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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
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Data Evaluation and Methods Research

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Center for Health Statistics

Hyattsville, Maryland
October 2010
DHHS Publication No. (PHS) 2011–1352

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Abstract

Objectives

This report presents complete period life tables by Hispanic origin, race for the non-Hispanic white and non-Hispanic black populations, and sex for the United States based on age-specific death rates in 2006.

Methods

The methods used to estimate the probability of death for ages 0–80 for the Hispanic population and 0–65 for the non-Hispanic white and non-Hispanic black populations are the same as those used in annual U.S. life tables since 1997, with an important modification. Age-specific death rates are first corrected for racial and ethnic misclassification on U.S. death certificates. To address the effects of age misstatement at the oldest ages, the methodology used to estimate mortality for ages 66 and over for the non-Hispanic white and non-Hispanic black populations is the same as that used to estimate the annual life tables since 2005. For the Hispanic population, the probability of death for ages over 80 is estimated as a function of non-Hispanic white mortality with the use of the Brass relational logit model.

Results

Life expectancy at birth for the total population in 2006 was 77.7 years; 80.6 years for the Hispanic population, 78.1 years for the non-Hispanic white population, and 72.9 years for the non-Hispanic black population. The Hispanic population has a life expectancy advantage at birth of 2.5 years over the non-Hispanic white population and 7.7 years over the non-Hispanic black population. Although seemingly paradoxical, these results are consistent with the findings of numerous studies which show a Hispanic mortality advantage despite this population's lower socioeconomic status. Nonetheless, the procedures used in this report to correct for racial and ethnic misclassification and age misstatement are not error free and therefore some of the observed advantage may still be a function of data artifact. This report does not address other factors that may explain the Hispanic mortality advantage.

Keywords: survival • death rates • Hispanic origin • race

United States Life Tables by Hispanic Origin

by Elizabeth Arias, Ph.D., Division of Vital Statistics

Introduction

In 2006, the Hispanic population represented 15 percent of the total U.S. population and is the largest ethnic minority population in the United States, having surpassed in number the non-Hispanic black population. As a result, considerable interest and demand for the production of reliable vital statistics for this population, including mortality measures such as life expectancy exist. Unfortunately, data quality problems prevented the production of reliable U.S. life tables for this population until now. Specifically, two data quality issues needed to be addressed. The first is race and Hispanic origin misclassification on U.S. death certificates, which leads to the underestimation of death rates for minority populations including the Hispanic population (1–3). The second involves the misstatement of age at the oldest ages in both vital statistics and census data. Research shows that age misstatement leads to underestimates of mortality at the oldest ages (4,5). The latest research on the quality of race and Hispanic origin classification on U.S. death certificates shows that classification has improved for the Hispanic population and relatively minor adjustments are required to correct for the effects of misclassification (2,3). Moreover, recent research on Hispanic mortality patterns has produced information that can be used to address the problem of age misstatement at the oldest ages for this population.

This report presents complete period life tables for the total Hispanic population in 2006, based on a new methodology that addresses the data issues that previously prevented the estimation of reliable life tables for this population. For comparison, complete period life tables are also estimated for the non-Hispanic white and non-Hispanic black populations. The methods used to estimate the probability of death for ages 0–80 for the Hispanic population and 0–65 for the non-Hispanic white and non-Hispanic black populations are the same as those used in annual U.S. life tables since 1997, with an important modification. Age-specific death rates are first corrected for racial and ethnic misclassification on U.S. death certificates. The correction factors used are classification ratios that reflect the net difference in assignment of a specific race and Hispanic origin category between vital registration and census population classification systems (2,3). These classification ratios were

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generated from a comparison of self-reported race and ethnicity on the Current Population Survey (CPS) to proxy reported race and ethnicity on the death certificates of linked CPS-death certificate records for a sample of CPS respondents (2,3). While these ratios represent the most current and robust measures of racial and ethnic misclassification on U.S. death certificates to date, they are not error free. Further, they do not correct for the possibility that some Hispanic deaths may be missed in the U.S. vital statistics system as a result of the return migration of foreign born Hispanic persons. It is important to note however that there is no conclusive evidence in support of a data artifact effect resulting from return migration.

To address the effects of age misstatement at the oldest ages, the methodology used to estimate mortality for ages 66 and over for the non-Hispanic white and non-Hispanic black populations is the same as that used to estimate the annual life tables since 2005 for the total population and the populations classified by race as white or black. For the Hispanic population, the probability of death for ages over 80 is estimated as a function of non-Hispanic white mortality with the use of the Brass relational logit model. As will be discussed thoroughly, it was not possible to use the same methodology to estimate mortality at the oldest ages for the Hispanic population as was used for the non-Hispanic white and non-Hispanic black populations because of the lack of reliable Medicare data for the former.

Background

The Hispanic Population in the United States

According to the American Community Survey, persons self-identified as Hispanic numbered approximately 45.4 million and represented 15.1 percent of the total U.S. population in 2007 (Table A). The Office of Management and Budget's (OMB) standards on the collection of racial and ethnic information defines ''Hispanic'' as ''a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race'' (6). As a result, it is a diverse population, although the overwhelming majority (64.5 percent) is of Mexican origin. The other groups in order of size are: Puerto Rican (9.1 percent), Central American (7.9 percent), ''other'' Hispanic (5.7 percent), South American (5.6 percent), Cuban (3.5 percent), Dominican (2.8 percent), and Spaniard (1.0 percent). The ''other'' group includes persons who did not provide a country of origin. A review of the ancestry of this group shows that most people in this category are third generation or higher persons of Mexican origin in the southwest who no longer identify with a specific Hispanic origin country. Within the Central American category, the majority population is of Salvadoran origin, which alone makes up 3.2 percent of the total Hispanic population, followed by the population of Guatemalan ancestry (2 percent). The South American population is more evenly distributed by country, with Colombians, Ecuadorians, and Peruvians having the largest numbers.

Table A. Selected demographic and socioeconomic characteristics by Hispanic origin subgroup and race for the non-Hispanic white and non-Hispanic black populations

	Hispanic									Non-Hispanic	
Demographic characteristics	Total	Mexican	Puerto Rican	Cuban	Dominican	Spaniard	Central American	South American	Other Hispanic	White	Black
Population estimate[1]	45,432,158	29,318,971	4,127,728	1,572,138	1,249,471	454,299	3,592,810	2,544,070	2,572,671	198,420,355	36,397,922
Percent of total population	15.1	9.7	1.4	0.5	0.4	0.2	1.2	0.8	0.9	65.9	12.1
Percent of Hispanic population	100.0	64.5	9.1	3.5	2.8	1.0	7.9	5.6	5.7	. . .	. . .
Median age[1]	27.4	25.7	29.0	41.4	29.4	36.1	29.5	34.1	27.3	40.8	31.9
Percent aged 65 and over[1]	5.5	4.3	6.9	19.0	6.2	12.3	3.8	7.1	7.9	15.5	8.6
Total fertility rate[2]	3.0	3.1	2.2	1.6	– – –	– – –	[3]3.0	[3]3.0	– – –	1.9	2.1
Infant mortality rate[4]	5.4	5.3	8.0	5.1	– – –	– – –	[3]4.5	[3]4.5	– – –	5.6	13.4
Percent U.S. born[1]	60.9	61.2	([5])	39.3	41.0	84.3	33.4	31.1	83.2	96.1	92.3
Percent foreign born[1]	39.1	38.8	([5])	60.7	59.0	15.7	66.6	68.9	16.8	3.9	7.7
Socioeconomic characteristics											
Percent with bachelor's degree or higher[1]	12.6	8.7	15.3	25.3	14.9	28.7	11.3	30.6	16.4	30.4	17.2
Median family income in U.S. dollars[1]	43,240	41,350	43,578	52,978	36,245	64,749	43,101	54,435	49,011	70,399	41,567
Poverty rate[1]	18.9	20.5	21.3	10.7	25.0	9.4	16.3	10.0	15.2	6.1	21.2

. . . Not applicable.

– – – Data not available.

[1]Figure is the average of 3-year estimates from the American Community Survey data collected January 2006–December 2008.

[2]Martin JA, Hamilton BE, Sutton PD, et al. Births: Final data for 2006. National vital statistics reports; vol 57 no 7. Hyattsville, MD: National Center for Health Statistics. 2009.

[3]Estimates are for Central and South American combined. Data is not available to estimate these indicators separately for the two groups.

[4]Mathews TJ, MacDorman MF. Infant mortality statistics from the 2006 period linked birth/infant death data set. National vital statistics reports; vol 58 no 17. Hyattsville, MD: National Center for Health Statistics. 2010.

[5]The Puerto Rican population is considered U.S.-born, whether born on the U.S. mainland or the island of Puerto Rico.

The national origin diversity of the Hispanic population is compounded by diversity in other characteristics (see Table A for selected indicators). Some groups are predominantly U.S.-born and others foreign-born. For instance, while 61 percent of the Mexican origin population is U.S.-born, 69 percent of the South American population is foreign-born. Likewise, while most subgroups have a very young age structure, some have relatively old age structures. This is especially the case for the Cuban origin population, which has a median age of 41 years with 19 percent of the population aged 65 and over, making it older than the non-Hispanic white population. Age structure coupled with current fertility rates highlight that some groups will continue to grow rapidly, irrespective of immigration rates, while others, like the Cuban population, will decline unless there is new and substantial immigration from Cuba. Finally, there is diversity in socioeconomic status as well. While most subgroups face relatively poor socioeconomic conditions, as measured by median family income, educational attainment, and family poverty rates, a few groups fair relatively well in comparison to the majority population as indicated in Table A.

An interesting similarity among the Hispanic subgroups for which data are available is the very low infant mortality rates, despite socioeconomic characteristics that would suggest a demographic profile similar to that of the non-Hispanic black population. With the exception of the Puerto Rican population, all Hispanic subgroups have lower infant mortality rates than the non-Hispanic white population, despite its considerably higher socioeconomic status. This finding preludes the results in this report.

Race and Hispanic Origin Reporting on U.S. Death Certificates

There are two important reasons why U.S. life tables by Hispanic origin have not been available until now. First, until recently, coverage of the U.S. Hispanic population in the U.S. mortality statistics system was incomplete. A Hispanic origin item was added to the U.S. Standard Death Certificate for the first time in 1989, but it was not adopted by every state until 1997 (2,3). By 1997 all states included a Hispanic origin item on the death certificate and reporting rates were over 99 percent (2,3). Second, early evaluation studies of the quality of race and Hispanic origin reporting on U.S. death certificates revealed a significant degree of misclassification of such, leading to the underestimation of death rates for the Hispanic population (1,7). Death rates, which are the foundation of the period life table, are based on two distinct data sources. The numerator of a death rate is derived from death counts (usually from vital statistics), while the denominator of a death rate is derived from population estimates (usually from a census or survey). Because death certificates and population censuses employ distinct race and Hispanic origin reporting procedures, there is the potential for inconsistencies among the numerators and denominators of race and Hispanic origin specific death rates (2,3).

The latest research to evaluate race and Hispanic origin reporting on U.S. death certificates found that the misclassification of race and Hispanic origin on death certificates in the United States accounts for a net underestimate of 5 percent for total Hispanic deaths, 1 percent for total non-Hispanic black deaths, and a net overestimate of less than one-half of a percent for non-Hispanic white deaths (2,3). These results are based on a comparison of self-reported race and Hispanic origin on the CPS to race and Hispanic origin reported on the death certificates of a sample of decedents in the National Longitudinal Mortality Study (NLMS) who died in the period 1990–1998 (2,3). NLMS consists of an annual series of CPS and decennial census files dating from years 1973 and 1978–1998, linked to National Vital Statistics System (NVSS) mortality data for the years 1979–1998. Each linked record contains race and Hispanic origin information from both the CPS and death certificates (2,3).

NLMS linked records are used to estimate sex-age-specific ratios of CPS race and Hispanic origin counts to death certificate counts (2,3). The CPS to death certificate ratio, or ‘‘classification ratio,’’ is specifically the ratio of the weighted count of self-reported race and ethnicity on the CPS to the weighted count of the same racial and ethnic category on the death certificates of the sample of NLMS decedents described above. It can be interpreted as the net difference in assignment of a specific race and Hispanic origin category between the two classification systems and used as a correction factor for race and Hispanic origin misclassification on death certificates (2,3). The assumption is made that the race and ethnicity reported by a CPS respondent is more reliable than proxy reporting of race and ethnicity conducted by a funeral director who has little personal knowledge of the decedent. Further, public policy embodied in the 1997 OMB standards mandates that self-identification should be the standard used for the collection and recording of racial and ethnic information (6).

Age Misstatement at the Oldest Ages and Use of Medicare Data

Numerous studies have shown that at the oldest ages—approximately ages 80 and over depending on the population—death rates based on vital registration and census data are unreliable due to age misstatement (4,5). Age misstatement has been found in both census and vital registration data and can consist of age exaggeration (usually at the oldest ages), age understating (more common at younger ages), or a combination of both (4). Age exaggeration at the oldest ages has been found to be more pronounced in the black population resulting mainly from underregistration of black births for older cohorts (5). Research also indicates that age misstatement at the oldest ages is significant for some Latin American populations for the same reasons (8). Irrespective of the type of age misstatement, the general effect has been found to be the underestimation of

mortality at the oldest ages (4).

Medicare data have been traditionally employed in the estimation of U.S. decennial life tables and in the estimation of U.S. annual life tables since 1997, although their use has been restricted to the total population and populations classified by race as white or black (5). Medicare data are considered to be more accurate than vital statistics and census data at the oldest ages because Medicare enrollees must have proof of age in order to enroll (9). However, the reliability of Medicare data beyond age 100 declines because of the small percentage of persons who enrolled at the start of the Medicare program and for whom it was not possible to verify exact age (5). More problematic, however, is that Medicare data are completely unreliable for the Hispanic population, as well as for populations other than white or black (9–11).

Medicare data derive its racial and ethnic information from the Social Security Administration (SSA). Racial and ethnic information is collected by SSA when individuals apply for a social security card. In 1936–1980 applicants were given three race choices on the SS–5 form consisting of the terms ''white,'' ''negro,'' or ''other,'' and no ethnicity choice (11). Based on the 1977 OMB racial and ethnic reporting standards, SSA revised the SS–5 application form in 1980 by expanding the race categories and adding ethnicity in the form of Hispanic origin (12). The new racial and ethnic categories include white (non-Hispanic), black (non-Hispanic), Asian or Pacific Islander (API), American Indian or Alaska Native (AIAN), and Hispanic (11). As a result, racial and ethnic information about current Medicare enrollees consists of a combination of pre-1980 and post-1980 racial and ethnic classification systems with enrollees falling into any of the following categories: white (including Hispanic and non-Hispanic), black (including Hispanic and non-Hispanic), AIAN, API, Hispanic, other, and unknown (11).

This classification system makes it difficult to correctly identify Hispanic enrollees in the Medicare data. A linkage between NLMS and 5 years of Medicare data (1991–1995) was used to explore the consistency of racial and ethnic self-identification between the two systems. The evaluation revealed significantly different results for the Hispanic population and the non-Hispanic white and non-Hispanic black populations. For instance, only 8 percent of CPS self-identified Hispanic respondents are classified as Hispanic in the Medicare database. The majority, 79 percent, are classified as white.

On the other hand, the evaluation of the NLMS-Medicare linked data revealed very high agreement between the two datasets for the non-Hispanic white and non-Hispanic black populations. For example, 98 percent of CPS self-identified non-Hispanic white respondents were classified as white in the Medicare database and 95 percent of CPS self-identified non-Hispanic black respondents were classified as black in the Medicare database. The evaluation also found that it is possible to use Medicare data to estimate old-age mortality for both the white and black racial groups, irrespective of Hispanic origin as has been done traditionally, and to estimate old-age mortality for the non-Hispanic segments of these populations. For example, 96 percent of respondents classified as white in the Medicare database had self-identified as non-Hispanic white in the CPS and 97 percent of respondents classified as black in the Medicare database had self-identified as non-Hispanic black in the CPS. In other words, close to 100 percent of both the white and black records in the Medicare database are made up of individuals who self-identified as non-Hispanic white or non-Hispanic black in the CPS.

Methods

Data Used for Calculating Life Table Functions

The data used to prepare the U.S. life tables by Hispanic origin include vital statistics final death counts, census population estimates, and death and population counts for Medicare beneficiaries aged 66–100 from the Centers for Medicare & Medicaid (CMS).

Vital statistics data—Death counts used for computing the life tables presented in this report are final numbers of deaths for 2006 collected from death certificates filed in state vital statistics offices and reported to the National Center for Health Statistics (NCHS) as part of the NVSS. Race and Hispanic origin are reported separately on the death certificate.

The U.S. Standard Death Certificate was revised in 2003 and the race and Hispanic origin items reflect the mandate of the OMB 1997 ''Revision of the Race and Ethnic Standards for Federal Statistics and Administrative Reporting'' (6). This revision allowed individuals to report more than one race and increased the race choices from four to five by separating the Asian and Pacific Islander groups (6,12,13). The 1997 standards replaced the OMB 1977 standards, which only allowed the reporting of a single race with four choices, including white, black, AIAN, and API (14). In 2006, 25 states were compliant with the 1997 revised standards but 25 others continued to collect racial and ethnic data according to the 1977 standards. In order to attain uniformity and comparability during the transition period until all states implement the 1997 standards, multiple-race responses are ''bridged'' back to the 1977 single-race standards. The bridging procedure is the same as that used to bridge multiple-race population estimates (13,15).

Population data—Data used for computing the life tables in this report represent the population residing in the United States, enumerated as of April 1, 2000 and estimated as of July 1, 2006. These estimates were produced under a collaborative arrangement with the U.S. Census Bureau and are based on the 2000 census counts by age, race, Hispanic origin, and sex, modified to be consistent with the OMB 1977 standards (14). The modification is the same as that used to bridge multiple-race responses on death certificates (13).

Medicare data—Data from the Medicare program are used to supplement vital statistics and census

data for ages 66–100 for the non-Hispanic white and non-Hispanic black populations. As noted above, Medicare data are considered more reliable for the estimation of mortality at the oldest ages because of the proof of age requirement. Medicare coverage of the American population aged 65 and over is extensive and is especially reliable for the white and black populations, as discussed above (10).

Nonetheless, Medicare data suffer from the effects of ''phantom records,'' which lead to the overestimation of the number of people over age 90 or so. For example, the number of people aged 90 and over is greater in Medicare data than in census data (9,10). Phantom records arise as a result of some Medicare enrollees being registered more than once or because a Medicare enrollee's death is not reported (9). To address this problem, the Medicare data used were restricted to the records of Medicare enrollees who are also eligible for Social Security or Railroad Retirement income benefits. This eliminates approximately 3 percent of records from the full Medicare file (9).

To estimate the probability of death for the Medicare population for the non-Hispanic white and non-Hispanic black populations in 2006, age-specific number of deaths and population counts by sex and race for the population aged 66–100 from the 2006 Medicare file were used. The data file is created by CMS for SSA, which, under a special agreement, shares the files with NCHS.

Preliminary Adjustment of the Data

Adjustments for unknown age—An adjustment is made to account for the small proportion of deaths each year for which age is not reported on the death certificate. The number of deaths in each age category is adjusted proportionally to account for those with not-stated ages. The following factor is used to make the adjustment. This factor (F) is calculated for the total and each sex group within a racial and ethnic population for which life tables are constructed:

$$F = \frac{D}{D^a}, \qquad [1]$$

where D is the total number of deaths and D^a is the total number of deaths for which age is stated. F is then applied by multiplying it times the number of deaths in each age group. Table B shows values for F by sex used to adjust mortality data for the Hispanic, non-Hispanic white, and non-Hispanic black populations in 2006.

Adjustment for misclassification of race and Hispanic origin on death certificates—The NLMS-based classification ratios discussed above are used to adjust age-specific number of deaths for ages 1–95 and over. Age-specific adjusted counts of death are estimated for the total Hispanic, non-Hispanic white, and non-Hispanic black populations and by sex for each group as follows:

$$_nD_x = {}_nD_x^F * {}_nCR_x, \qquad [2]$$

where ${}_nD_x^F$ is age-specific number of deaths adjusted for unknown age as described above, ${}_nCR_x$ are the age-specific classification ratios used to correct for the misclassification of race and Hispanic origin on death certificates, and ${}_nD_x$ are final age-specific counts of death adjusted for age, race, and Hispanic origin misclassification. Table C shows values of the sex- and age-specific classification ratios (${}_nCR_x$) by Hispanic origin and race for the non-Hispanic population (black and white).

Correction for racial and ethnic misclassification of infant deaths is addressed by using infant death counts and live birth counts from the 2005 and 2006 linked birth/infant death data files rather than the traditional birth and death data files (16,17). In the linked file, each infant death record is linked to its corresponding birth record so that the race and ethnicity reported on the birth record can be ascribed to the infant death record (16,17). As a result, racial- and ethnic-specific infant mortality rates estimated with the linked file do not suffer from the problem of racial and ethnic discrepancies between the numerator and denominator of the rate. A ratio of infant mortality rates based on the traditional birth and death data files to infant mortality rates based on the linked birth/infant death data file shows that using the traditional files overestimates the infant mortality rate by 2 percent for Hispanic infants, 2 percent–4 percent for non-Hispanic black infants, and less than 1 percent for non-Hispanic white infants (see ratios for age 0 in Table C). Because the probability of death at age 0 used to calculate the life table uses live births in the denominator (procedure described

Table B. Values for *F* used to adjust for not-stated age based on 2006 mortality data

Hispanic origin, race, and sex	Total deaths	Total deaths for which age was not stated	*F*
Hispanic	133,004	36	1.00027074
Male	74,250	29	1.00039072
Female	58,754	7	1.00011916
Non-Hispanic white	1,944,617	92	1.00004731
Male	947,966	72	1.00007596
Female	996,651	20	1.00002007
Non-Hispanic black	286,581	19	1.00006630
Male	146,729	11	1.00007497
Female	139,852	8	1.00005721

Table C. Classification ratios by Hispanic origin, race for the non-Hispanic white and non-Hispanic black populations, age, and sex

Age	Hispanic			Non-Hispanic white			Non-Hispanic black		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
All ages	1.0501	1.0415	1.0614	0.9960	0.9954	0.9966	1.0055	1.0066	1.0043
[1]0	1.0206	1.0222	1.0181	1.0019	0.9938	1.0122	1.0325	1.0435	1.0189
1–14	[2]0.9198	[2]1.0000	[2]0.7994	0.9930	0.9869	1.0011	1.0200	1.0000	[2]1.0689
15–24	0.9650	0.9770	0.9290	1.0032	1.0040	1.0010	0.9997	0.9996	1.0000
25–34	1.0189	1.0542	0.9288	0.9975	0.9872	1.0212	1.0043	1.0034	1.0060
35–44	1.0803	1.0863	1.0657	0.9902	0.9864	0.9971	1.0066	1.0081	1.0045
45–54	1.0501	1.0152	1.1208	0.9938	0.9943	0.9930	1.0023	1.0144	0.9880
55–64	1.0260	1.0291	1.0216	0.9932	0.9915	0.9958	1.0135	1.0174	1.0087
65–74	1.0700	1.0640	1.0779	0.9950	0.9961	0.9935	1.0036	0.9979	1.0095
75–84	1.0473	1.0316	1.0651	0.9967	0.9964	0.9971	1.0040	1.0058	1.0023
85–94	1.0468	1.0261	1.0614	0.9978	0.9975	0.9979	1.0083	1.0101	1.0072
95 and over	1.1277	1.1700	1.1000	0.9981	0.9927	0.9998	0.9979	1.0300	0.9881

[1]Ratios for age 0 are estimated as the ratio of infant mortality rates based on the traditional death and birth files to the infant mortality rate based on the 2006 linked birth/infant death data file and only shown for illustration purposes; see text for details.
[2]Ratio is unreliable because either the unweighted number of Current Population Survey deaths or the unweighted number of death certificate deaths or both are based on fewer than 20 deaths.

below), it is preferable to use the linked birth/infant death data file. Further, the classification ratios derived from the NLMS are unreliable for this age category as a result of extremely small sample sizes.

Interpolation of P_x and D_x—Anomalies, both random and those associated with reporting age at death, can be problematic when using vital statistics and census data by single years of age to estimate the probability of death (5,18). Graduation techniques are often used to eliminate these anomalies and to derive a smooth curve by age. Beer's ordinary minimized fifth difference formula is used to obtain smoothed values of P_x and D_x from 5-year age groupings of ${}_nP_x$ from ages 0–99 and ${}_nD_x$ from ages 5–99, and where ${}_nD_x$ has first been adjusted for not-reported age and race and Hispanic origin misclassification on the death certificate (18).

Calculation of the Probability of Dying, q_x

Calculation of complete period life tables starts with the estimation of age-specific probabilities of death (q_x) which are a function of age-specific death rates, D_x / P_x. Death rates are derived from the number of deaths throughout a calendar year (D_x) and the midyear population (P_x) in that calendar year.

Calculation of q_0—Calculated using a birth cohort method that employs a separation factor (f) defined as the proportion of infant deaths in year t occurring to infants born in the previous year (t - 1). f is estimated by categorizing infant deaths by date of birth. The probability of death is then calculated as

$$q_0 = \frac{D_0\,(1-f)}{B^t} + \frac{D_0\,(f)}{B^{t-1}}, \qquad [3]$$

where D_0 is the number of infant deaths from the 2006 linked birth/infant death data file, B^t is the number of live births from the 2006 linked birth/infant death data file, and B^{t-1} is the number of live births from the 2005 linked birth/infant death data file. Table D shows separation factors and numbers of births for 2005–2006.

Calculation of vital statistics (q_x) for ages 1–99—Calculated assuming that l_x (number of survivors at exact age x in the life table population) declines linearly between x and $x + 1$ (i.e., that deaths between exact age x and $x + 1$ occur on average at age $x + ½$). This simplification is generally considered acceptable when age intervals are 1 year in length (5). Under this assumption, $l_x = L_x + ½\,d_x$, where L_x is the average life table population at risk of dying between ages x and $x + 1$ and d_x is the number of deaths occurring between age x and $x + 1$. q_x is then

$$q_x = \frac{d_x}{l_x} = \frac{d_x}{L_x + \frac{1}{2}\,d_x}.$$

Table D. Births in 2005 and 2006, deaths in 2006 of infants born in 2005 and 2006, and separation factors by Hispanic origin, race for the non-Hispanic white and non-Hispanic black populations, and sex: United States

	Hispanic			Non-Hispanic white			Non-Hispanic black		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
Births									
2005	985,513	503,489	482,024	2,279,959	1,170,614	1,109,345	583,764	296,240	287,524
2006	1,039,079	530,875	508,204	2,308,654	1,184,310	1,124,344	617,260	314,607	302,653
Deaths in 2006 of infants born in:									
2005	675	379	294	1,559	887	683	972	533	436
2006	4,947	2,731	2,218	11,325	6,441	4,873	7,269	3,985	3,287
Separation factor (f)	0.120	0.122	0.117	0.121	0.121	0.123	0.118	0.118	0.117

One can make the same assumption for the observed population [i.e., that the observed population aged x at risk of dying at the beginning of the year (N_x) declines linearly between ages x and $x + 1$]. Under this assumption, $N_x = P_x + ½ D_x$, where P_x is the midyear population or average observed population at risk of dying between ages x and $x + 1$ and D_x is the observed number of deaths occurring between ages x and $x + 1$. q_x is calculated as

$$q_x = \frac{D_x}{N_x} = \frac{D_x}{P_x + \frac{1}{2} D_x} . \qquad [4]$$

For x = 1–99, D_x is the Beer's smoothed number of deaths adjusted for not-stated age and race and Hispanic origin misclassification on the death certificate and P_x is the Beer's smoothed population at risk of dying between ages x and $x + 1$.

Probability of Dying at the Oldest Ages for the Non-Hispanic White and Non-Hispanic Black Populations

As noted above, Medicare data are used to supplement vital statistics data for the estimation of q_x at the oldest ages because it is more accurate as proof of age is required for enrollment in the Medicare program. Medicare data are used here to estimate the probability of dying for ages 66–100 for the non-Hispanic white and non-Hispanic black populations. The method described in this section was first developed to estimate mortality for ages 66–100 for the 1999–2001 U.S. decennial life tables and the U.S. annual life tables beginning with year 2005 for the total population and the white and black racial groups (19,20). Annual life tables for years 2000–2004 were revised with this methodology and republished (20). As discussed in the "Data Used for Calculating Life Table Functions" section, it is possible to use Medicare data for the non-Hispanic white and non-Hispanic black populations as well as the total black and white populations irrespective of Hispanic origin.

For ages 66–94, the probability of dying was obtained by blending vital statistics (q_x^V) with Medicare (q_x^M) through a weighting process that gives gradually declining weight to vital statistics data and gradually increasing weight to Medicare data. For ages 95–100, Medicare (q_x^M) is used exclusively. For ages 66–100, q_x is estimated as

$$q_x = \frac{1}{30}[(95 - x)\, q_x^V + (x - 65) q_x^M],$$

when x = 66,...,94,

and

$$q_x = q_x^M, \text{ when } x = 95,...,100, \qquad [5]$$

where q_x is a combination of q_x^V and q_x^M, q_x^V is the probability of dying calculated with formula 4, and q_x^M is the probability of dying based on Medicare data.

The third component of the Heligman-Pollard (HP) model was then used to smooth the probabilities of death for ages 66–100 obtained above and also to extrapolate the probabilities of deaths for ages over 100. The HP model is a nonlinear model consisting of three components and eight parameters, where

$$\frac{q_x}{1 - q_x} = A^{(x+B)^C} + D \exp[-E(\log x - \log F)^2] + GH^x.$$

Parameter A measures mortality in the first year of life, parameter B measures the rate of change in mortality from birth to the first year of life, and parameter C measures the rate of mortality decline in childhood. Parameters D, E, and F measure the location, width, and height of the "accident hump" and parameters G and H measure mortality levels and changes for ages approximately 40 and over (19,20).

A nonlinear weighted least squares model, with weights,

$$w_x = \frac{1}{q_x^2},$$

was used to fit the third component of the HP model in the age range 65–100. The model was estimated as

$$\frac{q_x}{1 - q_x} = GH^x . \qquad [6]$$

Predicted $\hat{q}_x$ was then estimated as

$$\hat{q}_x = \frac{\hat{G}\,\hat{H}^x}{1 + \hat{G}\,\hat{H}^x} , \qquad [7]$$

where $\hat{G}$ and $\hat{H}$ are the predicted parameters given by fitting model 6. Predicted parameters for the non-Hispanic white and non-Hispanic black populations in 2006 are presented in Table E. Although reliable data-based probabilities of death for older ages are only available through ages 100 or so, q_x was extrapolated to age 130 in order to estimate the life table population until no survivors remain. This information is then used to estimate L_x for ages 100–130, which is used to close the table with the age category 100 and over, combined (discussed below).

To ensure a smooth transition from vital q_x^V and predicted $\hat{q}_x$ the two were blended from ages 66–74 with a graduating process:

$$q_x = \frac{1}{10}[(75 - x)\, q_x^V + (x - 65)\hat{q}_x], \qquad [8]$$

when x = 66,...,74.

Probability of Dying at the Oldest Ages for the Hispanic Population

As previously noted, Medicare data are unreliable for the Hispanic population because of the

Table E. Estimated parameters *G* and *H* used for predicting q_x from ages 66–130: Non-Hispanic white and non-Hispanic black populations

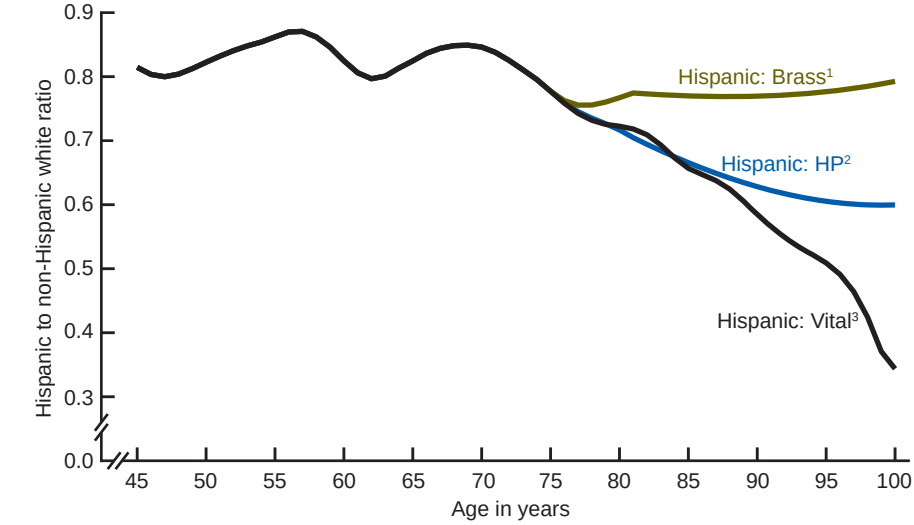
	Non-Hispanic white			Non-Hispanic black		
	Total	Male	Female	Total	Male	Female
G	0.0000125	0.0000173	0.0000064	0.0000984	0.0001990	0.0000449
H	1.1118	1.1100	1.1190	1.0855	1.0792	1.0939

inconsistencies in the Medicare racial and ethnic classification system. As a result, it was necessary to use other methods to estimate mortality at the oldest ages for this population. Past age 80 mortality estimates based strictly on vital statistics for the Hispanic population are too low, despite correction for ethnic misclassification on the death certificate.

A couple of estimation strategies were tested in order to estimate mortality for ages over 80 for the Hispanic population. First, the third component of the HP model was fit to vital statistics data and the predicted parameters were then used to extrapolate mortality for ages over 80. Several age ranges in which age-specific mortality patterns appear reasonable were used to fit the model, including ages 45–80, 55–80, and 65–80. The 65–80 age range produced the best statistical fit, however, the resulting predicted probabilities of death for ages 81–100 remained unrealistically low, with Hispanic to non-Hispanic white mortality ratios declining progressively with age from about 80 percent at age 75 to about 65 percent at ages 100 and over.

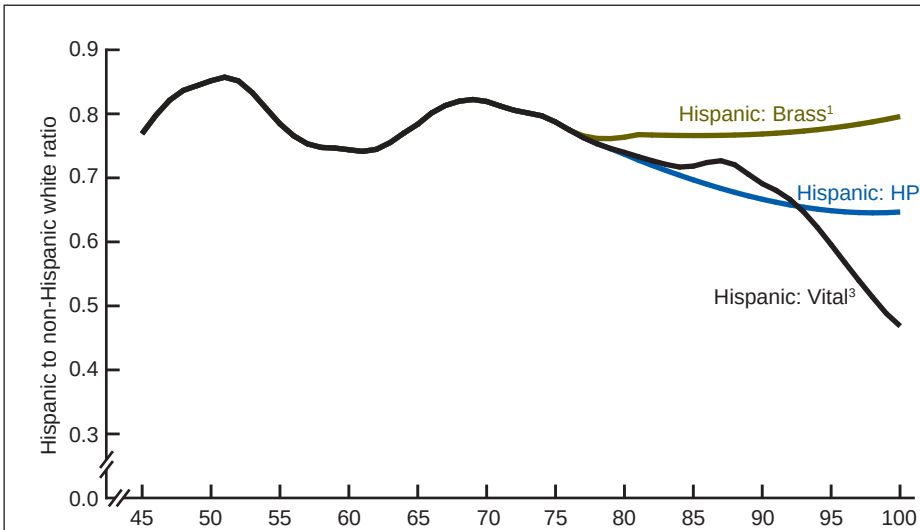
A consistent finding across diverse studies has been that Hispanic mortality in the adult and advanced ages varies between approximately 80 percent and 89 percent of that of the non-Hispanic white population (2,3,21,22). Two studies that used Medicare data to compare Hispanic to non-Hispanic white mortality by using a name-based algorithm to identify Hispanic persons in the Medicare-NUMIDENT SSA database, found age-specific ratios of Hispanic to non-Hispanic white mortality at ages 65 and over to consistently be around 85 percent (21,22). While not without limitations, these findings are based on the most reliable data available about age-specific mortality at the oldest ages.

The second estimation method tested, the Brass relational logit model, takes advantage of the relationship between Hispanic and non-Hispanic white mortality identified by the mentioned studies and is one that has been widely and successfully used to predict the mortality of one population relative to another at the older ages



[1]Refers to results based on Brass relational logit model.
[2]Refers to results based on Heligman-Pollard model.
[3]Refers to results based on vital statistics data.
SOURCE: CDC/NCHS, National Vital Statistics System and Centers for Medicare & Medicaid Services, Medicare data.

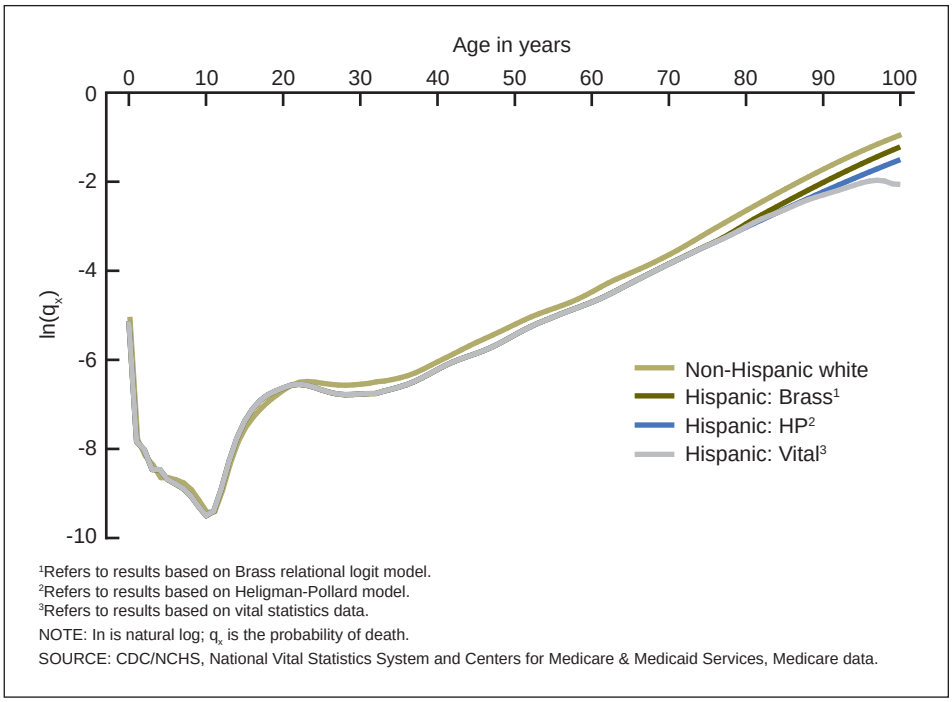
Figure 1. Hispanic to non-Hispanic white age-specific mortality ratios for males: United States, 2006



[1]Refers to results based on Brass relational logit model.
[2]Refers to results based on Heligman-Pollard model.
[3]Refers to results based on vital statistics data.
SOURCE: CDC/NCHS, National Vital Statistics System and Centers for Medicare & Medicaid Services, Medicare data.

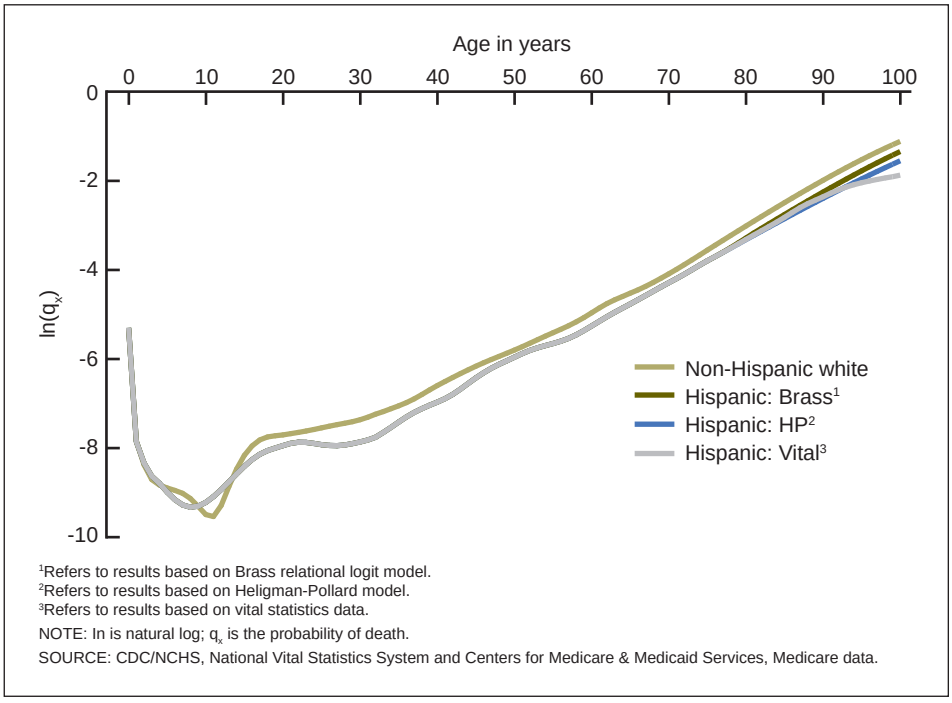
Figure 2. Hispanic to non-Hispanic white age-specific mortality ratios for females: United States, 2006

(23–26). Using the age-specific mortality pattern of the non-Hispanic white population as the "standard," Brass' relational logit model is used to predict Hispanic mortality in the older ages. The "standard" is fit to Hispanic data in the age interval 45–80 and the predicted parameters are used to estimate the probabilities of death for ages 76–100. This method allows the relationship between the two populations in the younger ages to be carried over to the older ages (23–26). Figures 1 and 2 show age-specific ratios of Hispanic to non-Hispanic white probabilities of death, where the Hispanic estimates are



[1]Refers to results based on Brass relational logit model.
[2]Refers to results based on Heligman-Pollard model.
[3]Refers to results based on vital statistics data.
NOTE: ln is natural log; q_x is the probability of death.
SOURCE: CDC/NCHS, National Vital Statistics System and Centers for Medicare & Medicaid Services, Medicare data.

Figure 3. Male age pattern of mortality: United States, 2006



[1]Refers to results based on Brass relational logit model.
[2]Refers to results based on Heligman-Pollard model.
[3]Refers to results based on vital statistics data.
NOTE: ln is natural log; q_x is the probability of death.
SOURCE: CDC/NCHS, National Vital Statistics System and Centers for Medicare & Medicaid Services, Medicare data.

Figure 4. Female age pattern of mortality: United States, 2006

based respectively on vital statistics, the Brass relational logit model, and the HP model, and the non-Hispanic estimates are based on the method described in the previous section. Hispanic mortality estimates based on the Brass logit model maintain the relative difference with the non-Hispanic white population in the oldest ages consistent with the findings of the two studies that estimated Hispanic mortality directly from Medicare data (21,22). A comparison of the sex and age patterns of mortality for the age range 0–100 between the non-Hispanic white and Hispanic populations based on the Brass model, the HP model, and vital statistics reveals that the Brass model produces the most realistic mortality pattern for the Hispanic population (Figures 3 and 4). The Brass relational logit model with the non-Hispanic white population as the standard was therefore used to estimate mortality for ages 80 and over for the Hispanic population.

The Brass relational logit model expresses the age-specific mortality pattern of a population of interest as a function of the age-specific mortality pattern of a "standard" population and is expressed as

$$\hat{Y}(x) = \alpha + \beta Y^S(x)\,, \qquad [9]$$

where $\hat{Y}(x)$ is the predicted logit of the probability of death (q_x) in the population of interest, i.e.,

$$\text{logit}[q_x] = \ln\left[\frac{q(x)}{1\text{-}q(x)}\right],$$

$Y^S(x)$ is the logit of the probability of death (q_x^S) in the standard population, i.e.,

$$\text{logit}[q_x^S] = \ln\left[\frac{q_x^S}{1\text{-}q_x^S}\right],$$

α is the predicted parameter that measures the level of mortality of the population of interest relative to the standard population, and β is the predicted parameter that measures the slope of the mortality function of the population of interest relative to the standard population (23–26). Table F shows values of predicted α and β and their standard errors.

Ordinary least squares regression was used to fit equation 9 in the age range 45–80. The resulting predicted parameters α and β were then used to estimate the predicted probability of death for ages 76–130 in the Hispanic population. $\hat{q}_x$ was predicted to age 130 in order to estimate the life table population until no survivors remain, as was done for the non-Hispanic white and non-Hispanic black populations. This information is then used to estimate L_x for ages 100–130, which is used to close the table with the age category 100 and over, combined (discussed in the following section).

Table F. Estimated Brass relational logit model parameters α and β

	Total	SE	Male	SE	Female	SE
α	–0.3690	0.027	–0.3675	0.036	–0.3377	0.037
β	0.9671	0.006	0.9627	0.008	0.9789	0.008

NOTE: SE is standard error.

Predicted $\hat{q}_x$ is estimated by transforming its logit $[\hat{Y}(x)]$ back as follows:

$$\hat{q}_x = \frac{\exp[\hat{Y}(x)]}{1+\exp[\hat{Y}(x)]} = \frac{\exp[\alpha+\beta Y^s(x)]}{1+\exp[\alpha+\beta Y^s(x)]} . \quad [10]$$

To ensure a smooth transition from vital q_x^V and predicted $\hat{q}_x$, the two were blended from ages 76–80 with a graduating process:

$$q_x = \frac{1}{6}[(81-x)q_x^V + (x\text{-}75)\,\hat{q}_x] ,$$
$$\text{when } x = 76,\ldots,80. \quad [11]$$

Finally, to close the table at age 100 and over (combined), ${}_\infty q_{100}$ is set equal to 1.0 because all survivors to this age will die at some point in the open-ended age interval. Once q_x is obtained for each single year of age, the other life table functions are easily calculated.

Calculation of Remaining Life Table Functions for All Groups

Survivor function (l_x)—The life table radix (l_0) is set at 100,000. For ages greater than 0, the number of survivors remaining at exact age x is calculated as

$$l_x = l_{x-1}(1-q_{x-1}) . \quad [12]$$

Decrement function (d_x)—The number of deaths occurring between age x and $x+1$ is calculated from the survivor function:

$$d_x = l_x - l_{x+1} = l_x q_x . \quad [13]$$

Note that ${}_\infty d_{100} = {}_\infty l_{100}$ since ${}_\infty q_{100} = 1.0$.

Person-years lived (L_x)—Person-years lived for ages 1–99 is calculated assuming that the survivor function declines linearly between age x and $x+1$. This gives the formula

$$L_x = \tfrac{1}{2}(l_x + l_{x+1}) = l_x - \tfrac{1}{2}d_x . \quad [14]$$

For $x = 0$, the separation factor f is used to calculate L_0:

$$L_0 = f\,l_0 + (1-f)\,l_1 . \quad [15]$$

Finally, ${}_\infty L_{100}$ is estimated as the sum of the extrapolated L_x values for ages 100–130.

Person-years lived at and above age x (T_x)—Calculated by summing L_x values at and above age x:

$$T_x = \sum_{x=0}^{\infty} L_x . \quad [16]$$

Life expectancy at age x(e_x)—Calculated as

$$e_x = \frac{T_x}{l_x} . \quad [17]$$

Results

Life Expectancy by Hispanic Origin and Race

Tables 1–9 show complete life tables by Hispanic origin, race (white and black) for the non-Hispanic population, and sex for 2006. Table G

Table G. Expectation of life by age, sex, Hispanic origin, and race for the non-Hispanic white and non-Hispanic black populations: United States, 2006

Age	All origins			Hispanic			Non-Hispanic white			Non-Hispanic black		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
0	77.7	75.1	80.2	80.6	77.9	83.1	78.1	75.6	80.4	72.9	69.2	76.2
1	77.2	74.7	79.7	80.0	77.4	82.5	77.5	75.1	79.9	72.9	69.3	76.2
5	73.3	70.8	75.8	76.1	73.5	78.6	73.6	71.1	75.9	69.0	65.4	72.3
10	68.4	65.8	70.8	71.2	68.5	73.7	68.6	66.2	71.0	64.1	60.5	67.4
15	63.4	60.9	65.9	66.2	63.6	68.7	63.7	61.2	66.0	59.2	55.6	62.5
20	58.6	56.1	61.0	61.4	58.9	63.8	58.9	56.5	61.1	54.4	50.9	57.6
25	53.9	51.5	56.1	56.7	54.2	58.9	54.1	51.9	56.3	49.8	46.5	52.8
30	49.2	46.9	51.3	51.9	49.6	54.0	49.4	47.2	51.4	45.2	42.0	48.0
35	44.4	42.2	46.4	47.1	44.8	49.1	44.6	42.5	46.6	40.6	37.6	43.3
40	39.7	37.6	41.7	42.4	40.2	44.3	39.9	37.9	41.8	36.1	33.2	38.7
45	35.2	33.1	37.0	37.7	35.6	39.5	35.3	33.4	37.1	31.8	28.9	34.3
50	30.7	28.8	32.5	33.2	31.2	34.9	30.9	29.0	32.6	27.7	24.9	30.0
55	26.5	24.7	28.0	28.8	26.9	30.4	26.6	24.8	28.1	23.9	21.3	25.9
60	22.4	20.7	23.8	24.6	22.8	26.0	22.4	20.8	23.8	20.3	18.0	22.1
65	18.5	17.0	19.7	20.6	19.0	21.7	18.5	17.1	19.7	17.0	15.0	18.4
70	14.9	13.6	15.9	16.8	15.4	17.7	14.8	13.6	15.9	13.9	12.2	15.0
75	11.6	10.4	12.3	13.3	12.1	14.1	11.5	10.4	12.3	11.0	9.7	11.9
80	8.7	7.8	9.3	10.2	9.2	10.8	8.7	7.8	9.2	8.7	7.6	9.3
85	6.4	5.7	6.8	7.6	6.8	8.0	6.3	5.6	6.7	6.7	5.9	7.1
90	4.6	4.1	4.8	5.6	5.0	5.7	4.5	4.0	4.7	5.0	4.5	5.3
95	3.2	2.9	3.3	4.0	3.5	4.0	3.2	2.8	3.3	3.8	3.5	3.9
100	2.3	2.0	2.3	2.8	2.5	2.8	2.2	2.0	2.2	2.8	2.6	2.8

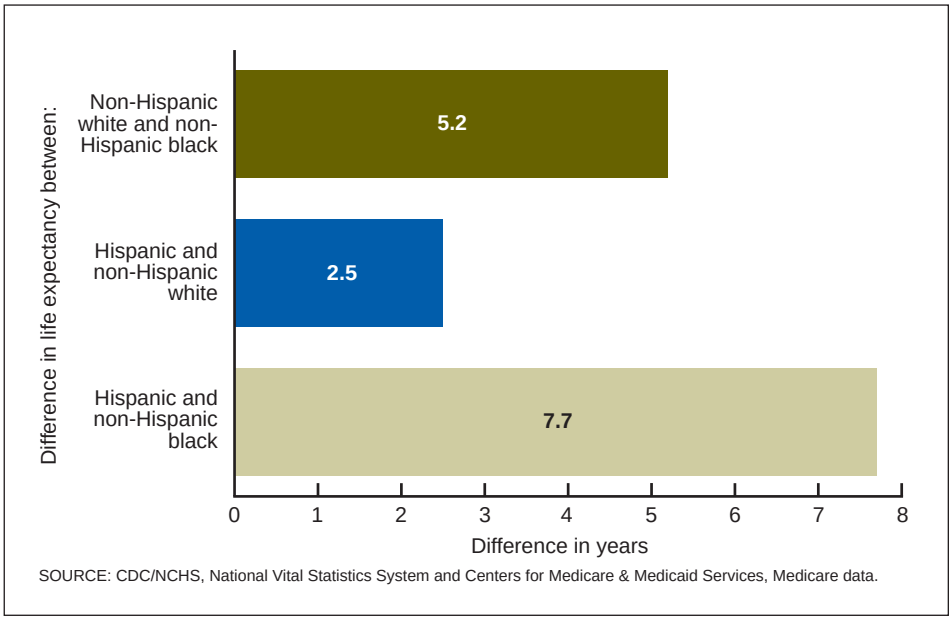


Figure 5. Difference in life expectancy at birth: United States, 2006

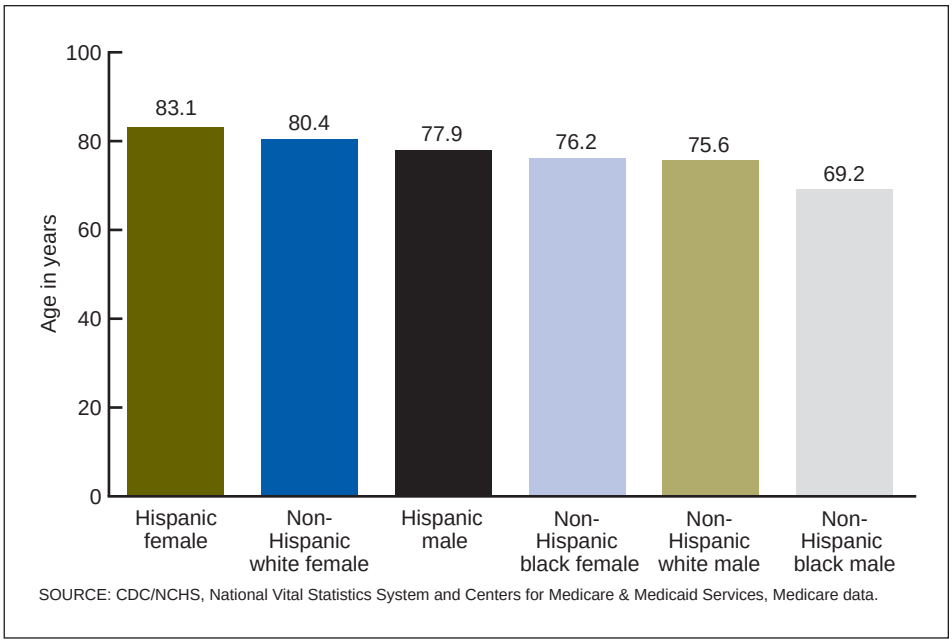


Figure 6. Life expectancy at birth, by Hispanic origin, race, and sex: United States, 2006

summarizes life expectancy by age, Hispanic origin, race, and sex. Life expectancy at birth for 2006 represents the average number of years that a group of infants would live if the infants were to experience throughout life the age-specific death rates prevailing in 2006. Life expectancy at birth for the total population in 2006 was 77.7 years (27). Life expectancy was 80.6 years for the Hispanic population, 78.1 years for the non-Hispanic white population, and 72.9 years for the non-Hispanic black population. The Hispanic population has a mortality advantage at birth of 2.5 years over the non-Hispanic white population and 7.7 years over the non-Hispanic black population (Figure 5).

Among the six Hispanic origin-race-sex groups (Figure 6), Hispanic females have the highest life expectancy at birth (83.1 years), followed by non-Hispanic white females (80.4 years), Hispanic males (77.9 years), non-Hispanic black females (76.2 years), non-Hispanic white males (75.6 years), and non-Hispanic black males (69.2 years). The smallest differential is between Hispanic and non-Hispanic white females, with Hispanic females having an advantage of 2.7 years. The largest differential is between Hispanic females and non-Hispanic black males, with Hispanic females having a life expectancy at birth 13.9 years greater.

The Hispanic population has higher life expectancy than the non-Hispanic white and non-Hispanic black populations at every age from birth until approximately age 95 when Hispanic male and non-Hispanic black male life expectancy is equal at 3.5 years (Table G). At age 65, Hispanic females have the highest life expectancy (21.7 years), followed by non-Hispanic white females (19.7 years), Hispanic males (19.0 years), non-Hispanic black females (18.4 years), non-Hispanic white males (17.1 years), and non-Hispanic black males (15.0 years). This pattern changes by age 85 when Hispanic females still have the highest life expectancy (8.0 years), but are immediately followed by non-Hispanic black females (7.1 years), Hispanic males (6.8 years), non-Hispanic white females (6.7 years), non-Hispanic black males (5.9 years), and non-Hispanic white males (5.6 years). The crossover at the oldest ages between the non-Hispanic white and non-Hispanic black populations has been observed for some time now when comparing age-specific mortality between the white and black populations. It is not clear whether the mortality crossover is due to a data artifact or reflects a real advantage for the black population at the oldest ages (25).

In 2006, the female to male advantage in life expectancy at birth, or the sex gap, was 5.1 years for the total population (27). The sex gap increased from 2 years to 7.8 years between 1900 and 1975 and then declined to reach a low of 5.0 in 2004 (27). In 2006, there was noticeable variability in the sex gap in life expectancy at birth by Hispanic

Table H. Number surviving by age, sex, Hispanic origin, and race for the non-Hispanic white and non-Hispanic black populations: United States, 2006

Age	All origins			Hispanic			Non-Hispanic white			Non-Hispanic black		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
0	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
1	99,329	99,266	99,395	99,444	99,397	99,494	99,444	99,392	99,499	98,585	98,491	98,739
5	99,216	99,144	99,291	99,340	99,283	99,399	99,345	99,287	99,406	98,406	98,301	98,579
10	99,147	99,068	99,229	99,281	99,216	99,349	99,281	99,218	99,348	98,303	98,184	98,494
15	99,065	98,972	99,164	99,198	99,119	99,281	99,208	99,131	99,289	98,188	98,050	98,404
20	98,747	98,524	98,982	98,885	98,645	99,140	98,915	98,739	99,100	97,761	97,391	98,216
25	98,253	97,797	98,739	98,433	97,966	98,956	98,453	98,064	98,864	97,045	96,308	97,878
30	97,759	97,099	98,461	98,035	97,390	98,779	97,980	97,402	98,585	96,213	95,089	97,418
35	97,213	96,371	98,105	97,619	96,808	98,560	97,454	96,705	98,233	95,240	93,757	96,778
40	96,495	95,466	97,579	97,048	96,059	98,196	96,767	95,840	97,729	93,992	92,181	95,830
45	95,397	94,112	96,740	96,187	94,935	97,633	95,715	94,539	96,931	92,192	90,019	94,359
50	93,750	92,082	95,478	94,904	93,360	96,662	94,152	92,598	95,751	89,493	86,719	92,201
55	91,352	89,083	93,681	92,988	90,963	95,234	91,893	89,776	94,067	85,462	81,567	89,168
60	88,057	85,054	91,119	90,382	87,630	93,343	88,754	85,967	91,610	80,136	74,904	85,052
65	83,251	79,346	87,200	86,639	83,048	90,384	84,063	80,430	87,767	73,118	66,352	79,402
70	76,661	71,652	81,662	81,070	76,391	85,795	77,529	72,817	82,291	64,632	56,479	72,114
75	67,331	61,057	73,449	73,079	67,168	78,842	68,182	62,220	74,084	54,103	44,764	62,547
80	54,201	46,859	61,175	62,023	55,057	68,578	54,934	47,840	61,746	41,405	31,827	50,066
85	37,805	30,371	44,685	47,149	39,493	53,959	38,266	30,961	45,053	27,815	19,468	35,481
90	20,898	15,034	26,183	30,059	23,046	35,852	21,017	15,184	26,251	15,448	9,630	20,899
95	7,991	4,895	10,685	14,487	9,744	18,012	7,901	4,821	10,552	6,526	3,546	9,336
100	1,737	850	2,460	4,522	2,523	5,771	1,656	795	2,351	1,875	873	2,784

origin and race. The gap was 4.8 years for the non-Hispanic white population, 5.2 years for the Hispanic population, and 7.0 years for the non-Hispanic black population.

Finally, the Hispanic mortality advantage is also illustrated in the effect produced on life expectancy at birth when race and Hispanic origin are decoupled. To date, U.S. life tables have been produced by race (white and black), irrespective of Hispanic origin. When Hispanic origin is excluded from the two race groups and only the non-Hispanic segments are included, life expectancy at birth declines. For example, for the black population, irrespective of Hispanic origin, life expectancy at birth was 73.2 years in 2006 (27). However, it declined to 72.9 years when only the non-Hispanic segment of the black population is included. Similarly, life expectancy for the white population, irrespective of Hispanic origin, was 78.2 years in 2006 (27) and declined to 78.1 years when only the non-Hispanic segment of the white population is included. The effect of the Hispanic mortality advantage on race-specific life expectancy is also observed for each race-sex group.

Survivorship by Hispanic Origin and Race

Table H shows the number of survivors out of 100,000 persons born alive (l_x) by age, Hispanic origin, and race (white and black) for the non-Hispanic population and sex. In 2006, 99.3 percent of all infants born in the United States survived the first year of life (27). In comparison, 99.4 percent of Hispanic infants survived the first year of life. Likewise, 99.4 percent of non-Hispanic white infants survived. On the other hand, 98.6 percent of non-Hispanic black infants survived the first year of life. In 2006, 37.8 percent of the life table cohort survived to age 85, however, survival at the oldest ages varied significantly by Hispanic origin and race. While 47.1 percent of the Hispanic population survived to age 85, 38.3 percent of the non-Hispanic white population, and only 27.8 percent of the non-Hispanic black population did so.

Among the six Hispanic origin-race-sex groups (Table H), Hispanic females have the highest median age at death with approximately 50.5 percent surviving to age 86. The next group with the highest median age at death is non-Hispanic white females with 48.7 percent surviving to age 84. The next group is Hispanic males, with 49.2 percent surviving to age 82, followed by non-Hispanic black females with 50.0 percent surviving to age 80, non-Hispanic white males with 50.9 percent surviving to age 79, and finally non-Hispanic black males with 49.7 percent surviving to age 73 years. The median age at death for non-Hispanic black males is 13 years less than that of Hispanic females.

The Hispanic mortality advantage as seen through age-specific survival rates (Figure 7) is mostly concentrated in the adult and very old ages. Between ages 1 and 16, non-Hispanic white females have a very slight advantage over Hispanic females with higher survival rates. But, beginning with age 17, Hispanic females take the lead with progressively higher age-specific survival rates. Similarly, non-Hispanic white males have slightly higher survival rates than Hispanic males over the age range 1–30, with the highest advantage for non-Hispanic white males in the age range 20–27 or so. After age 30, Hispanic males regain the advantage with progressively higher age-specific

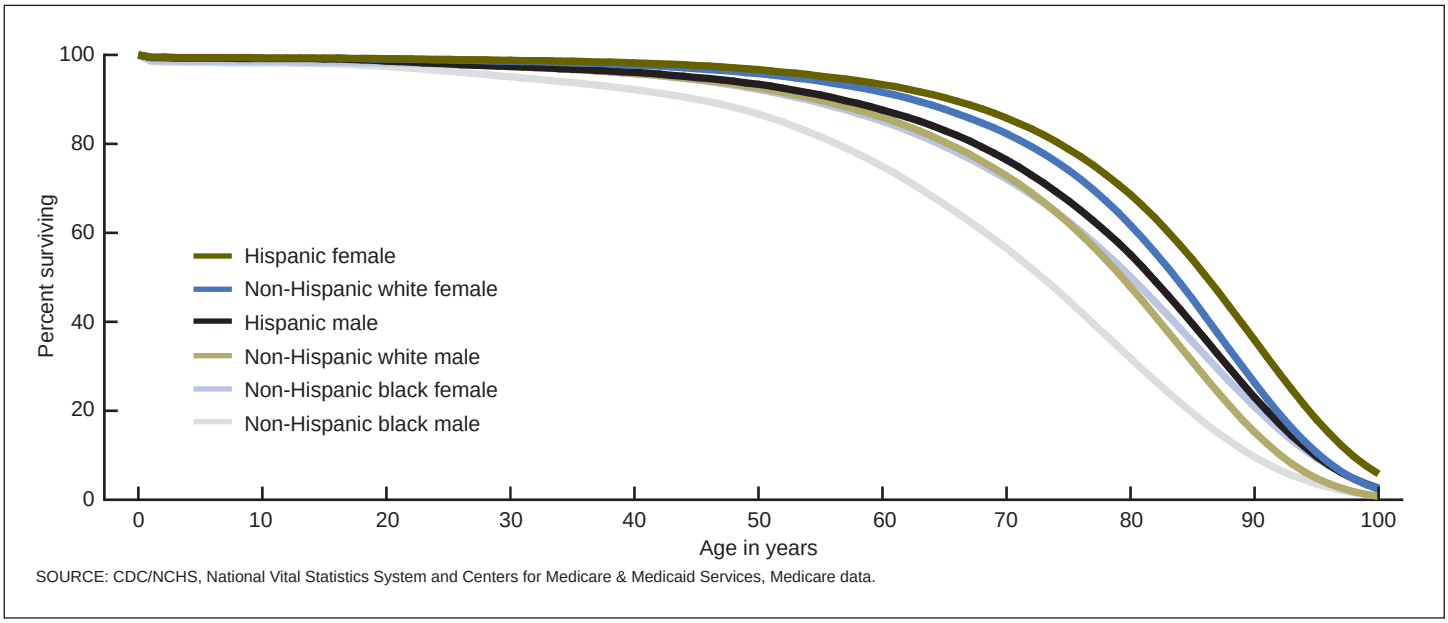


Figure 7. Percentage surviving, by Hispanic origin, race, age, and sex: United States, 2006

survival rates, which taper somewhat at the very oldest ages.

Discussion

This report presents the first ever U.S. life tables by Hispanic origin and race for the non-Hispanic white and non-Hispanic black populations. The data quality problems that had prevented their production in the past—ethnic misclassification on the death certificate and age misstatement at the oldest ages—were addressed in this study as robustly as possible given available data and methods. The results show that the Hispanic population has higher life expectancy at birth and at almost every subsequent age than the non-Hispanic white and non-Hispanic black populations. The finding of higher life expectancy for the Hispanic population seems paradoxical because on average the Hispanic population has lower socioeconomic status than the non-Hispanic white population. Given the relationship between socioeconomic status and mortality, a mortality profile similar to that of the non-Hispanic black population would seem more likely for the Hispanic population.

This seemingly paradoxical result has been found in numerous research studies using a variety of data sources, including state and national vital statistics, local surveys, and national linked mortality follow-up surveys, such as the NLMS and the National Health Interview Survey–Multiple Cause of Death (NHIS–MCD) linked data. All such studies have consistently found a Hispanic mortality advantage over the non-Hispanic white population even when differences in demographic and socioeconomic characteristics are taken into account (21,22,28–32). Research into the causes of this paradox has been extensive although not conclusive (21,22,28–32).

Three sets of explanations have been proposed: data artifact, migration effects, and cultural effects (28). There are three data problems that may lead to the appearance of a Hispanic mortality advantage. One type consists of incongruence between ethnic classification in the numerators and denominators of death rates. This type of data artifact affects vital statistics because the classification or reporting procedures used in the two distinct data sources (vital registration and census population estimates) may differ. A second type of data artifact is age misstatement, which tends to depress mortality rates at older ages, as previously discussed. Finally, a third type of data artifact is the problem of differential record linkage success rates in linked datasets, such as the NLMS and NHIS–MCD, which may disproportionately undercount Hispanic deaths and therefore lead to a false appearance of a Hispanic mortality advantage in mortality follow-up studies that rely on record linkage to identify mortality status because unlinked records are presumed alive (28).

To produce the U.S. national life tables by Hispanic origin presented in this report, the two types of data artifacts that affect vital statistics data—incongruence in ethnic classification between numerators and denominators of death rates and age misstatement—were thoroughly and robustly addressed. It was not possible to address differential linkage rates. However, because only linked records were used to assess the quality of racial and ethnic reporting on death certificates, linkage errors would only affect the classification ratios to the extent that incorrectly unlinked records differed from linked records in the rate of agreement between CPS and death certificate racial and ethnic classifications. No definitive evidence of differential linkage rates by race or ethnicity in the NLMS exists (3).

The two other sets of explanations—migration effects and cultural effects—may indeed explain the Hispanic mortality advantage, but are impossible to test with vital statistics data and are beyond the purview of this study. It has been hypothesized that the

lower observed mortality of the Hispanic population could be a function of migrant selectivity for better health (the healthy migrant effect) or return migration of ill migrants (the salmon bias effect) whose deaths are missed in the U.S. vital statistics system (28). There is as yet no conclusive evidence to support either of these migration effects as the explanations of the Hispanic mortality advantage, although the most recent research that directly tests the salmon bias effect found that foreign-born Hispanic emigrants (or return migrants) did have higher mortality but its magnitude was too small to explain a significant portion of the Hispanic mortality advantage (22). Finally, cultural effects in the form of family structure, lifestyle behaviors, and social networks may also explain the Hispanic mortality advantage by conferring a protective barrier against the vicissitudes of minority status and low socioeconomic conditions. However, there is as yet no conclusive evidence that the cultural effect explains the Hispanic mortality advantage (28).

The life tables presented in this report have some limitations. First, the classification ratios used to correct for racial and ethnic misclassification on U.S. death certificates are based on CPS data that pertain only to the noninstitutionalized population of the United States. Second, they are based on deaths that occurred in the period 1990–1998. To the degree that there were important changes in the reporting of race and ethnicity on death certificates in subsequent years, the resulting tables are biased. Third, while there is no conclusive evidence in support of the salmon bias effect, the possibility remains that Hispanic deaths are missed in the U.S. vital statistics system due to return migration and therefore the resulting death rates are biased irrespective of correction for ethnic misclassification.

Finally, a significant limitation present in U.S. life tables constructed for the total Hispanic population is that these life tables may mask important differences between the various Hispanic subgroups that make up this population. As noted in the ''Background'' section, the Hispanic population varies by national origin group, nativity status, socioeconomic status, and important demographic characteristics, such as age structure and fertility. Hispanic life tables presented in this report will tend to reflect the mortality profile of the Mexican-American population, which makes up 64.5 percent of the total Hispanic population in the United States. Similarly, it is possible that mortality profiles for the Hispanic population differ by nativity status, particularly if migrant selectivity or return migration play a role in the Hispanic mortality advantage. As a result, the next steps that need to be taken to better portray the mortality of the Hispanic population in the United States is to produce life tables by Hispanic origin subgroup and nativity status.

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Table 1. Life table for the Hispanic population: United States, 2006

Age	Probability of dying between ages x to $x+1$	Number surviving to age x	Number dying between ages x to $x+1$	Person-years lived between ages x to $x+1$	Total number of person-years lived above age x	Expectation of life at age x
	q_x	l_x	d_x	L_x	T_x	e_x
0–1	0.005557	100,000	556	99,511	8,059,214	80.6
1–2	0.000391	99,444	39	99,425	7,959,703	80.0
2–3	0.000285	99,405	28	99,391	7,860,278	79.1
3–4	0.000195	99,377	19	99,367	7,760,887	78.1
4–5	0.000182	99,358	18	99,349	7,661,519	77.1
5–6	0.000148	99,340	15	99,332	7,562,171	76.1
6–7	0.000130	99,325	13	99,319	7,462,838	75.1
7–8	0.000117	99,312	12	99,306	7,363,520	74.1
8–9	0.000104	99,300	10	99,295	7,264,214	73.2
9–10	0.000092	99,290	9	99,286	7,164,918	72.2
10–11	0.000087	99,281	9	99,277	7,065,633	71.2
11–12	0.000097	99,272	10	99,268	6,966,356	70.2
12–13	0.000135	99,263	13	99,256	6,867,088	69.2
13–14	0.000208	99,249	21	99,239	6,767,832	68.2
14–15	0.000309	99,229	31	99,213	6,668,593	67.2
15–16	0.000427	99,198	42	99,177	6,569,379	66.2
16–17	0.000543	99,156	54	99,129	6,470,202	65.3
17–18	0.000650	99,102	64	99,070	6,371,074	64.3
18–19	0.000737	99,038	73	99,001	6,272,004	63.3
19–20	0.000802	98,965	79	98,925	6,173,003	62.4
20–21	0.000866	98,885	86	98,842	6,074,078	61.4
21–22	0.000925	98,800	91	98,754	5,975,235	60.5
22–23	0.000951	98,708	94	98,661	5,876,481	59.5
23–24	0.000939	98,614	93	98,568	5,777,820	58.6
24–25	0.000902	98,522	89	98,477	5,679,252	57.6
25–26	0.000857	98,433	84	98,391	5,580,775	56.7
26–27	0.000819	98,348	81	98,308	5,482,385	55.7
27–28	0.000793	98,268	78	98,229	5,384,076	54.8
28–29	0.000785	98,190	77	98,151	5,285,848	53.8
29–30	0.000792	98,113	78	98,074	5,187,696	52.9
30–31	0.000802	98,035	79	97,996	5,089,622	51.9
31–32	0.000814	97,957	80	97,917	4,991,626	51.0
32–33	0.000827	97,877	81	97,836	4,893,710	50.0
33–34	0.000879	97,796	86	97,753	4,795,873	49.0
34–35	0.000934	97,710	91	97,664	4,698,120	48.1
35–36	0.000999	97,619	98	97,570	4,600,456	47.1
36–37	0.001073	97,521	105	97,469	4,502,886	46.2
37–38	0.001160	97,417	113	97,360	4,405,417	45.2
38–39	0.001260	97,304	123	97,242	4,308,057	44.3
39–40	0.001373	97,181	133	97,114	4,210,815	43.3
40–41	0.001496	97,048	145	96,975	4,113,701	42.4
41–42	0.001630	96,902	158	96,823	4,016,726	41.5
42–43	0.001771	96,744	171	96,659	3,919,902	40.5
43–44	0.001920	96,573	185	96,480	3,823,243	39.6
44–45	0.002082	96,388	201	96,287	3,726,763	38.7
45–46	0.002255	96,187	217	96,079	3,630,476	37.7
46–47	0.002445	95,970	235	95,853	3,534,397	36.8
47–48	0.002657	95,735	254	95,608	3,438,544	35.9
48–49	0.002894	95,481	276	95,343	3,342,936	35.0
49–50	0.003158	95,205	301	95,054	3,247,593	34.1
50–51	0.003452	94,904	328	94,740	3,152,538	33.2
51–52	0.003769	94,577	356	94,398	3,057,798	32.3
52–53	0.004086	94,220	385	94,028	2,963,400	31.5
53–54	0.004382	93,835	411	93,629	2,869,372	30.6
54–55	0.004662	93,424	436	93,206	2,775,743	29.7
55–56	0.004952	92,988	460	92,758	2,682,537	28.8
56–57	0.005271	92,528	488	92,284	2,589,779	28.0
57–58	0.005620	92,040	517	91,781	2,497,495	27.1
58–59	0.006019	91,523	551	91,247	2,405,713	26.3
59–60	0.006484	90,972	590	90,677	2,314,466	25.4
60–61	0.007018	90,382	634	90,065	2,223,789	24.6
61–62	0.007629	89,748	685	89,405	2,133,724	23.8
62–63	0.008337	89,063	742	88,692	2,044,319	23.0

Table 1. Life table for the Hispanic population: United States, 2006—Con.

Age	Probability of dying between ages x to $x+1$	Number surviving to age x	Number dying between ages x to $x+1$	Person-years lived between ages x to $x+1$	Total number of person-years lived above age x	Expectation of life at age x
	q_x	l_x	d_x	L_x	T_x	e_x
63–64	0.009131	88,320	806	87,917	1,955,627	22.1
64–65	0.009997	87,514	875	87,077	1,867,710	21.3
65–66	0.010937	86,639	948	86,165	1,780,633	20.6
66–67	0.011969	85,691	1,026	85,179	1,694,468	19.8
67–68	0.013092	84,666	1,108	84,112	1,609,289	19.0
68–69	0.014322	83,557	1,197	82,959	1,525,178	18.3
69–70	0.015670	82,361	1,291	81,715	1,442,219	17.5
70–71	0.017094	81,070	1,386	80,377	1,360,503	16.8
71–72	0.018615	79,684	1,483	78,943	1,280,126	16.1
72–73	0.020322	78,201	1,589	77,406	1,201,184	15.4
73–74	0.022257	76,612	1,705	75,759	1,123,777	14.7
74–75	0.024396	74,907	1,827	73,993	1,048,018	14.0
75–76	0.026621	73,079	1,945	72,106	974,025	13.3
76–77	0.028991	71,134	2,062	70,103	901,919	12.7
77–78	0.031773	69,071	2,195	67,974	831,816	12.0
78–79	0.035067	66,877	2,345	65,704	763,842	11.4
79–80	0.038878	64,532	2,509	63,277	698,138	10.8
80–81	0.043196	62,023	2,679	60,683	634,861	10.2
81–82	0.048024	59,344	2,850	57,919	574,177	9.7
82–83	0.052933	56,494	2,990	54,999	516,259	9.1
83–84	0.058313	53,503	3,120	51,944	461,260	8.6
84–85	0.064202	50,384	3,235	48,766	409,316	8.1
85–86	0.070642	47,149	3,331	45,483	360,550	7.6
86–87	0.077674	43,818	3,404	42,116	315,067	7.2
87–88	0.085342	40,415	3,449	38,690	272,950	6.8
88–89	0.093691	36,966	3,463	35,234	234,260	6.3
89–90	0.102764	33,502	3,443	31,781	199,026	5.9
90–91	0.112606	30,059	3,385	28,367	167,246	5.6
91–92	0.123262	26,675	3,288	25,031	138,879	5.2
92–93	0.134773	23,387	3,152	21,811	113,848	4.9
93–94	0.147178	20,235	2,978	18,746	92,038	4.5
94–95	0.160513	17,257	2,770	15,872	73,292	4.2
95–96	0.174809	14,487	2,532	13,220	57,420	4.0
96–97	0.190090	11,954	2,272	10,818	44,200	3.7
97–98	0.206373	9,682	1,998	8,683	33,382	3.4
98–99	0.223665	7,684	1,719	6,825	24,699	3.2
99–100	0.241964	5,965	1,443	5,244	17,874	3.0
100 and over	1.00000	4,522	4,522	12,631	12,631	2.8

Table 2. Life table for Hispanic males: United States, 2006

Age	Probability of dying between ages x to $x+1$	Number surviving to age x	Number dying between ages x to $x+1$	Person-years lived between ages x to $x+1$	Total number of person-years lived above age x	Expectation of life at age x
	q_x	l_x	d_x	L_x	T_x	e_x
0–1	0.006030	100,000	603	99,471	7,789,415	77.9
1–2	0.000395	99,397	39	99,377	7,689,944	77.4
2–3	0.000330	99,358	33	99,341	7,590,567	76.4
3–4	0.000212	99,325	21	99,314	7,491,226	75.4
4–5	0.000211	99,304	21	99,293	7,391,911	74.4
5–6	0.000170	99,283	17	99,274	7,292,618	73.5
6–7	0.000154	99,266	15	99,258	7,193,343	72.5
7–8	0.000139	99,251	14	99,244	7,094,085	71.5
8–9	0.000118	99,237	12	99,231	6,994,841	70.5
9–10	0.000093	99,225	9	99,221	6,895,610	69.5
10–11	0.000075	99,216	7	99,212	6,796,389	68.5
11–12	0.000083	99,209	8	99,205	6,697,177	67.5
12–13	0.000138	99,200	14	99,194	6,597,973	66.5
13–14	0.000257	99,187	25	99,174	6,498,779	65.5
14–15	0.000427	99,161	42	99,140	6,399,605	64.5
15–16	0.000623	99,119	62	99,088	6,300,465	63.6
16–17	0.000816	99,057	81	99,017	6,201,377	62.6
17–18	0.000993	98,976	98	98,927	6,102,360	61.7
18–19	0.001131	98,878	112	98,822	6,003,433	60.7
19–20	0.001229	98,766	121	98,706	5,904,611	59.8
20–21	0.001321	98,645	130	98,580	5,805,905	58.9
21–22	0.001403	98,515	138	98,445	5,707,326	57.9
22–23	0.001434	98,376	141	98,306	5,608,880	57.0
23–24	0.001406	98,235	138	98,166	5,510,574	56.1
24–25	0.001341	98,097	131	98,031	5,412,408	55.2
25–26	0.001263	97,966	124	97,904	5,314,377	54.2
26–27	0.001198	97,842	117	97,783	5,216,473	53.3
27–28	0.001153	97,725	113	97,668	5,118,690	52.4
28–29	0.001135	97,612	111	97,557	5,021,021	51.4
29–30	0.001140	97,501	111	97,446	4,923,464	50.5
30–31	0.001151	97,390	112	97,334	4,826,019	49.6
31–32	0.001163	97,278	113	97,221	4,728,685	48.6
32–33	0.001166	97,165	113	97,108	4,631,463	47.7
33–34	0.001227	97,052	119	96,992	4,534,355	46.7
34–35	0.001282	96,933	124	96,870	4,437,363	45.8
35–36	0.001345	96,808	130	96,743	4,340,492	44.8
36–37	0.001421	96,678	137	96,609	4,243,749	43.9
37–38	0.001524	96,541	147	96,467	4,147,140	43.0
38–39	0.001657	96,394	160	96,314	4,050,672	42.0
39–40	0.001815	96,234	175	96,147	3,954,359	41.1
40–41	0.001995	96,059	192	95,963	3,858,212	40.2
41–42	0.002183	95,868	209	95,763	3,762,249	39.2
42–43	0.002364	95,658	226	95,545	3,666,486	38.3
43–44	0.002530	95,432	241	95,311	3,570,940	37.4
44–45	0.002690	95,191	256	95,063	3,475,629	36.5
45–46	0.002857	94,935	271	94,799	3,380,566	35.6
46–47	0.003049	94,663	289	94,519	3,285,767	34.7
47–48	0.003285	94,375	310	94,220	3,191,248	33.8
48–49	0.003580	94,065	337	93,896	3,097,028	32.9
49–50	0.003932	93,728	369	93,544	3,003,132	32.0
50–51	0.004330	93,360	404	93,157	2,909,588	31.2
51–52	0.004757	92,955	442	92,734	2,816,431	30.3
52–53	0.005196	92,513	481	92,273	2,723,697	29.4
53–54	0.005621	92,032	517	91,774	2,631,424	28.6
54–55	0.006032	91,515	552	91,239	2,539,650	27.8
55–56	0.006468	90,963	588	90,669	2,448,411	26.9
56–57	0.006940	90,375	627	90,061	2,357,742	26.1
57–58	0.007420	89,748	666	89,415	2,267,681	25.3
58–59	0.007913	89,082	705	88,729	2,178,266	24.5
59–60	0.008448	88,377	747	88,003	2,089,537	23.6
60–61	0.009037	87,630	792	87,234	2,001,533	22.8
61–62	0.009720	86,838	844	86,416	1,914,299	22.0
62–63	0.010541	85,994	906	85,541	1,827,883	21.3

Table 2. Life table for Hispanic males: United States, 2006—Con.

Age	Probability of dying between ages x to $x+1$	Number surviving to age x	Number dying between ages x to $x+1$	Person-years lived between ages x to $x+1$	Total number of person-years lived above age x	Expectation of life at age x
	q_x	l_x	d_x	L_x	T_x	e_x
63–64	0.011514	85,088	980	84,598	1,742,342	20.5
64–65	0.012609	84,108	1,061	83,578	1,657,744	19.7
65–66	0.013794	83,048	1,146	82,475	1,574,166	19.0
66–67	0.015069	81,902	1,234	81,285	1,491,692	18.2
67–68	0.016447	80,668	1,327	80,004	1,410,407	17.5
68–69	0.017949	79,341	1,424	78,629	1,330,402	16.8
69–70	0.019590	77,917	1,526	77,154	1,251,773	16.1
70–71	0.021335	76,391	1,630	75,576	1,174,620	15.4
71–72	0.023185	74,761	1,733	73,894	1,099,044	14.7
72–73	0.025208	73,028	1,841	72,107	1,025,150	14.0
73–74	0.027433	71,187	1,953	70,210	953,043	13.4
74–75	0.029837	69,234	2,066	68,201	882,833	12.8
75–76	0.032292	67,168	2,169	66,084	814,632	12.1
76–77	0.035015	64,999	2,276	63,861	748,548	11.5
77–78	0.038310	62,723	2,403	61,522	684,687	10.9
78–79	0.042298	60,320	2,551	59,044	623,165	10.3
79–80	0.046949	57,769	2,712	56,413	564,121	9.8
80–81	0.052228	55,057	2,875	53,619	507,708	9.2
81–82	0.058095	52,181	3,031	50,665	454,089	8.7
82–83	0.063844	49,150	3,138	47,581	403,424	8.2
83–84	0.070120	46,012	3,226	44,399	355,843	7.7
84–85	0.076962	42,785	3,293	41,139	311,445	7.3
85–86	0.084411	39,493	3,334	37,826	270,306	6.8
86–87	0.092509	36,159	3,345	34,486	232,480	6.4
87–88	0.101298	32,814	3,324	31,152	197,994	6.0
88–89	0.110820	29,490	3,268	27,856	166,842	5.7
89–90	0.121116	26,222	3,176	24,634	138,986	5.3
90–91	0.132226	23,046	3,047	21,522	114,352	5.0
91–92	0.144189	19,999	2,884	18,557	92,830	4.6
92–93	0.157038	17,115	2,688	15,771	74,273	4.3
93–94	0.170803	14,427	2,464	13,195	58,501	4.1
94–95	0.185510	11,963	2,219	10,853	45,306	3.8
95–96	0.201175	9,744	1,960	8,764	34,453	3.5
96–97	0.217810	7,784	1,695	6,936	25,689	3.3
97–98	0.235415	6,088	1,433	5,372	18,753	3.1
98–99	0.253981	4,655	1,182	4,064	13,381	2.9
99–100	0.273487	3,473	950	2,998	9,318	2.7
100 and over	1.00000	2,523	2,523	6,320	6,320	2.5

Table 3. Life table for Hispanic females: United States, 2006

Age	Probability of dying between ages x to $x+1$	Number surviving to age x	Number dying between ages x to $x+1$	Person-years lived between ages x to $x+1$	Total number of person-years lived above age x	Expectation of life at age x
	q_x	l_x	d_x	L_x	T_x	e_x
0–1	0.005062	100,000	506	99,553	8,312,283	83.1
1–2	0.000386	99,494	38	99,475	8,212,730	82.5
2–3	0.000239	99,455	24	99,444	8,113,256	81.6
3–4	0.000178	99,432	18	99,423	8,013,812	80.6
4–5	0.000151	99,414	15	99,406	7,914,389	79.6
5–6	0.000124	99,399	12	99,393	7,814,983	78.6
6–7	0.000105	99,387	10	99,381	7,715,590	77.6
7–8	0.000093	99,376	9	99,372	7,616,209	76.6
8–9	0.000089	99,367	9	99,362	7,516,837	75.6
9–10	0.000091	99,358	9	99,354	7,417,475	74.7
10–11	0.000099	99,349	10	99,344	7,318,121	73.7
11–12	0.000112	99,339	11	99,334	7,218,777	72.7
12–13	0.000132	99,328	13	99,322	7,119,443	71.7
13–14	0.000157	99,315	16	99,307	7,020,122	70.7
14–15	0.000187	99,300	19	99,290	6,920,815	69.7
15–16	0.000222	99,281	22	99,270	6,821,524	68.7
16–17	0.000258	99,259	26	99,246	6,722,254	67.7
17–18	0.000291	99,233	29	99,219	6,623,008	66.7
18–19	0.000316	99,205	31	99,189	6,523,789	65.8
19–20	0.000334	99,173	33	99,157	6,424,600	64.8
20–21	0.000353	99,140	35	99,123	6,325,444	63.8
21–22	0.000371	99,105	37	99,087	6,226,321	62.8
22–23	0.000381	99,068	38	99,049	6,127,234	61.8
23–24	0.000380	99,031	38	99,012	6,028,185	60.9
24–25	0.000371	98,993	37	98,975	5,929,173	59.9
25–26	0.000361	98,956	36	98,938	5,830,199	58.9
26–27	0.000355	98,921	35	98,903	5,731,260	57.9
27–28	0.000353	98,885	35	98,868	5,632,357	57.0
28–29	0.000358	98,851	35	98,833	5,533,489	56.0
29–30	0.000370	98,815	37	98,797	5,434,656	55.0
30–31	0.000383	98,779	38	98,760	5,335,859	54.0
31–32	0.000401	98,741	40	98,721	5,237,100	53.0
32–33	0.000426	98,701	42	98,680	5,138,379	52.1
33–34	0.000474	98,659	47	98,636	5,039,698	51.1
34–35	0.000531	98,612	52	98,586	4,941,063	50.1
35–36	0.000599	98,560	59	98,530	4,842,476	49.1
36–37	0.000672	98,501	66	98,468	4,743,946	48.2
37–38	0.000744	98,435	73	98,398	4,645,478	47.2
38–39	0.000810	98,362	80	98,322	4,547,080	46.2
39–40	0.000873	98,282	86	98,239	4,448,758	45.3
40–41	0.000937	98,196	92	98,150	4,350,519	44.3
41–42	0.001013	98,104	99	98,054	4,252,369	43.3
42–43	0.001115	98,005	109	97,950	4,154,314	42.4
43–44	0.001254	97,895	123	97,834	4,056,364	41.4
44–45	0.001424	97,773	139	97,703	3,958,530	40.5
45–46	0.001615	97,633	158	97,555	3,860,827	39.5
46–47	0.001810	97,476	176	97,388	3,763,272	38.6
47–48	0.002005	97,299	195	97,202	3,665,885	37.7
48–49	0.002190	97,104	213	96,998	3,568,683	36.8
49–50	0.002371	96,892	230	96,777	3,471,685	35.8
50–51	0.002570	96,662	248	96,538	3,374,908	34.9
51–52	0.002788	96,414	269	96,279	3,278,370	34.0
52–53	0.002994	96,145	288	96,001	3,182,091	33.1
53–54	0.003174	95,857	304	95,705	3,086,090	32.2
54–55	0.003337	95,553	319	95,393	2,990,385	31.3
55–56	0.003495	95,234	333	95,067	2,894,992	30.4
56–57	0.003680	94,901	349	94,726	2,799,924	29.5
57–58	0.003919	94,552	371	94,367	2,705,198	28.6
58–59	0.004248	94,181	400	93,981	2,610,831	27.7
59–60	0.004672	93,781	438	93,562	2,516,850	26.8
60–61	0.005181	93,343	484	93,101	2,423,288	26.0
61–62	0.005754	92,860	534	92,592	2,330,187	25.1
62–63	0.006387	92,325	590	92,030	2,237,594	24.2

Table 3. Life table for Hispanic females: United States, 2006—Con.

Age	Probability of dying between ages x to $x+1$	Number surviving to age x	Number dying between ages x to $x+1$	Person-years lived between ages x to $x+1$	Total number of person-years lived above age x	Expectation of life at age x
	q_x	l_x	d_x	L_x	T_x	e_x
63–64	0.007049	91,736	647	91,412	2,145,564	23.4
64–65	0.007735	91,089	705	90,737	2,054,151	22.6
65–66	0.008481	90,384	767	90,001	1,963,415	21.7
66–67	0.009326	89,618	836	89,200	1,873,413	20.9
67–68	0.010261	88,782	911	88,327	1,784,214	20.1
68–69	0.011303	87,871	993	87,375	1,695,887	19.3
69–70	0.012461	86,878	1,083	86,337	1,608,512	18.5
70–71	0.013684	85,795	1,174	85,208	1,522,176	17.7
71–72	0.015003	84,621	1,270	83,986	1,436,968	17.0
72–73	0.016522	83,352	1,377	82,663	1,352,981	16.2
73–74	0.018294	81,975	1,500	81,225	1,270,318	15.5
74–75	0.020291	80,475	1,633	79,658	1,189,093	14.8
75–76	0.022401	78,842	1,766	77,959	1,109,435	14.1
76–77	0.024578	77,076	1,894	76,129	1,031,476	13.4
77–78	0.027085	75,181	2,036	74,163	955,347	12.7
78–79	0.030020	73,145	2,196	72,047	881,184	12.0
79–80	0.033423	70,949	2,371	69,764	809,137	11.4
80–81	0.037310	68,578	2,559	67,299	739,373	10.8
81–82	0.041726	66,019	2,755	64,642	672,075	10.2
82–83	0.046354	63,265	2,933	61,798	607,433	9.6
83–84	0.051467	60,332	3,105	58,779	545,635	9.0
84–85	0.057111	57,227	3,268	55,593	486,855	8.5
85–86	0.063332	53,959	3,417	52,250	431,262	8.0
86–87	0.070181	50,541	3,547	48,768	379,012	7.5
87–88	0.077709	46,994	3,652	45,168	330,245	7.0
88–89	0.085969	43,342	3,726	41,479	285,076	6.6
89–90	0.095017	39,616	3,764	37,734	243,597	6.1
90–91	0.104909	35,852	3,761	33,971	205,863	5.7
91–92	0.115698	32,091	3,713	30,234	171,892	5.4
92–93	0.127439	28,378	3,616	26,570	141,657	5.0
93–94	0.140182	24,762	3,471	23,026	115,087	4.6
94–95	0.153975	21,290	3,278	19,651	92,061	4.3
95–96	0.168858	18,012	3,042	16,491	72,410	4.0
96–97	0.184866	14,971	2,768	13,587	55,918	3.7
97–98	0.202022	12,203	2,465	10,970	42,332	3.5
98–99	0.220341	9,738	2,146	8,665	31,361	3.2
99–100	0.239821	7,592	1,821	6,682	22,696	3.0
100 and over	1.00000	5,771	5,771	16,014	16,014	2.8

Table 4. Life table for the non-Hispanic white population: United States, 2006

Age	Probability of dying between ages x to $x+1$	Number surviving to age x	Number dying between ages x to $x+1$	Person-years lived between ages x to $x+1$	Total number of person-years lived above age x	Expectation of life at age x
	q_x	l_x	d_x	L_x	T_x	e_x
0–1	0.005560	100,000	556	99,511	7,806,739	78.1
1–2	0.000392	99,444	39	99,425	7,707,228	77.5
2–3	0.000252	99,405	25	99,393	7,607,803	76.5
3–4	0.000194	99,380	19	99,370	7,508,411	75.6
4–5	0.000157	99,361	16	99,353	7,409,040	74.6
5–6	0.000152	99,345	15	99,338	7,309,687	73.6
6–7	0.000145	99,330	14	99,323	7,210,350	72.6
7–8	0.000135	99,316	13	99,309	7,111,027	71.6
8–9	0.000118	99,302	12	99,296	7,011,718	70.6
9–10	0.000095	99,291	9	99,286	6,912,422	69.6
10–11	0.000076	99,281	8	99,277	6,813,136	68.6
11–12	0.000075	99,274	7	99,270	6,713,858	67.6
12–13	0.000109	99,266	11	99,261	6,614,589	66.6
13–14	0.000186	99,255	18	99,246	6,515,328	65.6
14–15	0.000292	99,237	29	99,222	6,416,082	64.7
15–16	0.000404	99,208	40	99,188	6,316,859	63.7
16–17	0.000507	99,168	50	99,143	6,217,671	62.7
17–18	0.000602	99,118	60	99,088	6,118,529	61.7
18–19	0.000686	99,058	68	99,024	6,019,441	60.8
19–20	0.000761	98,990	75	98,952	5,920,417	59.8
20–21	0.000838	98,915	83	98,873	5,821,465	58.9
21–22	0.000913	98,832	90	98,787	5,722,591	57.9
22–23	0.000963	98,742	95	98,694	5,623,805	57.0
23–24	0.000982	98,646	97	98,598	5,525,111	56.0
24–25	0.000977	98,550	96	98,501	5,426,513	55.1
25–26	0.000965	98,453	95	98,406	5,328,012	54.1
26–27	0.000957	98,358	94	98,311	5,229,606	53.2
27–28	0.000954	98,264	94	98,217	5,131,295	52.2
28–29	0.000960	98,170	94	98,123	5,033,077	51.3
29–30	0.000976	98,076	96	98,028	4,934,954	50.3
30–31	0.001000	97,980	98	97,931	4,836,926	49.4
31–32	0.001031	97,882	101	97,832	4,738,994	48.4
32–33	0.001079	97,782	106	97,729	4,641,162	47.5
33–34	0.001113	97,676	109	97,622	4,543,434	46.5
34–35	0.001163	97,567	113	97,511	4,445,812	45.6
35–36	0.001220	97,454	119	97,394	4,348,301	44.6
36–37	0.001291	97,335	126	97,272	4,250,907	43.7
37–38	0.001387	97,209	135	97,142	4,153,634	42.7
38–39	0.001511	97,075	147	97,001	4,056,492	41.8
39–40	0.001660	96,928	161	96,847	3,959,491	40.8
40–41	0.001819	96,767	176	96,679	3,862,644	39.9
41–42	0.001984	96,591	192	96,495	3,765,965	39.0
42–43	0.002167	96,399	209	96,295	3,669,470	38.1
43–44	0.002366	96,190	228	96,077	3,573,175	37.1
44–45	0.002579	95,963	247	95,839	3,477,098	36.2
45–46	0.002801	95,715	268	95,581	3,381,259	35.3
46–47	0.003029	95,447	289	95,303	3,285,678	34.4
47–48	0.003269	95,158	311	95,003	3,190,375	33.5
48–49	0.003530	94,847	335	94,680	3,095,372	32.6
49–50	0.003817	94,512	361	94,332	3,000,693	31.7
50–51	0.004132	94,152	389	93,957	2,906,361	30.9
51–52	0.004473	93,763	419	93,553	2,812,404	30.0
52–53	0.004835	93,343	451	93,118	2,718,851	29.1
53–54	0.005203	92,892	483	92,650	2,625,733	28.3
54–55	0.005576	92,409	515	92,151	2,533,083	27.4
55–56	0.005957	91,893	547	91,620	2,440,932	26.6
56–57	0.006368	91,346	582	91,055	2,349,312	25.7
57–58	0.006835	90,764	620	90,454	2,258,257	24.9
58–59	0.007398	90,144	667	89,810	2,167,803	24.0
59–60	0.008081	89,477	723	89,115	2,077,993	23.2
60–61	0.008910	88,754	791	88,359	1,988,878	22.4
61–62	0.009847	87,963	866	87,530	1,900,519	21.6
62–63	0.010827	87,097	943	86,625	1,812,989	20.8

Table 4. Life table for the non-Hispanic white population: United States, 2006—Con.

Age	Probability of dying between ages x to $x+1$	Number surviving to age x	Number dying between ages x to $x+1$	Person-years lived between ages x to $x+1$	Total number of person-years lived above age x	Expectation of life at age x
	q_x	l_x	d_x	L_x	T_x	e_x
63–64	0.011763	86,154	1,013	85,647	1,726,363	20.0
64–65	0.012662	85,141	1,078	84,602	1,640,716	19.3
65–66	0.013644	84,063	1,147	83,489	1,556,115	18.5
66–67	0.014668	82,916	1,216	82,307	1,472,626	17.8
67–68	0.015860	81,699	1,296	81,051	1,390,318	17.0
68–69	0.017242	80,404	1,386	79,710	1,309,267	16.3
69–70	0.018833	79,017	1,488	78,273	1,229,556	15.6
70–71	0.020620	77,529	1,599	76,730	1,151,283	14.8
71–72	0.022666	75,930	1,721	75,070	1,074,553	14.2
72–73	0.025034	74,209	1,858	73,281	999,483	13.5
73–74	0.027733	72,352	2,007	71,348	926,203	12.8
74–75	0.030756	70,345	2,164	69,263	854,854	12.2
75–76	0.034136	68,182	2,327	67,018	785,591	11.5
76–77	0.037808	65,854	2,490	64,609	718,573	10.9
77–78	0.041857	63,364	2,652	62,038	653,964	10.3
78–79	0.046320	60,712	2,812	59,306	591,925	9.7
79–80	0.051233	57,900	2,966	56,417	532,619	9.2
80–81	0.056637	54,934	3,111	53,378	476,203	8.7
81–82	0.062572	51,822	3,243	50,201	422,825	8.2
82–83	0.069084	48,580	3,356	46,902	372,624	7.7
83–84	0.076219	45,224	3,447	43,500	325,722	7.2
84–85	0.084024	41,777	3,510	40,022	282,222	6.8
85–86	0.092548	38,266	3,541	36,496	242,200	6.3
86–87	0.101841	34,725	3,536	32,957	205,705	5.9
87–88	0.111952	31,189	3,492	29,443	172,748	5.5
88–89	0.122930	27,697	3,405	25,995	143,305	5.2
89–90	0.134820	24,292	3,275	22,655	117,311	4.8
90–91	0.147667	21,017	3,104	19,465	94,656	4.5
91–92	0.161509	17,914	2,893	16,467	75,191	4.2
92–93	0.176380	15,020	2,649	13,696	58,724	3.9
93–94	0.192307	12,371	2,379	11,182	45,028	3.6
94–95	0.209307	9,992	2,091	8,946	33,847	3.4
95–96	0.227386	7,901	1,796	7,002	24,900	3.2
96–97	0.246539	6,104	1,505	5,352	17,898	2.9
97–98	0.266749	4,599	1,227	3,986	12,546	2.7
98–99	0.287983	3,372	971	2,887	8,560	2.5
99–100	0.310192	2,401	745	2,029	5,674	2.4
100 and over	1.00000	1,656	1,656	3,645	3,645	2.2

Table 5. Life table for non-Hispanic white males: United States, 2006

Age	Probability of dying between ages x to $x+1$	Number surviving to age x	Number dying between ages x to $x+1$	Person-years lived between ages x to $x+1$	Total number of person-years lived above age x	Expectation of life at age x
	q_x	l_x	d_x	L_x	T_x	e_x
0–1	0.006079	100,000	608	99,466	7,560,477	75.6
1–2	0.000393	99,392	39	99,373	7,461,011	75.1
2–3	0.000273	99,353	27	99,339	7,361,639	74.1
3–4	0.000222	99,326	22	99,315	7,262,299	73.1
4–5	0.000167	99,304	17	99,295	7,162,985	72.1
5–6	0.000167	99,287	17	99,279	7,063,689	71.1
6–7	0.000159	99,271	16	99,263	6,964,410	70.2
7–8	0.000148	99,255	15	99,247	6,865,148	69.2
8–9	0.000127	99,240	13	99,234	6,765,900	68.2
9–10	0.000099	99,227	10	99,223	6,666,666	67.2
10–11	0.000077	99,218	8	99,214	6,567,444	66.2
11–12	0.000078	99,210	8	99,206	6,468,230	65.2
12–13	0.000125	99,202	12	99,196	6,369,024	64.2
13–14	0.000228	99,190	23	99,179	6,269,828	63.2
14–15	0.000370	99,167	37	99,149	6,170,649	62.2
15–16	0.000517	99,131	51	99,105	6,071,501	61.2
16–17	0.000654	99,079	65	99,047	5,972,396	60.3
17–18	0.000793	99,015	78	98,975	5,873,349	59.3
18–19	0.000930	98,936	92	98,890	5,774,374	58.4
19–20	0.001064	98,844	105	98,791	5,675,483	57.4
20–21	0.001207	98,739	119	98,679	5,576,692	56.5
21–22	0.001339	98,620	132	98,554	5,478,013	55.5
22–23	0.001426	98,488	140	98,417	5,379,459	54.6
23–24	0.001452	98,347	143	98,276	5,281,042	53.7
24–25	0.001430	98,204	140	98,134	5,182,766	52.8
25–26	0.001391	98,064	136	97,996	5,084,631	51.9
26–27	0.001361	97,928	133	97,861	4,986,636	50.9
27–28	0.001338	97,794	131	97,729	4,888,774	50.0
28–29	0.001333	97,664	130	97,598	4,791,046	49.1
29–30	0.001344	97,533	131	97,468	4,693,447	48.1
30–31	0.001365	97,402	133	97,336	4,595,979	47.2
31–32	0.001391	97,269	135	97,202	4,498,643	46.2
32–33	0.001442	97,134	140	97,064	4,401,442	45.3
33–34	0.001465	96,994	142	96,923	4,304,378	44.4
34–35	0.001514	96,852	147	96,779	4,207,455	43.4
35–36	0.001573	96,705	152	96,629	4,110,676	42.5
36–37	0.001652	96,553	160	96,473	4,014,047	41.6
37–38	0.001762	96,394	170	96,309	3,917,573	40.6
38–39	0.001908	96,224	184	96,132	3,821,265	39.7
39–40	0.002086	96,040	200	95,940	3,725,133	38.8
40–41	0.002277	95,840	218	95,731	3,629,193	37.9
41–42	0.002479	95,622	237	95,503	3,533,462	37.0
42–43	0.002706	95,385	258	95,256	3,437,958	36.0
43–44	0.002957	95,127	281	94,986	3,342,703	35.1
44–45	0.003228	94,845	306	94,692	3,247,717	34.2
45–46	0.003507	94,539	332	94,373	3,153,025	33.4
46–47	0.003795	94,208	358	94,029	3,058,651	32.5
47–48	0.004107	93,850	385	93,657	2,964,623	31.6
48–49	0.004453	93,465	416	93,257	2,870,965	30.7
49–50	0.004839	93,048	450	92,823	2,777,709	29.9
50–51	0.005265	92,598	487	92,354	2,684,885	29.0
51–52	0.005717	92,111	527	91,847	2,592,531	28.1
52–53	0.006180	91,584	566	91,301	2,500,683	27.3
53–54	0.006628	91,018	603	90,717	2,409,382	26.5
54–55	0.007063	90,415	639	90,096	2,318,666	25.6
55–56	0.007503	89,776	674	89,440	2,228,570	24.8
56–57	0.007979	89,103	711	88,747	2,139,131	24.0
57–58	0.008522	88,392	753	88,015	2,050,383	23.2
58–59	0.009181	87,639	805	87,236	1,962,368	22.4
59–60	0.009985	86,834	867	86,400	1,875,132	21.6
60–61	0.010957	85,967	942	85,496	1,788,731	20.8
61–62	0.012058	85,025	1,025	84,512	1,703,236	20.0
62–63	0.013230	84,000	1,111	83,444	1,618,723	19.3

Table 5. Life table for non-Hispanic white males: United States, 2006—Con.

Age	Probability of dying between ages x to $x+1$	Number surviving to age x	Number dying between ages x to $x+1$	Person-years lived between ages x to $x+1$	Total number of person-years lived above age x	Expectation of life at age x
	q_x	l_x	d_x	L_x	T_x	e_x
63–64	0.014378	82,888	1,192	82,293	1,535,279	18.5
64–65	0.015500	81,697	1,266	81,063	1,452,987	17.8
65–66	0.016729	80,430	1,345	79,758	1,371,923	17.1
66–67	0.018013	79,085	1,425	78,373	1,292,166	16.3
67–68	0.019480	77,660	1,513	76,904	1,213,793	15.6
68–69	0.021156	76,147	1,611	75,342	1,136,889	14.9
69–70	0.023071	74,536	1,720	73,677	1,061,547	14.2
70–71	0.025211	72,817	1,836	71,899	987,871	13.6
71–72	0.027672	70,981	1,964	69,999	915,972	12.9
72–73	0.030548	69,017	2,108	67,963	845,973	12.3
73–74	0.033841	66,908	2,264	65,776	778,010	11.6
74–75	0.037505	64,644	2,424	63,432	712,234	11.0
75–76	0.041550	62,220	2,585	60,927	648,802	10.4
76–77	0.045911	59,635	2,738	58,266	587,875	9.9
77–78	0.050707	56,897	2,885	55,454	529,609	9.3
78–79	0.055974	54,012	3,023	52,500	474,155	8.8
79–80	0.061752	50,988	3,149	49,414	421,655	8.3
80–81	0.068084	47,840	3,257	46,211	372,241	7.8
81–82	0.075014	44,583	3,344	42,910	326,030	7.3
82–83	0.082586	41,238	3,406	39,535	283,119	6.9
83–84	0.090847	37,833	3,437	36,114	243,584	6.4
84–85	0.099845	34,396	3,434	32,679	207,470	6.0
85–86	0.109627	30,961	3,394	29,264	174,791	5.6
86–87	0.120238	27,567	3,315	25,910	145,527	5.3
87–88	0.131726	24,253	3,195	22,655	119,617	4.9
88–89	0.144130	21,058	3,035	19,540	96,962	4.6
89–90	0.157491	18,023	2,838	16,604	77,421	4.3
90–91	0.171842	15,184	2,609	13,880	60,818	4.0
91–92	0.187210	12,575	2,354	11,398	46,938	3.7
92–93	0.203615	10,221	2,081	9,180	35,540	3.5
93–94	0.221066	8,140	1,799	7,240	26,359	3.2
94–95	0.239563	6,340	1,519	5,581	19,119	3.0
95–96	0.259092	4,821	1,249	4,197	13,539	2.8
96–97	0.279629	3,572	999	3,073	9,342	2.6
97–98	0.301131	2,573	775	2,186	6,269	2.4
98–99	0.323544	1,798	582	1,507	4,083	2.3
99–100	0.346798	1,217	422	1,006	2,576	2.1
100 and over	1.00000	795	795	1,570	1,570	2.0

Table 6. Life table for non-Hispanic white females: United States, 2006

Age	Probability of dying between ages x to $x+1$	Number surviving to age x	Number dying between ages x to $x+1$	Person-years lived between ages x to $x+1$	Total number of person-years lived above age x	Expectation of life at age x
	q_x	l_x	d_x	L_x	T_x	e_x
0–1	0.005014	100,000	501	99,560	8,044,925	80.4
1–2	0.000392	99,499	39	99,479	7,945,364	79.9
2–3	0.000229	99,460	23	99,448	7,845,885	78.9
3–4	0.000165	99,437	16	99,429	7,746,437	77.9
4–5	0.000146	99,420	14	99,413	7,647,009	76.9
5–6	0.000136	99,406	14	99,399	7,547,595	75.9
6–7	0.000129	99,392	13	99,386	7,448,196	74.9
7–8	0.000121	99,380	12	99,374	7,348,810	73.9
8–9	0.000108	99,368	11	99,362	7,249,436	73.0
9–10	0.000091	99,357	9	99,352	7,150,074	72.0
10–11	0.000075	99,348	7	99,344	7,050,722	71.0
11–12	0.000072	99,340	7	99,337	6,951,378	70.0
12–13	0.000092	99,333	9	99,329	6,852,041	69.0
13–14	0.000141	99,324	14	99,317	6,752,712	68.0
14–15	0.000209	99,310	21	99,300	6,653,395	67.0
15–16	0.000284	99,289	28	99,275	6,554,095	66.0
16–17	0.000351	99,261	35	99,244	6,454,820	65.0
17–18	0.000401	99,226	40	99,206	6,355,576	64.1
18–19	0.000429	99,187	43	99,165	6,256,370	63.1
19–20	0.000441	99,144	44	99,122	6,157,204	62.1
20–21	0.000449	99,100	44	99,078	6,058,082	61.1
21–22	0.000462	99,056	46	99,033	5,959,004	60.2
22–23	0.000475	99,010	47	98,987	5,859,971	59.2
23–24	0.000490	98,963	48	98,939	5,760,985	58.2
24–25	0.000507	98,915	50	98,889	5,662,046	57.2
25–26	0.000526	98,864	52	98,838	5,563,157	56.3
26–27	0.000546	98,812	54	98,785	5,464,318	55.3
27–28	0.000565	98,758	56	98,731	5,365,533	54.3
28–29	0.000584	98,703	58	98,674	5,266,802	53.4
29–30	0.000604	98,645	60	98,615	5,168,128	52.4
30–31	0.000631	98,585	62	98,554	5,069,513	51.4
31–32	0.000668	98,523	66	98,490	4,970,959	50.5
32–33	0.000715	98,457	70	98,422	4,872,469	49.5
33–34	0.000758	98,387	75	98,350	4,774,046	48.5
34–35	0.000809	98,312	80	98,273	4,675,697	47.6
35–36	0.000863	98,233	85	98,191	4,577,424	46.6
36–37	0.000927	98,148	91	98,103	4,479,233	45.6
37–38	0.001008	98,057	99	98,008	4,381,131	44.7
38–39	0.001111	97,958	109	97,904	4,283,123	43.7
39–40	0.001233	97,850	121	97,789	4,185,219	42.8
40–41	0.001360	97,729	133	97,662	4,087,429	41.8
41–42	0.001490	97,596	145	97,523	3,989,767	40.9
42–43	0.001629	97,451	159	97,371	3,892,244	39.9
43–44	0.001779	97,292	173	97,205	3,794,872	39.0
44–45	0.001935	97,119	188	97,025	3,697,667	38.1
45–46	0.002099	96,931	203	96,829	3,600,642	37.1
46–47	0.002269	96,727	219	96,618	3,503,813	36.2
47–48	0.002440	96,508	235	96,390	3,407,195	35.3
48–49	0.002617	96,273	252	96,147	3,310,805	34.4
49–50	0.002808	96,021	270	95,886	3,214,658	33.5
50–51	0.003016	95,751	289	95,607	3,118,772	32.6
51–52	0.003251	95,462	310	95,307	3,023,166	31.7
52–53	0.003516	95,152	335	94,985	2,927,859	30.8
53–54	0.003809	94,817	361	94,637	2,832,874	29.9
54–55	0.004124	94,456	390	94,261	2,738,237	29.0
55–56	0.004453	94,067	419	93,857	2,643,976	28.1
56–57	0.004803	93,648	450	93,423	2,550,119	27.2
57–58	0.005202	93,198	485	92,956	2,456,696	26.4
58–59	0.005680	92,713	527	92,450	2,363,740	25.5
59–60	0.006256	92,187	577	91,898	2,271,290	24.6
60–61	0.006961	91,610	638	91,291	2,179,392	23.8
61–62	0.007759	90,972	706	90,619	2,088,101	23.0
62–63	0.008576	90,266	774	89,879	1,997,482	22.1

Table 6. Life table for non-Hispanic white females: United States, 2006—Con.

Age	Probability of dying between ages x to $x+1$	Number surviving to age x	Number dying between ages x to $x+1$	Person-years lived between ages x to $x+1$	Total number of person-years lived above age x	Expectation of life at age x
	q_x	l_x	d_x	L_x	T_x	e_x
63–64	0.009332	89,492	835	89,075	1,907,603	21.3
64–65	0.010041	88,657	890	88,212	1,818,528	20.5
65–66	0.010818	87,767	949	87,292	1,730,316	19.7
66–67	0.011635	86,817	1,010	86,312	1,643,024	18.9
67–68	0.012616	85,807	1,083	85,266	1,556,711	18.1
68–69	0.013784	84,725	1,168	84,141	1,471,446	17.4
69–70	0.015147	83,557	1,266	82,924	1,387,305	16.6
70–71	0.016696	82,291	1,374	81,604	1,304,381	15.9
71–72	0.018468	80,917	1,494	80,170	1,222,776	15.1
72–73	0.020503	79,423	1,628	78,609	1,142,606	14.4
73–74	0.022823	77,795	1,775	76,907	1,063,997	13.7
74–75	0.025453	76,019	1,935	75,052	987,091	13.0
75–76	0.028446	74,084	2,107	73,030	912,039	12.3
76–77	0.031723	71,977	2,283	70,835	839,008	11.7
77–78	0.035362	69,694	2,465	68,461	768,173	11.0
78–79	0.039403	67,229	2,649	65,904	699,712	10.4
79–80	0.043884	64,580	2,834	63,163	633,808	9.8
80–81	0.048849	61,746	3,016	60,238	570,645	9.2
81–82	0.054344	58,730	3,192	57,134	510,407	8.7
82–83	0.060418	55,538	3,355	53,860	453,273	8.2
83–84	0.067122	52,183	3,503	50,431	399,413	7.7
84–85	0.074512	48,680	3,627	46,866	348,982	7.2
85–86	0.082642	45,053	3,723	43,191	302,115	6.7
86–87	0.091572	41,329	3,785	39,437	258,924	6.3
87–88	0.101361	37,545	3,806	35,642	219,487	5.8
88–89	0.112067	33,739	3,781	31,849	183,845	5.4
89–90	0.123747	29,958	3,707	28,105	151,996	5.1
90–91	0.136458	26,251	3,582	24,460	123,892	4.7
91–92	0.150251	22,669	3,406	20,966	99,432	4.4
92–93	0.165172	19,263	3,182	17,672	78,466	4.1
93–94	0.181258	16,081	2,915	14,624	60,794	3.8
94–95	0.198538	13,166	2,614	11,859	46,171	3.5
95–96	0.217029	10,552	2,290	9,407	34,311	3.3
96–97	0.236733	8,262	1,956	7,284	24,904	3.0
97–98	0.257637	6,306	1,625	5,494	17,620	2.8
98–99	0.279711	4,682	1,309	4,027	12,126	2.6
99–100	0.302905	3,372	1,021	2,861	8,099	2.4
100 and over	1.00000	2,351	2,351	5,238	5,238	2.2

Table 7. Life table for the non-Hispanic black population: United States, 2006

Age	Probability of dying between ages x to $x+1$	Number surviving to age x	Number dying between ages x to $x+1$	Person-years lived between ages x to $x+1$	Total number of person-years lived above age x	Expectation of life at age x
	q_x	l_x	d_x	L_x	T_x	e_x
0–1	0.014154	100,000	1,415	98,752	7,285,083	72.9
1–2	0.000720	98,585	71	98,549	7,186,332	72.9
2–3	0.000493	98,514	49	98,489	7,087,783	71.9
3–4	0.000325	98,465	32	98,449	6,989,293	71.0
4–5	0.000273	98,433	27	98,420	6,890,844	70.0
5–6	0.000261	98,406	26	98,393	6,792,425	69.0
6–7	0.000237	98,380	23	98,369	6,694,031	68.0
7–8	0.000214	98,357	21	98,347	6,595,662	67.1
8–9	0.000186	98,336	18	98,327	6,497,316	66.1
9–10	0.000154	98,318	15	98,310	6,398,989	65.1
10–11	0.000131	98,303	13	98,296	6,300,678	64.1
11–12	0.000134	98,290	13	98,283	6,202,382	63.1
12–13	0.000183	98,277	18	98,268	6,104,099	62.1
13–14	0.000288	98,259	28	98,245	6,005,831	61.1
14–15	0.000432	98,231	42	98,209	5,907,586	60.1
15–16	0.000591	98,188	58	98,159	5,809,377	59.2
16–17	0.000741	98,130	73	98,094	5,711,218	58.2
17–18	0.000883	98,057	87	98,014	5,613,124	57.2
18–19	0.001013	97,971	99	97,921	5,515,110	56.3
19–20	0.001133	97,872	111	97,816	5,417,189	55.4
20–21	0.001262	97,761	123	97,699	5,319,373	54.4
21–22	0.001395	97,637	136	97,569	5,221,674	53.5
22–23	0.001503	97,501	147	97,428	5,124,105	52.6
23–24	0.001573	97,355	153	97,278	5,026,677	51.6
24–25	0.001612	97,201	157	97,123	4,929,399	50.7
25–26	0.001643	97,045	159	96,965	4,832,276	49.8
26–27	0.001679	96,885	163	96,804	4,735,311	48.9
27–28	0.001716	96,723	166	96,640	4,638,507	48.0
28–29	0.001758	96,557	170	96,472	4,541,867	47.0
29–30	0.001808	96,387	174	96,300	4,445,396	46.1
30–31	0.001867	96,213	180	96,123	4,349,096	45.2
31–32	0.001935	96,033	186	95,940	4,252,973	44.3
32–33	0.002040	95,847	196	95,749	4,157,033	43.4
33–34	0.002103	95,652	201	95,551	4,061,283	42.5
34–35	0.002203	95,451	210	95,345	3,965,732	41.5
35–36	0.002312	95,240	220	95,130	3,870,387	40.6
36–37	0.002442	95,020	232	94,904	3,775,256	39.7
37–38	0.002601	94,788	247	94,665	3,680,352	38.8
38–39	0.002796	94,542	264	94,409	3,585,688	37.9
39–40	0.003023	94,277	285	94,135	3,491,278	37.0
40–41	0.003263	93,992	307	93,839	3,397,143	36.1
41–42	0.003519	93,686	330	93,521	3,303,305	35.3
42–43	0.003814	93,356	356	93,178	3,209,784	34.4
43–44	0.004159	93,000	387	92,806	3,116,606	33.5
44–45	0.004547	92,613	421	92,403	3,023,799	32.6
45–46	0.004953	92,192	457	91,964	2,931,397	31.8
46–47	0.005377	91,735	493	91,489	2,839,433	31.0
47–48	0.005854	91,242	534	90,975	2,747,945	30.1
48–49	0.006404	90,708	581	90,417	2,656,970	29.3
49–50	0.007030	90,127	634	89,810	2,566,552	28.5
50–51	0.007726	89,493	691	89,148	2,476,742	27.7
51–52	0.008465	88,802	752	88,426	2,387,594	26.9
52–53	0.009208	88,050	811	87,645	2,299,168	26.1
53–54	0.009909	87,240	864	86,807	2,211,523	25.4
54–55	0.010567	86,375	913	85,919	2,124,716	24.6
55–56	0.011241	85,462	961	84,982	2,038,797	23.9
56–57	0.011963	84,502	1,011	83,996	1,953,815	23.1
57–58	0.012714	83,491	1,062	82,960	1,869,819	22.4
58–59	0.013538	82,429	1,116	81,871	1,786,859	21.7
59–60	0.014480	81,313	1,177	80,725	1,704,987	21.0
60–61	0.015597	80,136	1,250	79,511	1,624,263	20.3
61–62	0.016877	78,886	1,331	78,220	1,544,752	19.6
62–63	0.018227	77,555	1,414	76,848	1,466,531	18.9

Table 7. Life table for the non-Hispanic black population: United States, 2006—Con.

Age	Probability of dying between ages x to $x+1$	Number surviving to age x	Number dying between ages x to $x+1$	Person-years lived between ages x to $x+1$	Total number of person-years lived above age x	Expectation of life at age x
	q_x	l_x	d_x	L_x	T_x	e_x
63–64	0.019488	76,141	1,484	75,399	1,389,684	18.3
64–65	0.020613	74,657	1,539	73,888	1,314,284	17.6
65–66	0.021691	73,118	1,586	72,325	1,240,397	17.0
66–67	0.022760	71,532	1,628	70,718	1,168,071	16.3
67–68	0.024071	69,904	1,683	69,063	1,097,353	15.7
68–69	0.025702	68,222	1,753	67,345	1,028,290	15.1
69–70	0.027620	66,468	1,836	65,550	960,945	14.5
70–71	0.029728	64,632	1,921	63,672	895,395	13.9
71–72	0.032027	62,711	2,008	61,707	831,723	13.3
72–73	0.034618	60,703	2,101	59,652	770,016	12.7
73–74	0.037529	58,601	2,199	57,501	710,364	12.1
74–75	0.040755	56,402	2,299	55,253	652,863	11.6
75–76	0.044287	54,103	2,396	52,905	597,610	11.0
76–77	0.047893	51,707	2,476	50,469	544,705	10.5
77–78	0.051778	49,231	2,549	47,956	494,236	10.0
78–79	0.055958	46,682	2,612	45,376	446,280	9.6
79–80	0.060455	44,069	2,664	42,737	400,905	9.1
80–81	0.065289	41,405	2,703	40,054	358,167	8.7
81–82	0.070479	38,702	2,728	37,338	318,114	8.2
82–83	0.076049	35,974	2,736	34,606	280,776	7.8
83–84	0.082020	33,238	2,726	31,875	246,169	7.4
84–85	0.088415	30,512	2,698	29,163	214,294	7.0
85–86	0.095257	27,815	2,650	26,490	185,130	6.7
86–87	0.102568	25,165	2,581	23,874	158,641	6.3
87–88	0.110373	22,584	2,493	21,338	134,766	6.0
88–89	0.118693	20,091	2,385	18,899	113,429	5.6
89–90	0.127550	17,707	2,258	16,577	94,530	5.3
90–91	0.136965	15,448	2,116	14,390	77,952	5.0
91–92	0.146958	13,332	1,959	12,353	63,562	4.8
92–93	0.157547	11,373	1,792	10,477	51,210	4.5
93–94	0.168748	9,581	1,617	8,773	40,733	4.3
94–95	0.180575	7,964	1,438	7,245	31,960	4.0
95–96	0.193039	6,526	1,260	5,896	24,715	3.8
96–97	0.206146	5,266	1,086	4,724	18,818	3.6
97–98	0.219900	4,181	919	3,721	14,095	3.4
98–99	0.234302	3,261	764	2,879	10,374	3.2
99–100	0.249345	2,497	623	2,186	7,494	3.0
100 and over	1.00000	1,875	1,875	5,308	5,308	2.8

Table 8. Life table for non-Hispanic black males: United States, 2006

Age	Probability of dying between ages x to $x+1$	Number surviving to age x	Number dying between ages x to $x+1$	Person-years lived between ages x to $x+1$	Total number of person-years lived above age x	Expectation of life at age x
	q_x	l_x	d_x	L_x	T_x	e_x
0–1	0.015095	100,000	1,509	98,669	6,924,106	69.2
1–2	0.000787	98,491	78	98,452	6,825,438	69.3
2–3	0.000470	98,413	46	98,390	6,726,986	68.4
3–4	0.000388	98,367	38	98,348	6,628,596	67.4
4–5	0.000283	98,329	28	98,315	6,530,248	66.4
5–6	0.000286	98,301	28	98,287	6,431,934	65.4
6–7	0.000274	98,273	27	98,259	6,333,647	64.4
7–8	0.000255	98,246	25	98,233	6,235,388	63.5
8–9	0.000215	98,221	21	98,210	6,137,154	62.5
9–10	0.000159	98,200	16	98,192	6,038,944	61.5
10–11	0.000110	98,184	11	98,179	5,940,753	60.5
11–12	0.000104	98,173	10	98,168	5,842,574	59.5
12–13	0.000181	98,163	18	98,154	5,744,406	58.5
13–14	0.000360	98,145	35	98,128	5,646,252	57.5
14–15	0.000611	98,110	60	98,080	5,548,124	56.6
15–16	0.000887	98,050	87	98,006	5,450,045	55.6
16–17	0.001143	97,963	112	97,907	5,352,038	54.6
17–18	0.001378	97,851	135	97,784	5,254,131	53.7
18–19	0.001579	97,716	154	97,639	5,156,347	52.8
19–20	0.001756	97,562	171	97,476	5,058,708	51.9
20–21	0.001940	97,391	189	97,296	4,961,232	50.9
21–22	0.002130	97,202	207	97,098	4,863,936	50.0
22–23	0.002282	96,995	221	96,884	4,766,838	49.1
23–24	0.002378	96,773	230	96,658	4,669,954	48.3
24–25	0.002431	96,543	235	96,426	4,573,296	47.4
25–26	0.002467	96,308	238	96,190	4,476,870	46.5
26–27	0.002507	96,071	241	95,950	4,380,681	45.6
27–28	0.002542	95,830	244	95,708	4,284,730	44.7
28–29	0.002581	95,586	247	95,463	4,189,022	43.8
29–30	0.002625	95,340	250	95,215	4,093,559	42.9
30–31	0.002675	95,089	254	94,962	3,998,344	42.0
31–32	0.002731	94,835	259	94,706	3,903,382	41.2
32–33	0.002854	94,576	270	94,441	3,808,676	40.3
33–34	0.002871	94,306	271	94,171	3,714,235	39.4
34–35	0.002959	94,035	278	93,896	3,620,064	38.5
35–36	0.003063	93,757	287	93,614	3,526,168	37.6
36–37	0.003191	93,470	298	93,321	3,432,554	36.7
37–38	0.003350	93,172	312	93,016	3,339,234	35.8
38–39	0.003545	92,860	329	92,695	3,246,218	35.0
39–40	0.003778	92,530	350	92,356	3,153,523	34.1
40–41	0.004030	92,181	371	91,995	3,061,167	33.2
41–42	0.004313	91,809	396	91,611	2,969,172	32.3
42–43	0.004661	91,413	426	91,200	2,877,561	31.5
43–44	0.005088	90,987	463	90,756	2,786,360	30.6
44–45	0.005586	90,524	506	90,272	2,695,604	29.8
45–46	0.006107	90,019	550	89,744	2,605,333	28.9
46–47	0.006657	89,469	596	89,171	2,515,589	28.1
47–48	0.007308	88,873	649	88,549	2,426,418	27.3
48–49	0.008101	88,224	715	87,867	2,337,869	26.5
49–50	0.009030	87,509	790	87,114	2,250,003	25.7
50–51	0.010084	86,719	874	86,282	2,162,888	24.9
51–52	0.011194	85,845	961	85,364	2,076,606	24.2
52–53	0.012277	84,884	1,042	84,363	1,991,242	23.5
53–54	0.013236	83,842	1,110	83,287	1,906,880	22.7
54–55	0.014079	82,732	1,165	82,150	1,823,593	22.0
55–56	0.014916	81,567	1,217	80,959	1,741,443	21.3
56–57	0.015824	80,351	1,271	79,715	1,660,484	20.7
57–58	0.016780	79,079	1,327	78,416	1,580,770	20.0
58–59	0.017858	77,752	1,389	77,058	1,502,354	19.3
59–60	0.019118	76,364	1,460	75,634	1,425,296	18.7
60–61	0.020625	74,904	1,545	74,131	1,349,662	18.0
61–62	0.022336	73,359	1,639	72,540	1,275,531	17.4
62–63	0.024108	71,720	1,729	70,856	1,202,991	16.8

Table 8. Life table for non-Hispanic black males: United States, 2006—Con.

Age	Probability of dying between ages x to $x+1$	Number surviving to age x	Number dying between ages x to $x+1$	Person-years lived between ages x to $x+1$	Total number of person-years lived above age x	Expectation of life at age x
	q_x	l_x	d_x	L_x	T_x	e_x
63–64	0.025687	69,991	1,798	69,092	1,132,135	16.2
64–65	0.027009	68,194	1,842	67,273	1,063,043	15.6
65–66	0.028211	66,352	1,872	65,416	995,770	15.0
66–67	0.029550	64,480	1,905	63,527	930,355	14.4
67–68	0.031258	62,574	1,956	61,596	866,827	13.9
68–69	0.033449	60,619	2,028	59,605	805,231	13.3
69–70	0.036040	58,591	2,112	57,535	745,626	12.7
70–71	0.038834	56,479	2,193	55,383	688,091	12.2
71–72	0.041800	54,286	2,269	53,151	632,708	11.7
72–73	0.045084	52,017	2,345	50,844	579,557	11.1
73–74	0.048710	49,672	2,419	48,462	528,713	10.6
74–75	0.052651	47,252	2,488	46,008	480,251	10.2
75–76	0.056865	44,764	2,546	43,492	434,242	9.7
76–77	0.061091	42,219	2,579	40,929	390,751	9.3
77–78	0.065610	39,640	2,601	38,339	349,822	8.8
78–79	0.070437	37,039	2,609	35,734	311,482	8.4
79–80	0.075591	34,430	2,603	33,129	275,748	8.0
80–81	0.081090	31,827	2,581	30,537	242,619	7.6
81–82	0.086950	29,247	2,543	27,975	212,082	7.3
82–83	0.093192	26,704	2,489	25,459	184,107	6.9
83–84	0.099832	24,215	2,417	23,006	158,648	6.6
84–85	0.106890	21,798	2,330	20,633	135,642	6.2
85–86	0.114383	19,468	2,227	18,354	115,009	5.9
86–87	0.122329	17,241	2,109	16,186	96,655	5.6
87–88	0.130746	15,132	1,978	14,143	80,469	5.3
88–89	0.139651	13,153	1,837	12,235	66,326	5.0
89–90	0.149057	11,316	1,687	10,473	54,091	4.8
90–91	0.158980	9,630	1,531	8,864	43,618	4.5
91–92	0.169432	8,099	1,372	7,413	34,754	4.3
92–93	0.180424	6,727	1,214	6,120	27,341	4.1
93–94	0.191964	5,513	1,058	4,984	21,221	3.8
94–95	0.204059	4,455	909	4,000	16,238	3.6
95–96	0.216711	3,546	768	3,161	12,237	3.5
96–97	0.229921	2,777	639	2,458	9,076	3.3
97–98	0.243685	2,139	521	1,878	6,618	3.1
98–99	0.257998	1,618	417	1,409	4,740	2.9
99–100	0.272848	1,200	327	1,036	3,331	2.8
100 and over	1.00000	873	873	2,295	2,295	2.6

Table 9. Life table for non-Hispanic black females: United States, 2006

Age	Probability of dying between ages x to $x+1$	Number surviving to age x	Number dying between ages x to $x+1$	Person-years lived between ages x to $x+1$	Total number of person-years lived above age x	Expectation of life at age x
	q_x	l_x	d_x	L_x	T_x	e_x
0–1	0.012611	100,000	1,261	98,886	7,624,497	76.2
1–2	0.000622	98,739	61	98,708	7,525,611	76.2
2–3	0.000497	98,678	49	98,653	7,426,902	75.3
3–4	0.000248	98,628	24	98,616	7,328,249	74.3
4–5	0.000252	98,604	25	98,592	7,229,633	73.3
5–6	0.000225	98,579	22	98,568	7,131,042	72.3
6–7	0.000189	98,557	19	98,548	7,032,473	71.4
7–8	0.000164	98,538	16	98,530	6,933,926	70.4
8–9	0.000148	98,522	15	98,515	6,835,395	69.4
9–10	0.000141	98,508	14	98,501	6,736,880	68.4
10–11	0.000143	98,494	14	98,487	6,638,380	67.4
11–12	0.000154	98,480	15	98,472	6,539,893	66.4
12–13	0.000174	98,465	17	98,456	6,441,421	65.4
13–14	0.000204	98,447	20	98,437	6,342,965	64.4
14–15	0.000241	98,427	24	98,416	6,244,527	63.4
15–16	0.000283	98,404	28	98,390	6,146,112	62.5
16–17	0.000328	98,376	32	98,360	6,047,722	61.5
17–18	0.000377	98,344	37	98,325	5,949,362	60.5
18–19	0.000432	98,306	42	98,285	5,851,037	59.5
19–20	0.000493	98,264	48	98,240	5,752,752	58.5
20–21	0.000561	98,216	55	98,188	5,654,512	57.6
21–22	0.000634	98,160	62	98,129	5,556,324	56.6
22–23	0.000699	98,098	69	98,064	5,458,195	55.6
23–24	0.000752	98,030	74	97,993	5,360,131	54.7
24–25	0.000794	97,956	78	97,917	5,262,138	53.7
25–26	0.000838	97,878	82	97,837	5,164,221	52.8
26–27	0.000887	97,796	87	97,753	5,066,384	51.8
27–28	0.000938	97,709	92	97,664	4,968,631	50.9
28–29	0.000992	97,618	97	97,569	4,870,967	49.9
29–30	0.001054	97,521	103	97,470	4,773,398	48.9
30–31	0.001126	97,418	110	97,363	4,675,928	48.0
31–32	0.001212	97,308	118	97,250	4,578,565	47.1
32–33	0.001316	97,191	128	97,127	4,481,315	46.1
33–34	0.001413	97,063	137	96,994	4,384,189	45.2
34–35	0.001525	96,926	148	96,852	4,287,195	44.2
35–36	0.001641	96,778	159	96,698	4,190,343	43.3
36–37	0.001773	96,619	171	96,533	4,093,645	42.4
37–38	0.001934	96,448	187	96,354	3,997,111	41.4
38–39	0.002130	96,261	205	96,159	3,900,757	40.5
39–40	0.002353	96,056	226	95,943	3,804,599	39.6
40–41	0.002583	95,830	248	95,706	3,708,655	38.7
41–42	0.002816	95,583	269	95,448	3,612,949	37.8
42–43	0.003068	95,313	292	95,167	3,517,501	36.9
43–44	0.003343	95,021	318	94,862	3,422,334	36.0
44–45	0.003638	94,703	345	94,531	3,327,472	35.1
45–46	0.003948	94,359	373	94,172	3,232,941	34.3
46–47	0.004266	93,986	401	93,786	3,138,769	33.4
47–48	0.004597	93,585	430	93,370	3,044,983	32.5
48–49	0.004946	93,155	461	92,925	2,951,613	31.7
49–50	0.005323	92,694	493	92,448	2,858,688	30.8
50–51	0.005731	92,201	528	91,937	2,766,240	30.0
51–52	0.006173	91,673	566	91,390	2,674,303	29.2
52–53	0.006646	91,107	606	90,804	2,582,914	28.4
53–54	0.007141	90,501	646	90,178	2,492,110	27.5
54–55	0.007650	89,855	687	89,511	2,401,931	26.7
55–56	0.008190	89,168	730	88,802	2,312,420	25.9
56–57	0.008763	88,437	775	88,050	2,223,618	25.1
57–58	0.009357	87,662	820	87,252	2,135,568	24.4
58–59	0.009997	86,842	868	86,408	2,048,316	23.6
59–60	0.010720	85,974	922	85,513	1,961,908	22.8
60–61	0.011577	85,052	985	84,560	1,876,395	22.1
61–62	0.012575	84,068	1,057	83,539	1,791,835	21.3
62–63	0.013658	83,010	1,134	82,444	1,708,296	20.6

Table 9. Life table for non-Hispanic black females: United States, 2006—Con.

Age	Probability of dying between ages x to $x+1$	Number surviving to age x	Number dying between ages x to $x+1$	Person-years lived between ages x to $x+1$	Total number of person-years lived above age x	Expectation of life at age x
	q_x	l_x	d_x	L_x	T_x	e_x
63–64	0.014724	81,877	1,206	81,274	1,625,853	19.9
64–65	0.015733	80,671	1,269	80,037	1,544,579	19.1
65–66	0.016747	79,402	1,330	78,737	1,464,542	18.4
66–67	0.017728	78,072	1,384	77,380	1,385,805	17.8
67–68	0.018866	76,688	1,447	75,965	1,308,425	17.1
68–69	0.020217	75,241	1,521	74,481	1,232,460	16.4
69–70	0.021787	73,720	1,606	72,917	1,157,979	15.7
70–71	0.023541	72,114	1,698	71,265	1,085,062	15.0
71–72	0.025504	70,416	1,796	69,518	1,013,797	14.4
72–73	0.027754	68,621	1,904	67,668	944,278	13.8
73–74	0.030315	66,716	2,022	65,705	876,610	13.1
74–75	0.033188	64,694	2,147	63,620	810,905	12.5
75–76	0.036373	62,547	2,275	61,409	747,285	11.9
76–77	0.039654	60,272	2,390	59,077	685,876	11.4
77–78	0.043218	57,882	2,502	56,631	626,799	10.8
78–79	0.047087	55,380	2,608	54,076	570,169	10.3
79–80	0.051283	52,772	2,706	51,419	516,092	9.8
80–81	0.055831	50,066	2,795	48,668	464,673	9.3
81–82	0.060757	47,271	2,872	45,835	416,005	8.8
82–83	0.066088	44,399	2,934	42,932	370,170	8.3
83–84	0.071850	41,465	2,979	39,975	327,239	7.9
84–85	0.078072	38,485	3,005	36,983	287,264	7.5
85–86	0.084784	35,481	3,008	33,977	250,281	7.1
86–87	0.092015	32,473	2,988	30,979	216,304	6.7
87–88	0.099796	29,485	2,942	28,013	185,326	6.3
88–89	0.108157	26,542	2,871	25,107	157,312	5.9
89–90	0.117127	23,671	2,773	22,285	132,206	5.6
90–91	0.126735	20,899	2,649	19,575	109,920	5.3
91–92	0.137008	18,250	2,500	17,000	90,346	5.0
92–93	0.147974	15,750	2,331	14,585	73,346	4.7
93–94	0.159655	13,419	2,142	12,348	58,761	4.4
94–95	0.172072	11,277	1,940	10,307	46,413	4.1
95–96	0.185241	9,336	1,729	8,472	36,107	3.9
96–97	0.199176	7,607	1,515	6,849	27,635	3.6
97–98	0.213884	6,092	1,303	5,440	20,786	3.4
98–99	0.229368	4,789	1,098	4,240	15,345	3.2
99–100	0.245621	3,690	906	3,237	11,106	3.0
100 and over	1.00000	2,784	2,784	7,869	7,869	2.8

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