Methodology and Results from the 2012 National Projections: 2012 to 2060

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ABSTRACT

This paper reports the methodology and results of the 2012 National Projections of the U.S. resident population. The projections were produced using a cohort-component method in which the components of population change were projected for each birth cohort. Changes in the racial and ethnic composition of the population will be evaluated along with variation in the dependency ratios and age structure. The timing of the majority-minority crossover, the year in which the non-Hispanic White alone population is projected to become the numerical minority, will also be examined.

INTRODUCTION

Substantial changes in the racial, ethnic and age composition of the U.S. population are expected to occur over the next 50 years. It is important for policy makers to have information that helps them anticipate and plan for these changes. To meet this need, the U.S. Census Bureau produces projections of the U.S. population in fine demographic detail. This paper reports on the methodology and results of the 2012 National Projections, including changes in population size and composition.

The 2012 National Projections are the first series based on the 2010 census. They project the U.S. resident population and components of population change by age, sex, race and Hispanic origin from July 1, 2012 to July 1, 2060. These projections are important because they serve as population controls for other government projection series, like the Bureau of Labor Statistics' labor force projections. They are also used for a variety of other purposes by government and non-government entities.

DATA AND METHODS

The 2012 National Projections were developed using a cohort component method. This method projects the resident population at a future time by adding births and net international migration to, and subtracting deaths from, the resident population at a previous time. The base population for this set of projections was the Census Bureau's estimate of the population for July 1, 2011, which is based on the 2010 census. Some components of population change were projected numerically while others were projected by applying rates to the projected population. Each component of the projections is discussed in the following section.[1]

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[1] A more detailed description of the 2012 National Projections methodology may be found at: http://www.census.gov/population/projections/methodology/.

Fertility

We produced one series of fertility projections for five race and Hispanic origin groups. Hispanics comprised one group while the non-Hispanics were separated into White, Black, American Indian and Alaska Natives (AIAN) and Asian or Pacific Islanders (API). Because not all states have updated their reporting of vital events to the 1997 OMB standards for collecting data on race and Hispanic origin, we use the categories consistent with the 1977 standards for processing the vital statistics data.

To project fertility, we began by averaging the age-specific fertility rates (ASFR) of non-Hispanic White females for the years 1989 through 2009.[2] We then assume the ASFRs of all five groups (including non-Hispanic White) will converge on the average of the ASFRs for the non-Hispanic White group in 2100. Figure 1 presents the total fertility rates (TFR) for each of the five race and Hispanic origin groups as well as the total, represented by the black line. The vertical black line bisecting the figure distinguishes the observed rates, to the left of the line, from the projected rates, to the right of the line.

The TFR of the total population is projected to decline from 2.0 in 2009 to 1.9 in 2060. The TFR for the non-Hispanic White population are projected to remain constant at 1.8 while the non-Hispanic API TFR is projected to rise from 1.7 in 2009 to almost 1.8 in 2060. In contrast, TFRs for the non-Hispanic Black, non-Hispanic AIAN and Hispanic populations are projected to decrease. The non-Hispanic Black TFR is projected to drop from about 2.0 in 2009 to 1.9 in 2060 while the non-Hispanic AIAN TFR is projected to drop from about 2.2 in 2009 to 2.0 in 2060. Hispanic TFRs are projected to have the steepest decline, dropping from about 2.5 in 2009 to 2.1 in 2060.

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[2] Age-specific fertility rates were produced by dividing the number of births to women in each age, race, and Hispanic origin group, obtained from the National Center for Heath Statistics, by the Census Bureau's Intercensal estimates of the female population within each age, race, and Hispanic origin group.

Mortality

One series of mortality projections were produced for the 2012 National Projections. Data quality issues led us to project mortality rates for just three groups: non-Hispanic White and API, non-Hispanic Black and AIAN and Hispanic (of any race). The first step in projecting mortality rates was to project life expectancy at birth for each of the three groups, by sex, to 2060. Hispanic life expectancy was assumed to converge with non-Hispanic White and API values in 2035. The projected life expectancy values were then converted to age-specific mortality rates using the Coale-Demeny West (United Nations, 2010) model life table, with some modifications. The model was extended to higher life expectancy because the projected life expectancies for some groups exceed the level in the model life table. The life table was also converted from an abridged to unabridged form and extended to age 100+.

Figure 2 displays estimates and projections of life expectancy at birth for the three race and Hispanic origin groups by sex. Life expectancy is projected to increase for all groups. Gains in life expectancy are largest for the non-Hispanic Black and AIAN group. For males in this group, life expectancy is projected to increase from 71.1 years in 2009 to 80.4 years in 2060. Females in this group are projected to increase from 77.5 years in 2009 to 84.7 years in 2060. Life expectancy for the non-Hispanic White and API and Hispanic groups is projected to increase to 83.2 for males and 87.2 for females in 2060. The difference in male and female life expectancy for all groups in 2060 is projected to be around 4 years.

Net International Migration (NIM)

The projections of net international migration (NIM) are based on three sub-components of migration: foreign-born immigration, foreign-born emigration, and the net international migration of the native-born population, including migration between Puerto Rico and the United

States. The native-born migration component was projected by holding the Census Bureau's most recent estimates of this component constant across the projection period.

Foreign-born immigration was calculated by applying projected rates of emigration from sending countries to the United States to projected populations of the sending countries. Countries were grouped into four regions: Europe, Central Asia, and the Middle East; Asia and the Pacific islands; non-Spanish Caribbean and sub-Saharan Africa; and the Spanish Caribbean and Latin America. These groupings were devised to represent relatively homogenous groups in terms of race and ethnicity reporting in our American Community Survey[3] data as opposed to creating groups strictly based on geographic proximity. A time series of emigration rates was calculated by dividing foreign-born immigration estimates, derived from 1990 and 2000 census and ACS data, by estimates of the sending region's population.[4] The rates of emigration were then projected by assuming the current rates move toward an ultimate rate that can be thought of simplistically as a weighted average of the observed rates. Projected immigrants to the United States were calculated for each year by multiplying the projected rate of emigration from the sending regions by the projected populations of the sending regions. Age, sex, race and Hispanic origin were assigned to immigrants based on distributions from the 2010 ACS. Once the foreign-born immigrants were distributed by age, sex, race, and Hispanic origin, the projected total number of immigrants for 2011 was controlled to the Census Bureau's estimates of the level of foreign-born immigration for 2011. Linear interpolation was used to re-project the foreign-born immigrants from the controlled 2011 value to the original level projected for 2030. Further

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[3] The ACS data are based on a sample and are subject to sampling variability. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see http://www.census.gov/acs.

[4] Estimates and projections of sending country populations were taken from the Census Bureau's International Data Base which is located at:
http://www.census.gov/population/international/data/idb/informationGateway.php.

information is provided in the 2012 National Projections methodology statement (U.S. Census Bureau, 2012).

The process of projecting foreign-born emigration from the United States occurs in two steps. First, rates of foreign-born emigration are calculated using a residual method by age, sex, Hispanic Origin, and arrival cohort. We start with an estimate of the foreign-born population in 2000, account for immigration and mortality over the decade, and assume that the difference (or residual) between this 'expected' population and the estimated 2010 population represents emigration of the foreign-born. These differences are then used to produce annual rates of emigration. Foreign-born emigration from the United States is then projected using a cohort component method. A foreign-born base population for 2010 was aged forward to 2060, accounting for immigration and mortality and applying the emigration rates annually to derive a numeric projection of emigration.

RESULTS

Natural Increase

Natural increase represents the impact of vital events on population growth and is calculated by subtracting the number of deaths from the number of births for each group. It plays an important role in determining the age structure and rate of growth for a population. Figure 3 shows the natural increase for 2012 through 2060 by Hispanic origin. Total natural increase is projected to drop from about 1.7 million in 2012 to 891 thousand in 2060. This decline is driven by the Non-Hispanic pattern which is projected to drop sharply from 749 thousand in 2012 to -410 thousand in 2050 before rebounding slightly to -324 thousand in 2060. Non-Hispanic natural increase is projected to become negative in 2033. This dramatic change is driven by low

projected birth rates combined with smaller cohorts of women in the child-bearing ages and the marked increase in the population over 65 which produces more deaths despite projected improvement in survivorship ratios. In contrast, natural increase for the Hispanic population is projected to increase from 939 thousand in 2012 to 1.2 million in 2060 due to the positive net migration of women in child-bearing ages and higher fertility rates.

Net International Migration

Net international migration is projected to increase for both Hispanics and non-Hispanics across the projection period. Figure 4 shows that total net international migration is projected to increase rapidly from 725 thousand in 2012 to about 1.1 million in 2030, then rise gradually to about 1.2 million in 2060. Non-Hispanic net international migration is projected to follow a similar pattern, rising from 435 thousand in 2012 to 721 thousand in 2060. Hispanic net international migration is projected to rise from 290 thousand in 2012 to 509 thousand in 2040 before dropping to 494 thousand in 2060.

Figure 5 shows the projected percent distribution of net international migration by race and Hispanic origin for 2012 and 2060. The percent that is Hispanic is projected to increase slightly from 40.0 percent in 2012 to 40.7 percent in 2060. The only groups that are projected to change substantially over the projection period are the non-Hispanic Black alone and Asian alone groups. The percent of net international migration that is non-Hispanic Black alone is projected to increase from 10.1 percent in 2012 to 18.6 percent in 2060 while the percent that is non-Hispanic Asian alone is projected to decrease from 33.2 percent in 2012 to 24.1 percent in 2060.

Population Growth

Population growth, representing the total annual change projected for the population, was calculated by adding natural increase and net international migration. Figure 6 shows that

population growth is projected to drop slightly from an annual increase of 2.4 million people in 2012 to a projected annual increase of 2.1 million people in 2060. This is due to the declines in natural increase projected for the non-Hispanic population. This reduction in the pace of change would be even sharper if not for the rising levels of net international migration. In fact, net international migration is projected to usurp the position of natural increase as the primary agent of population change in 2032.

Population Size

The U.S. population is projected to continue growing in the 2012 National Projections (see Figure 7). The total population is projected to grow steadily, increasing from about 314 million in 2012 to 420 million in 2060. The United States is projected to cross the 400 million mark in 2051. Annual percent change in the total population is projected to decrease from about 0.8 percent between 2012 and 2013 to about 0.5 percent from 2046 through the end of the projection period.

Population by Race and Hispanic Origin

The percent distribution of the U.S. population by race and Hispanic origin is projected to change substantially between 2012 and 2060. Figure 8 shows that the percentage of the population that is non-Hispanic is projected to decrease from 83.0 percent in 2012 to 69.4 percent in 2060. This decline is caused by the percentage that is non-Hispanic White alone dropping from 63.0 percent in 2012 to 42.6 percent in 2060. In contrast, all other non-Hispanic race groups are projected to hold a larger share of the population in 2060. The percentage that is Hispanic is projected to increase from 17.0 percent in 2012 to 30.6 percent in 2060. This is due to relatively high levels of net migration and higher fertility rates.

The question of when non-Hispanic Whites will no longer make up the majority of the U.S. population always arises when projections are discussed. Figure 9 shows the projected majority-minority crossover for the total population and for the under 18 population.[5] While the population of minority groups is projected to grow steadily across the period, the population of non-Hispanic Whites is projected to grow very slowly to 2026 then begin to decline. As a result, the majority-minority crossover is projected to occur in 2043. The crossover is expected to occur in 2018 for the under 18 population. This change could affect the way that Americans think about minority status.

Population by Age

Table 1 presents projections of the median age of the population by race and Hispanic origin for 2012 and 2060. The median age of the total population as well as the population within different race and Hispanic origin groups is projected to increase over the next 48 years, indicating a shift to a larger proportion being in the older ages. Overall, the median age of the total population is projected to rise from 37.4 years in 2012 to 41.1 years in 2060. The projected median age of the non-Hispanic population increases by 4 years, from 40.1 years in 2012 to 44.1 years in 2060. For Hispanics, the median age is projected to increase by about 7 years over the period, from about 28 years in 2012 to about 35 years in 2060. The Non-Hispanic White alone population has the highest projected median age in both 2012 and 2060 at 42.6 and 47.8 years, respectively. The Two or More Races population has the youngest median age which is projected to increase from 19.2 years in 2012 to 25.5 years in 2060.

Changes in the age composition of the population have consequences for dependency ratios. Figure 10 shows youth, old-age and total dependency ratios from 2012 to 2060. Largely as a consequence of the baby-boom generation moving into the 65 plus group in the early part of

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[5] Minority refers to people who reported their ethnicity or race as something other than non-Hispanic White.

the projection period, the total dependency ratio is projected to increase from about 60 in 2012 to about 75 in 2035 where it remains relatively stable over the remainder of the period. The youth dependency ratio is projected to remain relatively stable over the projection period at just under 40 while the old-age dependency ratio is projected to rise from about 22 in 2012 to almost 37 in 2035 where it holds until about 2054 where it begins to rise again, reaching 39 in 2060.
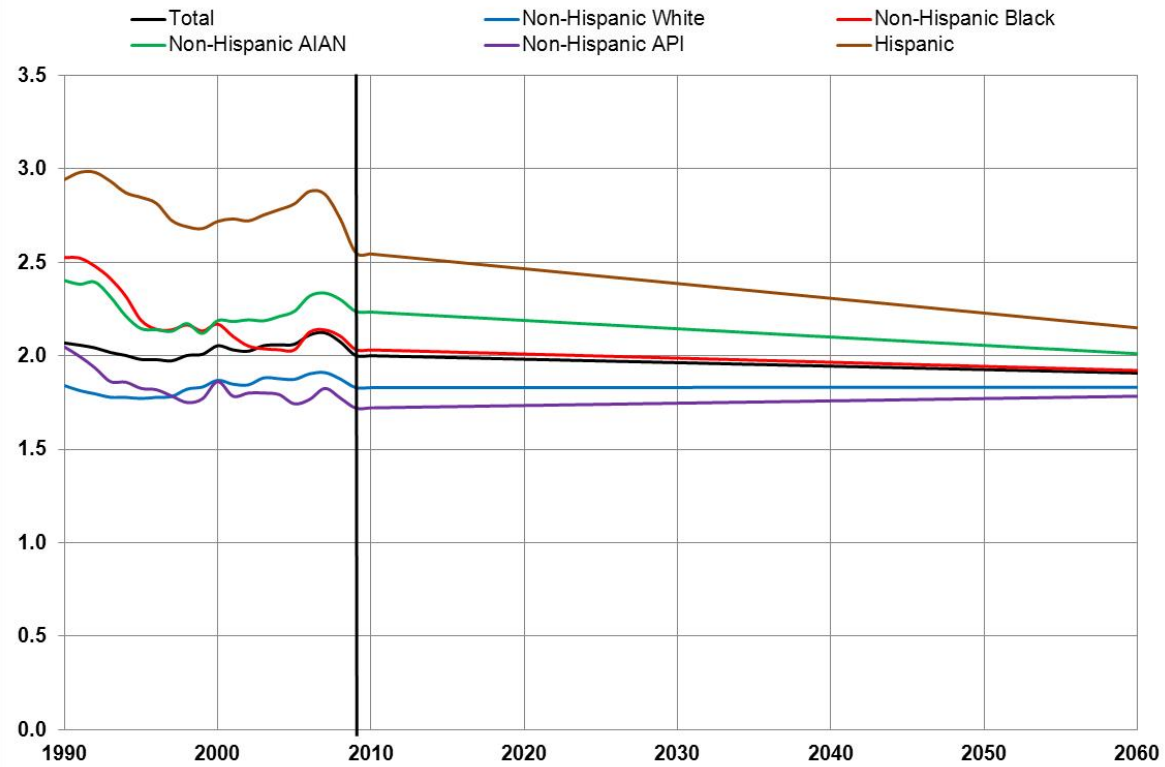
CONCLUSIONS

The 2012 National Projections provide a view of what the United States might look like in the coming decades. In this series of projections, the U.S. population is projected to continue growing, although the pace of growth is projected to slow in the coming decades. As time passes the primary source of population growth is projected to shift away from natural increase toward net international migration.

Projected changes for natural increase and net international migration suggest that the United States will grow more diverse in terms of race and ethnicity in the coming years. Substantial shifts are also projected for the age structure of the population. The U.S. population is projected to continue aging over the next several decades, resulting in a larger proportion of the population being in the older age groups. These factors are also projected to impact dependency ratios. Projected declines in birth rates keep youth dependency ratios at or below current levels while the old-age dependency ratios are projected to rise considerably between 2012 and 2060. Trends in old age dependency result in increases in the projected total dependency ratios of the U.S. population between 2012 and 2060.

REFERENCES

United Nations Population Division. 2010. *WPP2010: Extended Model Life Tables.*
    <http://esa.un.org/wpp/Model-Life-Tables/download-page.html>. Accessed 8/7/2012.

U.S. Census Bureau. (2012). *Methodology and Assumptions for the 2012 National Projections.*
    U.S. Census Bureau: Washington, DC.
    <http://www.census.gov/population/projections/files/methodology/methodstatement12.pdf>.

Figure 1. Total Fertility Rates by Race and Hispanic Origin: 1990 to 2060

Legend:
- Total
- Non-Hispanic White
- Non-Hispanic Black
- Non-Hispanic AIAN
- Non-Hispanic API
- Hispanic

AIAN=American Indian and Alaska Native, API=Asian and Native Hawaiian and Pacific Islander
Source: U.S. Census Bureau, Population Division, 2012

Figure 2. Life Expectancy at Birth by Sex, Race, and Hispanic Origin: 1990 to 2060
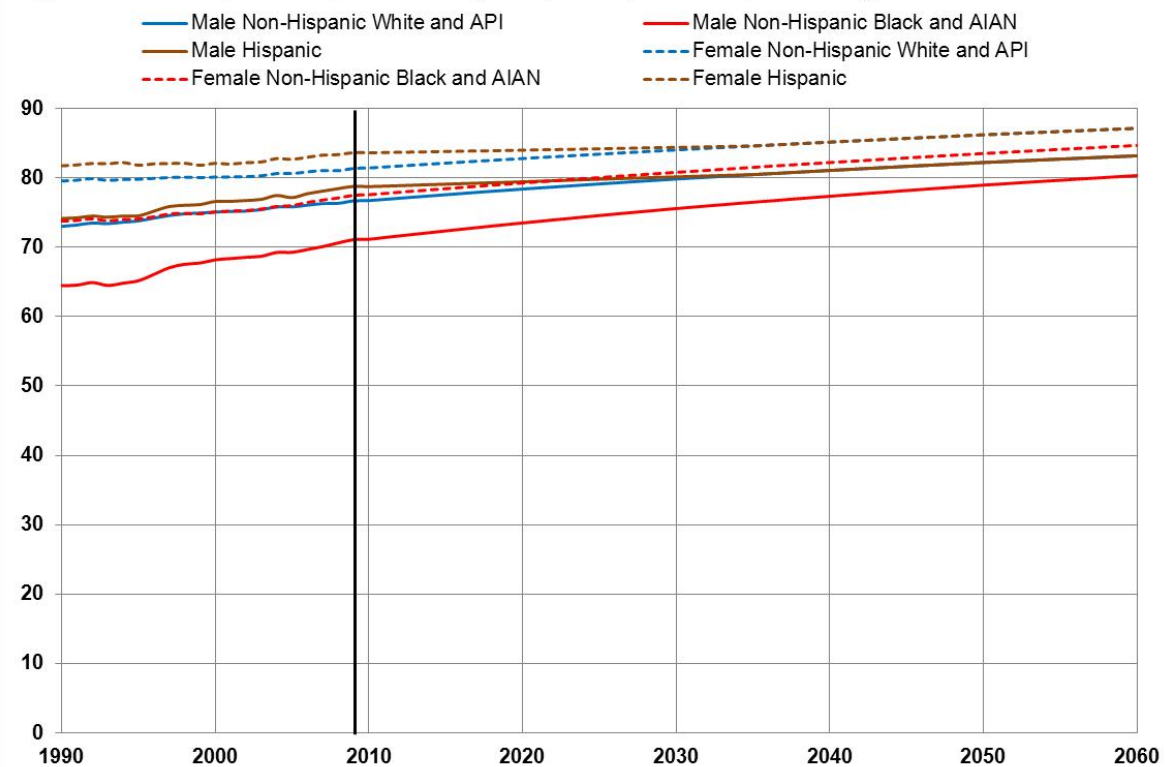
Legend:
- Male Non-Hispanic White and API
- Male Non-Hispanic Black and AIAN
- Male Hispanic
- Female Non-Hispanic White and API
- Female Non-Hispanic Black and AIAN
- Female Hispanic

AIAN=American Indian and Alaska Native, API=Asian and Native Hawaiian and Pacific Islander
Source: U.S. Census Bureau, Population Division, 2012

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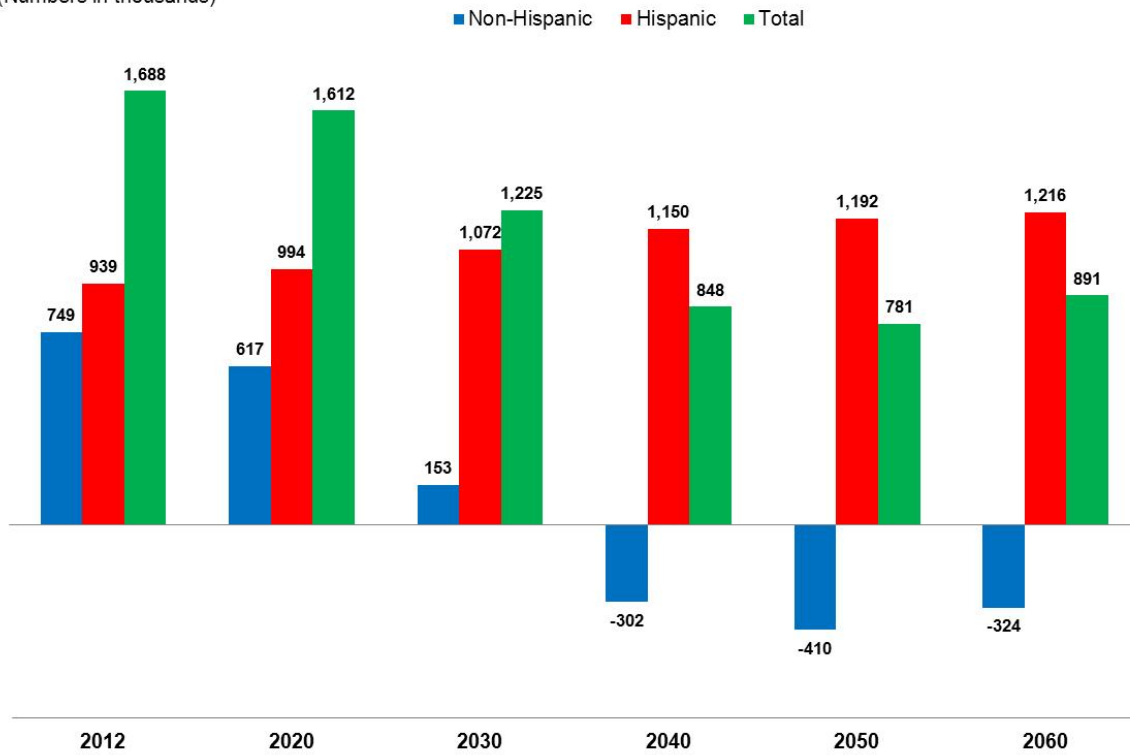## Figure 3. Natural Increase by Hispanic Origin: 2012 to 2060
(Numbers in thousands)

■ Non-Hispanic ■ Hispanic ■ Total

	2012	2020	2030	2040	2050	2060
Non-Hispanic	749	617	153	-302	-410	-324
Hispanic	939	994	1,072	1,150	1,192	1,216
Total	1,688	1,612	1,225	848	781	891

Estimates may not sum to totals shown because of rounding.
Source: U.S. Census Bureau, Population Division, 2012

Figure 4. Net International Migration by Hispanic Origin: 2012 to 2060
(Numbers in thousands)

■ Non-Hispanic ■ Hispanic ■ Total

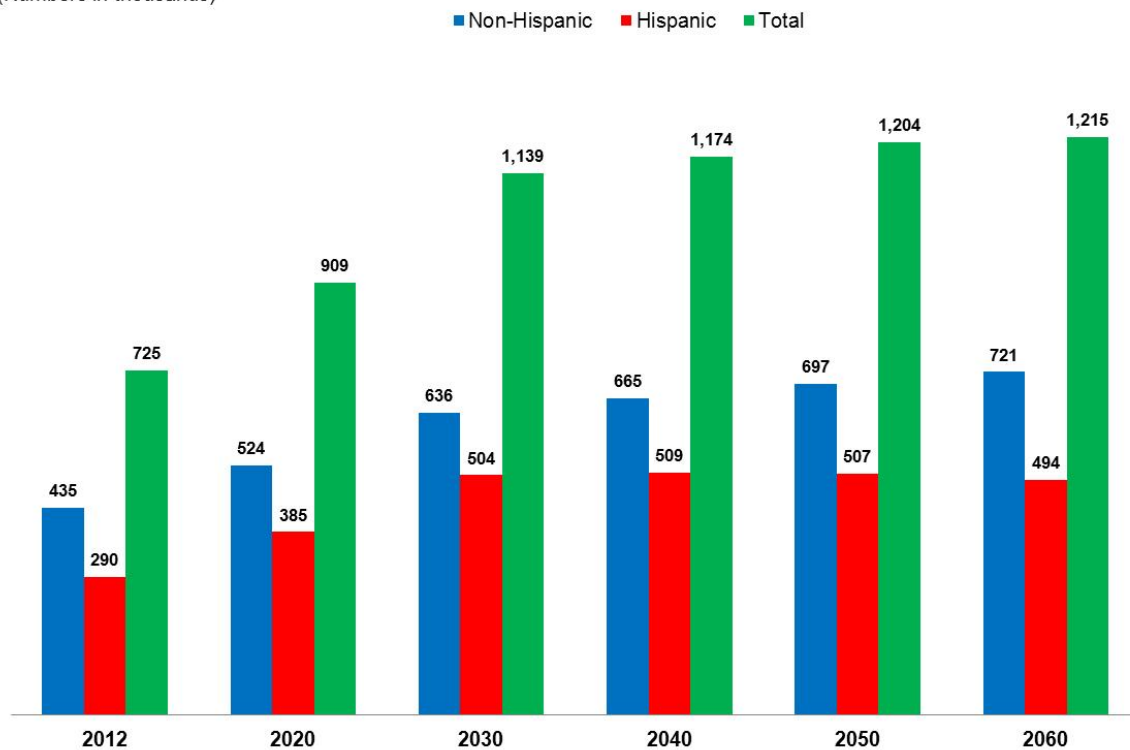|	2012	2020	2030	2040	2050	2060
Non-Hispanic	435	524	636	665	697	721
Hispanic	290	385	504	509	507	494
Total	725	909	1,139	1,174	1,204	1,215

Estimates may not sum to totals shown because of rounding.
Source: U.S. Census Bureau, Population Division, 2012

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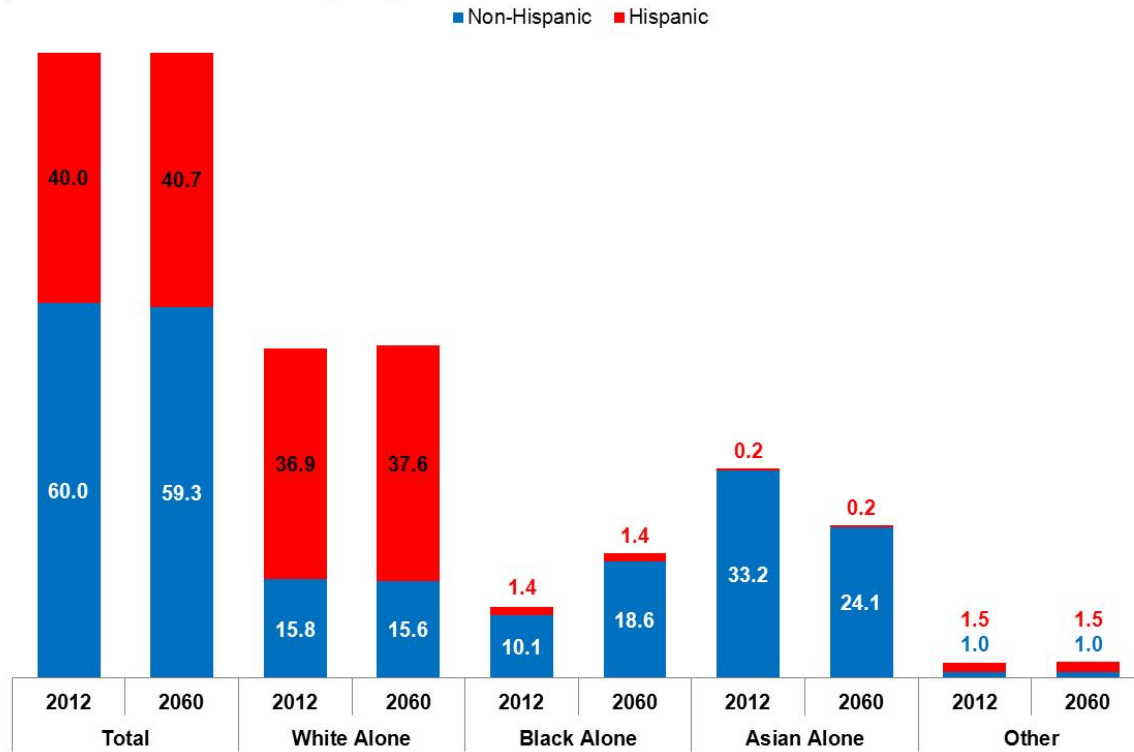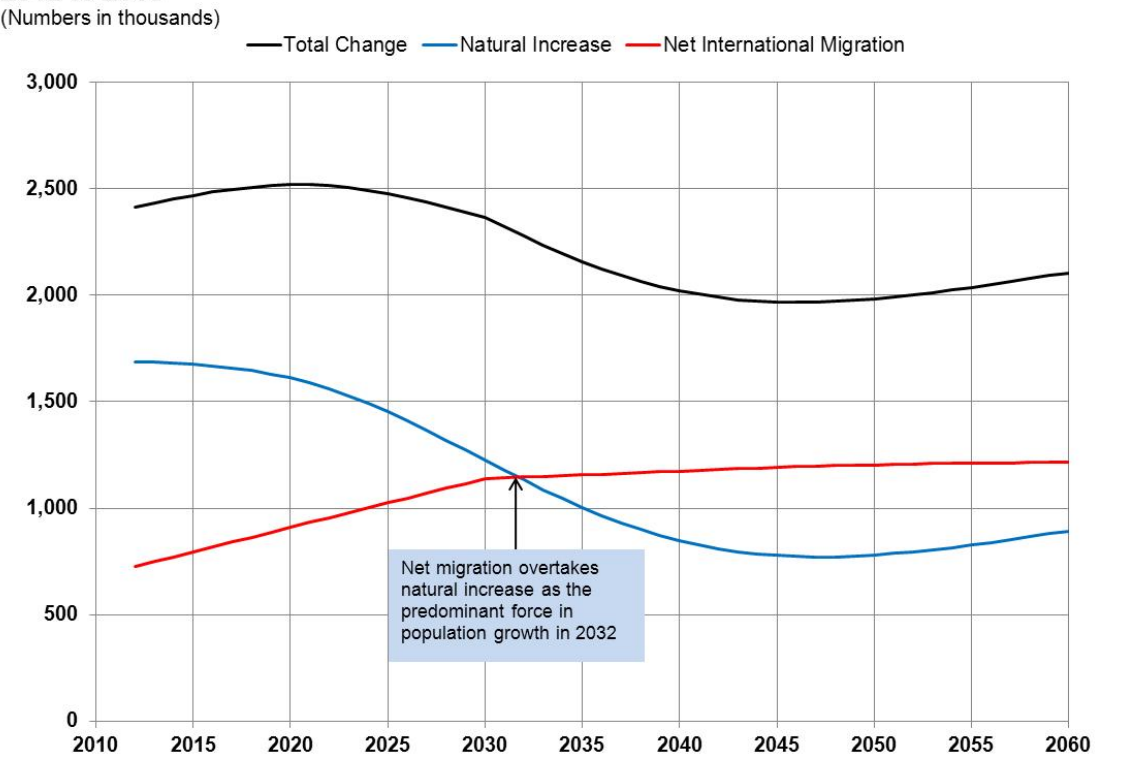## Figure 5. Net International Migration by Race and Hispanic Origin: 2012 and 2060
(Percent of total net international migration)

Legend: ■ Non-Hispanic ■ Hispanic

Group	Year	Non-Hispanic	Hispanic
Total	2012	60.0	40.0
Total	2060	59.3	40.7
White Alone	2012	15.8	36.9
White Alone	2060	15.6	37.6
Black Alone	2012	10.1	1.4
Black Alone	2060	18.6	1.4
Asian Alone	2012	33.2	0.2
Asian Alone	2060	24.1	0.2
Other	2012	1.0	1.5
Other	2060	1.0	1.5

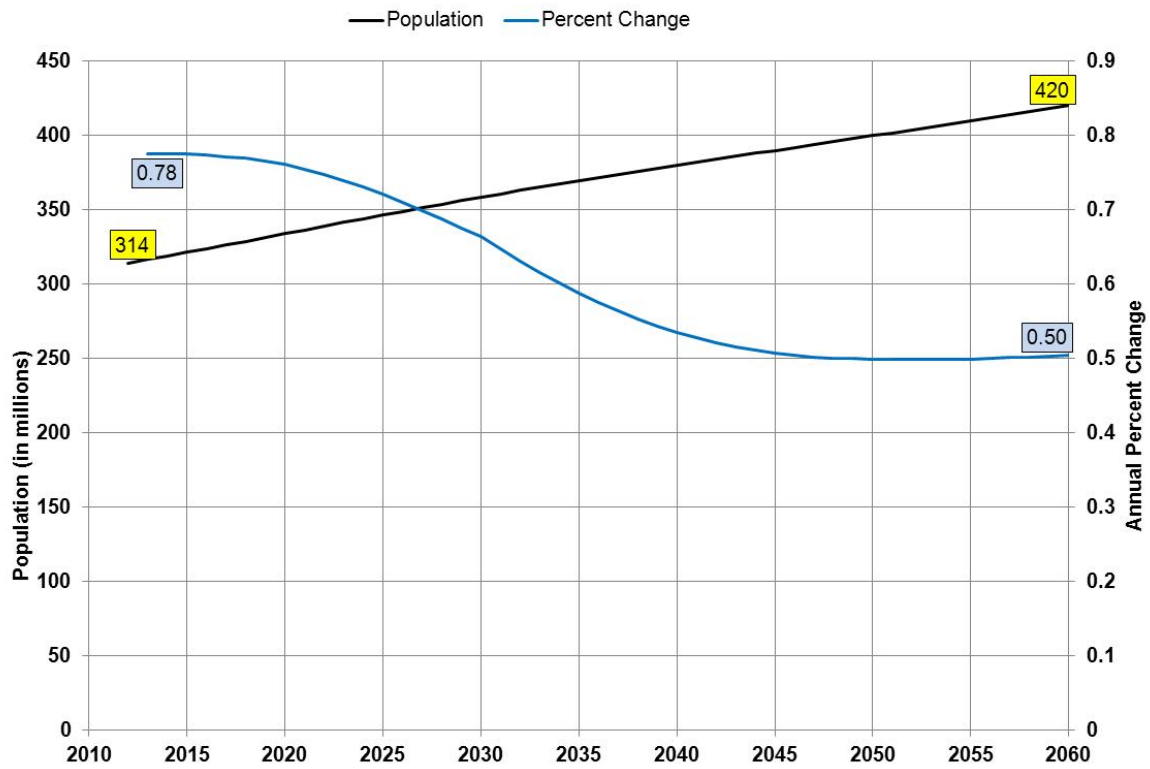Source: U.S. Census Bureau, Population Division, 2012

Figure 6. Net International Migration, Natural Increase and Total Annual Change: 2012 to 2060
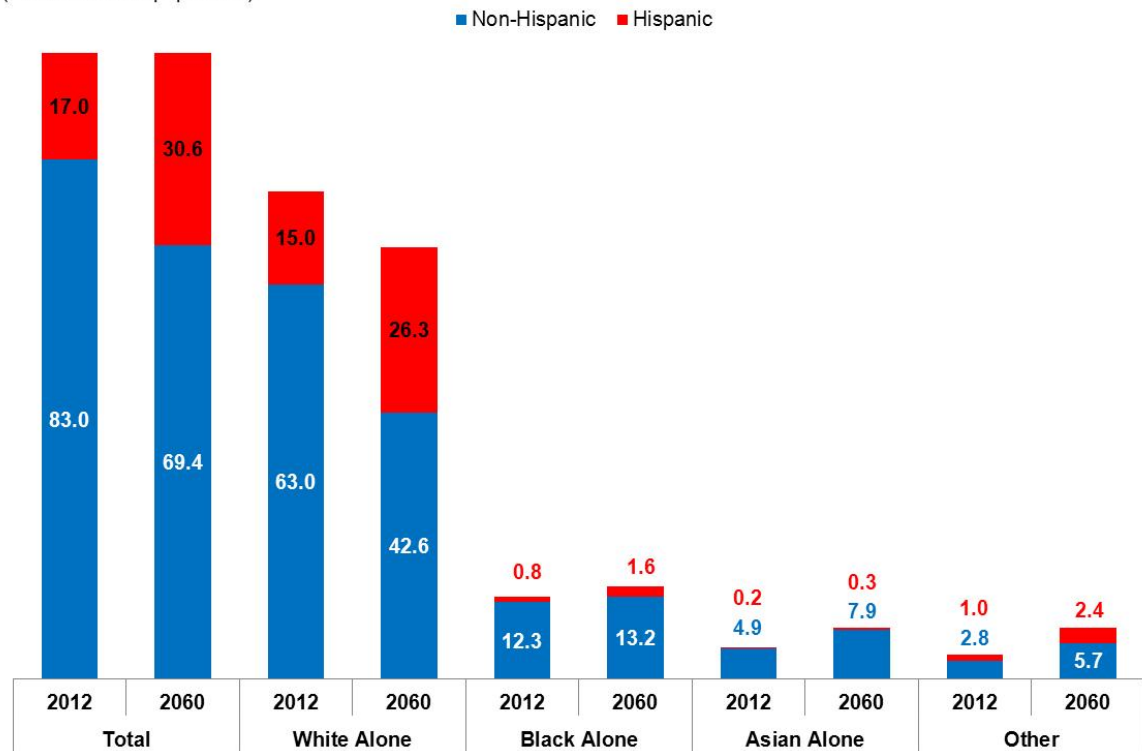(Numbers in thousands)

Legend: —— Total Change —— Natural Increase —— Net International Migration

Net migration overtakes natural increase as the predominant force in population growth in 2032

Source: U.S. Census Bureau, Population Division, 2012

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Figure 7. Total Population and Annual Percent Change: 2012 to 2060

Legend: — Population   — Percent Change

Left axis: Population (in millions) — 0, 50, 100, 150, 200, 250, 300, 350, 400, 450
Right axis: Annual Percent Change — 0, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9
X axis: 2010, 2015, 2020, 2025, 2030, 2035, 2040, 2045, 2050, 2055, 2060

Population: 314 (start) to 420 (end)
Percent Change: 0.78 (start) to 0.50 (end)

Figure 8. Population by Race and Hispanic Origin: 2012 and 2060
(Percent of total population)

Legend: ■ Non-Hispanic ■ Hispanic

Total
- 2012: Non-Hispanic 83.0, Hispanic 17.0
- 2060: Non-Hispanic 69.4, Hispanic 30.6

White Alone
- 2012: Non-Hispanic 63.0, Hispanic 15.0
- 2060: Non-Hispanic 42.6, Hispanic 26.3

Black Alone
- 2012: Non-Hispanic 12.3, Hispanic 0.8
- 2060: Non-Hispanic 13.2, Hispanic 1.6

Asian Alone
- 2012: Non-Hispanic 4.9, Hispanic 0.2
- 2060: Non-Hispanic 7.9, Hispanic 0.3

Other
- 2012: Non-Hispanic 2.8, Hispanic 1.0
- 2060: Non-Hispanic 5.7, Hispanic 2.4

Figure 9. Projected Population by Minority Status: 2012 to 2060
(Numbers in millions)

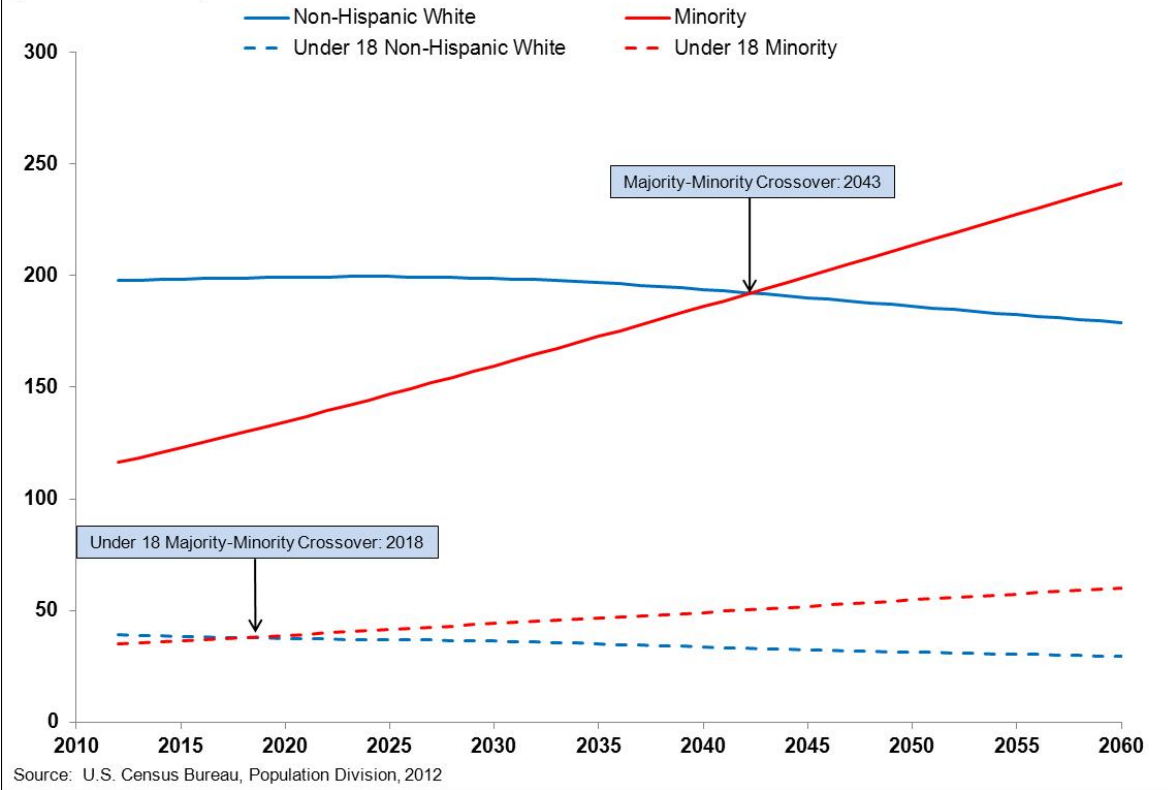Source: U.S. Census Bureau, Population Division, 2012

Table 1. Median Age by Race and Hispanic Origin: 2012 and 2060

Year	Hispanic Origin	Total	White Alone	Black Alone	AIAN Alone	Asian Alone	NHPI Alone	Two or More Races
2012	**Total**	37.4	39.3	32.5	29.7	35.8	29.2	19.2
	Non-Hispanic	40.1	42.6	33.1	32.2	36.1	30.6	19.1
	Hispanic	27.8	28.3	25.1	26.8	25.5	25.7	19.7
2060	**Total**	41.1	42.9	39.9	38.3	42.4	39.0	25.5
	Non-Hispanic	44.1	47.8	40.8	40.7	42.8	40.4	26.1
	Hispanic	34.8	35.6	32.2	36.2	31.2	35.6	23.7
Difference	**Total**	3.7	3.5	7.4	8.6	6.6	9.7	6.3
	Non-Hispanic	4.0	5.2	7.7	8.5	6.7	9.8	7.0
	Hispanic	7.0	7.3	7.2	9.5	5.6	9.8	4.0

Figure 10. Projected Dependency Ratios: 2012 to 2060

Source: U.S. Census Bureau, Population Division, 2012