SAFER • HEALTHIER • PEOPLE™

Monitoring the Nation's Health

The life tables in this report have been updated to reflect correct birth and death counts in the estimation of q_x at age zero.

United States Life Tables by Hispanic Origin

Vital and Health Statistics
Series 2, Number 152
October 2010

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

Suggested citation

Arias E. United States life tables by Hispanic origin. National Center for Health Statistics. Vital Health Stat 2(152). 2010.

Library of Congress Cataloging-in-Publication Data

United States life tables by Hispanic origin
p. ; cm.— (Vital and health statistics. Series 2 ; no. 152) (DHHS publication ; no. (PHS) 2010–1352)
"October 2010."
Includes bibliographical references.
ISBN-13: 978–0-8406–0643-3
ISBN-10: 0–8406-0643–5
1. Life expectancy—United States—Statistics. 2. Life expectancy—United States—Tables. 3. Hispanic Americans—Statistics. 4. Hispanic Americans—Tables. I. National Center for Health Statistics (U.S.) II. Series: Vital and health statistics. Series 2, Data evaluation and methods research ; no. 152. III. Series: DHHS publication ; no. (PHS) 2010–1352.
HB1335.U54 2010
305.868'073090511—dc22

2010040423

For sale by the U.S. Government Printing Office
Superintendent of Documents
Mail Stop: SSOP
Washington, DC 20402-9328
Printed on acid-free paper.

Vital and Health Statistics

Series 2, Number 152

United States Life Tables by Hispanic Origin

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

Contents

Figures

Text Tables

Detailed Tables

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

The author is grateful to Professors Irma Elo and Samuel H. Preston, Department of Sociology, University of Pennsylvania, and Professor Alberto Palloni, Department of Sociology, University of Wisconsin-Madison, for their review of the methodology and their insightful comments and suggestions. The author is also grateful for the helpful comments provided by Robert N. Anderson, Mortality Statistics Branch (MSB), Division of Vital Statistics (DVS); Julia Holmes, DVS; and Jennifer Madans, Office of the Center Director. This report was prepared under the general direction of Charles J. Rothwell, Director, DVS, and Robert N. Anderson, Chief, MSB. Content review was provided by Betzaida Tejada-Vera, MSB. This report was edited by Betsy M. Finley and Demarius V. Miller, CDC/NCHM/Division of Creative Services, Writer-Editor Services Branch; typeset by Annette F. Holman, and graphics produced by Odell D. Eldridge (Contractor), CDC/OSELS/NCHS/OD/Office of Information Services, Information Design and Publishing Staff.

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

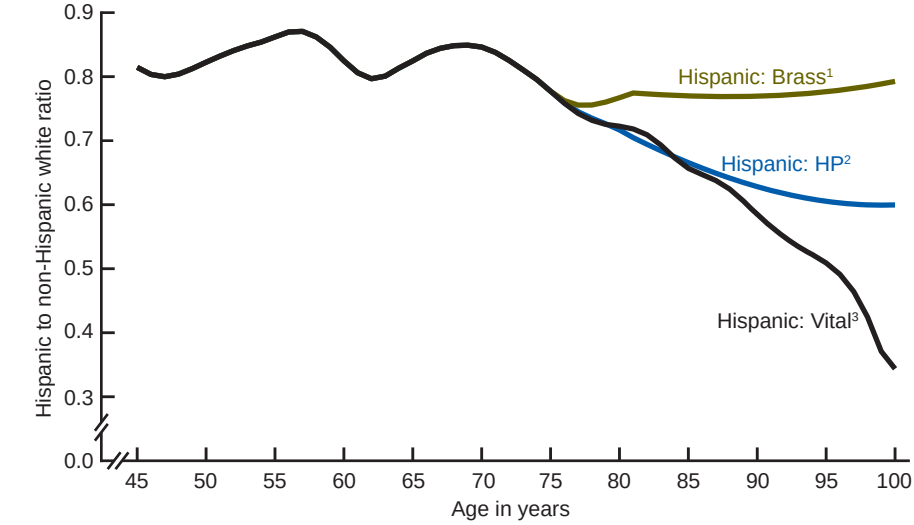
	Non-Hispanic white			Non-Hispanic black		
	Total	Male	Female	Total	Male	Female
G	0.0000125	0.0000173	0.0000064	0.0000984	0.0001990	0.0000449
H	1.1118	1.1100	1.1190	1.0855	1.0792	1.0939

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.

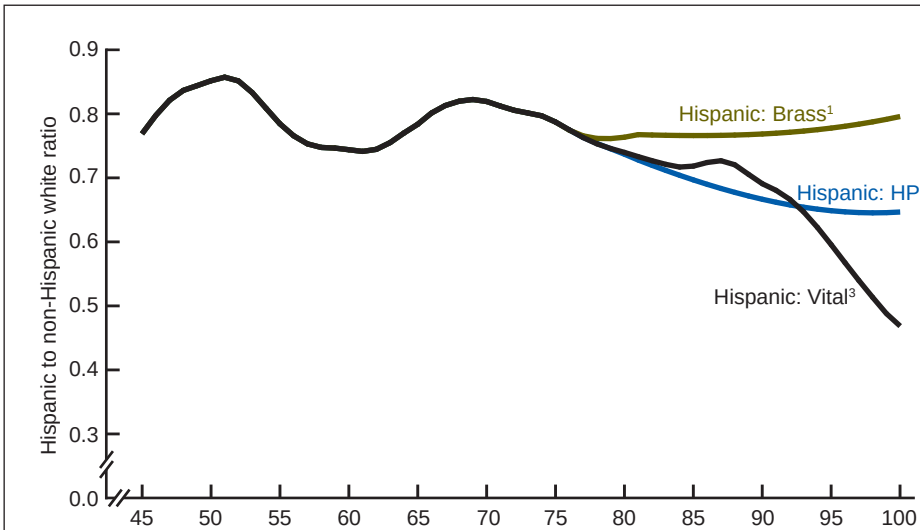
A consistent finding across diverse studies has been that Hispanic mortality in the adult and advanced ages varies between approximately 80 percent and 89 percent of that of the non-Hispanic white population (2,3,21,22). Two studies that used Medicare data to compare Hispanic to non-Hispanic white mortality 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.

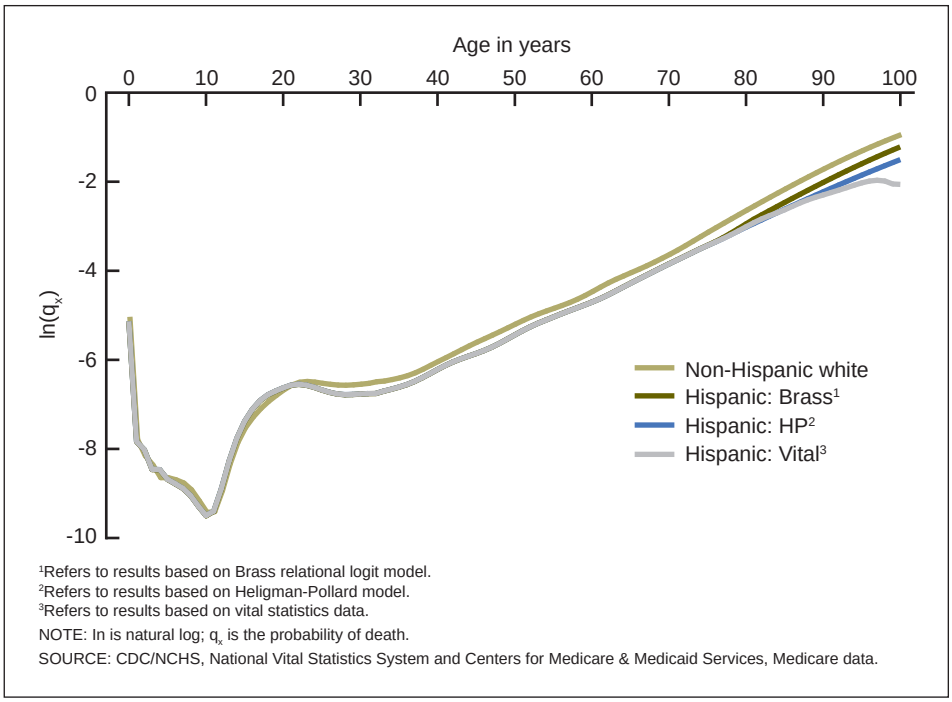
Figure 1. Hispanic to non-Hispanic white age-specific mortality ratios for males: United States, 2006



[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.

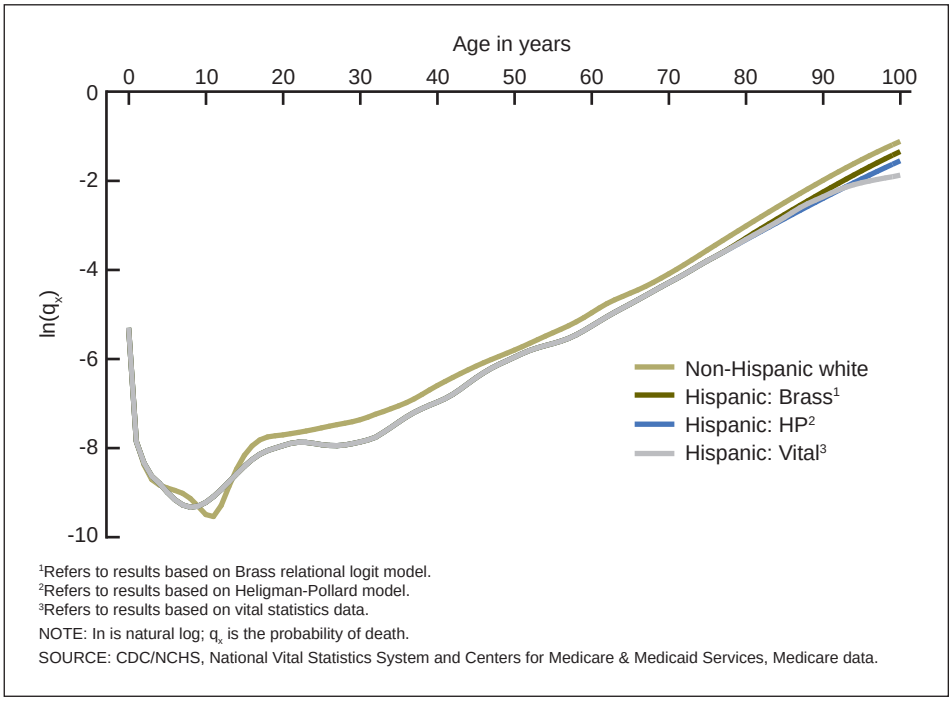
Figure 2. Hispanic to non-Hispanic white age-specific mortality ratios for females: United States, 2006

(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	80.5	72.9	69.3	76.3
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

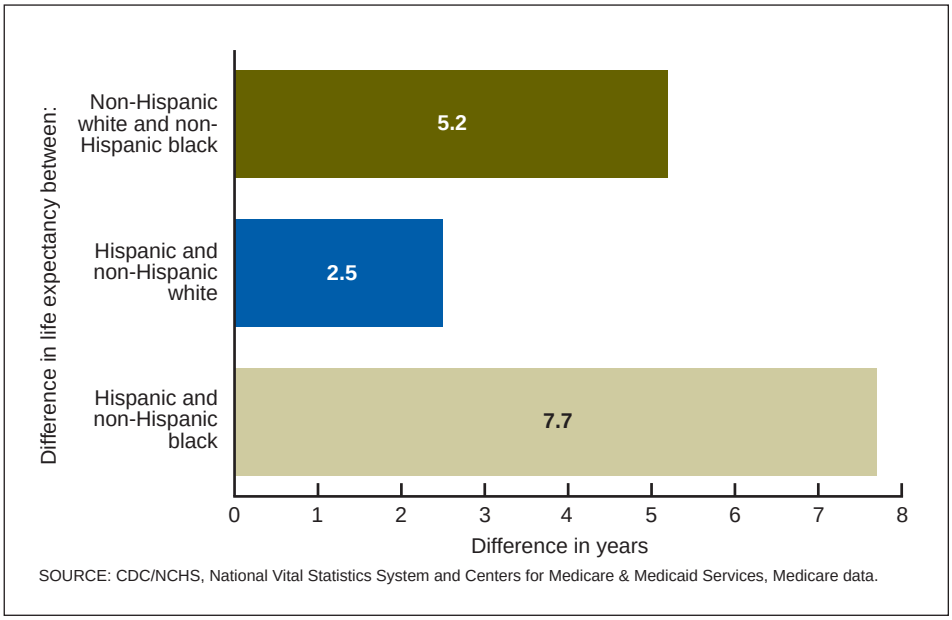


Figure 5. Difference in life expectancy at birth: United States, 2006

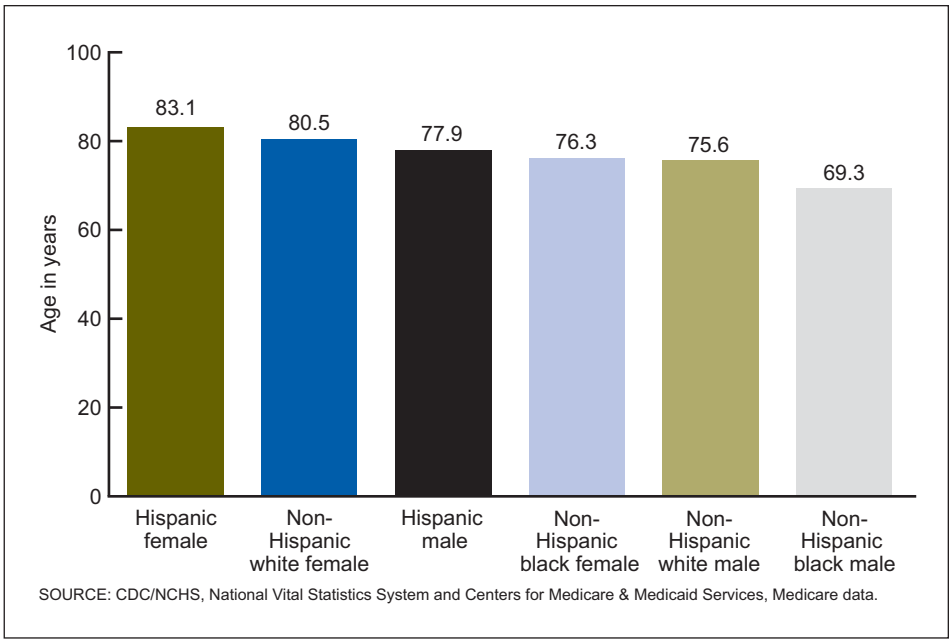


Figure 6. Life expectancy at birth, by Hispanic origin, race, and sex: United States, 2006

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 (80.5 years), Hispanic males (77.9 years), non-Hispanic black females (76.3 years), non-Hispanic white males (75.6 years), and non-Hispanic black males (69.3 years). The smallest differential is between Hispanic and non-Hispanic white females, with Hispanic females having an advantage of 2.6 years. The largest differential is between Hispanic females and non-Hispanic black males, with Hispanic females having a life expectancy at birth 13.8 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	99,455	99,410	99,503	99,441	99,380	99,505	98,656	98,553	98,762
5	99,216	99,144	99,291	99,351	99,296	99,408	99,342	99,275	99,412	98,477	98,364	98,603
10	99,147	99,068	99,229	99,292	99,229	99,358	99,278	99,206	99,354	98,374	98,247	98,517
15	99,065	98,972	99,164	99,209	99,132	99,290	99,205	99,119	99,296	98,259	98,113	98,427
20	98,747	98,524	98,982	98,896	98,658	99,149	98,912	98,727	99,107	97,831	97,453	98,239
25	98,253	97,797	98,739	98,444	97,979	98,965	98,450	98,053	98,871	97,115	96,370	97,901
30	97,759	97,099	98,461	98,046	97,403	98,787	97,978	97,391	98,592	96,282	95,150	97,441
35	97,213	96,371	98,105	97,630	96,821	98,569	97,451	96,694	98,239	95,309	93,817	96,801
40	96,495	95,466	97,579	97,058	96,072	98,205	96,764	95,829	97,735	94,060	92,240	95,853
45	95,397	94,112	96,740	96,198	94,947	97,642	95,713	94,528	96,937	92,259	90,076	94,381
50	93,750	92,082	95,478	94,915	93,372	96,671	94,149	92,587	95,757	89,558	86,775	92,223
55	91,352	89,083	93,681	92,999	90,975	95,242	91,891	89,766	94,073	85,524	81,619	89,189
60	88,057	85,054	91,119	90,392	87,642	93,351	88,751	85,957	91,616	80,194	74,952	85,072
65	83,251	79,346	87,200	86,649	83,059	90,392	84,060	80,421	87,773	73,171	66,394	79,421
70	76,661	71,652	81,662	81,079	76,401	85,803	77,527	72,808	82,297	64,679	56,515	72,131
75	67,331	61,057	73,449	73,087	67,177	78,849	68,180	62,212	74,089	54,142	44,793	62,561
80	54,201	46,859	61,175	62,030	55,064	68,584	54,932	47,834	61,750	41,435	31,848	50,078
85	37,805	30,371	44,685	47,154	39,498	53,963	38,265	30,958	45,056	27,835	19,480	35,489
90	20,898	15,034	26,183	30,063	23,049	35,855	21,016	15,183	26,253	15,459	9,636	20,904
95	7,991	4,895	10,685	14,488	9,745	18,014	7,900	4,821	10,553	6,531	3,548	9,339
100	1,737	850	2,460	4,522	2,523	5,772	1,656	795	2,351	1,876	873	2,785

origin and race. The gap was 4.9 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, 99.5 percent of Hispanic infants survived the first year of life; 99.4 percent of non-Hispanic white infants survived. On the other hand, 98.7 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 47.2 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

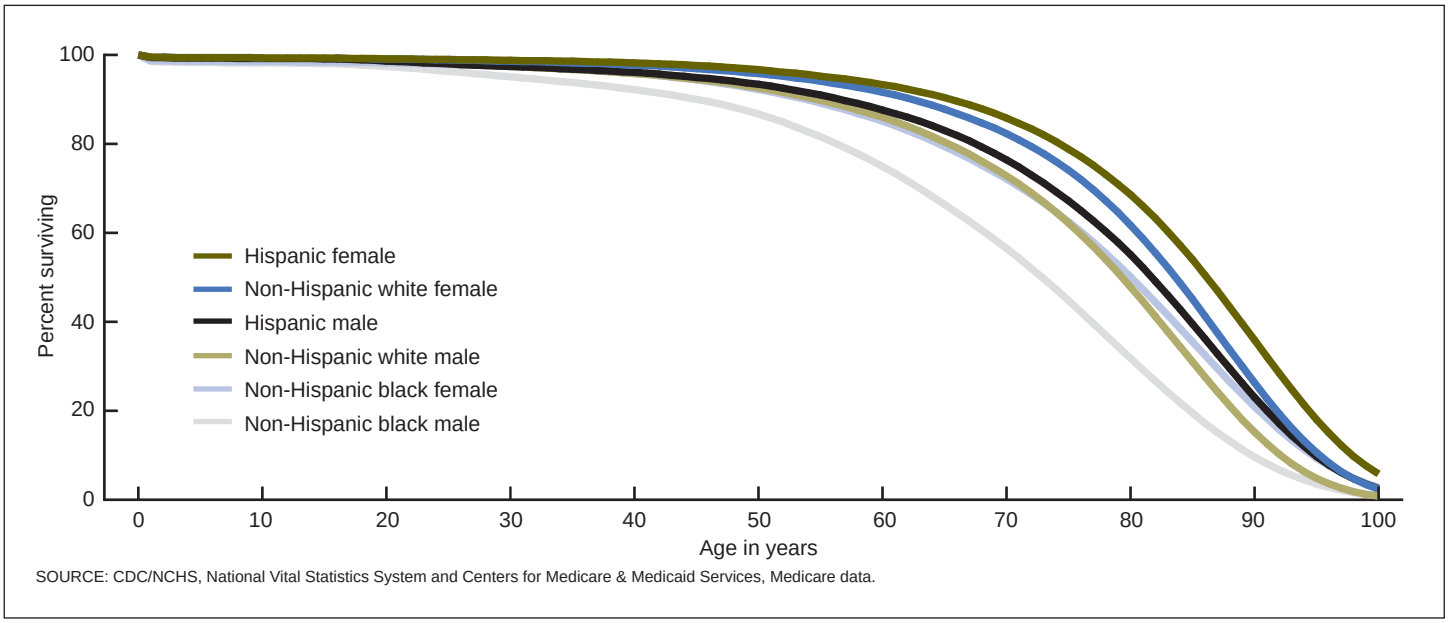


Figure 7. Percentage surviving, by Hispanic origin, race, age, and sex: United States, 2006

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.

References

1. Rosenberg HM, Maurer JD, Sorlie PD, et al. Quality of death rates by race and Hispanic origin: A summary of current research, 1999. National Center for Health Statistics. Vital Health Stat 2(128). 1999.
2. Arias E, Schauman WS, Eschbach K, et al. The validity of race and Hispanic origin reporting on death certificates in the United States. National Center for Health Statistics. Vital Health Stat 2(148). 2008.
3. Arias E, Eschbach K, Schauman WS, Backlund EL, Sorlie PD. The Hispanic mortality advantage and ethnic misclassification on US death certificates. Am J Public Health 100(S1):S171–7. 2010.
4. Preston SH, Elo IT, Stewart Q. Effects of age misreporting on mortality estimates at older ages. Popul Stud 53(2):165–77. 1999.
5. Anderson RN. Method for constructing complete annual U.S. life tables. National Center for Health Statistics. Vital Health Stat 2(129). 1999.
6. Office of Management and Budget. Revisions to the standards for the classification of federal data on race and ethnicity. Fed Regist 62FR58782: 58782–90. 1997.
7. Sorlie PD, Rogot E, Johnson NJ. Validity of demographic characteristics on the death certificate. Epidemiology 3(2):181–4. 1992.
8. Dechter A, Preston SH. Age misreporting and its effects on adult mortality estimates in Latin America. Popul Bull UN (31–32):1–16. 1991.
9. Bell FC, Miller ML. Life tables for the United States social security area 1900–2100. Baltimore, MD: Social Security Administration, Office of the Chief Actuary. SSA Pub No 11–11536. 2005.
10. Research Data Assistance Center. Introduction to the use of Medicare data for research. Minneapolis, MN: University of Minnesota School of Public Health. 2004.
11. Research Data Assistance Center. Race and ethnic data in Social Security Administration (SSA) and Centers for Medicare and Medicaid Services (CMS) records. Minneapolis, MN: University of Minnesota School of Public Health.
12. National Center for Health Statistics. Mortality technical appendix. Vital Statistics System. Available from: http://www.cdc.gov/nchs/products/vsus.htm#appendices.
13. Ingram DD, Parker JD, Schenker N, et al. United States Census 2000 population with bridged race categories. Vital Health Stat 2(135). 2003.
14. Office of Management and Budget. Race and ethnic standards for federal statistics and administrative reporting. Statistical policy directive 15. 1977.
15. Heron MP, Hoyert DL, Murphy SL, et al. Deaths: Final data for 2006. National vital statistics reports; vol 57 no 14. Hyattsville, MD: National Center for Health Statistics. 2009.
16. Mathews TJ, MacDorman MF. Infant mortality statistics from the 2005 period linked birth/infant death data set. National vital statistics reports; vol 57 no 2. Hyattsville, MD: National Center for Health Statistics. 2008.
17. 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.
18. Shryock HS, Siegel JS, et al. The methods and materials of demography, vol 2. Washington, DC: U.S. Government Printing Office. 1971.
19. Wei R, Curtin LR, Arias E, Anderson RN. United States decennial life tables for 1999–2001, methodology of the United States life tables. National vital statistics reports; vol 57, no 4. Hyattsville, MD: National Center for Health Statistics. 2008.

20. Arias E, Rostron BL, Tejada-Vera B. United States life tables, 2005. National vital statistics reports; vol 58 no 10. Hyattsville, MD: National Center for Health Statistics. 2010.
21. Elo IT, Turra CM, Kestenbaum B, Fergusson BR. Mortality among elderly Hispanics in the United States: Past evidence and new results. Demography 41(1):109–28. 2004.
22. Turra CM, Elo IT. The impact of salmon bias on the Hispanic mortality advantage: New evidence from social security data. Popul Res Policy Rev 27(5):515–30. 2008.
23. Brass W. On the scale of mortality. In: Biological aspects of demography. London: Taylor and Francis. 1971.
24. Himes CL, Preston SH, Condran GA. A relational model of mortality at older ages in low mortality countries. Popul Stud 48:269–91. 1994.
25. Preston SH, Elo IT. Black mortality at very old ages in official US life tables: A skeptical appraisal. Popul Dev Rev 32(3):557–65. 2006.
26. Preston SH, Heuveline P, Guillot M. Demography measuring and modeling population processes. Oxford: Blackwell Publishing Ltd. 2001.
27. Arias E. United States life tables, 2006. National vital statistics reports; vol 58 no 21. Hyattsville, MD: National Center for Health Statistics. 2010.
28. Palloni A, Arias E. Paradox lost: Explaining the Hispanic adult mortality advantage. Demography 41(3):385–415. 2004.
29. Markides KS, Coreil J. The health of Hispanics in the southwestern United States: An epidemiologic paradox. Public Health Rep 101(3):253–65. 1986.
30. Sorlie PD, Backlund E, Johnson NJ, Rogot E. Mortality by Hispanic status in the United States. JAMA 270(20):2464–8. 1993.
31. Eschbach K, Kuo YF, Goodwin JS. Ascertainment of Hispanic ethnicity on California death certificates: Implications for the explanation of the Hispanic mortality advantage. Am J Public Health 96(12):2209–15. 2006.
32. Hummer RA, Powers DA, Pullum SG, Gossman GL, Frisbie WP. Paradox found (again): Infant mortality among the Mexican-origin population in the United States. Demography 44(3):441–57. 2007.

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

Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/Series_Reports/sr02_152/Table1.xls.

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	0.005446	100,000	545	99,521	8,060,110	80.6
1–2	0.000391	99,455	39	99,436	7,960,590	80.0
2–3	0.000285	99,417	28	99,402	7,861,154	79.1
3–4	0.000195	99,388	19	99,378	7,761,751	78.1
4–5	0.000182	99,369	18	99,360	7,662,373	77.1
5–6	0.000148	99,351	15	99,343	7,563,013	76.1
6–7	0.000130	99,336	13	99,330	7,463,670	75.1
7–8	0.000116	99,323	12	99,317	7,364,340	74.1
8–9	0.000104	99,312	10	99,306	7,265,023	73.2
9–10	0.000092	99,301	9	99,297	7,165,716	72.2
10–11	0.000087	99,292	9	99,288	7,066,420	71.2
11–12	0.000097	99,284	10	99,279	6,967,132	70.2
12–13	0.000135	99,274	13	99,267	6,867,853	69.2
13–14	0.000208	99,260	21	99,250	6,768,586	68.2
14–15	0.000309	99,240	31	99,225	6,669,336	67.2
15–16	0.000426	99,209	42	99,188	6,570,111	66.2
16–17	0.000543	99,167	54	99,140	6,470,923	65.3
17–18	0.000650	99,113	64	99,081	6,371,783	64.3
18–19	0.000737	99,049	73	99,012	6,272,702	63.3
19–20	0.000802	98,976	79	98,936	6,173,690	62.4
20–21	0.000866	98,896	86	98,853	6,074,754	61.4
21–22	0.000925	98,811	91	98,765	5,975,901	60.5
22–23	0.000951	98,719	94	98,672	5,877,136	59.5
23–24	0.000939	98,625	93	98,579	5,778,464	58.6
24–25	0.000902	98,533	89	98,488	5,679,885	57.6
25–26	0.000857	98,444	84	98,402	5,581,397	56.7
26–27	0.000819	98,359	81	98,319	5,482,995	55.7
27–28	0.000793	98,279	78	98,240	5,384,676	54.8
28–29	0.000785	98,201	77	98,162	5,286,436	53.8
29–30	0.000792	98,124	78	98,085	5,188,274	52.9
30–31	0.000802	98,046	79	98,007	5,090,189	51.9
31–32	0.000814	97,967	80	97,928	4,992,182	51.0
32–33	0.000827	97,888	81	97,847	4,894,255	50.0
33–34	0.000879	97,807	86	97,764	4,796,407	49.0
34–35	0.000934	97,721	91	97,675	4,698,644	48.1
35–36	0.000999	97,630	98	97,581	4,600,969	47.1
36–37	0.001072	97,532	105	97,480	4,503,388	46.2
37–38	0.001159	97,427	113	97,371	4,405,908	45.2
38–39	0.001260	97,314	123	97,253	4,308,537	44.3
39–40	0.001373	97,192	133	97,125	4,211,284	43.3
40–41	0.001496	97,058	145	96,986	4,114,159	42.4
41–42	0.001630	96,913	158	96,834	4,017,173	41.5
42–43	0.001771	96,755	171	96,670	3,920,339	40.5
43–44	0.001920	96,584	185	96,491	3,823,669	39.6
44–45	0.002082	96,398	201	96,298	3,727,178	38.7
45–46	0.002255	96,198	217	96,089	3,630,880	37.7
46–47	0.002445	95,981	235	95,863	3,534,791	36.8
47–48	0.002657	95,746	254	95,619	3,438,927	35.9
48–49	0.002894	95,492	276	95,354	3,343,308	35.0
49–50	0.003157	95,215	301	95,065	3,247,955	34.1
50–51	0.003452	94,915	328	94,751	3,152,890	33.2
51–52	0.003769	94,587	357	94,409	3,058,139	32.3
52–53	0.004086	94,231	385	94,038	2,963,730	31.5
53–54	0.004382	93,846	411	93,640	2,869,692	30.6
54–55	0.004662	93,434	436	93,216	2,776,052	29.7
55–56	0.004952	92,999	460	92,768	2,682,836	28.8
56–57	0.005271	92,538	488	92,294	2,590,067	28.0
57–58	0.005620	92,050	517	91,792	2,497,773	27.1
58–59	0.006019	91,533	551	91,258	2,405,982	26.3
59–60	0.006484	90,982	590	90,687	2,314,724	25.4
60–61	0.007018	90,392	634	90,075	2,224,037	24.6
61–62	0.007629	89,758	685	89,415	2,133,962	23.8

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

Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/Series_Reports/sr02_152/Table1.xls.

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
62–63	0.008337	89,073	743	88,702	2,044,547	23.0
63–64	0.009131	88,330	807	87,927	1,955,845	22.1
64–65	0.009997	87,524	875	87,086	1,867,918	21.3
65–66	0.010937	86,649	948	86,175	1,780,832	20.6
66–67	0.011969	85,701	1,026	85,188	1,694,657	19.8
67–68	0.013092	84,675	1,109	84,121	1,609,469	19.0
68–69	0.014322	83,567	1,197	82,968	1,525,348	18.3
69–70	0.015670	82,370	1,291	81,725	1,442,380	17.5
70–71	0.017094	81,079	1,386	80,386	1,360,655	16.8
71–72	0.018615	79,693	1,484	78,951	1,280,269	16.1
72–73	0.020322	78,210	1,589	77,415	1,201,317	15.4
73–74	0.022257	76,620	1,705	75,768	1,123,903	14.7
74–75	0.024396	74,915	1,828	74,001	1,048,135	14.0
75–76	0.026621	73,087	1,946	72,114	974,134	13.3
76–77	0.028991	71,142	2,062	70,110	902,019	12.7
77–78	0.031773	69,079	2,195	67,982	831,909	12.0
78–79	0.035066	66,884	2,345	65,712	763,927	11.4
79–80	0.038878	64,539	2,509	63,284	698,216	10.8
80–81	0.043196	62,030	2,679	60,690	634,931	10.2
81–82	0.048024	59,350	2,850	57,925	574,241	9.7
82–83	0.052933	56,500	2,991	55,005	516,316	9.1
83–84	0.058312	53,509	3,120	51,949	461,311	8.6
84–85	0.064202	50,389	3,235	48,772	409,362	8.1
85–86	0.070642	47,154	3,331	45,489	360,590	7.6
86–87	0.077674	43,823	3,404	42,121	315,102	7.2
87–88	0.085342	40,419	3,449	38,694	272,981	6.8
88–89	0.093691	36,970	3,464	35,238	234,286	6.3
89–90	0.102764	33,506	3,443	31,784	199,049	5.9
90–91	0.112606	30,063	3,385	28,370	167,264	5.6
91–92	0.123262	26,677	3,288	25,033	138,894	5.2
92–93	0.134772	23,389	3,152	21,813	113,861	4.9
93–94	0.147178	20,237	2,978	18,748	92,048	4.5
94–95	0.160513	17,259	2,770	15,873	73,300	4.2
95–96	0.174809	14,488	2,533	13,222	57,427	4.0
96–97	0.190090	11,956	2,273	10,819	44,205	3.7
97–98	0.206373	9,683	1,998	8,684	33,385	3.4
98–99	0.223665	7,685	1,719	6,825	24,702	3.2
99–100	0.241964	5,966	1,444	5,244	17,876	3.0
100 and over	1.000000	4,522	4,522	12,632	12,632	2.8

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

Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/Series_Reports/sr02_152/Table2.xls.

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	0.005897	100,000	590	99,482	7,790,457	77.9
1–2	0.000395	99,410	39	99,391	7,690,975	77.4
2–3	0.000330	99,371	33	99,355	7,591,585	76.4
3–4	0.000212	99,338	21	99,328	7,492,230	75.4
4–5	0.000211	99,317	21	99,307	7,392,902	74.4
5–6	0.000170	99,296	17	99,288	7,293,596	73.5
6–7	0.000154	99,279	15	99,272	7,194,308	72.5
7–8	0.000139	99,264	14	99,257	7,095,036	71.5
8–9	0.000118	99,250	12	99,244	6,995,779	70.5
9–10	0.000093	99,239	9	99,234	6,896,535	69.5
10–11	0.000075	99,229	7	99,226	6,797,301	68.5
11–12	0.000083	99,222	8	99,218	6,698,075	67.5
12–13	0.000138	99,214	14	99,207	6,598,857	66.5
13–14	0.000257	99,200	25	99,187	6,499,651	65.5
14–15	0.000427	99,175	42	99,153	6,400,463	64.5
15–16	0.000623	99,132	62	99,101	6,301,310	63.6
16–17	0.000816	99,070	81	99,030	6,202,209	62.6
17–18	0.000993	98,990	98	98,940	6,103,179	61.7
18–19	0.001131	98,891	112	98,835	6,004,238	60.7
19–20	0.001229	98,779	121	98,719	5,905,403	59.8
20–21	0.001321	98,658	130	98,593	5,806,684	58.9
21–22	0.001403	98,528	138	98,459	5,708,091	57.9
22–23	0.001434	98,390	141	98,319	5,609,633	57.0
23–24	0.001406	98,248	138	98,179	5,511,314	56.1
24–25	0.001340	98,110	132	98,045	5,413,134	55.2
25–26	0.001263	97,979	124	97,917	5,315,090	54.2
26–27	0.001198	97,855	117	97,796	5,217,173	53.3
27–28	0.001153	97,738	113	97,682	5,119,376	52.4
28–29	0.001135	97,625	111	97,570	5,021,695	51.4
29–30	0.001140	97,514	111	97,459	4,924,125	50.5
30–31	0.001151	97,403	112	97,347	4,826,666	49.6
31–32	0.001163	97,291	113	97,234	4,729,319	48.6
32–33	0.001165	97,178	113	97,121	4,632,085	47.7
33–34	0.001227	97,065	119	97,005	4,534,964	46.7
34–35	0.001282	96,946	124	96,883	4,437,958	45.8
35–36	0.001345	96,821	130	96,756	4,341,075	44.8
36–37	0.001421	96,691	137	96,622	4,244,319	43.9
37–38	0.001524	96,554	147	96,480	4,147,696	43.0
38–39	0.001657	96,407	160	96,327	4,051,216	42.0
39–40	0.001815	96,247	175	96,159	3,954,889	41.1
40–41	0.001995	96,072	192	95,976	3,858,730	40.2
41–42	0.002183	95,880	209	95,776	3,762,754	39.2
42–43	0.002364	95,671	226	95,558	3,666,978	38.3
43–44	0.002530	95,445	241	95,324	3,571,420	37.4
44–45	0.002690	95,203	256	95,075	3,476,096	36.5
45–46	0.002857	94,947	271	94,812	3,381,020	35.6
46–47	0.003049	94,676	289	94,532	3,286,208	34.7
47–48	0.003285	94,387	310	94,232	3,191,677	33.8
48–49	0.003580	94,077	337	93,909	3,097,444	32.9
49–50	0.003932	93,741	369	93,556	3,003,535	32.0
50–51	0.004330	93,372	404	93,170	2,909,979	31.2
51–52	0.004757	92,968	442	92,747	2,816,809	30.3
52–53	0.005196	92,525	481	92,285	2,724,062	29.4
53–54	0.005621	92,045	517	91,786	2,631,777	28.6
54–55	0.006032	91,527	552	91,251	2,539,991	27.8
55–56	0.006467	90,975	588	90,681	2,448,740	26.9
56–57	0.006940	90,387	627	90,073	2,358,059	26.1
57–58	0.007420	89,760	666	89,427	2,267,985	25.3
58–59	0.007913	89,094	705	88,741	2,178,559	24.5
59–60	0.008447	88,389	747	88,015	2,089,817	23.6
60–61	0.009037	87,642	792	87,246	2,001,802	22.8
61–62	0.009720	86,850	844	86,428	1,914,556	22.0

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

Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/Series_Reports/sr02_152/Table2.xls.

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
62–63	0.010541	86,006	907	85,552	1,828,128	21.3
63–64	0.011514	85,099	980	84,609	1,742,576	20.5
64–65	0.012609	84,119	1,061	83,589	1,657,967	19.7
65–66	0.013794	83,059	1,146	82,486	1,574,378	19.0
66–67	0.015069	81,913	1,234	81,296	1,491,892	18.2
67–68	0.016447	80,679	1,327	80,015	1,410,596	17.5
68–69	0.017949	79,352	1,424	78,640	1,330,581	16.8
69–70	0.019590	77,927	1,527	77,164	1,251,941	16.1
70–71	0.021335	76,401	1,630	75,586	1,174,777	15.4
71–72	0.023184	74,771	1,734	73,904	1,099,191	14.7
72–73	0.025208	73,037	1,841	72,117	1,025,287	14.0
73–74	0.027433	71,196	1,953	70,220	953,171	13.4
74–75	0.029837	69,243	2,066	68,210	882,951	12.8
75–76	0.032292	67,177	2,169	66,092	814,741	12.1
76–77	0.035015	65,008	2,276	63,870	748,649	11.5
77–78	0.038310	62,732	2,403	61,530	684,779	10.9
78–79	0.042298	60,328	2,552	59,052	623,249	10.3
79–80	0.046949	57,777	2,713	56,420	564,197	9.8
80–81	0.052228	55,064	2,876	53,626	507,776	9.2
81–82	0.058095	52,188	3,032	50,672	454,150	8.7
82–83	0.063844	49,156	3,138	47,587	403,478	8.2
83–84	0.070120	46,018	3,227	44,405	355,891	7.7
84–85	0.076962	42,791	3,293	41,144	311,486	7.3
85–86	0.084411	39,498	3,334	37,831	270,342	6.8
86–87	0.092509	36,164	3,345	34,491	232,511	6.4
87–88	0.101298	32,818	3,324	31,156	198,020	6.0
88–89	0.110820	29,494	3,269	27,860	166,864	5.7
89–90	0.121116	26,225	3,176	24,637	139,004	5.3
90–91	0.132226	23,049	3,048	21,525	114,367	5.0
91–92	0.144189	20,001	2,884	18,559	92,842	4.6
92–93	0.157038	17,117	2,688	15,773	74,283	4.3
93–94	0.170803	14,429	2,465	13,197	58,509	4.1
94–95	0.185510	11,965	2,220	10,855	45,312	3.8
95–96	0.201175	9,745	1,960	8,765	34,457	3.5
96–97	0.217810	7,785	1,696	6,937	25,692	3.3
97–98	0.235415	6,089	1,433	5,372	18,756	3.1
98–99	0.253981	4,656	1,182	4,064	13,383	2.9
99–100	0.273487	3,473	950	2,998	9,319	2.7
100 and over	1.000000	2,523	2,523	6,321	6,321	2.5

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

Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/Series_Reports/sr02_152/Table3.xls.

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	0.004974	100,000	497	99,561	8,313,014	83.1
1–2	0.000386	99,503	38	99,483	8,213,453	82.5
2–3	0.000239	99,464	24	99,452	8,113,970	81.6
3–4	0.000178	99,440	18	99,432	8,014,518	80.6
4–5	0.000151	99,423	15	99,415	7,915,086	79.6
5–6	0.000124	99,408	12	99,402	7,815,671	78.6
6–7	0.000105	99,395	10	99,390	7,716,269	77.6
7–8	0.000093	99,385	9	99,380	7,616,879	76.6
8–9	0.000089	99,376	9	99,371	7,517,499	75.6
9–10	0.000091	99,367	9	99,362	7,418,128	74.7
10–11	0.000099	99,358	10	99,353	7,318,765	73.7
11–12	0.000112	99,348	11	99,342	7,219,412	72.7
12–13	0.000132	99,337	13	99,330	7,120,070	71.7
13–14	0.000157	99,324	16	99,316	7,020,739	70.7
14–15	0.000187	99,308	19	99,299	6,921,423	69.7
15–16	0.000222	99,290	22	99,279	6,822,124	68.7
16–17	0.000258	99,268	26	99,255	6,722,846	67.7
17–18	0.000290	99,242	29	99,228	6,623,591	66.7
18–19	0.000316	99,213	31	99,198	6,524,363	65.8
19–20	0.000334	99,182	33	99,165	6,425,165	64.8
20–21	0.000353	99,149	35	99,131	6,326,000	63.8
21–22	0.000371	99,114	37	99,095	6,226,869	62.8
22–23	0.000381	99,077	38	99,058	6,127,773	61.8
23–24	0.000379	99,039	38	99,020	6,028,715	60.9
24–25	0.000371	99,002	37	98,983	5,929,695	59.9
25–26	0.000361	98,965	36	98,947	5,830,711	58.9
26–27	0.000355	98,929	35	98,912	5,731,764	57.9
27–28	0.000353	98,894	35	98,877	5,632,852	57.0
28–29	0.000358	98,859	35	98,842	5,533,976	56.0
29–30	0.000370	98,824	37	98,806	5,435,134	55.0
30–31	0.000383	98,787	38	98,768	5,336,328	54.0
31–32	0.000401	98,750	40	98,730	5,237,560	53.0
32–33	0.000426	98,710	42	98,689	5,138,830	52.1
33–34	0.000474	98,668	47	98,645	5,040,141	51.1
34–35	0.000531	98,621	52	98,595	4,941,497	50.1
35–36	0.000599	98,569	59	98,539	4,842,902	49.1
36–37	0.000672	98,510	66	98,477	4,744,363	48.2
37–38	0.000744	98,443	73	98,407	4,645,886	47.2
38–39	0.000809	98,370	80	98,330	4,547,479	46.2
39–40	0.000873	98,291	86	98,248	4,449,149	45.3
40–41	0.000937	98,205	92	98,159	4,350,901	44.3
41–42	0.001013	98,113	99	98,063	4,252,742	43.3
42–43	0.001115	98,013	109	97,959	4,154,679	42.4
43–44	0.001254	97,904	123	97,843	4,056,720	41.4
44–45	0.001424	97,781	139	97,712	3,958,878	40.5
45–46	0.001615	97,642	158	97,563	3,861,166	39.5
46–47	0.001810	97,484	176	97,396	3,763,603	38.6
47–48	0.002004	97,308	195	97,210	3,666,207	37.7
48–49	0.002190	97,113	213	97,007	3,568,996	36.8
49–50	0.002371	96,900	230	96,785	3,471,990	35.8
50–51	0.002570	96,671	248	96,546	3,375,204	34.9
51–52	0.002788	96,422	269	96,288	3,278,658	34.0
52–53	0.002994	96,153	288	96,009	3,182,370	33.1
53–54	0.003174	95,865	304	95,713	3,086,361	32.2
54–55	0.003336	95,561	319	95,402	2,990,648	31.3
55–56	0.003495	95,242	333	95,076	2,895,246	30.4
56–57	0.003680	94,909	349	94,735	2,800,170	29.5
57–58	0.003919	94,560	371	94,375	2,705,435	28.6
58–59	0.004247	94,190	400	93,990	2,611,060	27.7
59–60	0.004672	93,790	438	93,570	2,517,071	26.8
60–61	0.005181	93,351	484	93,110	2,423,500	26.0
61–62	0.005754	92,868	534	92,601	2,330,391	25.1

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

Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/Series_Reports/sr02_152/Table3.xls.

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
62–63	0.006387	92,333	590	92,039	2,237,790	24.2
63–64	0.007048	91,744	647	91,420	2,145,752	23.4
64–65	0.007735	91,097	705	90,745	2,054,331	22.6
65–66	0.008481	90,392	767	90,009	1,963,587	21.7
66–67	0.009326	89,626	836	89,208	1,873,578	20.9
67–68	0.010261	88,790	911	88,334	1,784,370	20.1
68–69	0.011303	87,879	993	87,382	1,696,036	19.3
69–70	0.012461	86,886	1,083	86,344	1,608,653	18.5
70–71	0.013684	85,803	1,174	85,216	1,522,309	17.7
71–72	0.015003	84,629	1,270	83,994	1,437,093	17.0
72–73	0.016522	83,359	1,377	82,670	1,353,100	16.2
73–74	0.018294	81,982	1,500	81,232	1,270,429	15.5
74–75	0.020291	80,482	1,633	79,665	1,189,197	14.8
75–76	0.022401	78,849	1,766	77,966	1,109,532	14.1
76–77	0.024578	77,083	1,895	76,135	1,031,566	13.4
77–78	0.027085	75,188	2,036	74,170	955,431	12.7
78–79	0.030020	73,151	2,196	72,053	881,261	12.0
79–80	0.033423	70,955	2,372	69,770	809,208	11.4
80–81	0.037310	68,584	2,559	67,305	739,438	10.8
81–82	0.041726	66,025	2,755	64,648	672,134	10.2
82–83	0.046354	63,270	2,933	61,804	607,486	9.6
83–84	0.051467	60,337	3,105	58,785	545,682	9.0
84–85	0.057111	57,232	3,269	55,598	486,898	8.5
85–86	0.063332	53,963	3,418	52,255	431,300	8.0
86–87	0.070181	50,546	3,547	48,772	379,046	7.5
87–88	0.077709	46,998	3,652	45,172	330,274	7.0
88–89	0.085969	43,346	3,726	41,483	285,101	6.6
89–90	0.095017	39,620	3,765	37,737	243,618	6.1
90–91	0.104909	35,855	3,762	33,974	205,881	5.7
91–92	0.115698	32,094	3,713	30,237	171,907	5.4
92–93	0.127439	28,380	3,617	26,572	141,669	5.0
93–94	0.140182	24,764	3,471	23,028	115,097	4.6
94–95	0.153975	21,292	3,278	19,653	92,069	4.3
95–96	0.168858	18,014	3,042	16,493	72,416	4.0
96–97	0.184866	14,972	2,768	13,588	55,923	3.7
97–98	0.202022	12,204	2,466	10,971	42,335	3.5
98–99	0.220340	9,739	2,146	8,666	31,364	3.2
99–100	0.239820	7,593	1,821	6,682	22,698	3.0
100 and over	1.000000	5,772	5,772	16,016	16,016	2.8

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

Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/Series_Reports/sr02_152/Table4.xls.

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	0.005589	100,000	559	99,509	7,806,508	78.1
1–2	0.000392	99,441	39	99,422	7,707,000	77.5
2–3	0.000252	99,402	25	99,390	7,607,578	76.5
3–4	0.000194	99,377	19	99,367	7,508,189	75.6
4–5	0.000157	99,358	16	99,350	7,408,821	74.6
5–6	0.000152	99,342	15	99,335	7,309,471	73.6
6–7	0.000145	99,327	14	99,320	7,210,136	72.6
7–8	0.000135	99,313	13	99,306	7,110,817	71.6
8–9	0.000118	99,299	12	99,294	7,011,510	70.6
9–10	0.000095	99,288	9	99,283	6,912,217	69.6
10–11	0.000076	99,278	8	99,274	6,812,934	68.6
11–12	0.000075	99,271	7	99,267	6,713,660	67.6
12–13	0.000109	99,263	11	99,258	6,614,393	66.6
13–14	0.000186	99,252	18	99,243	6,515,135	65.6
14–15	0.000292	99,234	29	99,219	6,415,892	64.7
15–16	0.000404	99,205	40	99,185	6,316,672	63.7
16–17	0.000507	99,165	50	99,140	6,217,487	62.7
17–18	0.000602	99,115	60	99,085	6,118,348	61.7
18–19	0.000686	99,055	68	99,021	6,019,263	60.8
19–20	0.000761	98,987	75	98,949	5,920,242	59.8
20–21	0.000838	98,912	83	98,870	5,821,292	58.9
21–22	0.000913	98,829	90	98,784	5,722,422	57.9
22–23	0.000963	98,739	95	98,691	5,623,638	57.0
23–24	0.000982	98,643	97	98,595	5,524,947	56.0
24–25	0.000977	98,547	96	98,498	5,426,352	55.1
25–26	0.000965	98,450	95	98,403	5,327,854	54.1
26–27	0.000957	98,355	94	98,308	5,229,451	53.2
27–28	0.000954	98,261	94	98,214	5,131,143	52.2
28–29	0.000960	98,167	94	98,120	5,032,928	51.3
29–30	0.000976	98,073	96	98,025	4,934,808	50.3
30–31	0.001000	97,978	98	97,929	4,836,783	49.4
31–32	0.001031	97,880	101	97,829	4,738,854	48.4
32–33	0.001079	97,779	106	97,726	4,641,025	47.5
33–34	0.001113	97,673	109	97,619	4,543,299	46.5
34–35	0.001163	97,565	113	97,508	4,445,680	45.6
35–36	0.001220	97,451	119	97,392	4,348,173	44.6
36–37	0.001291	97,332	126	97,269	4,250,781	43.7
37–38	0.001387	97,206	135	97,139	4,153,511	42.7
38–39	0.001511	97,072	147	96,998	4,056,372	41.8
39–40	0.001660	96,925	161	96,845	3,959,374	40.8
40–41	0.001819	96,764	176	96,676	3,862,530	39.9
41–42	0.001984	96,588	192	96,492	3,765,853	39.0
42–43	0.002167	96,396	209	96,292	3,669,361	38.1
43–44	0.002366	96,188	228	96,074	3,573,069	37.1
44–45	0.002579	95,960	247	95,836	3,476,995	36.2
45–46	0.002801	95,713	268	95,579	3,381,159	35.3
46–47	0.003029	95,444	289	95,300	3,285,581	34.4
47–48	0.003269	95,155	311	95,000	3,190,281	33.5
48–49	0.003530	94,844	335	94,677	3,095,281	32.6
49–50	0.003817	94,510	361	94,329	3,000,604	31.7
50–51	0.004132	94,149	389	93,954	2,906,275	30.9
51–52	0.004473	93,760	419	93,550	2,812,320	30.0
52–53	0.004835	93,340	451	93,115	2,718,770	29.1
53–54	0.005203	92,889	483	92,647	2,625,655	28.3
54–55	0.005576	92,406	515	92,148	2,533,008	27.4
55–56	0.005957	91,891	547	91,617	2,440,860	26.6
56–57	0.006368	91,343	582	91,052	2,349,243	25.7
57–58	0.006835	90,762	620	90,451	2,258,191	24.9
58–59	0.007398	90,141	667	89,808	2,167,739	24.0
59–60	0.008081	89,474	723	89,113	2,077,931	23.2
60–61	0.008910	88,751	791	88,356	1,988,819	22.4
61–62	0.009847	87,961	866	87,527	1,900,463	21.6

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

Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/Series_Reports/sr02_152/Table4.xls.

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
62–63	0.010827	87,094	943	86,623	1,812,935	20.8
63–64	0.011763	86,151	1,013	85,645	1,726,312	20.0
64–65	0.012662	85,138	1,078	84,599	1,640,668	19.3
65–66	0.013644	84,060	1,147	83,487	1,556,069	18.5
66–67	0.014668	82,913	1,216	82,305	1,472,582	17.8
67–68	0.015860	81,697	1,296	81,049	1,390,277	17.0
68–69	0.017242	80,401	1,386	79,708	1,309,228	16.3
69–70	0.018833	79,015	1,488	78,271	1,229,520	15.6
70–71	0.020620	77,527	1,599	76,728	1,151,249	14.8
71–72	0.022666	75,928	1,721	75,068	1,074,521	14.2
72–73	0.025034	74,207	1,858	73,278	999,454	13.5
73–74	0.027733	72,350	2,006	71,346	926,175	12.8
74–75	0.030756	70,343	2,163	69,261	854,829	12.2
75–76	0.034136	68,180	2,327	67,016	785,568	11.5
76–77	0.037808	65,852	2,490	64,607	718,552	10.9
77–78	0.041857	63,363	2,652	62,036	653,944	10.3
78–79	0.046320	60,710	2,812	59,304	591,908	9.7
79–80	0.051233	57,898	2,966	56,415	532,604	9.2
80–81	0.056637	54,932	3,111	53,376	476,188	8.7
81–82	0.062572	51,821	3,243	50,200	422,812	8.2
82–83	0.069084	48,578	3,356	46,900	372,613	7.7
83–84	0.076219	45,222	3,447	43,499	325,712	7.2
84–85	0.084024	41,775	3,510	40,020	282,213	6.8
85–86	0.092548	38,265	3,541	36,495	242,193	6.3
86–87	0.101841	34,724	3,536	32,956	205,698	5.9
87–88	0.111952	31,188	3,492	29,442	172,743	5.5
88–89	0.122930	27,696	3,405	25,994	143,301	5.2
89–90	0.134820	24,291	3,275	22,654	117,307	4.8
90–91	0.147667	21,016	3,103	19,465	94,653	4.5
91–92	0.161509	17,913	2,893	16,466	75,189	4.2
92–93	0.176380	15,020	2,649	13,695	58,722	3.9
93–94	0.192307	12,371	2,379	11,181	45,027	3.6
94–95	0.209307	9,992	2,091	8,946	33,846	3.4
95–96	0.227386	7,900	1,796	7,002	24,900	3.2
96–97	0.246539	6,104	1,505	5,352	17,897	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	5,673	2.4
100 and over	1.000000	1,656	1,656	3,645	3,645	2.2

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

Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/Series_Reports/sr02_152/Table5.xls.

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	0.006196	100,000	620	99,455	7,559,586	75.6
1–2	0.000393	99,380	39	99,361	7,460,131	75.1
2–3	0.000273	99,341	27	99,328	7,360,770	74.1
3–4	0.000222	99,314	22	99,303	7,261,442	73.1
4–5	0.000167	99,292	17	99,284	7,162,139	72.1
5–6	0.000167	99,275	17	99,267	7,062,855	71.1
6–7	0.000159	99,259	16	99,251	6,963,588	70.2
7–8	0.000148	99,243	15	99,236	6,864,337	69.2
8–9	0.000127	99,228	13	99,222	6,765,101	68.2
9–10	0.000099	99,216	10	99,211	6,665,879	67.2
10–11	0.000077	99,206	8	99,202	6,566,669	66.2
11–12	0.000078	99,198	8	99,194	6,467,467	65.2
12–13	0.000125	99,191	12	99,184	6,368,272	64.2
13–14	0.000228	99,178	23	99,167	6,269,088	63.2
14–15	0.000370	99,155	37	99,137	6,169,921	62.2
15–16	0.000517	99,119	51	99,093	6,070,784	61.2
16–17	0.000654	99,068	65	99,035	5,971,691	60.3
17–18	0.000792	99,003	78	98,964	5,872,656	59.3
18–19	0.000930	98,924	92	98,878	5,773,692	58.4
19–20	0.001064	98,832	105	98,780	5,674,814	57.4
20–21	0.001206	98,727	119	98,668	5,576,034	56.5
21–22	0.001339	98,608	132	98,542	5,477,366	55.5
22–23	0.001426	98,476	140	98,406	5,378,824	54.6
23–24	0.001451	98,336	143	98,264	5,280,418	53.7
24–25	0.001430	98,193	140	98,123	5,182,154	52.8
25–26	0.001391	98,053	136	97,984	5,084,031	51.9
26–27	0.001361	97,916	133	97,849	4,986,047	50.9
27–28	0.001338	97,783	131	97,717	4,888,198	50.0
28–29	0.001333	97,652	130	97,587	4,790,480	49.1
29–30	0.001344	97,522	131	97,456	4,692,893	48.1
30–31	0.001365	97,391	133	97,324	4,595,437	47.2
31–32	0.001391	97,258	135	97,190	4,498,113	46.2
32–33	0.001442	97,123	140	97,053	4,400,922	45.3
33–34	0.001465	96,982	142	96,911	4,303,870	44.4
34–35	0.001514	96,840	147	96,767	4,206,958	43.4
35–36	0.001573	96,694	152	96,618	4,110,191	42.5
36–37	0.001652	96,542	159	96,462	4,013,573	41.6
37–38	0.001761	96,382	170	96,297	3,917,111	40.6
38–39	0.001908	96,212	184	96,121	3,820,814	39.7
39–40	0.002085	96,029	200	95,929	3,724,693	38.8
40–41	0.002277	95,829	218	95,720	3,628,764	37.9
41–42	0.002479	95,610	237	95,492	3,533,045	37.0
42–43	0.002706	95,373	258	95,244	3,437,553	36.0
43–44	0.002957	95,115	281	94,975	3,342,308	35.1
44–45	0.003228	94,834	306	94,681	3,247,334	34.2
45–46	0.003507	94,528	331	94,362	3,152,653	33.4
46–47	0.003795	94,196	357	94,018	3,058,290	32.5
47–48	0.004107	93,839	385	93,646	2,964,273	31.6
48–49	0.004453	93,454	416	93,246	2,870,626	30.7
49–50	0.004839	93,037	450	92,812	2,777,381	29.9
50–51	0.005265	92,587	487	92,344	2,684,568	29.0
51–52	0.005717	92,100	527	91,837	2,592,225	28.1
52–53	0.006180	91,573	566	91,290	2,500,388	27.3
53–54	0.006628	91,007	603	90,706	2,409,098	26.5
54–55	0.007063	90,404	638	90,085	2,318,392	25.6
55–56	0.007502	89,766	673	89,429	2,228,307	24.8
56–57	0.007979	89,092	711	88,737	2,138,878	24.0
57–58	0.008521	88,381	753	88,005	2,050,141	23.2
58–59	0.009181	87,628	805	87,226	1,962,136	22.4
59–60	0.009985	86,824	867	86,390	1,874,911	21.6
60–61	0.010957	85,957	942	85,486	1,788,520	20.8
61–62	0.012058	85,015	1,025	84,502	1,703,034	20.0

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

Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/Series_Reports/sr02_152/Table5.xls.

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
62–63	0.013230	83,990	1,111	83,434	1,618,532	19.3
63–64	0.014378	82,879	1,192	82,283	1,535,098	18.5
64–65	0.015500	81,687	1,266	81,054	1,452,815	17.8
65–66	0.016729	80,421	1,345	79,748	1,371,761	17.1
66–67	0.018013	79,075	1,424	78,363	1,292,013	16.3
67–68	0.019480	77,651	1,513	76,895	1,213,650	15.6
68–69	0.021156	76,138	1,611	75,333	1,136,755	14.9
69–70	0.023071	74,528	1,719	73,668	1,061,422	14.2
70–71	0.025211	72,808	1,836	71,890	987,754	13.6
71–72	0.027672	70,973	1,964	69,991	915,864	12.9
72–73	0.030548	69,009	2,108	67,955	845,873	12.3
73–74	0.033841	66,901	2,264	65,769	777,918	11.6
74–75	0.037505	64,637	2,424	63,425	712,150	11.0
75–76	0.041549	62,212	2,585	60,920	648,725	10.4
76–77	0.045911	59,628	2,738	58,259	587,805	9.9
77–78	0.050707	56,890	2,885	55,448	529,546	9.3
78–79	0.055974	54,005	3,023	52,494	474,099	8.8
79–80	0.061752	50,982	3,148	49,408	421,605	8.3
80–81	0.068084	47,834	3,257	46,206	372,197	7.8
81–82	0.075014	44,577	3,344	42,905	325,991	7.3
82–83	0.082586	41,233	3,405	39,531	283,086	6.9
83–84	0.090847	37,828	3,437	36,110	243,555	6.4
84–85	0.099845	34,392	3,434	32,675	207,445	6.0
85–86	0.109626	30,958	3,394	29,261	174,770	5.6
86–87	0.120238	27,564	3,314	25,907	145,509	5.3
87–88	0.131725	24,250	3,194	22,653	119,603	4.9
88–89	0.144130	21,055	3,035	19,538	96,950	4.6
89–90	0.157491	18,021	2,838	16,602	77,412	4.3
90–91	0.171842	15,183	2,609	13,878	60,810	4.0
91–92	0.187210	12,574	2,354	11,397	46,932	3.7
92–93	0.203615	10,220	2,081	9,179	35,536	3.5
93–94	0.221066	8,139	1,799	7,239	26,356	3.2
94–95	0.239563	6,340	1,519	5,580	19,117	3.0
95–96	0.259092	4,821	1,249	4,196	13,537	2.8
96–97	0.279629	3,572	999	3,072	9,341	2.6
97–98	0.301131	2,573	775	2,186	6,268	2.4
98–99	0.323544	1,798	582	1,507	4,083	2.3
99–100	0.346798	1,216	422	1,005	2,575	2.1
100 and over	1.000000	795	795	1,570	1,570	2.0

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

Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/Series_Reports/sr02_152/Table6.xls.

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	0.004950	100,000	495	99,566	8,045,444	80.5
1–2	0.000392	99,505	39	99,486	7,945,878	79.9
2–3	0.000229	99,466	23	99,455	7,846,392	78.9
3–4	0.000165	99,443	16	99,435	7,746,937	77.9
4–5	0.000146	99,427	14	99,420	7,647,502	76.9
5–6	0.000136	99,412	14	99,406	7,548,083	75.9
6–7	0.000129	99,399	13	99,392	7,448,677	74.9
7–8	0.000121	99,386	12	99,380	7,349,285	73.9
8–9	0.000108	99,374	11	99,369	7,249,904	73.0
9–10	0.000091	99,363	9	99,359	7,150,536	72.0
10–11	0.000075	99,354	7	99,351	7,051,177	71.0
11–12	0.000072	99,347	7	99,343	6,951,826	70.0
12–13	0.000092	99,340	9	99,335	6,852,483	69.0
13–14	0.000141	99,331	14	99,324	6,753,148	68.0
14–15	0.000209	99,317	21	99,306	6,653,824	67.0
15–16	0.000284	99,296	28	99,282	6,554,518	66.0
16–17	0.000351	99,268	35	99,250	6,455,237	65.0
17–18	0.000401	99,233	40	99,213	6,355,986	64.1
18–19	0.000429	99,193	43	99,172	6,256,774	63.1
19–20	0.000441	99,150	44	99,129	6,157,602	62.1
20–21	0.000449	99,107	44	99,084	6,058,473	61.1
21–22	0.000462	99,062	46	99,039	5,959,389	60.2
22–23	0.000475	99,016	47	98,993	5,860,350	59.2
23–24	0.000490	98,969	49	98,945	5,761,357	58.2
24–25	0.000507	98,921	50	98,896	5,662,411	57.2
25–26	0.000526	98,871	52	98,845	5,563,516	56.3
26–27	0.000546	98,819	54	98,792	5,464,671	55.3
27–28	0.000565	98,765	56	98,737	5,365,879	54.3
28–29	0.000584	98,709	58	98,680	5,267,142	53.4
29–30	0.000604	98,651	60	98,622	5,168,462	52.4
30–31	0.000631	98,592	62	98,561	5,069,840	51.4
31–32	0.000668	98,530	66	98,497	4,971,280	50.5
32–33	0.000715	98,464	70	98,429	4,872,783	49.5
33–34	0.000758	98,393	75	98,356	4,774,354	48.5
34–35	0.000809	98,319	80	98,279	4,675,998	47.6
35–36	0.000863	98,239	85	98,197	4,577,719	46.6
36–37	0.000927	98,155	91	98,109	4,479,522	45.6
37–38	0.001008	98,064	99	98,014	4,381,413	44.7
38–39	0.001111	97,965	109	97,910	4,283,399	43.7
39–40	0.001233	97,856	121	97,796	4,185,489	42.8
40–41	0.001360	97,735	133	97,669	4,087,693	41.8
41–42	0.001490	97,602	145	97,530	3,990,024	40.9
42–43	0.001629	97,457	159	97,378	3,892,495	39.9
43–44	0.001778	97,298	173	97,212	3,795,117	39.0
44–45	0.001935	97,125	188	97,031	3,697,906	38.1
45–46	0.002099	96,937	203	96,835	3,600,874	37.1
46–47	0.002269	96,734	219	96,624	3,504,039	36.2
47–48	0.002440	96,514	235	96,397	3,407,415	35.3
48–49	0.002617	96,279	252	96,153	3,311,019	34.4
49–50	0.002808	96,027	270	95,892	3,214,866	33.5
50–51	0.003016	95,757	289	95,613	3,118,974	32.6
51–52	0.003250	95,468	310	95,313	3,023,361	31.7
52–53	0.003516	95,158	335	94,991	2,928,048	30.8
53–54	0.003809	94,824	361	94,643	2,833,057	29.9
54–55	0.004124	94,462	390	94,268	2,738,414	29.0
55–56	0.004453	94,073	419	93,863	2,644,147	28.1
56–57	0.004803	93,654	450	93,429	2,550,283	27.2
57–58	0.005202	93,204	485	92,962	2,456,854	26.4
58–59	0.005680	92,719	527	92,456	2,363,893	25.5
59–60	0.006256	92,193	577	91,904	2,271,437	24.6
60–61	0.006961	91,616	638	91,297	2,179,533	23.8
61–62	0.007759	90,978	706	90,625	2,088,236	23.0

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

Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/Series_Reports/sr02_152/Table6.xls.

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
62–63	0.008576	90,272	774	89,885	1,997,611	22.1
63–64	0.009332	89,498	835	89,080	1,907,726	21.3
64–65	0.010041	88,663	890	88,218	1,818,645	20.5
65–66	0.010818	87,773	950	87,298	1,730,428	19.7
66–67	0.011635	86,823	1,010	86,318	1,643,130	18.9
67–68	0.012616	85,813	1,083	85,271	1,556,812	18.1
68–69	0.013784	84,730	1,168	84,146	1,471,540	17.4
69–70	0.015146	83,562	1,266	82,929	1,387,394	16.6
70–71	0.016696	82,297	1,374	81,610	1,304,465	15.9
71–72	0.018467	80,923	1,494	80,175	1,222,855	15.1
72–73	0.020503	79,428	1,629	78,614	1,142,680	14.4
73–74	0.022823	77,800	1,776	76,912	1,064,066	13.7
74–75	0.025453	76,024	1,935	75,056	987,154	13.0
75–76	0.028446	74,089	2,108	73,035	912,098	12.3
76–77	0.031722	71,981	2,283	70,840	839,063	11.7
77–78	0.035362	69,698	2,465	68,466	768,223	11.0
78–79	0.039403	67,233	2,649	65,909	699,757	10.4
79–80	0.043884	64,584	2,834	63,167	633,849	9.8
80–81	0.048849	61,750	3,016	60,242	570,682	9.2
81–82	0.054344	58,733	3,192	57,138	510,440	8.7
82–83	0.060418	55,542	3,356	53,864	453,302	8.2
83–84	0.067122	52,186	3,503	50,434	399,439	7.7
84–85	0.074512	48,683	3,627	46,869	349,004	7.2
85–86	0.082642	45,056	3,723	43,194	302,135	6.7
86–87	0.091572	41,332	3,785	39,440	258,941	6.3
87–88	0.101361	37,547	3,806	35,644	219,501	5.8
88–89	0.112067	33,741	3,781	31,851	183,857	5.4
89–90	0.123747	29,960	3,707	28,106	152,006	5.1
90–91	0.136458	26,253	3,582	24,461	123,900	4.7
91–92	0.150251	22,670	3,406	20,967	99,438	4.4
92–93	0.165172	19,264	3,182	17,673	78,471	4.1
93–94	0.181258	16,082	2,915	14,625	60,798	3.8
94–95	0.198538	13,167	2,614	11,860	46,173	3.5
95–96	0.217028	10,553	2,290	9,408	34,313	3.3
96–97	0.236733	8,263	1,956	7,285	24,906	3.0
97–98	0.257637	6,307	1,625	5,494	17,621	2.8
98–99	0.279711	4,682	1,310	4,027	12,127	2.6
99–100	0.302905	3,372	1,021	2,862	8,100	2.4
100 and over	1.000000	2,351	2,351	5,238	5,238	2.2

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

Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/Series_Reports/sr02_152/Table7.xls.

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	0.013441	100,000	1,344	98,814	7,290,340	72.9
1–2	0.000720	98,656	71	98,620	7,191,526	72.9
2–3	0.000493	98,585	49	98,561	7,092,905	71.9
3–4	0.000325	98,536	32	98,520	6,994,345	71.0
4–5	0.000273	98,504	27	98,491	6,895,825	70.0
5–6	0.000261	98,477	26	98,464	6,797,334	69.0
6–7	0.000237	98,452	23	98,440	6,698,869	68.0
7–8	0.000214	98,428	21	98,418	6,600,430	67.1
8–9	0.000186	98,407	18	98,398	6,502,012	66.1
9–10	0.000154	98,389	15	98,381	6,403,614	65.1
10–11	0.000131	98,374	13	98,367	6,305,232	64.1
11–12	0.000134	98,361	13	98,354	6,206,865	63.1
12–13	0.000183	98,348	18	98,339	6,108,511	62.1
13–14	0.000287	98,330	28	98,316	6,010,172	61.1
14–15	0.000432	98,302	42	98,280	5,911,856	60.1
15–16	0.000591	98,259	58	98,230	5,813,576	59.2
16–17	0.000741	98,201	73	98,165	5,715,346	58.2
17–18	0.000883	98,128	87	98,085	5,617,181	57.2
18–19	0.001013	98,042	99	97,992	5,519,096	56.3
19–20	0.001133	97,942	111	97,887	5,421,104	55.3
20–21	0.001262	97,831	123	97,770	5,323,218	54.4
21–22	0.001395	97,708	136	97,640	5,225,448	53.5
22–23	0.001503	97,572	147	97,498	5,127,808	52.6
23–24	0.001573	97,425	153	97,348	5,030,310	51.6
24–25	0.001612	97,272	157	97,193	4,932,962	50.7
25–26	0.001643	97,115	160	97,035	4,835,768	49.8
26–27	0.001679	96,955	163	96,874	4,738,733	48.9
27–28	0.001716	96,793	166	96,709	4,641,859	48.0
28–29	0.001758	96,626	170	96,542	4,545,150	47.0
29–30	0.001808	96,457	174	96,369	4,448,608	46.1
30–31	0.001867	96,282	180	96,192	4,352,239	45.2
31–32	0.001935	96,102	186	96,009	4,256,047	44.3
32–33	0.002040	95,917	196	95,819	4,160,037	43.4
33–34	0.002103	95,721	201	95,620	4,064,218	42.5
34–35	0.002202	95,520	210	95,414	3,968,598	41.5
35–36	0.002312	95,309	220	95,199	3,873,184	40.6
36–37	0.002442	95,089	232	94,973	3,777,985	39.7
37–38	0.002601	94,857	247	94,733	3,683,012	38.8
38–39	0.002796	94,610	265	94,478	3,588,279	37.9
39–40	0.003023	94,345	285	94,203	3,493,801	37.0
40–41	0.003263	94,060	307	93,907	3,399,599	36.1
41–42	0.003519	93,753	330	93,588	3,305,692	35.3
42–43	0.003814	93,423	356	93,245	3,212,103	34.4
43–44	0.004159	93,067	387	92,874	3,118,858	33.5
44–45	0.004547	92,680	421	92,469	3,025,985	32.6
45–46	0.004953	92,259	457	92,030	2,933,515	31.8
46–47	0.005377	91,802	494	91,555	2,841,485	31.0
47–48	0.005854	91,308	535	91,041	2,749,930	30.1
48–49	0.006404	90,773	581	90,483	2,658,890	29.3
49–50	0.007030	90,192	634	89,875	2,568,407	28.5
50–51	0.007726	89,558	692	89,212	2,478,532	27.7
51–52	0.008465	88,866	752	88,490	2,389,320	26.9
52–53	0.009208	88,114	811	87,708	2,300,830	26.1
53–54	0.009909	87,303	865	86,870	2,213,121	25.4
54–55	0.010567	86,438	913	85,981	2,126,251	24.6
55–56	0.011241	85,524	961	85,043	2,040,270	23.9
56–57	0.011963	84,563	1,012	84,057	1,955,227	23.1
57–58	0.012714	83,551	1,062	83,020	1,871,170	22.4
58–59	0.013538	82,489	1,117	81,930	1,788,150	21.7
59–60	0.014480	81,372	1,178	80,783	1,706,220	21.0
60–61	0.015597	80,194	1,251	79,568	1,625,437	20.3
61–62	0.016876	78,943	1,332	78,277	1,545,868	19.6

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

Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/Series_Reports/sr02_152/Table7.xls.

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
62–63	0.018226	77,611	1,415	76,903	1,467,591	18.9
63–64	0.019488	76,196	1,485	75,454	1,390,688	18.3
64–65	0.020613	74,711	1,540	73,941	1,315,234	17.6
65–66	0.021691	73,171	1,587	72,378	1,241,293	17.0
66–67	0.022760	71,584	1,629	70,769	1,168,915	16.3
67–68	0.024071	69,955	1,684	69,113	1,098,146	15.7
68–69	0.025702	68,271	1,755	67,394	1,029,033	15.1
69–70	0.027620	66,516	1,837	65,598	961,639	14.5
70–71	0.029728	64,679	1,923	63,718	896,042	13.9
71–72	0.032027	62,756	2,010	61,751	832,324	13.3
72–73	0.034618	60,746	2,103	59,695	770,573	12.7
73–74	0.037529	58,643	2,201	57,543	710,878	12.1
74–75	0.040755	56,443	2,300	55,292	653,335	11.6
75–76	0.044287	54,142	2,398	52,943	598,042	11.0
76–77	0.047893	51,745	2,478	50,505	545,099	10.5
77–78	0.051778	49,266	2,551	47,991	494,593	10.0
78–79	0.055958	46,715	2,614	45,408	446,603	9.6
79–80	0.060455	44,101	2,666	42,768	401,194	9.1
80–81	0.065288	41,435	2,705	40,083	358,426	8.7
81–82	0.070479	38,730	2,730	37,365	318,343	8.2
82–83	0.076049	36,000	2,738	34,631	280,978	7.8
83–84	0.082020	33,262	2,728	31,898	246,347	7.4
84–85	0.088415	30,534	2,700	29,184	214,449	7.0
85–86	0.095257	27,835	2,651	26,509	185,264	6.7
86–87	0.102568	25,183	2,583	23,892	158,755	6.3
87–88	0.110373	22,600	2,494	21,353	134,864	6.0
88–89	0.118693	20,106	2,386	18,913	113,511	5.6
89–90	0.127550	17,719	2,260	16,589	94,598	5.3
90–91	0.136965	15,459	2,117	14,401	78,009	5.0
91–92	0.146958	13,342	1,961	12,362	63,608	4.8
92–93	0.157547	11,381	1,793	10,485	51,247	4.5
93–94	0.168748	9,588	1,618	8,779	40,762	4.3
94–95	0.180575	7,970	1,439	7,251	31,983	4.0
95–96	0.193039	6,531	1,261	5,901	24,732	3.8
96–97	0.206146	5,270	1,086	4,727	18,832	3.6
97–98	0.219900	4,184	920	3,724	14,105	3.4
98–99	0.234302	3,264	765	2,881	10,381	3.2
99–100	0.249345	2,499	623	2,187	7,500	3.0
100 and over	1.000000	1,876	1,876	5,312	5,312	2.8

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

Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/Series_Reports/sr02_152/Table8.xls.

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	0.014466	100,000	1,447	98,724	6,928,521	69.3
1–2	0.000787	98,553	78	98,515	6,829,797	69.3
2–3	0.000470	98,476	46	98,453	6,731,282	68.4
3–4	0.000388	98,430	38	98,410	6,632,830	67.4
4–5	0.000283	98,391	28	98,377	6,534,419	66.4
5–6	0.000286	98,364	28	98,349	6,436,042	65.4
6–7	0.000274	98,335	27	98,322	6,337,692	64.4
7–8	0.000255	98,308	25	98,296	6,239,370	63.5
8–9	0.000215	98,283	21	98,273	6,141,075	62.5
9–10	0.000159	98,262	16	98,254	6,042,802	61.5
10–11	0.000110	98,247	11	98,241	5,944,547	60.5
11–12	0.000104	98,236	10	98,231	5,846,306	59.5
12–13	0.000181	98,226	18	98,217	5,748,075	58.5
13–14	0.000360	98,208	35	98,190	5,649,859	57.5
14–15	0.000611	98,173	60	98,143	5,551,668	56.6
15–16	0.000887	98,113	87	98,069	5,453,526	55.6
16–17	0.001143	98,026	112	97,970	5,355,457	54.6
17–18	0.001378	97,914	135	97,846	5,257,487	53.7
18–19	0.001579	97,779	154	97,701	5,159,641	52.8
19–20	0.001756	97,624	171	97,538	5,061,940	51.9
20–21	0.001940	97,453	189	97,358	4,964,401	50.9
21–22	0.002130	97,264	207	97,160	4,867,043	50.0
22–23	0.002282	97,057	221	96,946	4,769,883	49.1
23–24	0.002378	96,835	230	96,720	4,672,937	48.3
24–25	0.002431	96,605	235	96,487	4,576,217	47.4
25–26	0.002467	96,370	238	96,251	4,479,730	46.5
26–27	0.002507	96,132	241	96,012	4,383,479	45.6
27–28	0.002542	95,891	244	95,769	4,287,467	44.7
28–29	0.002581	95,647	247	95,524	4,191,697	43.8
29–30	0.002625	95,401	250	95,275	4,096,173	42.9
30–31	0.002675	95,150	255	95,023	4,000,898	42.0
31–32	0.002731	94,896	259	94,766	3,905,875	41.2
32–33	0.002854	94,637	270	94,501	3,811,109	40.3
33–34	0.002871	94,366	271	94,231	3,716,608	39.4
34–35	0.002959	94,096	278	93,956	3,622,377	38.5
35–36	0.003063	93,817	287	93,673	3,528,420	37.6
36–37	0.003191	93,530	298	93,380	3,434,747	36.7
37–38	0.003350	93,231	312	93,075	3,341,366	35.8
38–39	0.003545	92,919	329	92,754	3,248,291	35.0
39–40	0.003778	92,590	350	92,415	3,155,537	34.1
40–41	0.004030	92,240	372	92,054	3,063,122	33.2
41–42	0.004313	91,868	396	91,670	2,971,069	32.3
42–43	0.004661	91,472	426	91,259	2,879,399	31.5
43–44	0.005088	91,045	463	90,814	2,788,140	30.6
44–45	0.005586	90,582	506	90,329	2,697,326	29.8
45–46	0.006107	90,076	550	89,801	2,606,997	28.9
46–47	0.006657	89,526	596	89,228	2,517,196	28.1
47–48	0.007308	88,930	650	88,605	2,427,968	27.3
48–49	0.008101	88,280	715	87,923	2,339,362	26.5
49–50	0.009030	87,565	791	87,170	2,251,440	25.7
50–51	0.010084	86,775	875	86,337	2,164,270	24.9
51–52	0.011194	85,899	962	85,419	2,077,933	24.2
52–53	0.012277	84,938	1,043	84,417	1,992,514	23.5
53–54	0.013236	83,895	1,110	83,340	1,908,097	22.7
54–55	0.014079	82,785	1,165	82,202	1,824,757	22.0
55–56	0.014916	81,619	1,217	81,011	1,742,555	21.3
56–57	0.015823	80,402	1,272	79,766	1,661,545	20.7
57–58	0.016779	79,130	1,328	78,466	1,581,779	20.0
58–59	0.017858	77,802	1,389	77,107	1,503,313	19.3
59–60	0.019118	76,412	1,461	75,682	1,426,206	18.7
60–61	0.020624	74,952	1,546	74,179	1,350,524	18.0
61–62	0.022336	73,406	1,640	72,586	1,276,346	17.4

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

Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/Series_Reports/sr02_152/Table8.xls.

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
62–63	0.024108	71,766	1,730	70,901	1,203,760	16.8
63–64	0.025687	70,036	1,799	69,137	1,132,858	16.2
64–65	0.027009	68,237	1,843	67,316	1,063,722	15.6
65–66	0.028211	66,394	1,873	65,458	996,406	15.0
66–67	0.029550	64,521	1,907	63,568	930,949	14.4
67–68	0.031258	62,614	1,957	61,636	867,381	13.9
68–69	0.033449	60,657	2,029	59,643	805,745	13.3
69–70	0.036040	58,628	2,113	57,572	746,102	12.7
70–71	0.038834	56,515	2,195	55,418	688,531	12.2
71–72	0.041799	54,321	2,271	53,185	633,113	11.7
72–73	0.045084	52,050	2,347	50,877	579,927	11.1
73–74	0.048710	49,703	2,421	48,493	529,050	10.6
74–75	0.052651	47,282	2,489	46,038	480,557	10.2
75–76	0.056865	44,793	2,547	43,519	434,520	9.7
76–77	0.061091	42,246	2,581	40,955	391,000	9.3
77–78	0.065610	39,665	2,602	38,364	350,045	8.8
78–79	0.070437	37,063	2,611	35,757	311,681	8.4
79–80	0.075591	34,452	2,604	33,150	275,924	8.0
80–81	0.081090	31,848	2,583	30,556	242,774	7.6
81–82	0.086950	29,265	2,545	27,993	212,218	7.3
82–83	0.093192	26,721	2,490	25,475	184,225	6.9
83–84	0.099832	24,230	2,419	23,021	158,749	6.6
84–85	0.106890	21,811	2,331	20,646	135,728	6.2
85–86	0.114383	19,480	2,228	18,366	115,083	5.9
86–87	0.122329	17,252	2,110	16,197	96,717	5.6
87–88	0.130746	15,141	1,980	14,152	80,520	5.3
88–89	0.139650	13,162	1,838	12,243	66,368	5.0
89–90	0.149057	11,324	1,688	10,480	54,126	4.8
90–91	0.158980	9,636	1,532	8,870	43,646	4.5
91–92	0.169432	8,104	1,373	7,417	34,776	4.3
92–93	0.180424	6,731	1,214	6,124	27,359	4.1
93–94	0.191964	5,516	1,059	4,987	21,235	3.8
94–95	0.204058	4,457	910	4,003	16,248	3.6
95–96	0.216711	3,548	769	3,163	12,245	3.5
96–97	0.229921	2,779	639	2,460	9,082	3.3
97–98	0.243685	2,140	522	1,879	6,622	3.1
98–99	0.257998	1,619	418	1,410	4,743	2.9
99–100	0.272848	1,201	328	1,037	3,333	2.8
100 and over	1.000000	873	873	2,296	2,296	2.6

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

Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/Series_Reports/sr02_152/Table9.xls.

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	0.012377	100,000	1,238	98,907	7,626,297	76.3
1–2	0.000622	98,762	61	98,732	7,527,390	76.2
2–3	0.000497	98,701	49	98,676	7,428,658	75.3
3–4	0.000248	98,652	24	98,640	7,329,982	74.3
4–5	0.000252	98,627	25	98,615	7,231,342	73.3
5–6	0.000225	98,603	22	98,591	7,132,727	72.3
6–7	0.000189	98,580	19	98,571	7,034,136	71.4
7–8	0.000164	98,562	16	98,554	6,935,565	70.4
8–9	0.000148	98,546	15	98,538	6,837,011	69.4
9–10	0.000141	98,531	14	98,524	6,738,473	68.4
10–11	0.000143	98,517	14	98,510	6,639,949	67.4
11–12	0.000154	98,503	15	98,495	6,541,439	66.4
12–13	0.000174	98,488	17	98,479	6,442,943	65.4
13–14	0.000204	98,471	20	98,461	6,344,464	64.4
14–15	0.000241	98,451	24	98,439	6,246,003	63.4
15–16	0.000283	98,427	28	98,413	6,147,564	62.5
16–17	0.000328	98,399	32	98,383	6,049,151	61.5
17–18	0.000377	98,367	37	98,348	5,950,768	60.5
18–19	0.000432	98,330	42	98,308	5,852,420	59.5
19–20	0.000493	98,287	48	98,263	5,754,112	58.5
20–21	0.000561	98,239	55	98,211	5,655,849	57.6
21–22	0.000633	98,184	62	98,153	5,557,637	56.6
22–23	0.000699	98,121	69	98,087	5,459,485	55.6
23–24	0.000752	98,053	74	98,016	5,361,398	54.7
24–25	0.000794	97,979	78	97,940	5,263,382	53.7
25–26	0.000838	97,901	82	97,860	5,165,441	52.8
26–27	0.000887	97,819	87	97,776	5,067,581	51.8
27–28	0.000938	97,733	92	97,687	4,969,805	50.9
28–29	0.000992	97,641	97	97,592	4,872,118	49.9
29–30	0.001054	97,544	103	97,493	4,774,526	48.9
30–31	0.001126	97,441	110	97,386	4,677,033	48.0
31–32	0.001212	97,331	118	97,273	4,579,647	47.1
32–33	0.001316	97,214	128	97,150	4,482,375	46.1
33–34	0.001412	97,086	137	97,017	4,385,225	45.2
34–35	0.001525	96,948	148	96,875	4,288,208	44.2
35–36	0.001641	96,801	159	96,721	4,191,333	43.3
36–37	0.001773	96,642	171	96,556	4,094,612	42.4
37–38	0.001934	96,470	187	96,377	3,998,056	41.4
38–39	0.002130	96,284	205	96,181	3,901,679	40.5
39–40	0.002353	96,079	226	95,966	3,805,498	39.6
40–41	0.002583	95,853	248	95,729	3,709,532	38.7
41–42	0.002816	95,605	269	95,471	3,613,803	37.8
42–43	0.003068	95,336	292	95,190	3,518,333	36.9
43–44	0.003343	95,043	318	94,885	3,423,143	36.0
44–45	0.003638	94,726	345	94,553	3,328,258	35.1
45–46	0.003948	94,381	373	94,195	3,233,705	34.3
46–47	0.004266	94,008	401	93,808	3,139,510	33.4
47–48	0.004597	93,607	430	93,392	3,045,702	32.5
48–49	0.004946	93,177	461	92,947	2,952,310	31.7
49–50	0.005323	92,716	493	92,470	2,859,363	30.8
50–51	0.005731	92,223	529	91,959	2,766,894	30.0
51–52	0.006173	91,694	566	91,411	2,674,935	29.2
52–53	0.006646	91,128	606	90,825	2,583,524	28.4
53–54	0.007141	90,523	646	90,199	2,492,699	27.5
54–55	0.007650	89,876	688	89,532	2,402,499	26.7
55–56	0.008190	89,189	730	88,823	2,312,967	25.9
56–57	0.008763	88,458	775	88,071	2,224,143	25.1
57–58	0.009357	87,683	820	87,273	2,136,073	24.4
58–59	0.009997	86,863	868	86,428	2,048,800	23.6
59–60	0.010720	85,994	922	85,533	1,962,372	22.8
60–61	0.011577	85,072	985	84,580	1,876,839	22.1
61–62	0.012575	84,087	1,057	83,559	1,792,259	21.3

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

Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/Series_Reports/sr02_152/Table9.xls.

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
62–63	0.013658	83,030	1,134	82,463	1,708,700	20.6
63–64	0.014724	81,896	1,206	81,293	1,626,237	19.9
64–65	0.015733	80,690	1,270	80,056	1,544,944	19.1
65–66	0.016747	79,421	1,330	78,756	1,464,888	18.4
66–67	0.017728	78,091	1,384	77,398	1,386,132	17.8
67–68	0.018866	76,706	1,447	75,983	1,308,734	17.1
68–69	0.020217	75,259	1,521	74,498	1,232,751	16.4
69–70	0.021787	73,738	1,607	72,934	1,158,253	15.7
70–71	0.023541	72,131	1,698	71,282	1,085,318	15.0
71–72	0.025504	70,433	1,796	69,535	1,014,036	14.4
72–73	0.027754	68,637	1,905	67,684	944,501	13.8
73–74	0.030315	66,732	2,023	65,720	876,817	13.1
74–75	0.033188	64,709	2,148	63,635	811,097	12.5
75–76	0.036373	62,561	2,276	61,424	747,462	11.9
76–77	0.039654	60,286	2,391	59,091	686,038	11.4
77–78	0.043218	57,895	2,502	56,644	626,948	10.8
78–79	0.047087	55,393	2,608	54,089	570,303	10.3
79–80	0.051283	52,785	2,707	51,431	516,214	9.8
80–81	0.055831	50,078	2,796	48,680	464,783	9.3
81–82	0.060757	47,282	2,873	45,846	416,103	8.8
82–83	0.066087	44,409	2,935	42,942	370,258	8.3
83–84	0.071849	41,474	2,980	39,984	327,316	7.9
84–85	0.078072	38,494	3,005	36,992	287,332	7.5
85–86	0.084784	35,489	3,009	33,985	250,340	7.1
86–87	0.092015	32,480	2,989	30,986	216,355	6.7
87–88	0.099796	29,492	2,943	28,020	185,369	6.3
88–89	0.108157	26,548	2,871	25,113	157,349	5.9
89–90	0.117127	23,677	2,773	22,290	132,237	5.6
90–91	0.126735	20,904	2,649	19,579	109,946	5.3
91–92	0.137008	18,255	2,501	17,004	90,367	5.0
92–93	0.147974	15,754	2,331	14,588	73,363	4.7
93–94	0.159655	13,422	2,143	12,351	58,775	4.4
94–95	0.172072	11,279	1,941	10,309	46,424	4.1
95–96	0.185241	9,339	1,730	8,474	36,115	3.9
96–97	0.199176	7,609	1,515	6,851	27,642	3.6
97–98	0.213884	6,093	1,303	5,442	20,791	3.4
98–99	0.229367	4,790	1,099	4,241	15,349	3.2
99–100	0.245621	3,691	907	3,238	11,108	3.0
100 and over	1.000000	2,785	2,785	7,870	7,870	2.8

Vital and Health Statistics Series Descriptions

ACTIVE SERIES

Series 1. **Programs and Collection Procedures**—This type of report describes the data collection programs of the National Center for Health Statistics. Series 1 includes descriptions of the methods used to collect and process the data, definitions, and other material necessary for understanding the data.

Series 2. **Data Evaluation and Methods Research**—This type of report concerns statistical methods and includes analytical techniques, objective evaluations of reliability of collected data, and contributions to statistical theory. Also included are experimental tests of new survey methods, comparisons of U.S. methodologies with those of other countries, and as of 2009, studies of cognition and survey measurement, and final reports of major committees concerning vital and health statistics measurement and methods.

Series 3. **Analytical and Epidemiological Studies**—This type of report presents analytical or interpretive studies based on vital and health statistics. As of 2009, Series 3 also includes studies based on surveys that are not part of continuing data systems of the National Center for Health Statistics and international vital and health statistics reports.

Series 10. **Data From the National Health Interview Survey**—This type of report contains statistics on illness; unintentional injuries; disability; use of hospital, medical, and other health services; and a wide range of special current health topics covering many aspects of health behaviors, health status, and health care utilization. Series 10 is based on data collected in this continuing national household interview survey.

Series 11. **Data From the National Health Examination Survey, the National Health and Nutrition Examination Surveys, and the Hispanic Health and Nutrition Examination Survey**—In this type of report, data from direct examination, testing, and measurement on representative samples of the civilian noninstitutionalized population provide the basis for (1) medically defined total prevalence of specific diseases or conditions in the United States and the distributions of the population with respect to physical, physiological, and psychological characteristics, and (2) analyses of trends and relationships among various measurements and between survey periods.

Series 13. **Data From the National Health Care Survey**—This type of report contains statistics on health resources and the public's use of health care resources including ambulatory, hospital, and long-term care services based on data collected directly from health care providers and provider records.

Series 20. **Data on Mortality**—This type of report contains statistics on mortality that are not included in regular, annual, or monthly reports. Special analyses by cause of death, age, other demographic variables, and geographic and trend analyses are included.

Series 21. **Data on Natality, Marriage, and Divorce**—This type of report contains statistics on natality, marriage, and divorce that are not included in regular, annual, or monthly reports. Special analyses by health and demographic variables and geographic and trend analyses are included.

Series 23. **Data From the National Survey of Family Growth**—These reports contain statistics on factors that affect birth rates, including contraception and infertility; factors affecting the formation and dissolution of families, including cohabitation, marriage, divorce, and remarriage; and behavior related to the risk of HIV and other sexually transmitted diseases. These statistics are based on national surveys of women and men of childbearing age.

DISCONTINUED SERIES

Series 4. **Documents and Committee Reports**—These are final reports of major committees concerned with vital and health statistics and documents. The last Series 4 report was published in 2002. As of 2009, this type of report is included in Series 2 or another appropriate series, depending on the report topic.

Series 5. **International Vital and Health Statistics Reports**—This type of report compares U.S. vital and health statistics with those of other countries or presents other international data of relevance to the health statistics system of the United States. The last Series 5 report was published in 2003. As of 2009, this type of report is included in Series 3 or another series, depending on the report topic.

Series 6. **Cognition and Survey Measurement**—This type of report uses methods of cognitive science to design, evaluate, and test survey instruments. The last Series 6 report was published in 1999. As of 2009, this type of report is included in Series 2.

Series 12. **Data From the Institutionalized Population Surveys**—The last Series 12 report was published in 1974. Reports from these surveys are included in Series 13.

Series 14. **Data on Health Resources: Manpower and Facilities**—The last Series 14 report was published in 1989. Reports on health resources are included in Series 13.

Series 15. **Data From Special Surveys**—This type of report contains statistics on health and health-related topics collected in special surveys that are not part of the continuing data systems of the National Center for Health Statistics. The last Series 15 report was published in 2002. As of 2009, reports based on these surveys are included in Series 3.

Series 16. **Compilations of Advance Data From Vital and Health Statistics**—The last Series 16 report was published in 1996. All reports are available online, and so compilations of Advance Data reports are no longer needed.

Series 22. **Data From the National Mortality and Natality Surveys**—The last Series 22 report was published in 1973. Reports from these sample surveys, based on vital records, are published in Series 20 or 21.

Series 24. **Compilations of Data on Natality, Mortality, Marriage, and Divorce**—The last Series 24 report was published in 1996. All reports are available online, and so compilations of reports are no longer needed.

For answers to questions about this report or for a list of reports published in these series, contact:

Information Dissemination Staff
National Center for Health Statistics
Centers for Disease Control and Prevention
3311 Toledo Road, Room 5412
Hyattsville, MD 20782

1–800–232–4636
E-mail: cdcinfo@cdc.gov
Internet: http://www.cdc.gov/nchs

U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES

Centers for Disease Control and Prevention
National Center for Health Statistics
3311 Toledo Road
Hyattsville, MD 20782

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

MEDIA MAIL
POSTAGE & FEES PAID
CDC/NCHS
PERMIT NO. G-284

CS216348
T37791 (10/2010)
DHHS Publication No. (PHS) 2011–1351, Series 2, No. 152