 population as documented in the Count Question Resolution program.

The race modification conforms to the Office of Management and Budget's (OMB) 1997 revised standards for collecting and presenting data on race and ethnicity. The revised OMB standards identified five minimum race categories: White; Black or African American; American Indian and Alaska Native; Asian; and, Native Hawaiian and Other Pacific Islander. Additionally, the OMB recommended that respondents be given the option of marking or selecting one or more races to indicate their racial identity. Finally, for respondents unable to identify with any of the five race categories, the OMB approved including a sixth category - "Some other race" - on the Census 2000 questionnaire.

No modification was necessary for responses indicating only an OMB race alone or in combination with another race. However, about 18.5 million people checked "Some other race" alone or in combination with another race. These people were primarily of Hispanic origin and many wrote in their Hispanic origin or Hispanic origin type (such as Mexican or Puerto Rican) as their race. For purposes of estimates production, responses of "Some other race" alone were modified by blanking the "Some other race" response and imputing an OMB race alone or in combination with another race response. The responses were imputed from a donor, who matched on response to the question on Hispanic origin. Responses of both "Some other race" and an OMB race were modified by blanking the "Some other race" response and keeping the OMB race response.

The resulting race categories (White; Black; American Indian and Alaska Native; Asian; and, Native Hawaiian and Other Pacific Islander) conform with OMB's 1997 revised standards for the collection of data on race and ethnicity

and are more consistent with the race categories in other administrative sources, such as vital statistics.

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

Estimates of the U.S. population by sex, race, and Hispanic origin, were derived quarterly by updating the modified Census 2000 population with data on the components of population change. The following formula was applied to update each group:

- (1) 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 and civilian citizens.

Estimation of the components of population change

A detailed description of selected sources of data for the components of change, and their method of estimation, is available in Hollmann, Frederick W., Lisa B. Kuzmeskus, R. Colby Perkins, and Elizabeth A. Weber, "United States Population Estimates by Age, Sex, Race, and Hispanic Origin: 1990 to 1997," U.S. Bureau of the Census, PPL-91, Washington, DC, 1998 and Deardorff and Blumerman, 2001, "Evaluating Components of International Migration: Estimates of the Foreign-Born Population by Migrant Status in 2000," Population Division Working Paper Series No. 58). The following is a summary update of these data sources and procedures.

### *Births*

Registered births to U.S. resident women are estimated from data supplied by the National Center for Health Statistics (NCHS).

### *Deaths*

Data on registered deaths to U.S. residents by sex and race are also supplied by NCHS.

### *International Migration*

The net international migration component in the population estimates includes: (1) legal immigration to the United States, (2) emigration of foreign born and native people from the United States, (3) net movement between the United States and Puerto Rico, (4) estimates of temporary migrants, and (5) estimates of net residual foreign-born population, which include unauthorized migration.

For the first time, the national estimates of the international migration component incorporated data available from the Census 2000 Supplemental Survey (C2SS) and the 2001 Supplemental Survey (SSO1) along with estimates developed from the Demographic Analysis and Population Estimates (DAPE) project. (See Deardorff and Blumerman, 2001, "Evaluating Components of International Migration: Estimates of the Foreign-Born Population by Migrant Status in 2000", Population Division Working Paper Series No. 58.)

Estimates of the net change in the combined components of legal immigration to the United States, emigration of the foreign born population from the United States, temporary migrants, and the net residual foreign-born population for the July 1, 2000 to July 1, 2001 period were developed from the survey data. The foreign-born population (based on C2SS data) was survived forward and compared to the estimates of the foreign-born population derived from the SSO1 data. The estimates from the DAPE project provided the estimates of the emigration of the native population and the net movement between the United States and Puerto Rico.

Independent estimates of each of the components of international migration are not available. However, the analysis of the data supplied by the Immigration and Naturalization Service (INS) on the flow of legal permanent residents for the 2000 to 2001 period supports the estimates derived from the survey data.

### *Federally-affiliated U.S. citizens*

The final category of population change takes into account the temporary movement of federally-affiliated U.S. citizens. The component consists mostly of movement of the active duty Armed Forces and Armed Forces dependents between the United States and overseas. Also included is the movement of civilian federal employees and their dependents.

The migration of federally-affiliated citizens was estimated using trends in the number of personnel abroad, from several sources: Armed Forces overseas strength statistics supplied by the branches of the Armed Forces in the Departments of Defense (Army, Navy, Marines, and Air Force) and Transportation (Coast Guard); military dependents residing overseas published by the Department of Defense for four branches of the Armed Forces (excluding the Coast Guard) and civilian federal employees overseas supplied by the Office of Personnel Management (OPM) inflated to include dependents.

The estimation of net migration from this population to the United States follows a reverse component-of-change logic applied to the federally-affiliated overseas population. The net increase in the overseas federal population, minus net recruits to this population from abroad (for example, residents of outlying areas joining the Armed Forces), minus births, plus deaths, provides an estimate of the net migration to the overseas federal population from the United States. The negative of this estimate is the estimated migration of federally-affiliated citizens to the United States from overseas.

The net migration of U.S. citizens not affiliated with the federal government, as well as the temporary movement of students, scholars, and embassy personnel, are assumed to be zero, although these movements do, in fact, represent a change of residence in and out of the United States according to the residence definition used in the estimates.

#### Estimation of the components of population change by age

Not all data sources provide information on age. As stated, the international migration components are based on a variety of data sources and analytic estimates. The age distribution of legal permanent residents, the foreign born emigrants and the unauthorized immigrants developed from the Demographic Analysis and Population Estimates (DAPE) project was applied to the net international migration estimate obtained from the Census 2000 Supplemental Survey (C2SS) and the 2001 Supplemental Survey (SSO1).

The age distribution of federally-affiliated U.S. citizens was estimated by the method of cohort survival, using age distributions of Armed Forces overseas supplied by the Department of Defense, Defense Manpower Data Center, as well as distributions of overseas Armed Forces dependents from the 1970 census (the last census enumeration available on the overseas population), and overseas civilian federal employees from the Office of Personnel Management (OPM).

#### Estimation of the components of population change by race and Hispanic origin

##### *Births*

Registered births to U.S. resident women were estimated from data supplied by the National Center for Health Statistics (NCHS). At present, NCHS continues to collect birth certificate data using the 1977 race standards 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, it was necessary to develop birth data that coincided with the new race categories: White; Black; American Indian and Alaska Native; Asian; and Native Hawaiian and Other Pacific Islander, under the "mark one or more races" scenario. Because of this inconsistency in data on race, it was necessary to model the full 31 possible single and multiple race combinations.

Data on births by birth month, sex, and race and Hispanic origin of the mother and father are based on final micro-data files for calendar year 2000 from the NCHS registration system. The model was based on 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, the NCHS births were tabulated for each of the combinations of parents' race/Hispanic origin. These births by parents' race/Hispanic origin were then distributed according to the Census

2000 race/Hispanic origin distribution for the age zero population for the matching combination of parents' race/Hispanic origin. Race/Hispanic origin modeling was done separately for mother-only and two-parent households.

To estimate the distribution of births for calendar year 2001, data on preliminary 2001 births received from NCHS from their 90 percent sample of final births were distributed according to the 2000 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 2002, age-specific birth rates centered on July 1, 2001, for women in each race group and for women of Hispanic origin were applied to preliminary estimates of the number of resident women in the specified age groups.

### *Deaths*

Data on registered deaths to U.S. residents by death month, age, sex, race and Hispanic origin were supplied by NCHS. Final data were available through 2000 and preliminary data were available for 2001.

It was again necessary to model the race distribution because death certificates ask for the race of the deceased using only four race categories (1977 race categories of White; Black; American Indian, Eskimo or Aleut; Asian or Pacific Islander). The race distribution was modeled using death rates which varied for each of the five race alone groups and were constant for each of the 26 multiple race groups. Separate death rates were calculated for the 1977 race categories by age, sex, and Hispanic origin. Rates were constructed using the 1998 mortality<sup>1</sup> and 1998 population estimates.<sup>2</sup> These rates were then applied to the Census 2000 population in the 31 modified race categories. Death rates for the White, the Black, the American Indian, Eskimo or Aleut, and the Asian and Pacific Islander groups were applied to the corresponding White alone, Black alone, American Indian and Alaska Native alone, Asian alone, and Native Hawaiian and Other Pacific Islander alone populations. The Asian and Pacific Islander death rate was applied to both the Asian alone population and the Native Hawaiian and Other Pacific Islander alone population. Multiple race deaths were estimated as the difference between total 2000 deaths as reported by NCHS and the sum of deaths estimated for the single race groups.

The 2001 deaths were distributed using 2000 deaths by modeled race, death month, age, and sex and were controlled to the 2001 preliminary deaths from NCHS by Hispanic origin.

To estimate the distribution of deaths by race and Hispanic origin for the first half of 2002, projected age-specific mortality rates for July 1, 2001 were applied to preliminary 2002 estimates of the population by single year of age, sex, race, and Hispanic origin.

### *International migration*

As described earlier, the international net migration components are based on a variety of data sources and analytic estimates, including ethnicity (Hispanic and not Hispanic) reported in the census sample data and estimates of the distribution by race from country-of-birth tallies.

### *Armed Forces*

For the Armed Forces overseas statistics, distributions by sex, race, and Hispanic origin are derived from separate tabulations provided by the Defense Manpower Data Center (Department of Defense), giving demographic detail by duty location and branch of service.

For the military dependents, the distribution by sex is based on information on military dependents residing abroad from the 1970 census of population of U.S. citizens residing overseas (the last census enumeration available on the overseas population). We assume the race distribution of the dependents to be the same as the current race distribution of the Armed Forces overseas.

Estimation of the Population by Quarter and Month

The calendar quarter is the basic time interval for estimating distributions of components of change by age, sex, race, and Hispanic origin.

For the most part, the data sources for the demographic components of change provide monthly data. For some preliminary data, monthly series were imputed by projection of seasonal distributions from final data for earlier years. Data from the INS on legal alien immigration and refugees are available by month. Most Armed Forces strength data by branch of service, used to estimate movement of Armed Forces from overseas, are available by month, whereas data on Armed Forces dependents and all Armed Forces demographic detail are available by quarter. No seasonal information was available for undocumented immigration, emigration of legal residents, net migration from Puerto Rico to the United States, and net migration of non-refugee temporary residents; so no seasonality was assumed. For births, deaths, and legal alien immigrants, quarterly distributions by age, sex, race, and Hispanic origin were independently derived. For other components, sex, race, and Hispanic origin distributions were imputed to quarterly data either from the current calendar year or fiscal year, or on the basis of a projection from a past year.

The procedure for estimating the population by quarter, once the quarterly components of change were estimated, followed the component accounting procedure described earlier. The single-year age distribution of the base population was further distributed to quarter-year of age in proportion to registered births in the birth year of each birth cohort.

To complete the population estimates for the months that do not begin a calendar quarter, monthly series were estimated of births, deaths, and immigration, by sex, race, and Hispanic origin. Aggregate monthly components--births, deaths, international migration, and federal U.S. citizen migration--were expanded to month-of-birth from quarterly data. The resulting monthly series of month-of-birth cohort components were used to produce the monthly population estimates.

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<sup>1</sup> The race distribution for the 1998 deaths as set in the processing of the national estimates is used here because it adjusts for NCHS/Census race inconsistencies. In the production of national population estimates in the 1990s, preliminary deaths to the American Indian, and Asian and Pacific Islander populations by sex were projected using life tables, with proportional adjustment to sum to the other races total. Hispanic origin deaths by sex and race were estimated for all years using life tables applied to a distribution of the Hispanic population by age, sex, and race.

<sup>2</sup> The 1998 population estimate from the vintage 2000 population estimates.