Methodology Summary

Interim Population Projections for States by Age and Sex: 2004 to 2030

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The interim state population projections were prepared to be consistent with the interim United States (U.S.) national population projections released in March 2004 (http://www.census.gov/ipc/www/usinterimproj). The cohort-component method was used to produce interim state population projections by single year of age and sex. Each birth cohort (the people born in a specified year) was projected forward (e.g., from age 27 in one year to age 28 a year later). Each component of population change – births, deaths, internal migration, and international migration – was projected separately from 2000 to 2030 based on recent fertility, mortality, and migration trends. Rates of fertility, mortality, and migration were held constant throughout the projection period with small adjustments to fit the estimated components of change from 2001 to 2003. The sum of the projected total state populations by single year of age (0 to 85 and older) and sex were controlled to the interim U.S. population projections from 2004 to 2030 by single year of age and sex.

The interim state projections in this release are based on the general assumption that recent demographic trends will continue in the future. The projections represent the results of incorporating these assumptions in a mathematical projection model and are not forecasts of what future population trends will be.

Projected fertility and mortality rates were based on birth and death statistics by state from the National Center for Health Statistics (NCHS). Projected internal migration was based on data on state migration patterns derived from the Internal Revenue Service (IRS) and Census 2000 data. Projected international migration was based on the estimates of net international migration by state derived from the Population Estimates Program and data on the foreign-born population enumerated in Census 2000.

I. Methodology Overview

The cohort-component method was used to produce the state projections, which were made as of July 1 in projection years. The base population by single year of age and sex was carried forward from April 1, 2000 (the reference date for Census 2000) to July 1, 2000 by interpolating the population between Census 2000 and the projected 2001 population. The July 1, 2000 population was then used as a base to project the population in future years. The projections for 2001, 2002, and 2003 were compared with the population estimates already published for those years. Differences between these projections and estimates were used to derive small adjustments in the projected components of population change for the 2004-to-2030 period. For more information about the population estimates, see the website: http://www.census.gov/popest/datasets.html

Fertility rates, mortality rates (converted to survival rates to project population), internal migration rates, and international migration rates by age and sex were developed for 2000. For each age, the survival rate was applied to the population to obtain the population that would be one year older in the following year. The survived population and initial population were averaged to derive the population base to which rates

of migration and childbearing were applied. Age-specific fertility rates were applied to women of childbearing age to derive projected births. Then the projected in-migration and out-migration rates were applied to the population base in each state to derive internal migration. The projected age and sex composition derived from Census 2000 data on migration between 1995 and 2000 was used to distribute internal migration by age and sex to states. The net international migration by state was based on the most recent estimates of net international migration rates. The distribution of projected net international migration by age and sex was based on the projected composition derived from the foreign-born population entering the United States between 1995 and 2000.

II. **Fertility and projection of births**

Data on 1999 and 2000 births by single year of age of mother, obtained from NCHS, were used to derive age-specific fertility rates based on the Census 2000 population. Fertility rates by state from this calculation were held constant throughout the projection years. Total fertility rates, which are the sum of the age-specific fertility rates, represent the implied completed fertility rate of women based on 1999 and 2000 age-specific fertility rates (Table 1).

The total number of projected births by state was calculated as the product of the age-specific fertility rates and the female population of childbearing ages. The projected births for each year starting in 2004 were adjusted based on the average ratio of estimated births to projected births for 2001 to 2003 (Table 1).

III. Mortality and projection of deaths

Data on 1999 and 2000 deaths by state of residence were obtained from NCHS and used to calculate age-sex- specific death rates based on the Census 2000 population. A logistic smoothing technique was used to smooth and extrapolate the death rates by age to age 110 and over, which were then used to construct life tables and to derive survival rates. The state mortality rates for 2000 were held constant throughout the projection years. Average life expectancy at birth by state is shown in Table 2.

For each year in each age-sex group, the total of the starting population plus net migration multiplied by the projected survival rate was used to derive the projected population at the end of each year. The projected deaths were the difference between the survived population and the population at the beginning of each year. The projected deaths for each year, starting in 2004, were adjusted based on the difference between projected deaths and estimated deaths for 2001-2003 (Table 2).

IV. Internal migration

Rates of state-to-region and region-to-state migration flows based on aggregate data from the IRS were used to project internal migration into the future.[1] The 1995-2000 census migration characteristics were used to project the composition of migrants, which, in turn, was controlled to the projected migration flows to derive total projected migration by age and sex.

[1]The migration flows between small states were too small to derive reliable state-to-state migration rates.

Aggregate IRS data were used to derive annual region-to-state (in-migration) and state-to-region (out-migration) migration flows for states from 1975-1976 to 1999-2000. The four regions used in these calculations are the Northeast, Midwest, South, and West.[2] The migration rates for a total of 408 migration flows in each of 25 years were calculated. Univariate, non-seasonal, time series autoregressive integrated moving average (ARIMA) models were used to project the migration rates from each state to each of the four regions and the rates from each region to each state. As these models are best suited to short-term forecasting, they were used for the years from 2000 to 2005. For the 2006-2025 period, migration rates were obtained by interpolating between the projected 2005 rate and the series mean calculated from the 1975 to 2000 migration series. From 2026 to 2030, the series was held constant at the mean. This approach provided a smooth trend line gradually moving toward the series mean. The means of the time series from 1975-1976 to 1999-2000 for the 408 migration flows are shown in Table 3.

The 1995-to-2000 census-based rates of migration by age and sex for the each of 408 region-to-state and state-to-region migration flows were used to project the composition of migrants by age and sex. The projected region-to-state migration flows by age and sex were summed to derive in-migration, and the state-to-region migrations were summed to derive out-migration by age and sex.

V. International migration

[2] Northeast region includes Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania. Midwest region includes Wisconsin, Michigan, Illinois, Indiana, Ohio, Minnesota, Nebraska, Iowa, Kansas, Missouri, North Dakota, and South Dakota. South region includes Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia, Alabama, Kentucky, Mississippi, Tennessee, Arkansas, Louisiana, Oklahoma, and Texas. West region includes Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming, Alaska, California, Hawaii, Oregon, and Washington.

The interim state population projections used the Census Bureau's estimates of net international migration rates for states between 2001 and 2003. The rates for the years between 2004 and 2010 resulted from the exponential interpolation of the 2003 rates and the mean of the 2000-2003 rates. For the years 2010 and beyond, the international migration rates were assumed to return to the mean of the 2000-2003 rates. The average annual estimate of international migration for the United States between 2000 and 2003 was about 1.3 million. The estimates of net international migration rates for states are shown in Table 4.

The proportions of the foreign-born population that entered each state in the five years prior to Census 2000 were used to project the composition of net international migration by age and sex. The projected composition of net international migration by age and sex for each state was applied to the projected net international migration to derive the projected net international migration by age and sex.

VI. Final population projections

As a last step in the projection process, the resulting state population projections by age and sex were adjusted proportionally to be consistent by single year of age and sex with the interim population projections for the United States released in March 2004.

VII. Future Population Projections

This set of state population projections represents only an interim update to incorporate the Census 2000 population results. In the future, we plan to develop a revised set of population projections to include projections by race and Hispanic origin as well as by age and sex.