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Method for Constructing Complete Annual U.S. Life Tables

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

Hyattsville, Maryland
December 1999
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Contents

Text Tables

Figures

Detailed Tables

Abstract

Objectives

This report describes a method for constructing complete annual U.S. life tables and for extending the age coverage of the life table to age 100. Previously, annual life tables were based on an abridged methodology and were closed with the age category 85 years and over. In the United States, approximately one-third of the population survives beyond age 85 years. This fact, coupled with improvements in age reporting and the availability of higher quality old-age mortality data, recommends that the life table be closed at an older age.

Methods

The method, similar to that used to construct the decennial life tables, uses vital statistics and census data to calculate death rates for ages under 85 years and Medicare data for ages 85 years and over. Previously, the annual life tables were abridged, and used only vital statistics and census data.

Conclusions

The complete life table methodology described in this report produces estimates of life expectancy at ages 100 years and younger that are consistent with previously published life tables. Complete life tables based on 1996 mortality data compared favorably with published 1996 abridged life tables and with the 1989–91 decennial life tables. The methodology was implemented beginning with final mortality data for 1997.

Keywords: *life expectancy • life tables • survival • death rates • race and ethnicity*

A Method for Constructing Complete Annual U.S. Life Tables

by Robert N. Anderson, Ph.D., Division of Vital Statistics

Introduction

The purpose of this report is to describe a method for constructing complete annual U.S. life tables. Previously, the annual life tables have been produced using a method of constructing abridged life tables by reference to a standard table, which assumes that certain relationships among functions of the life table being constructed are the same as those of an existing life table referred to as the ''standard'' table (1). Abridged life tables are an approximation of complete life tables, whose use is dictated largely by limited computational resources. In the absence of these constraints, annual abridged life tables can be replaced with complete life tables using a method similar to that developed for the U.S. decennial life tables.

The method described in this report is also designed to extend the age coverage of the life table. Previously, the annual life tables were closed with the age category 85 years and over. Survival in the United States at the older ages is such that approximately one-third of the population survives beyond age 85 years (2). This fact, coupled with improvements in age reporting at the older ages and the availability of higher quality mortality data from sources other than vital statistics, recommends that the life table be closed at an older age. The method described in this report closes the annual life tables with the age category 100 years and over.

The report first provides some background and a brief review of the theoretical and empirical literature on which the method is based. Next, the mathematical details of the method are described. Finally, 1996 life expectancies calculated using the new methodology are presented and compared with published life expectancies from the 1996 abridged life tables and the 1989–91 decennial life tables.

Background

Complete versus Abridged Life Tables

Life tables can be classified in two ways according to the length of the age interval in which data are presented (3). A complete life table contains data for every single year of age. An abridged life table, on the other hand, typically contains data by 5- or 10-year age intervals. The abridged life table is a short cut method designed for use when the time, skill, or computational resources needed to prepare a complete life table are not available. The abridged method is also sometimes used when data are sparsely distributed by single years of age. A complete life table, of course, can be aggregated into 5- or 10-year age groups.

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Clearly, when circumstances are favorable in terms of resources, skill, and data, the complete life table is preferred over the abridged life table. The advantages of the complete life table are greater accuracy and greater age detail. In addition, complete annual life tables have the advantage of being comparable to the decennial life tables. Complete life tables have been constructed on a decennial basis since 1900 as part of the U.S. Decennial Life Table series. Sparseness of data is generally not a problem for U.S. life tables, except in the case of some racial and ethnic groups with small populations. Notwithstanding, the problem of sparse data is often surmountable as evidenced by life tables produced for States having as few as 700 total deaths in a given race-sex group as part of the U.S. Decennial Life Table series (4).

In the past, time and resources were perhaps important factors weighing against the construction of complete life tables on an annual basis. Given the current state of modern computing, calculation of the complete life table is feasible on a routine basis.

Extending the Open-Ended Age Interval to 100 Years and Over

Through the 1996 data year, the U.S. abridged life tables were closed with the age category 85 years and over. This strategy has been continued in part because death rates at older ages have long been considered to be of low accuracy (5–7). Use of an open-ended age interval to close the life table alleviates the need for accuracy beyond the beginning of the final interval since the probability of dying in the interval is by definition 1.0. On the other hand, this strategy obscures mortality patterns at ages over 85 years. In earlier decades of this century, there were not many survivors beyond age 85. Survival at age 85 years in the United States in 1900 was only about 6 percent (8). By 1940 survival had climbed to about 11 percent and by 1960 to about 19 percent (9,10). In contrast, in 1996 about one-third of the total U.S. population and nearly 42 percent of U.S. females survived to age 85 years (2). Consequently, a life table closed with the category 85 years and over inadequately describes the mortality experience of a significant proportion of the population.

The problem with expanding the age categories at the oldest ages is uncertainty regarding the actual risk of mortality at these ages. The level and shape of the age pattern of mortality at older ages has been a subject of interest for more than a century. In 1825, Benjamin Gompertz observed what has been termed the ‘‘Gompertz law,’’ i.e., that between sexual maturity and extreme old age mortality progresses geometrically as age increases arithmetically (11). However, at the very old ages, the simple Gompertz equation fails to adequately describe the age pattern of mortality. Rather than increase exponentially as the Gompertz equation would predict, after about age 80, a deceleration in the rate of increase has been observed (5,6,12–17). The departure from the Gompertz formula in U.S. mortality data has been attributed by some to age misreporting (5). However, the decelerating increase in mortality is consistent with what has been observed for countries with excellent age reporting and highly reliable age-specific mortality data at extremely old ages (5,6,15,16,17). While age-reporting problems may contribute somewhat, heterogeneity of mortality risk within age groups is perhaps also responsible for the observed decelerating increase in mortality by age. Heterogeneity and age misreporting are discussed below.

Heterogeneity of Mortality Risk

When constructing life tables, it is typically assumed that the age-specific probability of dying applies to all persons between ages x and $x+n$. However, it is clear that the risk of mortality is not constant within even very narrow age ranges. Mortality risk varies, sometimes greatly, by factors such as race, sex, and place of residence, among others. Thus, age-specific mortality rates represent only average mortality risk that may not accurately describe the actual risk of mortality for any particular specific group of persons or for any particular individual. Constructing separate life tables by race, sex, and place of residence accounts for the heterogeneity of mortality risk due to these factors. What is not typically taken into account is the distribution of frailty within each age group. Even accounting for a multitude of demographic, geographic, and socioeconomic factors, there are some persons who are more frail than others, i.e., inherently more susceptible to dying from any particular cause, at any particular age and time.

A growing body of research examines heterogeneity in individual frailty and how it may affect the age trajectory of mortality. This research has shown that differences in the composition of age-specific populations in terms of frailty may be an important factor in explaining the observed deceleration in the increase in mortality by age (18–22). The premise is that death changes the composition of a cohort by differentially removing the frail (19). Thus, even if all individuals in a cohort were to experience exponential increases in mortality risk with increasing age, the average mortality risk of the total cohort may level off or even decline as the cohort becomes progressively less frail in its composition (18,19).

Age Misstatement

U.S. annual abridged life tables are currently constructed using age-specific central death rates derived from vital registration and census population data. At ages over 85 years, it has been demonstrated that the reliability of death rates based on these data is compromised to some extent by age misreporting, particularly for nonwhite populations, and is increasingly problematic with increasing age (6,7,23,24). Age misreporting, often overstatement of age, is much more prevalent in the census population data than in the vital registration data and, as a result, inflates the denominators of age-specific death rates at the oldest ages such that the rates are biased downward (6).

The age misstatement problem in the United States is generally attributed to the lack of birth records for the extreme elderly (5,7,23). The lack of birth records is a problem particularly for elderly minority populations for which birth registration lagged far behind that for the white population (7,23). Research on the subject has shown a ''birth registration effect'' on age reporting, i.e., persons known to have birth certificates are much more likely to report their ages accurately (7). Although birth registration was common in many States by the mid-19th century, it was typically incomplete. The national birth registration system was not established until 1915 and consisted initially of only 10 States and the District of Columbia (25). After 1915, more States were admitted until 1933 when the national birth registration area included the entire United States. The result is an increasing proportion of persons in the U.S. population with registered births, which should result in increasing accuracy of age reporting over time.

Vital statistics death rates have become much more reasonable over time. Figure 1 shows death rates for ages 65 years and over for 1970, 1980, and 1990. For 1970 death rates increase until ages 95–99 years after which the death rate drops substantially. The death rate for those aged 100 years and over is unrealistically low, lower even than that for those aged 65–69 years. In 1980 the death rate for those aged 100 years and over is substantially higher than in 1970 but is still questionable since it is lower than that for the age group 95–99 years. In 1990 the death rate for those aged 100 years and over is even higher and reaches a level that is much more plausible. It is almost certain that the increase in the death rate during these two decades is not due to real increases in mortality at ages 100 years and over. Instead, improvements in age reporting and perhaps better census enumeration of the elderly are responsible. Given this trend, death rates for the extreme elderly based on population estimates derived from the 2000 census population are very likely to be of even better quality.

Medicare Data as a Standard

It is well known that death rates based on Medicare enrollment data are more accurate than those based on vital statistics and census data because proof of age is a prerequisite for enrollment (26,27). Despite the proof-of-age requirement, a small percent of Medicare enrollment records have not been verified strictly with regard to age. Most of these records correspond to persons enrolled in 1966 (the year that the Medicare program began operating) and subsequent years who were over age 65 but for whom proof of exact age did not exist. For some of these records, age is certainly misreported. As a result, the accuracy of Medicare death rates become increasingly uncertain with age for those over 100 years (26,27). Because birth records are used to verify age, age reporting in Medicare data is also subject to a birth registration effect that should improve the reliability of Medicare death rates from year to year. Because of their presumed accuracy compared with death rates based on vital statistics and census data, Medicare death rates have long been used in the construction of the U.S. decennial life tables (4).

Figures 2–5 show a comparison of the probability of dying by age (q_x) based on vital statistics and Medicare data from age 65 to 99 years for the four major race-sex groups in 1996. For

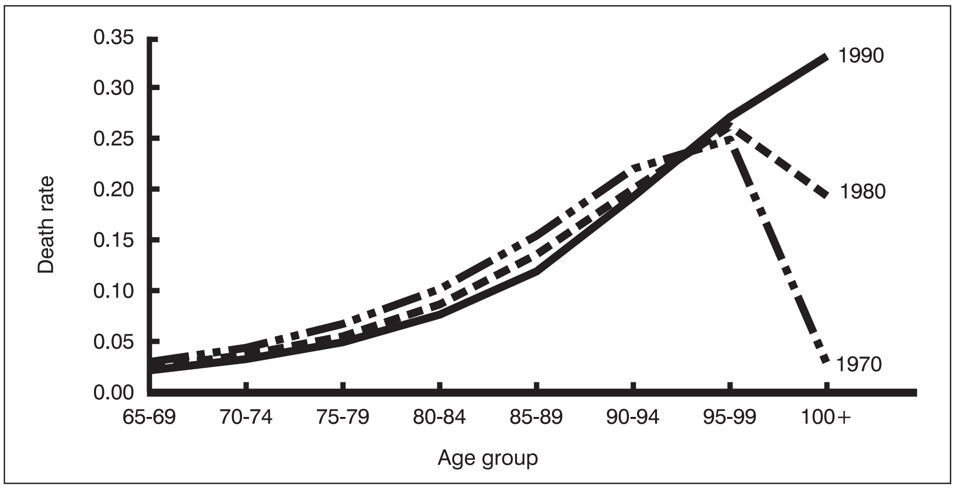

Figure 1. Vital statistics death rates, aged 65 years and over: United States, 1970, 1980, and 1990

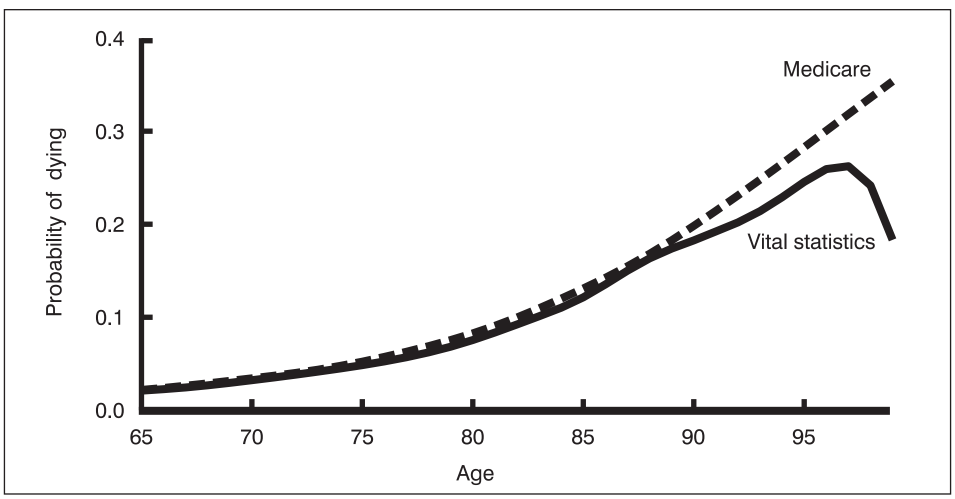

Figure 2. Probability of dying by single years of age, 65–99 years for white males based on vital statistics data and Medicare data: United States, 1996

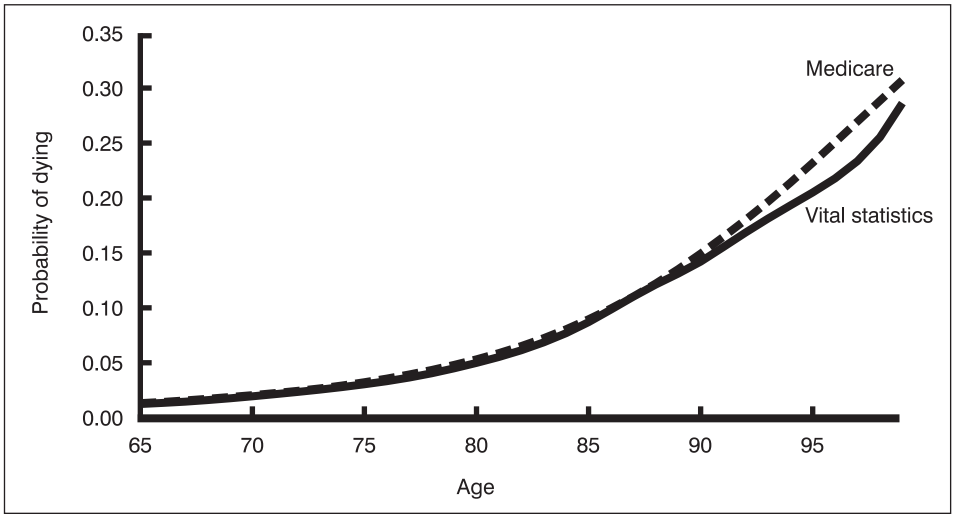

Figure 3. Probability of dying by single years of age, 65–99 years for white females based on vital statistics data and Medicare data: United States, 1996

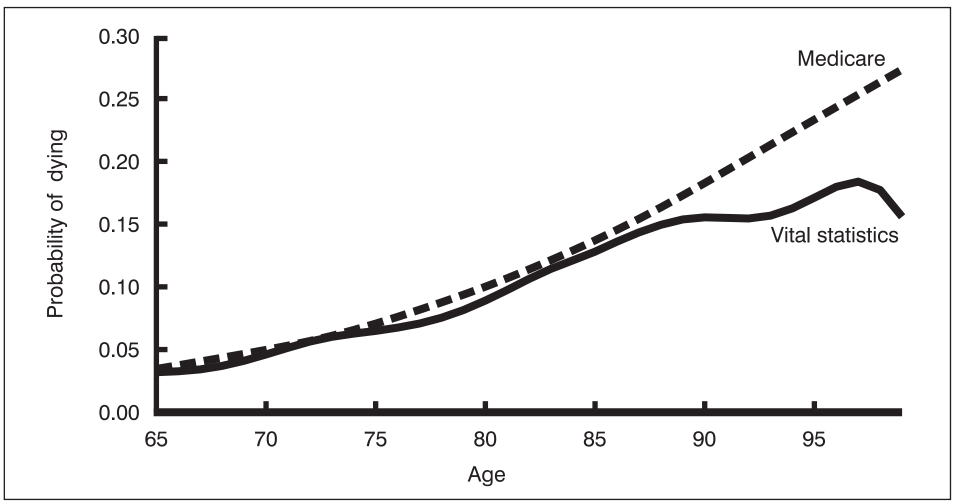

Figure 4. Probability of dying by single years of age, 65–99 years for black males based on vital statistics data and Medicare data: United States, 1996

white males (figure 2), q_x values based on vital statistics and Medicare data begin to diverge substantially at about age 87. The same is basically true for black males (figure 4), although the divergence is larger. For white and black females (figures 3 and 5), the divergence is smaller and begins at about age 90. Assuming that they are reasonably accurate, q_x values for ages over 85 years based on Medicare data appear to be substantially more reasonable than those based on vital statistics and census data and seem to be substantially free of the age misstatements among the elderly that characterize death rates based on vital statistics and census data.

Methods

Calculation of the complete life table is derived from the probability of death (q_x), which depends on the number of deaths (D_x) and the midyear population (P_x) for each single year of age (x) observed during the calendar year of interest.

Adjustment for Deaths for Which Age Was Not Reported

An adjustment must be made to account for the small proportion of deaths each year for which age is not reported. The data are aggregated into 5-year age groups for those aged 5 years and over and into single years of age for those under 5 years. The number of deaths in each age category is adjusted proportionally to account for those with not-stated ages. That is, the assumption is made that those deaths for which age was not reported are distributed among the various age groups in the same proportions as those for which age was reported. The following factor is used to make the adjustment. This factor (F) is calculated for each race-sex group 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.

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 (3). 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 such a technique and has been used in the construction of the U.S. Decennial Life Tables (3,4).

Population data are aggregated into 5-year age intervals except for those aged 100 years and over, which are allocated into a single category. Values of P_x by single years of age are obtained by interpolation using Beer's formula. Beer's general formula adapted to calculate P_x is

$$P_{x+k} = C_{k,x-10}\ {}_5P_{x-10} + C_{k,x-5}\ {}_5P_{x-5} + C_{k,x}\ {}_5P_x + C_{k,x+5}\ {}_5P_{x+5} + C_{k,x+10}\ {}_5P_{x+10} \qquad (2)$$

where P_{x+k} is the population aged $x+k$ ($k = 0,1,2,3,4$), ${}_5P_x$ is the total population aged x to $x+5$, and $C_{k,x}$ is Beer's interpolation coefficient for the kth fifth of the age interval x to $x+5$ applied to ${}_5P_x$. To interpolate single-year values from ${}_5P_0$, ${}_5P_5$, and ${}_5P_{95}$, the formula is slightly different. To obtain single-year

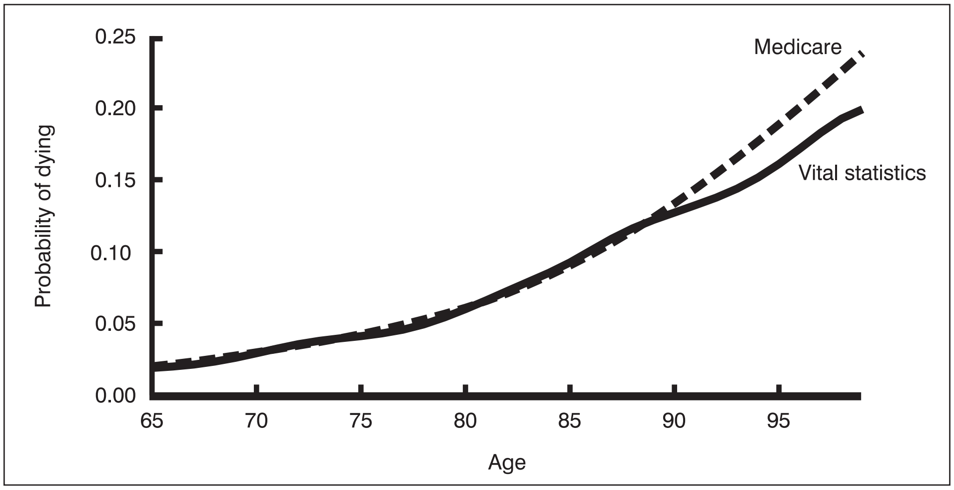

Figure 5. Probability of dying by single years of age, 65–99 years for black females based on vital statistics data and Medicare data: United States, 1996

values for these 5-year intervals the formulas below are used.

$$P_{0+k} = C_{k,0}\ {}_5P_0 + C_{k,5}\ {}_5P_5 + C_{k,10}\ {}_5P_{10} + C_{k,15}\ {}_5P_{15} + C_{k,20}\ {}_5P_{20} \quad (3)$$

$$P_{5+k} = C_{k,0}\ {}_5P_0 + C_{k,5}\ {}_5P_5 + C_{k,10}\ {}_5P_{10} + C_{k,15}\ {}_5P_{15} + C_{k,20}\ {}_5P_{20} \quad (4)$$

$$P_{95+k} = C_{k,80}\ {}_5P_{80} + C_{k,85}\ {}_5P_{85} + C_{k,90}\ {}_5P_{90} + C_{k,95}\ {}_5P_{95} + C_{k,100}\ {}_\infty P_{100} \quad (5)$$

Values for $C_{k,x}$ are shown in table A. Note that the population of the final, open-ended interval ${}_\infty P_{100}$ does not need interpolation and is treated in the interpolation algorithm (equation 5) as if it were a 5-year age interval.

Obtaining deaths by single years of age is somewhat more complicated. Interpolation is used to obtain single-year values for ages 5 to 99 years. Observed deaths adjusted for not-stated age are used for ages 0 to 4 years and for the category 100 years and over. Values for D_x are interpolated from deaths by 5-year age intervals (adjusted for not-stated age as described above) using Beer's formula in a manner similar to that used to interpolate the population data replacing ${}_5P_x$ with ${}_5D_x$ in equations 2, 4, and 5. The difference is that when interpolating ages 5 to 9 and 10 to 14 years, a fictitious value for ${}_5D_0$ is used. Because of the mortality peak in

Table A. Interpolation coefficients based on Beer's ordinary formula for the subdivision of grouped data into fifths

Interpolated subgroup (*x*+*k*)	5-year age interval beginning with age—				
	0	5	10	15	20
0 to 4 years					
0 years	+0.3333	−0.1636	−0.0210	+0.0796	−0.0283
1 year	+0.2595	−0.0780	+0.0130	+0.0100	−0.0045
2 years	+0.1924	+0.0064	+0.0184	−0.0256	+0.0084
3 years	+0.1329	+0.0844	+0.0054	−0.0356	+0.0129
4 years	+0.0819	+0.1508	−0.0158	−0.0284	+0.0115
	0	5	10	15	20
5 to 9 years					
5 years	+0.0404	+0.2000	−0.0344	−0.0128	+0.0068
6 years	+0.0093	+0.2268	−0.0402	+0.0028	+0.0013
7 years	−0.0108	+0.2272	−0.0248	+0.0112	−0.0028
8 years	−0.0198	+0.1992	+0.0172	+0.0072	−0.0038
9 years	−0.0191	+0.1468	+0.0822	−0.0084	−0.0015
	x−10	*x*−5	*x*	*x*+5	*x*+10
5*x* to 5*x*+5 years					
x years	−0.0117	+0.0804	+0.1570	−0.0284	+0.0027
x+1 years	−0.0020	+0.0160	+0.2200	−0.0400	+0.0060
x+2 years	+0.0050	−0.0280	+0.2460	−0.0280	+0.0050
x+3 years	+0.0060	−0.0400	+0.2200	+0.0160	−0.0020
x+4 years	+0.0027	−0.0284	+0.1570	+0.0804	−0.0117
	80	85	90	95	100
95 to 99 years					
95 years	−0.0015	−0.0084	+0.0822	+0.1468	−0.0191
96 years	−0.0038	+0.0072	+0.0172	+0.1992	−0.0198
97 years	−0.0028	+0.0112	−0.0248	+0.2272	−0.0108
98 years	+0.0013	+0.0028	−0.0402	+0.2268	+0.0093
99 years	+0.0068	−0.0128	−0.0344	+0.2000	+0.0404

NOTE: An additional panel of interpolation coefficients is usually shown for the final age interval. This panel is not shown because the final age interval in the life table is open-ended and is not based on interpolated data.

infancy, the use of the observed ${}_5D_0$ does not yield values for D_x for ages 5 to 14 years that join smoothly with the numbers reported at ages 0 to 4 years. The fictitious value for ${}_5D_0$ is calculated such that

$$V = .4072\ {}_5D_0^* + .2416\ {}_5D_5 + .0080\ {}_5D_{10} - .0896\ {}_5D_{15} + .0328\ {}_5D_{20}$$

where V is the sum of the deaths occurring at ages 2, 3, and 4 years and ${}_5D_0^*$ is the fictitious value for ${}_5D_0$ (4). Solving for ${}_5D_0^*$ gives

$${}_5D_0^* = 2.45580V - .59332\ {}_5D_5 - .01965\ {}_5D_{10} + .22004\ {}_5D_{15} - .08055\ {}_5D_{20}$$

${}_5D_0^*$ is then treated in the interpolation formula as if it were the actual number of deaths at ages 0–4 years. This modification produces a smooth transition from the observed values at ages under 5 years to the interpolated values at ages 5 years and over.

Calculation of q_0

q_0 is calculated by using a birth cohort method. Sometimes q_0 is assumed to be equal to the infant mortality rate, i.e., the number of deaths at age 0 to 1 in a given year divided by the number of births in that year. The problem with this is that some of the deaths in year t, occurred to infants born in year $t-1$. If the number of births is constant from year to year, then the infant mortality rate is a good measure of q_0. However, the number of births does fluctuate from year to year. The best method is to employ 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 can be calculated directly from the historical mortality file by categorizing infant deaths by date of birth. The probability of death is then

$$q_0 = \frac{D_0(1-f)}{B^t} + \frac{D_0 f}{B^{t-1}} \qquad (6)$$

where D_0 is the number of infant deaths adjusted for not-reported age, and B^t and B^{t-1} are the numbers of births in years t and $t-1$ respectively. Table B shows separation factors and numbers of births by race and sex for 1995–96.

Calculation of q_x for Ages 1–84 Years

q_x is 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 of age in length (3). Under this assumption, $l_x = L_x + \frac{1}{2}d_x$ 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

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

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, $N_x = P_x + \frac{1}{2}D_x$ 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

$$q_x = \frac{D_x}{N_x} = \frac{D_x}{P_x + \frac{1}{2}D_x} \qquad (7)$$

For x=1 to 4 years, D_x is the observed number of deaths adjusted for not-stated age and P_x is obtained by Beer's interpolation formula. For x=5 to 84 years, both D_x and P_x are obtained by interpolation.

Use of Medicare Data at Ages 85–99 Years

As noted above, q_x values at the oldest ages based on Medicare data are known to be more accurate than those based on vital statistics and census data. Consequently, the q_x values calculated for ages 85 to 99 years are based on Medicare data compiled by the Health Care Financing Administration (HCFA). Medicare data were limited to the group insured for hospital insurance. Age reporting is generally considered to be more accurate for this group (4,26,27).

There is ample evidence that the rate of increase in q_x declines over age 85 years (6,15,16). The change in q_x for ages over 85 years can be expressed using the formula

$$q_x = q_{x-1} \bullet e^{k_x} \qquad (8)$$

where k_x denotes the age-specific rate of mortality change with age (6,16). Solving for k_x gives

Table B. Births in 1995 and 1996, deaths in 1996 of infants born in 1995 and 1996, and separation factors by race and sex: United States

	Total			White			Black		
	Both sexes	Male	Female	Total	Male	Female	Total	Male	Female
Births									
1995	3,899,589	1,996,355	1,903,234	3,098,885	1,588,427	1,510,458	603,139	306,115	297,024
1996	3,891,494	1,990,480	1,901,014	3,093,057	1,584,423	1,508,634	594,781	301,474	293,307
Deaths in 1996 of infants born in—									
1995	3,790	2,111	1,679	2,521	1,411	1,110	1,123	619	504
1996	24,648	13,834	10,814	16,216	9,139	7,077	7,582	4,209	3,373
Separation factor	0.133	0.132	0.134	0.135	0.134	0.136	0.129	0.128	0.130

Table C. *k* values by age, race, and sex based on insured Medicare data: United States, 1996

Age	Total			White			Black		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
84–85	0.091181	0.086271	0.102951	0.092648	0.088117	0.104382	0.068007	0.060599	0.079584
85–86	0.089378	0.082232	0.103287	0.090739	0.084212	0.104601	0.067175	0.059143	0.079864
86–87	0.089073	0.081638	0.101669	0.090431	0.083306	0.103157	0.067299	0.058438	0.079452
87–88	0.089188	0.081528	0.100561	0.090884	0.083159	0.102382	0.067281	0.057785	0.078595
88–89	0.089883	0.081237	0.099911	0.091519	0.082865	0.101556	0.067210	0.056886	0.077566
89–90	0.088905	0.079517	0.097960	0.090469	0.081326	0.099509	0.066399	0.055412	0.075960
90–91	0.085312	0.076301	0.094030	0.086929	0.078337	0.095620	0.064893	0.053592	0.073872
91–92	0.080874	0.072163	0.089441	0.082634	0.074508	0.090998	0.062984	0.051358	0.071579
92–93	0.077608	0.068083	0.085771	0.079457	0.070873	0.087331	0.060950	0.048849	0.069157
93–94	0.075690	0.064318	0.083282	0.077533	0.067502	0.084484	0.058836	0.046305	0.066721
94–95	0.073817	0.061117	0.080482	0.075469	0.064258	0.081528	0.056927	0.043998	0.064245
95–96	0.070976	0.058176	0.076681	0.072286	0.060943	0.077616	0.055101	0.042061	0.061863
96–97	0.066674	0.055203	0.071785	0.067770	0.057473	0.072691	0.053490	0.040284	0.059621
97–98	0.062023	0.052406	0.066622	0.062928	0.054140	0.067694	0.051933	0.038724	0.057419
98–99	0.057652	0.049796	0.061827	0.058566	0.051076	0.063140	0.050430	0.037244	0.055308

$$k_x = ln(q_x) - ln(q_{x-1}) \qquad (9)$$

Values for k_x are then obtained from the Medicare data. Table C shows values for k by age, race, and sex based on the 1996 Medicare data. These data show clearly a declining rate of increase in q_x above age 85 years. These k_x values are then used to obtain q_x values for ages 85 to 99 years using equation 8. This method allows for flexibility in cases where the Medicare data are not available in a timely fashion. In these cases, Medicare data for the previous year can be used to calculate k_x values. Finally, ${}_{\infty}q_{100}$ is set equal to 1.0 since all will die at some point in this open-ended age interval. Once q_x is obtained for each single year of age, the other life table functions may be easily calculated.

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

$$l_x = l_{x-1}\,(1-q_{x-1}) \qquad (10)$$

Decrement Function d_x

The number of deaths occurring between age x and x+1 is calculated from the survivor function.

$$d_x = l_x - l_{x+1} = l_x\,q_x \qquad (11)$$

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

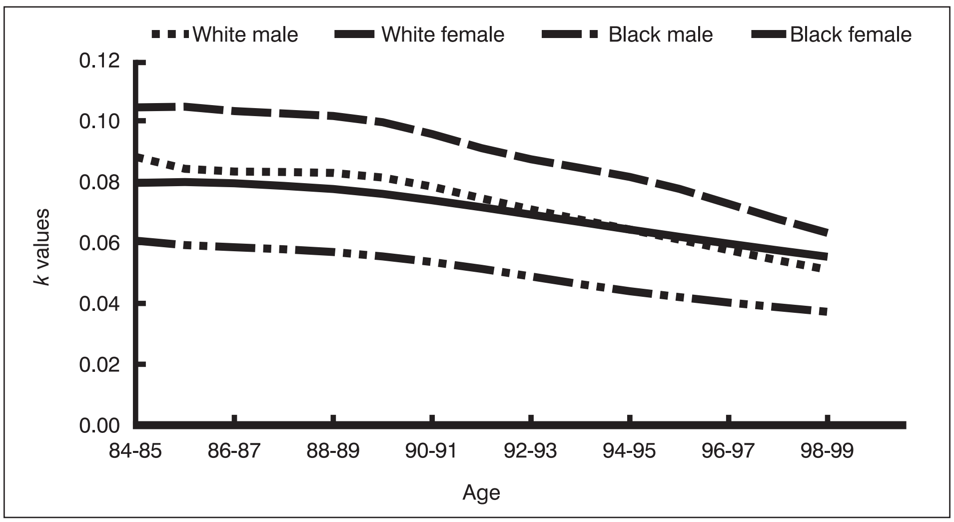

Figure 6. *k* values by age, race, and sex based on insured Medicare data: United States, 1996

Stationary Population L_x

The stationary population at ages 1 to 99 years is calculated assuming that the survivor function declines linearly between age x and x+1. This gives the formula

$$L_x = \frac{1}{2}(l_x + l_{x+1}) = l_x - \frac{1}{2}d_x \qquad (12)$$

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

$$L_0 = f\,l_0 + (1-f)\,l_1$$

${}_{\infty}L_{100}$ is calculated by surviving the life table cohort from age 100 using equations (8), (9), and (10) until L_x at these ages is essentially zero (somewhere between ages 110 and 120). q_x for these ages can be extrapolated from the Medicare data using equation 8. However, k_x values must be estimated for these ages. Figure 6 shows that the decline in k values by age over 85 years is approximately linear. k_x can then be modeled as a linear function of age

$$k_x = k_{85} + (x-85)\,s \qquad (13)$$

where s is the slope of the change in k_x by age and k_{85} is calculated as $[l_n(q_{88}/q_{81}]/7$ in order to minimize the effects of random fluctuations (6,16). s can be obtained by treating equation 13 as a linear regression model. Calculated values for s are shown in table D. The predicted values for k_x are then used to calculate q_x over age 100 years using equation (8). The corresponding L_x values for ages 100 years and over are then summed to give ${}_{\infty}L_{100}$.

Table D. Slope of the changes in *k* values by age, race, and sex

Race and sex	*s*
Total, both sexes	−0.00238
Male	−0.00271
Female	−0.00303
White, both sexes	−0.00190
Male	−0.00239
Female	−0.00243
Black, both sexes	−0.00107
Male	−0.00159
Female	−0.00151

This method is different from that used by the Social Security Administration (SSA) in their *Annual Social Security Trustees Reports* and in the decennial life table methodology which assumes that the percent increase from q_{x-1} to q_x does not fall below 5 percent for males, 6 percent for females, and 5.8 percent for the total population (26). This assumption has no theoretical basis. It is unclear whether k_x should continue to decrease beyond the limits set by SSA. Nevertheless, both methods result in reasonable values for ${}_{\infty}L_{100}$ and the resulting values for life expectancy are not substantially different.

Person-Years Lived at and Over Age *x* T_x

T_x is calculated by summing L_x values at and over age *x*.

$$T_x = \sum_{t=0}^{\infty} L_{x+t} \qquad (14)$$

Life Expectancy at Age *x* e_x

Life expectancy at exact age *x* is calculated as

$$e_x = \frac{T_x}{l_x} \qquad (15)$$

Results

Table E shows differences in q_x values based on vital statistics and census data compared with q_x values adjusted using Medicare data. Over age 90 years, the adjusted q_x values are consistently higher than those based on vital statistics and census data at the oldest ages, although the differences vary by race and sex. These differences are most likely indicative of age misreporting in the vital statistics death rates.

Complete 1996 life tables by race (black and white) and sex are shown in tables 1–9. Values for life expectancy are summarized in table F and compared with values obtained from the 1996 abridged life tables (2) and from the 1989–91 decennial life tables (28). The numbers from the decennial life tables are not directly comparable to the 1996 life tables because they were constructed using data for earlier years. However, the decennial life tables provide reference points with which to assess life expectancies at the oldest ages since the abridged life tables do not show life expectancies beyond age 85 years.

Through the age category 85 years and over, for white males, life expectancies from the complete life table compare very favorably with those obtained from the abridged life table. At age 100, life expectancy obtained from the complete life table is slightly lower than that from the decennial life table. The difference appears to be due to q_x values above age 100 calculated from Medicare data for 1989–91 being slightly lower than those obtained for 1996. While the overall risk of dying at the oldest ages may have risen from 1990 to 1996, it is more likely that the difference results from improvements in age reporting.

Table E. Comparison of 1996 probabilities of dying by race and sex based on vital statistics and Medicare data

Age	White male			White female			Black male			Black female		
	Vital statistics	Medicare	Difference	Vital statistics	Medicare	Difference	Vital statistics	Medicare	Difference	Vital statistics	Medicare	Difference
85–86	0.121402	0.120423	0.000979	0.086951	0.085393	0.001558	0.128045	0.128742	−0.000697	0.092371	0.092237	0.000134
87–86	0.135314	0.131003	0.004310	0.098395	0.094809	0.003586	0.136020	0.136586	−0.000566	0.100692	0.099905	0.000786
87–88	0.150067	0.142384	0.007683	0.110215	0.105111	0.005104	0.143379	0.144805	−0.001427	0.108934	0.108167	0.000767
88–89	0.163311	0.154731	0.008581	0.121186	0.116443	0.004743	0.149402	0.153420	−0.004018	0.116125	0.117011	−0.000886
89–90	0.173805	0.168099	0.005706	0.131161	0.128890	0.002271	0.153719	0.162400	−0.008681	0.121997	0.126449	−0.004451
90–91	0.182621	0.182341	0.000280	0.142065	0.142375	−0.000310	0.155373	0.171653	−0.016280	0.127102	0.136428	−0.009326
91–92	0.192169	0.197199	−0.005030	0.155121	0.156661	−0.001540	0.154930	0.181103	−0.026173	0.132263	0.146888	−0.014624
92–93	0.201956	0.212454	−0.010498	0.168433	0.171586	−0.003153	0.154484	0.190647	−0.036164	0.137509	0.157787	−0.020278
93–94	0.214041	0.228057	−0.014017	0.181148	0.187245	−0.006097	0.156731	0.200191	−0.043460	0.143751	0.169085	−0.025334
94–95	0.229022	0.243983	−0.014961	0.193135	0.203751	−0.010616	0.162533	0.209679	−0.047146	0.151502	0.180752	−0.029250
95–96	0.245475	0.260176	−0.014701	0.204964	0.221059	−0.016094	0.171036	0.219110	−0.048075	0.160881	0.192745	−0.031865
96–97	0.259304	0.276525	−0.017221	0.217812	0.238900	−0.021087	0.179702	0.228523	−0.048821	0.171593	0.205046	−0.033453
97–98	0.262376	0.292883	−0.030507	0.233581	0.256912	−0.023331	0.183836	0.237917	−0.054081	0.182700	0.217642	−0.034943
98–99	0.241638	0.309176	−0.067539	0.255156	0.274906	−0.019749	0.177122	0.247311	−0.070189	0.192472	0.230505	−0.038034
99–100	0.183163	0.325378	−0.142215	0.286332	0.292823	−0.006490	0.155789	0.256695	−0.100906	0.199028	0.243613	−0.044585
100+	1.000000	1.000000	0.000000	1.000000	1.000000	0.000000	1.000000	1.000000	0.000000	1.000000	1.000000	0.000000

Table F. Life expectancy by age, race, and sex from 1996 complete U.S. life tables, 1996 abridged U.S. life tables, and 1989–91 U.S. decennial life tables

Age	White male			White female			Black male			Black female		
	1996 complete	1996 abridged	1989–91 decennial	1996 complete	1996 abridged	1989–91 decennial	1996 complete	1996 abridged	1989–91 decennial	1996 complete	1996 abridged	1989–91 decennial
0	73.89	73.9	72.72	79.77	79.7	79.45	66.12	66.1	64.47	74.32	74.2	73.73
5	69.49	69.5	68.48	75.29	75.2	75.10	62.39	62.4	60.98	70.50	70.3	70.16
10	64.56	64.5	63.55	70.35	70.2	70.16	57.49	57.5	56.09	65.59	65.4	65.26
15	59.64	59.6	58.65	65.41	65.3	65.23	52.60	52.6	51.22	60.67	60.5	60.34
20	54.92	54.9	53.96	60.54	60.4	60.36	48.07	48.0	46.71	55.83	55.7	55.49
25	50.27	50.2	49.33	55.66	55.6	55.51	43.73	43.7	42.40	51.04	50.9	50.72
30	45.59	45.6	44.71	50.81	50.7	50.65	39.38	39.4	38.14	46.34	46.2	46.03
35	40.96	40.9	40.12	45.98	45.9	45.82	35.14	35.1	34.02	41.74	41.6	41.45
40	36.39	36.4	35.57	41.19	41.1	41.03	31.01	31.0	30.05	37.26	37.1	36.96
45	31.90	31.9	31.07	36.47	36.4	36.30	27.09	27.1	26.18	32.92	32.8	32.58
50	27.52	27.5	26.71	31.86	31.7	31.71	23.40	23.4	22.50	28.71	28.5	28.38
55	23.35	23.3	22.56	27.42	27.3	27.29	19.94	19.9	19.08	24.71	24.5	24.41
60	19.42	19.4	18.71	23.17	23.0	23.09	16.75	16.7	16.01	20.91	20.7	20.71
65	15.86	15.8	15.24	19.20	19.1	19.14	13.97	13.9	13.27	17.45	17.2	17.37
70	12.65	12.6	12.11	15.49	15.4	15.46	11.23	11.2	10.88	14.19	13.9	14.32
75	9.83	9.8	9.40	12.12	12.0	12.11	9.08	9.0	8.84	11.44	11.2	11.56
80	7.35	7.3	7.11	9.09	8.9	9.12	7.08	7.0	7.01	8.84	8.5	9.05
85	5.39	5.3	5.28	6.56	6.3	6.62	5.55	5.3	5.58	6.73	6.2	6.99
90	3.91	. . .	3.85	4.63	. . .	4.69	4.41	. . .	4.24	5.07	. . .	5.24
95	2.89	. . .	2.88	3.28	. . .	3.36	3.58	. . .	3.37	3.84	. . .	3.97
100	2.20	. . .	2.21	2.36	. . .	2.49	2.98	. . .	2.63	2.94	. . .	2.97

. . . Data not available.

For white females, life expectancies obtained from the complete life table are also similar to those obtained from the abridged life table, although life expectancy at birth is nearly 0.1 years higher and life expectancy at age 85 is nearly 0.3 years higher in the complete life table. These differences are primarily due to a larger stationary population in the complete life table for ages 85 years and over, which is the result of differences in the method used to estimate T_{85}. At the oldest ages, comparisons of life expectancies from the complete and decennial life tables show higher life expectancies for the decennial tables from ages 80 years and over. These differences derive from lower Medicare q_x values used to construct the decennial life tables than those used to construct the complete life tables.

For black males, differences between life expectancies from the complete life table and those from the abridged life table are generally small. At age 85, life expectancy in the complete life table is 0.25 years higher than in the abridged table. As with white females, the difference is the result of an outdated end value constant used to estimate T_{85}. At age 100, life expectancy from the complete life table is 0.35 years higher. The difference at age 100 is primarily due to differences in the calculation of q_x rather than to improvements in mortality at ages greater than 100 years. The decennial life table methodology does not allow the ratio of q_x to q_{x-1} fall below 1.05 at any age whereas the complete life table methodology does not constrain this ratio. For black males, the ratio in the complete life table drops below 1.05 at age 93 and by age 110 is about 1.02.

For black females, life expectancies obtained from the complete life table are slightly higher than those obtained from the abridged life table. At birth the difference is 0.1 years and at age 85 the difference is 0.5 years. These differences are also primarily the result of differences in the method used to estimate T_{85}. A comparison of life expectancies at the oldest ages shows that life expectancies above age 85 years from the complete life table are lower than those from the decennial life table. These differences are the result of lower Medicare q_x values in the decennial life tables.

White life expectancy exceeds black life expectancy until age 83 at which black life expectancy becomes higher. While mortality crossovers by race have been attributed by some to excessive age misreporting among the black population (5), others have suggested that the race crossovers are real (26,29). Indeed, frailty models suggest that the black population has death rates higher than the white population at younger ages but lower at the oldest ages. Assuming that high death rates among the black population at younger ages disproportionately affect the more frail members of this group, frailty models would predict that for the very old ages the black population would be, on average, less frail than the white population and would, therefore, have lower average death rates.

Black male life expectancy at age 100 is slightly higher than that for black females at the same age. It is very unusual for male life expectancy to exceed female life expectancy in any population, although it is sometimes evident in populations where females have unusually high mortality. However, in this case, black males appear to have unusually low mortality at the oldest ages. Differential frailty between black males and females may also explain this crossover, although age misreporting for black males is also likely responsible.

Conclusions

The complete life table methodology described in this report produces estimates of life expectancy at ages 100 and younger for the United States in 1996 that are consistent with those based on 1996 abridged life tables and, at older ages, with those based on the 1989–91 decennial life tables. The method is theoretically grounded and is consistent with mortality trajectories by age from empirical observations of populations known for excellent age reporting. Differences in life expectancies from abridged life tables for 1996 result primarily from differences in methods used to calculate T_{85}. The slightly higher life expectancies in the decennial life tables probably reflect improvements from 1990 to 1996 in age reporting in the Medicare data used to calculate q_x values rather than to increases in mortality at the older ages.

Beginning with 1997 mortality data, the method described in this report will be used to construct the annual U.S. life tables.

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Table 1. Life table for the total population: United States, 1996

Age	Proportion dying during age interval $q(x)$	Number living at beginning of age interval $l(x)$	Number dying during age interval $d(x)$	Stationary population in the age interval $L(x)$	Stationary population in this and all subsequent age intervals $T(x)$	Life expectancy at beginning of age interval $e(x)$
0–1	0.007320	100,000	732	99,365	7,617,716	76.18
1–2	0.000571	99,268	57	99,240	7,518,350	75.74
2–3	0.000391	99,211	39	99,192	7,419,111	74.78
3–4	0.000324	99,173	32	99,156	7,319,919	73.81
4–5	0.000256	99,140	25	99,128	7,220,762	72.83
5–6	0.000227	99,115	22	99,104	7,121,634	71.85
6–7	0.000210	99,093	21	99,082	7,022,531	70.87
7–8	0.000197	99,072	19	99,062	6,923,448	69.88
8–9	0.000180	99,052	18	99,043	6,824,386	68.90
9–10	0.000159	99,034	16	99,027	6,725,343	67.91
10–11	0.000143	99,019	14	99,012	6,626,317	66.92
11–12	0.000148	99,005	15	98,997	6,527,305	65.93
12–13	0.000194	98,990	19	98,980	6,428,308	64.94
13–14	0.000291	98,971	29	98,956	6,329,327	63.95
14–15	0.000424	98,942	42	98,921	6,230,371	62.97
15–16	0.000575	98,900	57	98,871	6,131,450	62.00
16–17	0.000715	98,843	71	98,808	6,032,579	61.03
17–18	0.000825	98,772	82	98,732	5,933,771	60.08
18–19	0.000893	98,691	88	98,647	5,835,040	59.12
19–20	0.000927	98,603	91	98,557	5,736,393	58.18
20–21	0.000960	98,511	95	98,464	5,637,836	57.23
21–22	0.000999	98,417	98	98,368	5,539,372	56.28
22–23	0.001026	98,318	101	98,268	5,441,004	55.34
23–24	0.001037	98,217	102	98,167	5,342,737	54.40
24–25	0.001040	98,116	102	98,065	5,244,570	53.45
25–26	0.001036	98,014	102	97,963	5,146,505	52.51
26–27	0.001040	97,912	102	97,861	5,048,543	51.56
27–28	0.001064	97,810	104	97,758	4,950,681	50.62
28–29	0.001116	97,706	109	97,652	4,852,923	49.67
29–30	0.001187	97,597	116	97,539	4,755,272	48.72
30–31	0.001264	97,481	123	97,420	4,657,732	47.78
31–32	0.001338	97,358	130	97,293	4,560,313	46.84
32–33	0.001416	97,228	138	97,159	4,463,020	45.90
33–34	0.001498	97,090	145	97,017	4,365,861	44.97
34–35	0.001584	96,945	154	96,868	4,268,843	44.03
35–36	0.001674	96,791	162	96,710	4,171,975	43.10
36–37	0.001770	96,629	171	96,544	4,075,265	42.17
37–38	0.001872	96,458	181	96,368	3,978,722	41.25
38–39	0.001984	96,277	191	96,182	3,882,354	40.32
39–40	0.002108	96,086	203	95,985	3,786,172	39.40
40–41	0.002245	95,884	215	95,776	3,690,187	38.49
41–42	0.002396	95,669	229	95,554	3,594,410	37.57
42–43	0.002562	95,439	245	95,317	3,498,856	36.66
43–44	0.002742	95,195	261	95,064	3,403,539	35.75
44–45	0.002935	94,934	279	94,795	3,308,475	34.85
45–46	0.003143	94,655	298	94,506	3,213,680	33.95
46–47	0.003369	94,358	318	94,199	3,119,174	33.06
47–48	0.003618	94,040	340	93,870	3,024,975	32.17
48–49	0.003900	93,700	365	93,517	2,931,106	31.28
49–50	0.004229	93,334	395	93,137	2,837,589	30.40
50–51	0.004629	92,939	430	92,724	2,744,452	29.53
51–52	0.005092	92,509	471	92,274	2,651,728	28.66
52–53	0.005585	92,038	514	91,781	2,559,454	27.81
53–54	0.006071	91,524	556	91,246	2,467,673	26.96
54–55	0.006556	90,969	596	90,670	2,376,426	26.12
55–56	0.007078	90,372	640	90,052	2,285,756	25.29
56–57	0.007691	89,732	690	89,387	2,195,704	24.47
57–58	0.008406	89,042	748	88,668	2,106,317	23.66
58–59	0.009252	88,294	817	87,885	2,017,648	22.85
59–60	0.010225	87,477	894	87,030	1,929,763	22.06
60–61	0.011299	86,582	978	86,093	1,842,733	21.28
61–62	0.012445	85,604	1,065	85,071	1,756,640	20.52
62–63	0.013633	84,539	1,153	83,963	1,671,569	19.77
63–64	0.014813	83,386	1,235	82,769	1,587,606	19.04

Table 1. Life table for the total population: United States, 1996—Con.

Age	Proportion dying during age interval *q*(*x*)	Number living at beginning of age interval *l*(*x*)	Number dying during age interval *d*(*x*)	Stationary population in the age interval *L*(*x*)	Stationary population in this and all subsequent age intervals *T*(*x*)	Life expectancy at beginning of age interval *e*(*x*)
64–65	0.015982	82,151	1,313	81,495	1,504,837	18.32
65–66	0.017105	80,838	1,383	80,147	1,423,343	17.61
66–67	0.018294	79,455	1,454	78,729	1,343,196	16.91
67–68	0.019719	78,002	1,538	77,233	1,264,468	16.21
68–69	0.021510	76,464	1,645	75,641	1,187,235	15.53
69–70	0.023638	74,819	1,769	73,935	1,111,593	14.86
70–71	0.025965	73,050	1,897	72,102	1,037,659	14.20
71–72	0.028349	71,154	2,017	70,145	965,557	13.57
72–73	0.030821	69,137	2,131	68,071	895,412	12.95
73–74	0.033353	67,006	2,235	65,888	827,341	12.35
74–75	0.036004	64,771	2,332	63,605	761,452	11.76
75–76	0.038826	62,439	2,424	61,227	697,847	11.18
76–77	0.041959	60,015	2,518	58,756	636,621	10.61
77–78	0.045564	57,496	2,620	56,187	577,865	10.05
78–79	0.049807	54,877	2,733	53,510	521,679	9.51
79–80	0.054720	52,143	2,853	50,717	468,169	8.98
80–81	0.060275	49,290	2,971	47,805	417,452	8.47
81–82	0.066397	46,319	3,075	44,781	369,647	7.98
82–83	0.073125	43,244	3,162	41,663	324,866	7.51
83–84	0.080462	40,082	3,225	38,469	283,203	7.07
84–85	0.088558	36,857	3,264	35,225	244,734	6.64
85–86	0.097012	33,593	3,259	31,963	209,509	6.24
86–87	0.106082	30,334	3,218	28,725	177,546	5.85
87–88	0.115965	27,116	3,144	25,544	148,821	5.49
88–89	0.126783	23,971	3,039	22,452	123,278	5.14
89–90	0.138706	20,932	2,903	19,480	100,826	4.82
90–91	0.151603	18,029	2,733	16,662	81,346	4.51
91–92	0.165104	15,296	2,525	14,033	64,683	4.23
92–93	0.179012	12,770	2,286	11,627	50,651	3.97
93–94	0.193458	10,484	2,028	9,470	39,023	3.72
94–95	0.208669	8,456	1,764	7,574	29,553	3.49
95–96	0.224655	6,691	1,503	5,940	21,980	3.28
96–97	0.241180	5,188	1,251	4,563	16,040	3.09
97–98	0.257808	3,937	1,015	3,429	11,477	2.92
98–99	0.274304	2,922	801	2,521	8,048	2.75
99–100	0.290583	2,120	616	1,812	5,527	2.61
100+	1.00000	1,504	1,504	3,714	3,714	2.47

Table 2. Life table for males: United States, 1996

Age	Proportion dying during age interval $q(x)$	Number living at beginning of age interval $l(x)$	Number dying during age interval $d(x)$	Stationary population in the age interval $L(x)$	Stationary population in this and all subsequent age intervals $T(x)$	Life expectancy at beginning of age interval $e(x)$
0–1	0.008020	100,000	802	99,304	7,307,754	73.08
1–2	0.000601	99,198	60	99,168	7,208,450	72.67
2–3	0.000447	99,138	44	99,116	7,109,282	71.71
3–4	0.000365	99,094	36	99,076	7,010,166	70.74
4–5	0.000285	99,058	28	99,044	6,911,090	69.77
5–6	0.000256	99,030	25	99,017	6,812,046	68.79
6–7	0.000242	99,004	24	98,992	6,713,029	67.81
7–8	0.000228	98,980	23	98,969	6,614,037	66.82
8–9	0.000205	98,958	20	98,948	6,515,067	65.84
9–10	0.000174	98,938	17	98,929	6,416,120	64.85
10–11	0.000147	98,920	15	98,913	6,317,191	63.86
11–12	0.000152	98,906	15	98,898	6,218,278	62.87
12–13	0.000218	98,891	22	98,880	6,119,380	61.88
13–14	0.000363	98,869	36	98,851	6,020,500	60.89
14–15	0.000563	98,833	56	98,805	5,921,648	59.92
15–16	0.000786	98,778	78	98,739	5,822,843	58.95
16–17	0.000992	98,700	98	98,651	5,724,104	57.99
17–18	0.001161	98,602	115	98,545	5,625,453	57.05
18–19	0.001276	98,488	126	98,425	5,526,908	56.12
19–20	0.001348	98,362	133	98,296	5,428,484	55.19
20–21	0.001421	98,229	140	98,160	5,330,188	54.26
21–22	0.001501	98,090	147	98,016	5,232,028	53.34
22–23	0.001550	97,942	152	97,867	5,134,012	52.42
23–24	0.001559	97,791	152	97,714	5,036,146	51.50
24–25	0.001541	97,638	150	97,563	4,938,431	50.58
25–26	0.001509	97,488	147	97,414	4,840,869	49.66
26–27	0.001491	97,341	145	97,268	4,743,454	48.73
27–28	0.001508	97,195	147	97,122	4,646,186	47.80
28–29	0.001575	97,049	153	96,972	4,549,064	46.87
29–30	0.001675	96,896	162	96,815	4,452,092	45.95
30–31	0.001784	96,734	173	96,647	4,355,277	45.02
31–32	0.001886	96,561	182	96,470	4,258,630	44.10
32–33	0.001990	96,379	192	96,283	4,162,160	43.19
33–34	0.002091	96,187	201	96,087	4,065,877	42.27
34–35	0.002193	95,986	211	95,881	3,969,790	41.36
35–36	0.002300	95,776	220	95,665	3,873,909	40.45
36–37	0.002414	95,555	231	95,440	3,778,244	39.54
37–38	0.002541	95,325	242	95,203	3,682,804	38.63
38–39	0.002684	95,082	255	94,955	3,587,600	37.73
39–40	0.002847	94,827	270	94,692	3,492,646	36.83
40–41	0.003027	94,557	286	94,414	3,397,954	35.94
41–42	0.003222	94,271	304	94,119	3,303,539	35.04
42–43	0.003434	93,967	323	93,806	3,209,420	34.15
43–44	0.003659	93,644	343	93,473	3,115,615	33.27
44–45	0.003896	93,302	364	93,120	3,022,141	32.39
45–46	0.004152	92,938	386	92,745	2,929,021	31.52
46–47	0.004431	92,552	410	92,347	2,836,276	30.65
47–48	0.004733	92,142	436	91,924	2,743,929	29.78
48–49	0.005070	91,706	465	91,474	2,652,004	28.92
49–50	0.005461	91,241	498	90,992	2,560,531	28.06
50–51	0.005934	90,743	538	90,474	2,469,539	27.21
51–52	0.006487	90,204	585	89,912	2,379,065	26.37
52–53	0.007086	89,619	635	89,302	2,289,153	25.54
53–54	0.007693	88,984	685	88,642	2,199,851	24.72
54–55	0.008311	88,300	734	87,933	2,111,209	23.91
55–56	0.008977	87,566	786	87,173	2,023,277	23.11
56–57	0.009756	86,780	847	86,356	1,936,104	22.31
57–58	0.010667	85,933	917	85,475	1,849,747	21.53
58–59	0.011748	85,016	999	84,517	1,764,272	20.75
59–60	0.012991	84,018	1,091	83,472	1,679,755	19.99
60–61	0.014358	82,926	1,191	82,331	1,596,283	19.25
61–62	0.015812	81,736	1,292	81,089	1,513,952	18.52
62–63	0.017330	80,443	1,394	79,746	1,432,863	17.81
63–64	0.018858	79,049	1,491	78,304	1,353,117	17.12

Table 2. Life table for males: United States, 1996—Con.

Age	Proportion dying during age interval $q(x)$	Number living at beginning of age interval $l(x)$	Number dying during age interval $d(x)$	Stationary population in the age interval $L(x)$	Stationary population in this and all subsequent age intervals $T(x)$	Life expectancy at beginning of age interval $e(x)$
64–65	0.020383	77,558	1,581	76,768	1,274,813	16.44
65–66	0.021848	75,978	1,660	75,148	1,198,045	15.77
66–67	0.023383	74,318	1,738	73,449	1,122,897	15.11
67–68	0.025207	72,580	1,830	71,665	1,049,449	14.46
68–69	0.027491	70,750	1,945	69,778	977,784	13.82
69–70	0.030207	68,805	2,078	67,766	908,006	13.20
70–71	0.033187	66,727	2,214	65,620	840,240	12.59
71–72	0.036240	64,512	2,338	63,343	774,620	12.01
72–73	0.039395	62,174	2,449	60,950	711,277	11.44
73–74	0.042591	59,725	2,544	58,453	650,327	10.89
74–75	0.045894	57,181	2,624	55,869	591,874	10.35
75–76	0.049398	54,557	2,695	53,210	536,005	9.82
76–77	0.053270	51,862	2,763	50,481	482,795	9.31
77–78	0.057672	49,099	2,832	47,684	432,315	8.80
78–79	0.062828	46,268	2,907	44,814	384,631	8.31
79–80	0.068839	43,361	2,985	41,868	339,817	7.84
80–81	0.075905	40,376	3,065	38,844	297,948	7.38
81–82	0.083882	37,311	3,130	35,746	259,105	6.94
82–83	0.092429	34,181	3,159	32,602	223,359	6.53
83–84	0.101131	31,022	3,137	29,453	190,757	6.15
84–85	0.110108	27,885	3,070	26,350	161,304	5.78
85–86	0.120029	24,814	2,978	23,325	134,954	5.44
86–87	0.130316	21,836	2,846	20,413	111,629	5.11
87–88	0.141402	18,990	2,685	17,648	91,216	4.80
88–89	0.153413	16,305	2,501	15,054	73,568	4.51
89–90	0.166396	13,804	2,297	12,655	58,513	4.24
90–91	0.180167	11,507	2,073	10,470	45,858	3.99
91–92	0.194452	9,434	1,834	8,516	35,388	3.75
92–93	0.209003	7,599	1,588	6,805	26,872	3.54
93–94	0.223728	6,011	1,345	5,339	20,066	3.34
94–95	0.238591	4,666	1,113	4,110	14,728	3.16
95–96	0.253628	3,553	901	3,102	10,618	2.99
96–97	0.268821	2,652	713	2,295	7,516	2.83
97–98	0.284078	1,939	551	1,664	5,221	2.69
98–99	0.299362	1,388	416	1,180	3,557	2.56
99–100	0.314647	973	306	820	2,377	2.44
100+	1.00000	667	667	1,557	1,557	2.34

Table 3. Life table for females: United States, 1996

Age	Proportion dying during age interval $q(x)$	Number living at beginning of age interval $l(x)$	Number dying during age interval $d(x)$	Stationary population in the age interval $L(x)$	Stationary population in this and all subsequent age intervals $T(x)$	Life expectancy at beginning of age interval $e(x)$
0–1	0.006587	100,000	659	99,430	7,917,797	79.18
1–2	0.000540	99,341	54	99,314	7,818,367	78.70
2–3	0.000332	99,288	33	99,271	7,719,053	77.74
3–4	0.000280	99,255	28	99,241	7,619,782	76.77
4–5	0.000226	99,227	22	99,216	7,520,541	75.79
5–6	0.000196	99,204	19	99,195	7,421,325	74.81
6–7	0.000177	99,185	18	99,176	7,322,131	73.82
7–8	0.000164	99,167	16	99,159	7,222,954	72.84
8–9	0.000153	99,151	15	99,144	7,123,795	71.85
9–10	0.000143	99,136	14	99,129	7,024,652	70.86
10–11	0.000138	99,122	14	99,115	6,925,523	69.87
11–12	0.000144	99,108	14	99,101	6,826,408	68.88
12–13	0.000169	99,094	17	99,085	6,727,307	67.89
13–14	0.000216	99,077	21	99,066	6,628,221	66.90
14–15	0.000278	99,056	28	99,042	6,529,155	65.91
15–16	0.000351	99,028	35	99,011	6,430,113	64.93
16–17	0.000420	98,993	42	98,973	6,331,102	63.95
17–18	0.000468	98,952	46	98,929	6,232,130	62.98
18–19	0.000485	98,905	48	98,881	6,133,201	62.01
19–20	0.000480	98,858	47	98,834	6,034,320	61.04
20–21	0.000469	98,810	46	98,787	5,935,486	60.07
21–22	0.000467	98,764	46	98,741	5,836,699	59.10
22–23	0.000473	98,718	47	98,694	5,737,958	58.12
23–24	0.000492	98,671	49	98,647	5,639,264	57.15
24–25	0.000521	98,622	51	98,597	5,540,617	56.18
25–26	0.000552	98,571	54	98,544	5,442,021	55.21
26–27	0.000582	98,517	57	98,488	5,343,477	54.24
27–28	0.000617	98,459	61	98,429	5,244,989	53.27
28–29	0.000657	98,398	65	98,366	5,146,560	52.30
29–30	0.000700	98,334	69	98,299	5,048,194	51.34
30–31	0.000745	98,265	73	98,228	4,949,894	50.37
31–32	0.000792	98,192	78	98,153	4,851,666	49.41
32–33	0.000847	98,114	83	98,073	4,753,513	48.45
33–34	0.000909	98,031	89	97,987	4,655,440	47.49
34–35	0.000978	97,942	96	97,894	4,557,454	46.53
35–36	0.001051	97,846	103	97,795	4,459,560	45.58
36–37	0.001127	97,743	110	97,688	4,361,765	44.62
37–38	0.001206	97,633	118	97,574	4,264,077	43.67
38–39	0.001288	97,515	126	97,453	4,166,502	42.73
39–40	0.001376	97,390	134	97,323	4,069,050	41.78
40–41	0.001473	97,256	143	97,184	3,971,727	40.84
41–42	0.001582	97,113	154	97,036	3,874,543	39.90
42–43	0.001706	96,959	165	96,876	3,777,507	38.96
43–44	0.001844	96,794	179	96,704	3,680,631	38.03
44–45	0.001996	96,615	193	96,519	3,583,926	37.09
45–46	0.002161	96,422	208	96,318	3,487,408	36.17
46–47	0.002339	96,214	225	96,101	3,391,090	35.25
47–48	0.002539	95,989	244	95,867	3,294,988	34.33
48–49	0.002772	95,745	265	95,612	3,199,122	33.41
49–50	0.003046	95,480	291	95,334	3,103,509	32.50
50–51	0.003381	95,189	322	95,028	3,008,175	31.60
51–52	0.003764	94,867	357	94,688	2,913,147	30.71
52–53	0.004163	94,510	393	94,313	2,818,459	29.82
53–54	0.004542	94,117	428	93,903	2,724,145	28.94
54–55	0.004909	93,689	460	93,459	2,630,243	28.07
55–56	0.005303	93,229	494	92,982	2,536,784	27.21
56–57	0.005771	92,735	535	92,467	2,443,802	26.35
57–58	0.006314	92,200	582	91,909	2,351,334	25.50
58–59	0.006956	91,617	637	91,299	2,259,426	24.66
59–60	0.007694	90,980	700	90,630	2,168,127	23.83
60–61	0.008518	90,280	769	89,896	2,077,497	23.01
61–62	0.009403	89,511	842	89,090	1,987,601	22.21
62–63	0.010322	88,669	915	88,212	1,898,511	21.41
63–64	0.011231	87,754	986	87,262	1,810,299	20.63

Table 3. Life table for females: United States, 1996—Con.

Age	Proportion dying during age interval *q*(*x*)	Number living at beginning of age interval *l*(*x*)	Number dying during age interval *d*(*x*)	Stationary population in the age interval *L*(*x*)	Stationary population in this and all subsequent age intervals *T*(*x*)	Life expectancy at beginning of age interval *e*(*x*)
64–65	0.012132	86,769	1,053	86,242	1,723,037	19.86
65–66	0.013006	85,716	1,115	85,159	1,636,795	19.10
66–67	0.013950	84,601	1,180	84,011	1,551,636	18.34
67–68	0.015097	83,421	1,259	82,791	1,467,625	17.59
68–69	0.016547	82,162	1,359	81,482	1,384,834	16.85
69–70	0.018274	80,802	1,477	80,064	1,303,352	16.13
70–71	0.020171	79,326	1,600	78,526	1,223,288	15.42
71–72	0.022130	77,725	1,720	76,865	1,144,763	14.73
72–73	0.024184	76,005	1,838	75,086	1,067,897	14.05
73–74	0.026322	74,167	1,952	73,191	992,811	13.39
74–75	0.028603	72,215	2,066	71,182	919,620	12.73
75–76	0.031050	70,149	2,178	69,060	848,438	12.09
76–77	0.033797	67,971	2,297	66,823	779,377	11.47
77–78	0.037028	65,674	2,432	64,458	712,555	10.85
78–79	0.040893	63,242	2,586	61,949	648,096	10.25
79–80	0.045392	60,656	2,753	59,279	586,147	9.66
80–81	0.050366	57,903	2,916	56,445	526,868	9.10
81–82	0.055798	54,986	3,068	53,452	470,423	8.56
82–83	0.061950	51,918	3,216	50,310	416,971	8.03
83–84	0.069017	48,702	3,361	47,021	366,661	7.53
84–85	0.077137	45,341	3,497	43,592	319,639	7.05
85–86	0.085502	41,843	3,578	40,054	276,047	6.60
86–87	0.094805	38,266	3,628	36,452	235,993	6.17
87–88	0.104951	34,638	3,635	32,820	199,541	5.76
88–89	0.116054	31,003	3,598	29,204	166,721	5.38
89–90	0.128248	27,405	3,515	25,647	137,518	5.02
90–91	0.141447	23,890	3,379	22,200	111,870	4.68
91–92	0.155392	20,511	3,187	18,917	89,670	4.37
92–93	0.169931	17,324	2,944	15,852	70,753	4.08
93–94	0.185150	14,380	2,662	13,049	54,901	3.82
94–95	0.201230	11,717	2,358	10,538	41,852	3.57
95–96	0.218095	9,360	2,041	8,339	31,314	3.35
96–97	0.235476	7,318	1,723	6,457	22,975	3.14
97–98	0.253002	5,595	1,416	4,887	16,518	2.95
98–99	0.270431	4,179	1,130	3,614	11,631	2.78
99–100	0.287679	3,049	877	2,611	8,017	2.63
100+	1.00000	2,172	2,172	5,406	5,406	2.49

Table 4. Life table for the white population: United States, 1996

Age	Proportion dying during age interval $q(x)$	Number living at beginning of age interval $l(x)$	Number dying during age interval $d(x)$	Stationary population in the age interval $L(x)$	Stationary population in this and all subsequent age intervals $T(x)$	Life expectancy at beginning of age interval $e(x)$
0–1	0.006065	100,000	607	99,475	7,687,380	76.87
1–2	0.000478	99,393	48	99,370	7,587,905	76.34
2–3	0.000339	99,346	34	99,329	7,488,535	75.38
3–4	0.000283	99,312	28	99,298	7,389,206	74.40
4–5	0.000222	99,284	22	99,273	7,289,907	73.42
5–6	0.000200	99,262	20	99,252	7,190,634	72.44
6–7	0.000188	99,242	19	99,233	7,091,382	71.46
7–8	0.000178	99,224	18	99,215	6,992,149	70.47
8–9	0.000164	99,206	16	99,198	6,892,934	69.48
9–10	0.000147	99,190	15	99,182	6,793,736	68.49
10–11	0.000133	99,175	13	99,169	6,694,554	67.50
11–12	0.000138	99,162	14	99,155	6,595,385	66.51
12–13	0.000181	99,148	18	99,139	6,496,230	65.52
13–14	0.000270	99,130	27	99,117	6,397,090	64.53
14–15	0.000392	99,104	39	99,084	6,297,973	63.55
15–16	0.000530	99,065	53	99,039	6,198,889	62.57
16–17	0.000658	99,012	65	98,980	6,099,851	61.61
17–18	0.000756	98,947	75	98,910	6,000,871	60.65
18–19	0.000810	98,872	80	98,832	5,901,961	59.69
19–20	0.000831	98,792	82	98,751	5,803,129	58.74
20–21	0.000848	98,710	84	98,668	5,704,377	57.79
21–22	0.000872	98,627	86	98,584	5,605,709	56.84
22–23	0.000888	98,541	87	98,497	5,507,125	55.89
23–24	0.000894	98,453	88	98,409	5,408,629	54.94
24–25	0.000896	98,365	88	98,321	5,310,220	53.98
25–26	0.000893	98,277	88	98,233	5,211,899	53.03
26–27	0.000896	98,189	88	98,145	5,113,665	52.08
27–28	0.000917	98,101	90	98,056	5,015,520	51.13
28–29	0.000962	98,011	94	97,964	4,917,464	50.17
29–30	0.001023	97,917	100	97,867	4,819,500	49.22
30–31	0.001088	97,817	106	97,764	4,721,633	48.27
31–32	0.001152	97,710	113	97,654	4,623,870	47.32
32–33	0.001219	97,598	119	97,538	4,526,216	46.38
33–34	0.001289	97,479	126	97,416	4,428,677	45.43
34–35	0.001362	97,353	133	97,287	4,331,261	44.49
35–36	0.001440	97,221	140	97,150	4,233,975	43.55
36–37	0.001523	97,080	148	97,007	4,136,824	42.61
37–38	0.001611	96,933	156	96,855	4,039,818	41.68
38–39	0.001706	96,776	165	96,694	3,942,963	40.74
39–40	0.001812	96,611	175	96,524	3,846,269	39.81
40–41	0.001930	96,436	186	96,343	3,749,745	38.88
41–42	0.002061	96,250	198	96,151	3,653,402	37.96
42–43	0.002210	96,052	212	95,946	3,557,251	37.03
43–44	0.002374	95,839	227	95,726	3,461,306	36.12
44–45	0.002552	95,612	244	95,490	3,365,580	35.20
45–46	0.002744	95,368	262	95,237	3,270,090	34.29
46–47	0.002954	95,106	281	94,966	3,174,853	33.38
47–48	0.003188	94,825	302	94,674	3,079,887	32.48
48–49	0.003462	94,523	327	94,359	2,985,213	31.58
49–50	0.003785	94,196	357	94,018	2,890,853	30.69
50–51	0.004180	93,839	392	93,643	2,796,835	29.80
51–52	0.004636	93,447	433	93,231	2,703,192	28.93
52–53	0.005116	93,014	476	92,776	2,609,962	28.06
53–54	0.005583	92,538	517	92,280	2,517,186	27.20
54–55	0.006044	92,021	556	91,743	2,424,906	26.35
55–56	0.006547	91,465	599	91,166	2,333,163	25.51
56–57	0.007144	90,866	649	90,542	2,241,997	24.67
57–58	0.007839	90,217	707	89,864	2,151,455	23.85
58–59	0.008658	89,510	775	89,123	2,061,591	23.03
59–60	0.009598	88,735	852	88,309	1,972,469	22.23
60–61	0.010635	87,883	935	87,416	1,884,159	21.44
61–62	0.011750	86,949	1,022	86,438	1,796,743	20.66
62–63	0.012929	85,927	1,111	85,372	1,710,305	19.90
63–64	0.014130	84,816	1,198	84,217	1,624,934	19.16

Table 4. Life table for the white population: United States, 1996—Con.

Age	Proportion dying during age interval $q(x)$	Number living at beginning of age interval $l(x)$	Number dying during age interval $d(x)$	Stationary population in the age interval $L(x)$	Stationary population in this and all subsequent age intervals $T(x)$	Life expectancy at beginning of age interval $e(x)$
64–65	0.015339	83,618	1,283	82,976	1,540,717	18.43
65–66	0.016513	82,335	1,360	81,655	1,457,740	17.70
66–67	0.017746	80,975	1,437	80,257	1,376,085	16.99
67–68	0.019190	79,539	1,526	78,775	1,295,828	16.29
68–69	0.020959	78,012	1,635	77,195	1,217,053	15.60
69–70	0.023027	76,377	1,759	75,498	1,139,858	14.92
70–71	0.025265	74,618	1,885	73,676	1,064,360	14.26
71–72	0.027559	72,733	2,004	71,731	990,685	13.62
72–73	0.029974	70,729	2,120	69,669	918,954	12.99
73–74	0.032513	68,609	2,231	67,493	849,285	12.38
74–75	0.035232	66,378	2,339	65,209	781,792	11.78
75–76	0.038151	64,039	2,443	62,818	716,583	11.19
76–77	0.041373	61,596	2,548	60,322	653,765	10.61
77–78	0.045061	59,048	2,661	57,717	593,443	10.05
78–79	0.049357	56,387	2,783	54,996	535,726	9.50
79–80	0.054291	53,604	2,910	52,149	480,730	8.97
80–81	0.059846	50,694	3,034	49,177	428,581	8.45
81–82	0.065976	47,660	3,144	46,088	379,404	7.96
82–83	0.072739	44,516	3,238	42,897	333,317	7.49
83–84	0.080181	41,278	3,310	39,623	290,420	7.04
84–85	0.088472	37,968	3,359	36,288	250,797	6.61
85–86	0.097060	34,609	3,359	32,929	214,509	6.20
86–87	0.106279	31,250	3,321	29,589	181,580	5.81
87–88	0.116338	27,928	3,249	26,304	151,991	5.44
88–89	0.127407	24,679	3,144	23,107	125,687	5.09
89–90	0.139617	21,535	3,007	20,032	102,580	4.76
90–91	0.152837	18,528	2,832	17,112	82,548	4.46
91–92	0.166717	15,697	2,617	14,388	65,436	4.17
92–93	0.181079	13,080	2,368	11,895	51,047	3.90
93–94	0.196054	10,711	2,100	9,661	39,152	3.66
94–95	0.211860	8,611	1,824	7,699	29,491	3.42
95–96	0.228467	6,787	1,551	6,012	21,792	3.21
96–97	0.245594	5,236	1,286	4,593	15,780	3.01
97–98	0.262815	3,950	1,038	3,431	11,187	2.83
98–99	0.279885	2,912	815	2,505	7,756	2.66
99–100	0.296766	2,097	622	1,786	5,251	2.50
100+	1.00000	1,475	1,475	3,465	3,465	2.35

Table 5. Life table for white males: United States, 1996

Age	Proportion dying during age interval $q(x)$	Number living at beginning of age interval $l(x)$	Number dying during age interval $d(x)$	Stationary population in the age interval $L(x)$	Stationary population in this and all subsequent age intervals $T(x)$	Life expectancy at beginning of age interval $e(x)$
0–1	0.006665	100,000	667	99,423	7,389,288	73.89
1–2	0.000521	99,333	52	99,308	7,289,865	73.39
2–3	0.000397	99,282	39	99,262	7,190,558	72.43
3–4	0.000322	99,242	32	99,226	7,091,296	71.45
4–5	0.000251	99,210	25	99,198	6,992,069	70.48
5–6	0.000227	99,186	23	99,174	6,892,871	69.49
6–7	0.000215	99,163	21	99,152	6,793,697	68.51
7–8	0.000205	99,142	20	99,132	6,694,545	67.53
8–9	0.000186	99,121	18	99,112	6,595,413	66.54
9–10	0.000160	99,103	16	99,095	6,496,301	65.55
10–11	0.000139	99,087	14	99,080	6,397,206	64.56
11–12	0.000145	99,073	14	99,066	6,298,126	63.57
12–13	0.000204	99,059	20	99,049	6,199,060	62.58
13–14	0.000333	99,039	33	99,022	6,100,011	61.59
14–15	0.000508	99,006	50	98,981	6,000,989	60.61
15–16	0.000705	98,955	70	98,921	5,902,008	59.64
16–17	0.000886	98,886	88	98,842	5,803,088	58.68
17–18	0.001032	98,798	102	98,747	5,704,246	57.74
18–19	0.001126	98,696	111	98,641	5,605,498	56.80
19–20	0.001181	98,585	116	98,527	5,506,858	55.86
20–21	0.001235	98,469	122	98,408	5,408,331	54.92
21–22	0.001296	98,347	127	98,283	5,309,923	53.99
22–23	0.001332	98,220	131	98,154	5,211,640	53.06
23–24	0.001336	98,089	131	98,023	5,113,485	52.13
24–25	0.001321	97,958	129	97,893	5,015,462	51.20
25–26	0.001295	97,828	127	97,765	4,917,569	50.27
26–27	0.001280	97,702	125	97,639	4,819,804	49.33
27–28	0.001297	97,577	127	97,513	4,722,165	48.39
28–29	0.001358	97,450	132	97,384	4,624,652	47.46
29–30	0.001448	97,318	141	97,247	4,527,268	46.52
30–31	0.001545	97,177	150	97,102	4,430,021	45.59
31–32	0.001636	97,027	159	96,947	4,332,919	44.66
32–33	0.001728	96,868	167	96,784	4,235,972	43.73
33–34	0.001819	96,700	176	96,613	4,139,187	42.80
34–35	0.001910	96,525	184	96,432	4,042,575	41.88
35–36	0.002006	96,340	193	96,244	3,946,142	40.96
36–37	0.002108	96,147	203	96,046	3,849,899	40.04
37–38	0.002218	95,944	213	95,838	3,753,853	39.13
38–39	0.002339	95,732	224	95,620	3,658,015	38.21
39–40	0.002476	95,508	236	95,389	3,562,395	37.30
40–41	0.002627	95,271	250	95,146	3,467,006	36.39
41–42	0.002795	95,021	266	94,888	3,371,860	35.49
42–43	0.002980	94,755	282	94,614	3,276,972	34.58
43–44	0.003180	94,473	300	94,323	3,182,358	33.69
44–45	0.003395	94,173	320	94,013	3,088,035	32.79
45–46	0.003627	93,853	340	93,683	2,994,022	31.90
46–47	0.003881	93,512	363	93,331	2,900,340	31.02
47–48	0.004162	93,149	388	92,956	2,807,009	30.13
48–49	0.004488	92,762	416	92,554	2,714,053	29.26
49–50	0.004872	92,345	450	92,121	2,621,500	28.39
50–51	0.005343	91,896	491	91,650	2,529,379	27.52
51–52	0.005889	91,405	538	91,135	2,437,729	26.67
52–53	0.006474	90,866	588	90,572	2,346,594	25.82
53–54	0.007054	90,278	637	89,960	2,256,021	24.99
54–55	0.007636	89,641	684	89,299	2,166,062	24.16
55–56	0.008270	88,957	736	88,589	2,076,763	23.35
56–57	0.009022	88,221	796	87,823	1,988,174	22.54
57–58	0.009902	87,425	866	86,992	1,900,351	21.74
58–59	0.010943	86,559	947	86,086	1,813,359	20.95
59–60	0.012140	85,612	1,039	85,092	1,727,273	20.18
60–61	0.013450	84,573	1,138	84,004	1,642,180	19.42
61–62	0.014857	83,435	1,240	82,816	1,558,176	18.68
62–63	0.016363	82,196	1,345	81,523	1,475,361	17.95
63–64	0.017928	80,851	1,450	80,126	1,393,838	17.24

Table 5. Life table for white males: United States, 1996—Con.

Age	Proportion dying during age interval $q(x)$	Number living at beginning of age interval $l(x)$	Number dying during age interval $d(x)$	Stationary population in the age interval $L(x)$	Stationary population in this and all subsequent age intervals $T(x)$	Life expectancy at beginning of age interval $e(x)$
64–65	0.019528	79,401	1,551	78,626	1,313,712	16.55
65–66	0.021087	77,851	1,642	77,030	1,235,086	15.86
66–67	0.022705	76,209	1,730	75,344	1,158,056	15.20
67–68	0.024576	74,479	1,830	73,564	1,082,712	14.54
68–69	0.026846	72,648	1,950	71,673	1,009,149	13.89
69–70	0.029495	70,698	2,085	69,655	937,475	13.26
70–71	0.032367	68,613	2,221	67,502	867,820	12.65
71–72	0.035312	66,392	2,344	65,220	800,318	12.05
72–73	0.038391	64,048	2,459	62,818	735,098	11.48
73–74	0.041586	61,589	2,561	60,308	672,280	10.92
74–75	0.044960	59,027	2,654	57,700	611,972	10.37
75–76	0.048564	56,374	2,738	55,005	554,271	9.83
76–77	0.052529	53,636	2,817	52,227	499,266	9.31
77–78	0.057032	50,818	2,898	49,369	447,039	8.80
78–79	0.062279	47,920	2,984	46,428	397,670	8.30
79–80	0.068368	44,936	3,072	43,400	351,242	7.82
80–81	0.075520	41,864	3,162	40,283	307,843	7.35
81–82	0.083599	38,702	3,235	37,084	267,560	6.91
82–83	0.092253	35,467	3,272	33,831	230,476	6.50
83–84	0.101091	32,195	3,255	30,567	196,645	6.11
84–85	0.110266	28,940	3,191	27,344	166,078	5.74
85–86	0.120423	25,749	3,101	24,199	138,733	5.39
86–87	0.131003	22,648	2,967	21,165	114,535	5.06
87–88	0.142384	19,681	2,802	18,280	93,370	4.74
88–89	0.154731	16,879	2,612	15,573	75,090	4.45
89–90	0.168099	14,267	2,398	13,068	59,517	4.17
90–91	0.182341	11,869	2,164	10,787	46,449	3.91
91–92	0.197199	9,705	1,914	8,748	35,662	3.67
92–93	0.212454	7,791	1,655	6,963	26,914	3.45
93–94	0.228057	6,136	1,399	5,436	19,951	3.25
94–95	0.243983	4,736	1,156	4,159	14,515	3.06
95–96	0.260176	3,581	932	3,115	10,356	2.89
96–97	0.276525	2,649	733	2,283	7,241	2.73
97–98	0.292883	1,917	561	1,636	4,958	2.59
98–99	0.309176	1,355	419	1,146	3,322	2.45
99–100	0.325378	936	305	784	2,176	2.32
100+	1.00000	632	632	1,392	1,392	2.20

Table 6. Life table for white females: United States, 1996

Age	Proportion dying during age interval $q(x)$	Number living at beginning of age interval $l(x)$	Number dying during age interval $d(x)$	Stationary population in the age interval $L(x)$	Stationary population in this and all subsequent age intervals $T(x)$	Life expectancy at beginning of age interval $e(x)$
0–1	0.005435	100,000	544	99,530	7,976,740	79.77
1–2	0.000433	99,456	43	99,435	7,877,210	79.20
2–3	0.000279	99,413	28	99,400	7,777,775	78.24
3–4	0.000242	99,386	24	99,374	7,678,375	77.26
4–5	0.000191	99,362	19	99,352	7,579,001	76.28
5–6	0.000171	99,343	17	99,334	7,479,649	75.29
6–7	0.000158	99,326	16	99,318	7,380,315	74.30
7–8	0.000150	99,310	15	99,303	7,280,997	73.32
8–9	0.000141	99,295	14	99,288	7,181,695	72.33
9–10	0.000132	99,281	13	99,274	7,082,406	71.34
10–11	0.000127	99,268	13	99,262	6,983,132	70.35
11–12	0.000131	99,255	13	99,249	6,883,870	69.36
12–13	0.000156	99,242	15	99,235	6,784,621	68.36
13–14	0.000204	99,227	20	99,217	6,685,387	67.37
14–15	0.000268	99,207	27	99,193	6,586,170	66.39
15–16	0.000344	99,180	34	99,163	6,486,977	65.41
16–17	0.000414	99,146	41	99,125	6,387,814	64.43
17–18	0.000459	99,105	46	99,082	6,288,688	63.45
18–19	0.000470	99,059	47	99,036	6,189,606	62.48
19–20	0.000454	99,013	45	98,990	6,090,570	61.51
20–21	0.000431	98,968	43	98,946	5,991,580	60.54
21–22	0.000417	98,925	41	98,905	5,892,634	59.57
22–23	0.000412	98,884	41	98,864	5,793,729	58.59
23–24	0.000424	98,843	42	98,822	5,694,865	57.62
24–25	0.000448	98,801	44	98,779	5,596,043	56.64
25–26	0.000475	98,757	47	98,734	5,497,264	55.66
26–27	0.000500	98,710	49	98,685	5,398,530	54.69
27–28	0.000528	98,661	52	98,635	5,299,845	53.72
28–29	0.000557	98,609	55	98,581	5,201,210	52.75
29–30	0.000589	98,554	58	98,525	5,102,629	51.78
30–31	0.000622	98,496	61	98,465	5,004,104	50.81
31–32	0.000659	98,434	65	98,402	4,905,639	49.84
32–33	0.000702	98,370	69	98,335	4,807,237	48.87
33–34	0.000751	98,301	74	98,264	4,708,902	47.90
34–35	0.000806	98,227	79	98,187	4,610,639	46.94
35–36	0.000865	98,148	85	98,105	4,512,452	45.98
36–37	0.000928	98,063	91	98,017	4,414,346	45.02
37–38	0.000993	97,972	97	97,923	4,316,329	44.06
38–39	0.001063	97,874	104	97,822	4,218,406	43.10
39–40	0.001140	97,770	111	97,715	4,120,584	42.15
40–41	0.001226	97,659	120	97,599	4,022,869	41.19
41–42	0.001323	97,539	129	97,475	3,925,270	40.24
42–43	0.001437	97,410	140	97,340	3,827,796	39.30
43–44	0.001566	97,270	152	97,194	3,730,456	38.35
44–45	0.001710	97,118	166	97,035	3,633,262	37.41
45–46	0.001865	96,952	181	96,861	3,536,227	36.47
46–47	0.002034	96,771	197	96,672	3,439,366	35.54
47–48	0.002225	96,574	215	96,467	3,342,694	34.61
48–49	0.002450	96,359	236	96,241	3,246,227	33.69
49–50	0.002718	96,123	261	95,992	3,149,986	32.77
50–51	0.003045	95,862	292	95,716	3,053,993	31.86
51–52	0.003418	95,570	327	95,407	2,958,277	30.95
52–53	0.003804	95,243	362	95,062	2,862,871	30.06
53–54	0.004168	94,881	395	94,683	2,767,809	29.17
54–55	0.004520	94,486	427	94,272	2,673,125	28.29
55–56	0.004903	94,059	461	93,828	2,578,853	27.42
56–57	0.005361	93,597	502	93,346	2,485,025	26.55
57–58	0.005891	93,096	548	92,821	2,391,679	25.69
58–59	0.006510	92,547	603	92,246	2,298,857	24.84
59–60	0.007221	91,945	664	91,613	2,206,611	24.00
60–61	0.008015	91,281	732	90,915	2,114,999	23.17
61–62	0.008877	90,549	804	90,147	2,024,084	22.35
62–63	0.009781	89,745	878	89,306	1,933,937	21.55
63–64	0.010688	88,867	950	88,393	1,844,630	20.76

Table 6. Life table for white females: United States, 1996—Con.

Age	Proportion dying during age interval q(x)	Number living at beginning of age interval l(x)	Number dying during age interval d(x)	Stationary population in the age interval L(x)	Stationary population in this and all subsequent age intervals T(x)	Life expectancy at beginning of age interval e(x)
64–65	0.011596	87,918	1,019	87,408	1,756,238	19.98
65–66	0.012483	86,898	1,085	86,356	1,668,830	19.20
66–67	0.013437	85,813	1,153	85,237	1,582,474	18.44
67–68	0.014579	84,660	1,234	84,043	1,497,237	17.69
68–69	0.015999	83,426	1,335	82,759	1,413,194	16.94
69–70	0.017672	82,091	1,451	81,366	1,330,436	16.21
70–71	0.019492	80,641	1,572	79,855	1,249,070	15.49
71–72	0.021374	79,069	1,690	78,224	1,169,215	14.79
72–73	0.023382	77,379	1,809	76,474	1,090,992	14.10
73–74	0.025532	75,569	1,929	74,605	1,014,517	13.42
74–75	0.027878	73,640	2,053	72,613	939,913	12.76
75–76	0.030417	71,587	2,177	70,498	867,299	12.12
76–77	0.033250	69,410	2,308	68,256	796,801	11.48
77–78	0.036552	67,102	2,453	65,875	728,546	10.86
78–79	0.040447	64,649	2,615	63,342	662,670	10.25
79–80	0.044933	62,034	2,787	60,640	599,329	9.66
80–81	0.049860	59,247	2,954	57,770	538,688	9.09
81–82	0.055251	56,293	3,110	54,738	480,919	8.54
82–83	0.061410	53,182	3,266	51,549	426,181	8.01
83–84	0.068587	49,916	3,424	48,205	374,632	7.51
84–85	0.076929	46,493	3,577	44,704	326,427	7.02
85–86	0.085393	42,916	3,665	41,084	281,723	6.56
86–87	0.094809	39,251	3,721	37,391	240,639	6.13
87–88	0.105111	35,530	3,735	33,663	203,248	5.72
88–89	0.116443	31,795	3,702	29,944	169,585	5.33
89–90	0.128890	28,093	3,621	26,283	139,641	4.97
90–91	0.142375	24,472	3,484	22,730	113,358	4.63
91–92	0.156661	20,988	3,288	19,344	90,628	4.32
92–93	0.171586	17,700	3,037	16,181	71,284	4.03
93–94	0.187245	14,663	2,746	13,290	55,103	3.76
94–95	0.203751	11,917	2,428	10,703	41,813	3.51
95–96	0.221059	9,489	2,098	8,440	31,109	3.28
96–97	0.238900	7,392	1,766	6,509	22,669	3.07
97–98	0.256912	5,626	1,445	4,903	16,161	2.87
98–99	0.274906	4,180	1,149	3,606	11,258	2.69
99–100	0.292823	3,031	888	2,587	7,652	2.52
100+	1.00000	2,144	2,144	5,064	5,064	2.36

Table 7. Life table for the black population: United States, 1996

Age	Proportion dying during age interval $q(x)$	Number living at beginning of age interval $l(x)$	Number dying during age interval $d(x)$	Stationary population in the age interval $L(x)$	Stationary population in this and all subsequent age intervals $T(x)$	Life expectancy at beginning of age interval $e(x)$
0–1	0.014658	100,000	1,466	98,723	7,032,782	70.33
1–2	0.001090	98,534	107	98,481	6,934,059	70.37
2–3	0.000679	98,427	67	98,393	6,835,578	69.45
3–4	0.000535	98,360	53	98,334	6,737,185	68.50
4–5	0.000448	98,307	44	98,285	6,638,851	67.53
5–6	0.000374	98,263	37	98,245	6,540,565	66.56
6–7	0.000335	98,227	33	98,210	6,442,320	65.59
7–8	0.000303	98,194	30	98,179	6,344,110	64.61
8–9	0.000268	98,164	26	98,151	6,245,931	63.63
9–10	0.000229	98,138	22	98,126	6,147,780	62.64
10–11	0.000198	98,115	19	98,105	6,049,654	61.66
11–12	0.000201	98,096	20	98,086	5,951,549	60.67
12–13	0.000269	98,076	26	98,063	5,853,463	59.68
13–14	0.000418	98,050	41	98,029	5,755,400	58.70
14–15	0.000621	98,009	61	97,978	5,657,371	57.72
15–16	0.000846	97,948	83	97,906	5,559,393	56.76
16–17	0.001057	97,865	103	97,813	5,461,486	55.81
17–18	0.001239	97,761	121	97,701	5,363,673	54.86
18–19	0.001383	97,640	135	97,573	5,265,972	53.93
19–20	0.001501	97,505	146	97,432	5,168,400	53.01
20–21	0.001630	97,359	159	97,280	5,070,968	52.09
21–22	0.001770	97,200	172	97,114	4,973,688	51.17
22–23	0.001880	97,028	182	96,937	4,876,574	50.26
23–24	0.001942	96,846	188	96,752	4,779,637	49.35
24–25	0.001970	96,658	190	96,562	4,682,885	48.45
25–26	0.001984	96,467	191	96,371	4,586,323	47.54
26–27	0.002015	96,276	194	96,179	4,489,951	46.64
27–28	0.002084	96,082	200	95,982	4,393,773	45.73
28–29	0.002205	95,881	211	95,776	4,297,791	44.82
29–30	0.002364	95,670	226	95,557	4,202,015	43.92
30–31	0.002529	95,444	241	95,323	4,106,458	43.02
31–32	0.002689	95,202	256	95,074	4,011,135	42.13
32–33	0.002859	94,946	271	94,811	3,916,061	41.24
33–34	0.003040	94,675	288	94,531	3,821,250	40.36
34–35	0.003233	94,387	305	94,235	3,726,719	39.48
35–36	0.003432	94,082	323	93,921	3,632,484	38.61
36–37	0.003640	93,759	341	93,589	3,538,564	37.74
37–38	0.003870	93,418	362	93,237	3,444,975	36.88
38–39	0.004134	93,056	385	92,864	3,351,738	36.02
39–40	0.004431	92,672	411	92,466	3,258,874	35.17
40–41	0.004755	92,261	439	92,042	3,166,408	34.32
41–42	0.005097	91,822	468	91,588	3,074,366	33.48
42–43	0.005457	91,354	499	91,105	2,982,778	32.65
43–44	0.005826	90,856	529	90,591	2,891,672	31.83
44–45	0.006207	90,326	561	90,046	2,801,081	31.01
45–46	0.006624	89,766	595	89,469	2,711,035	30.20
46–47	0.007076	89,171	631	88,856	2,621,567	29.40
47–48	0.007534	88,540	667	88,207	2,532,711	28.61
48–49	0.008000	87,873	703	87,522	2,444,504	27.82
49–50	0.008495	87,170	741	86,800	2,356,983	27.04
50–51	0.009072	86,430	784	86,038	2,270,183	26.27
51–52	0.009750	85,646	835	85,228	2,184,145	25.50
52–53	0.010479	84,811	889	84,366	2,098,917	24.75
53–54	0.011206	83,922	940	83,452	2,014,551	24.01
54–55	0.011916	82,981	989	82,487	1,931,099	23.27
55–56	0.012605	81,993	1,034	81,476	1,848,612	22.55
56–57	0.013370	80,959	1,082	80,418	1,767,136	21.83
57–58	0.014308	79,877	1,143	79,305	1,686,719	21.12
58–59	0.015512	78,734	1,221	78,123	1,607,413	20.42
59–60	0.016952	77,512	1,314	76,855	1,529,290	19.73
60–61	0.018578	76,198	1,416	75,491	1,452,435	19.06
61–62	0.020217	74,783	1,512	74,027	1,376,944	18.41
62–63	0.021703	73,271	1,590	72,476	1,302,917	17.78
63–64	0.022874	71,681	1,640	70,861	1,230,442	17.17

Table 7. Life table for the black population: United States, 1996—Con.

Age	Proportion dying during age interval $q(x)$	Number living at beginning of age interval $l(x)$	Number dying during age interval $d(x)$	Stationary population in the age interval $L(x)$	Stationary population in this and all subsequent age intervals $T(x)$	Life expectancy at beginning of age interval $e(x)$
64–65	0.023813	70,041	1,668	69,207	1,159,581	16.56
65–66	0.024551	68,373	1,679	67,534	1,090,373	15.95
66–67	0.025434	66,695	1,696	65,846	1,022,840	15.34
67–68	0.026864	64,998	1,746	64,125	956,993	14.72
68–69	0.029191	63,252	1,846	62,329	892,868	14.12
69–70	0.032371	61,406	1,988	60,412	830,539	13.53
70–71	0.036230	59,418	2,153	58,342	770,127	12.96
71–72	0.040231	57,265	2,304	56,113	711,785	12.43
72–73	0.043950	54,961	2,416	53,754	655,672	11.93
73–74	0.046765	52,546	2,457	51,317	601,918	11.46
74–75	0.048765	50,089	2,443	48,867	550,601	10.99
75–76	0.050482	47,646	2,405	46,443	501,734	10.53
76–77	0.052605	45,241	2,380	44,051	455,290	10.06
77–78	0.055340	42,861	2,372	41,675	411,240	9.59
78–79	0.059229	40,489	2,398	39,290	369,565	9.13
79–80	0.064349	38,091	2,451	36,865	330,275	8.67
80–81	0.070454	35,640	2,511	34,384	293,409	8.23
81–82	0.077038	33,129	2,552	31,853	259,025	7.82
82–83	0.083963	30,577	2,567	29,293	227,173	7.43
83–84	0.090623	28,009	2,538	26,740	197,880	7.06
84–85	0.096926	25,471	2,469	24,237	171,139	6.72
85–86	0.103747	23,002	2,386	21,809	146,903	6.39
86–87	0.110955	20,616	2,287	19,472	125,094	6.07
87–88	0.118680	18,328	2,175	17,241	105,622	5.76
88–89	0.126939	16,153	2,050	15,128	88,381	5.47
89–90	0.135764	14,103	1,915	13,145	73,253	5.19
90–91	0.145085	12,188	1,768	11,304	60,108	4.93
91–92	0.154812	10,420	1,613	9,613	48,804	4.68
92–93	0.164876	8,807	1,452	8,081	39,191	4.45
93–94	0.175238	7,355	1,289	6,710	31,110	4.23
94–95	0.185858	6,066	1,127	5,502	24,400	4.02
95–96	0.196745	4,938	972	4,453	18,898	3.83
96–97	0.207890	3,967	825	3,554	14,445	3.64
97–98	0.219313	3,142	689	2,798	10,890	3.47
98–99	0.231003	2,453	567	2,170	8,093	3.30
99–100	0.242952	1,886	458	1,657	5,923	3.14
100+	1.00000	1,428	1,428	4,266	4,266	2.99

Table 8. Life table for black males: United States, 1996

Age	Proportion dying during age interval $q(x)$	Number living at beginning of age interval $l(x)$	Number dying during age interval $d(x)$	Stationary population in the age interval $L(x)$	Stationary population in this and all subsequent age intervals $T(x)$	Life expectancy at beginning of age interval $e(x)$
0–1	0.016022	100,000	1,602	98,603	6,612,402	66.12
1–2	0.001097	98,398	108	98,344	6,513,799	66.20
2–3	0.000729	98,290	72	98,254	6,415,455	65.27
3–4	0.000594	98,218	58	98,189	6,317,201	64.32
4–5	0.000486	98,160	48	98,136	6,219,012	63.36
5–6	0.000416	98,112	41	98,092	6,120,876	62.39
6–7	0.000388	98,071	38	98,052	6,022,784	61.41
7–8	0.000360	98,033	35	98,016	5,924,732	60.44
8–9	0.000313	97,998	31	97,983	5,826,716	59.46
9–10	0.000249	97,967	24	97,955	5,728,734	58.48
10–11	0.000191	97,943	19	97,934	5,630,779	57.49
11–12	0.000186	97,924	18	97,915	5,532,845	56.50
12–13	0.000293	97,906	29	97,892	5,434,930	55.51
13–14	0.000543	97,877	53	97,851	5,337,039	54.53
14–15	0.000887	97,824	87	97,781	5,239,188	53.56
15–16	0.001263	97,737	123	97,676	5,141,407	52.60
16–17	0.001609	97,614	157	97,535	5,043,732	51.67
17–18	0.001910	97,457	186	97,364	4,946,197	50.75
18–19	0.002150	97,271	209	97,166	4,848,833	49.85
19–20	0.002350	97,062	228	96,948	4,751,667	48.96
20–21	0.002570	96,833	249	96,709	4,654,719	48.07
21–22	0.002805	96,585	271	96,449	4,558,010	47.19
22–23	0.002975	96,314	286	96,170	4,461,561	46.32
23–24	0.003044	96,027	292	95,881	4,365,390	45.46
24–25	0.003038	95,735	291	95,590	4,269,509	44.60
25–26	0.002998	95,444	286	95,301	4,173,920	43.73
26–27	0.002984	95,158	284	95,016	4,078,619	42.86
27–28	0.003035	94,874	288	94,730	3,983,603	41.99
28–29	0.003182	94,586	301	94,436	3,888,873	41.11
29–30	0.003397	94,285	320	94,125	3,794,437	40.24
30–31	0.003628	93,965	341	93,794	3,700,312	39.38
31–32	0.003844	93,624	360	93,444	3,606,517	38.52
32–33	0.004060	93,264	379	93,075	3,513,073	37.67
33–34	0.004273	92,886	397	92,687	3,419,999	36.82
34–35	0.004488	92,489	415	92,281	3,327,311	35.98
35–36	0.004706	92,074	433	91,857	3,235,030	35.14
36–37	0.004944	91,640	453	91,414	3,143,173	34.30
37–38	0.005228	91,187	477	90,949	3,051,760	33.47
38–39	0.005580	90,711	506	90,457	2,960,811	32.64
39–40	0.005996	90,204	541	89,934	2,870,353	31.82
40–41	0.006454	89,664	579	89,374	2,780,419	31.01
41–42	0.006935	89,085	618	88,776	2,691,045	30.21
42–43	0.007442	88,467	658	88,138	2,602,269	29.42
43–44	0.007964	87,809	699	87,459	2,514,131	28.63
44–45	0.008502	87,109	741	86,739	2,426,672	27.86
45–46	0.009099	86,369	786	85,976	2,339,933	27.09
46–47	0.009745	85,583	834	85,166	2,253,957	26.34
47–48	0.010384	84,749	880	84,309	2,168,791	25.59
48–49	0.011003	83,869	923	83,408	2,084,482	24.85
49–50	0.011634	82,946	965	82,464	2,001,075	24.12
50–51	0.012356	81,981	1,013	81,475	1,918,611	23.40
51–52	0.013211	80,968	1,070	80,433	1,837,136	22.69
52–53	0.014151	79,898	1,131	79,333	1,756,703	21.99
53–54	0.015121	78,768	1,191	78,172	1,677,370	21.30
54–55	0.016093	77,577	1,248	76,953	1,599,197	20.61
55–56	0.017034	76,328	1,300	75,678	1,522,245	19.94
56–57	0.018058	75,028	1,355	74,351	1,446,566	19.28
57–58	0.019316	73,673	1,423	72,962	1,372,216	18.63
58–59	0.020936	72,250	1,513	71,494	1,299,254	17.98
59–60	0.022874	70,738	1,618	69,929	1,227,760	17.36
60–61	0.025079	69,120	1,733	68,253	1,157,831	16.75
61–62	0.027278	67,386	1,838	66,467	1,089,578	16.17
62–63	0.029170	65,548	1,912	64,592	1,023,111	15.61
63–64	0.030483	63,636	1,940	62,666	958,519	15.06

Table 8. Life table for black males: United States, 1996—Con.

Age	Proportion dying during age interval *q*(*x*)	Number living at beginning of age interval *l*(*x*)	Number dying during age interval *d*(*x*)	Stationary population in the age interval *L*(*x*)	Stationary population in this and all subsequent age intervals *T*(*x*)	Life expectancy at beginning of age interval *e*(*x*)
64–65	0.031359	61,696	1,935	60,729	895,853	14.52
65–66	0.031904	59,762	1,907	58,808	835,124	13.97
66–67	0.032653	57,855	1,889	56,910	776,316	13.42
67–68	0.034172	55,966	1,912	55,010	719,405	12.85
68–69	0.036969	54,053	1,998	53,054	664,396	12.29
69–70	0.041016	52,055	2,135	50,987	611,342	11.74
70–71	0.046058	49,920	2,299	48,770	560,354	11.23
71–72	0.051359	47,621	2,446	46,398	511,584	10.74
72–73	0.056374	45,175	2,547	43,902	465,186	10.30
73–74	0.060136	42,628	2,564	41,347	421,285	9.88
74–75	0.062676	40,065	2,511	38,809	379,938	9.48
75–76	0.064819	37,554	2,434	36,337	341,129	9.08
76–77	0.067486	35,119	2,370	33,934	304,792	8.68
77–78	0.070761	32,749	2,317	31,591	270,858	8.27
78–79	0.075346	30,432	2,293	29,286	239,267	7.86
79–80	0.081461	28,139	2,292	26,993	209,982	7.46
80–81	0.089019	25,847	2,301	24,696	182,989	7.08
81–82	0.097437	23,546	2,294	22,399	158,292	6.72
82–83	0.106330	21,252	2,260	20,122	135,893	6.39
83–84	0.114397	18,992	2,173	17,906	115,771	6.10
84–85	0.121172	16,819	2,038	15,800	97,866	5.82
85–86	0.128742	14,781	1,903	13,830	82,065	5.55
86–87	0.136586	12,878	1,759	11,999	68,235	5.30
87–88	0.144805	11,119	1,610	10,314	56,236	5.06
88–89	0.153420	9,509	1,459	8,780	45,922	4.83
89–90	0.162400	8,050	1,307	7,397	37,142	4.61
90–91	0.171653	6,743	1,157	6,164	29,746	4.41
91–92	0.181103	5,586	1,012	5,080	23,581	4.22
92–93	0.190647	4,574	872	4,138	18,502	4.05
93–94	0.200191	3,702	741	3,331	14,364	3.88
94–95	0.209679	2,961	621	2,650	11,032	3.73
95–96	0.219110	2,340	513	2,084	8,382	3.58
96–97	0.228523	1,827	418	1,619	6,298	3.45
97–98	0.237917	1,410	335	1,242	4,680	3.32
98–99	0.247311	1,074	266	941	3,438	3.20
99–100	0.256695	809	208	705	2,496	3.09
100+	1.00000	601	601	1,791	1,791	2.98

Table 9. Life table for black females: United States, 1996

Age	Proportion dying during age interval $q(x)$	Number living at beginning of age interval $l(x)$	Number dying during age interval $d(x)$	Stationary population in the age interval $L(x)$	Stationary population in this and all subsequent age intervals $T(x)$	Life expectancy at beginning of age interval $e(x)$
0–1	0.013253	100,000	1,325	98,864	7,431,539	74.32
1–2	0.001082	98,675	107	98,621	7,332,674	74.31
2–3	0.000627	98,568	62	98,537	7,234,053	73.39
3–4	0.000474	98,506	47	98,483	7,135,516	72.44
4–5	0.000409	98,459	40	98,439	7,037,033	71.47
5–6	0.000331	98,419	33	98,403	6,938,594	70.50
6–7	0.000280	98,387	28	98,373	6,840,191	69.52
7–8	0.000245	98,359	24	98,347	6,741,818	68.54
8–9	0.000221	98,335	22	98,324	6,643,471	67.56
9–10	0.000208	98,313	20	98,303	6,545,147	66.57
10–11	0.000206	98,293	20	98,283	6,446,844	65.59
11–12	0.000217	98,273	21	98,262	6,348,562	64.60
12–13	0.000245	98,251	24	98,239	6,250,300	63.62
13–14	0.000290	98,227	28	98,213	6,152,061	62.63
14–15	0.000346	98,199	34	98,182	6,053,848	61.65
15–16	0.000414	98,165	41	98,144	5,955,666	60.67
16–17	0.000483	98,124	47	98,100	5,857,521	59.70
17–18	0.000544	98,077	53	98,050	5,759,421	58.72
18–19	0.000593	98,023	58	97,994	5,661,371	57.76
19–20	0.000636	97,965	62	97,934	5,563,377	56.79
20–21	0.000685	97,903	67	97,869	5,465,443	55.83
21–22	0.000745	97,836	73	97,799	5,367,574	54.86
22–23	0.000811	97,763	79	97,723	5,269,774	53.90
23–24	0.000881	97,684	86	97,641	5,172,051	52.95
24–25	0.000955	97,598	93	97,551	5,074,410	51.99
25–26	0.001032	97,504	101	97,454	4,976,859	51.04
26–27	0.001117	97,404	109	97,349	4,879,405	50.09
27–28	0.001213	97,295	118	97,236	4,782,056	49.15
28–29	0.001319	97,177	128	97,113	4,684,820	48.21
29–30	0.001434	97,049	139	96,979	4,587,708	47.27
30–31	0.001548	96,909	150	96,834	4,490,728	46.34
31–32	0.001664	96,759	161	96,679	4,393,894	45.41
32–33	0.001797	96,598	174	96,512	4,297,215	44.49
33–34	0.001951	96,425	188	96,331	4,200,703	43.56
34–35	0.002123	96,237	204	96,135	4,104,372	42.65
35–36	0.002302	96,032	221	95,922	4,008,238	41.74
36–37	0.002482	95,811	238	95,692	3,912,316	40.83
37–38	0.002665	95,574	255	95,446	3,816,623	39.93
38–39	0.002853	95,319	272	95,183	3,721,177	39.04
39–40	0.003049	95,047	290	94,902	3,625,994	38.15
40–41	0.003261	94,757	309	94,603	3,531,092	37.26
41–42	0.003488	94,448	329	94,283	3,436,489	36.38
42–43	0.003726	94,119	351	93,943	3,342,206	35.51
43–44	0.003973	93,768	373	93,582	3,248,263	34.64
44–45	0.004230	93,395	395	93,198	3,154,681	33.78
45–46	0.004509	93,000	419	92,791	3,061,483	32.92
46–47	0.004812	92,581	446	92,358	2,968,692	32.07
47–48	0.005136	92,135	473	91,899	2,876,334	31.22
48–49	0.005488	91,662	503	91,411	2,784,435	30.38
49–50	0.005885	91,159	536	90,891	2,693,024	29.54
50–51	0.006359	90,623	576	90,335	2,602,133	28.71
51–52	0.006910	90,047	622	89,735	2,511,799	27.89
52–53	0.007491	89,424	670	89,089	2,422,063	27.09
53–54	0.008046	88,754	714	88,397	2,332,974	26.29
54–55	0.008569	88,040	754	87,663	2,244,576	25.49
55–56	0.009084	87,286	793	86,889	2,156,913	24.71
56–57	0.009668	86,493	836	86,075	2,070,024	23.93
57–58	0.010383	85,657	889	85,212	1,983,949	23.16
58–59	0.011294	84,767	957	84,289	1,898,737	22.40
59–60	0.012386	83,810	1,038	83,291	1,814,448	21.65
60–61	0.013612	82,772	1,127	82,209	1,731,157	20.91
61–62	0.014869	81,645	1,214	81,038	1,648,949	20.20
62–63	0.016078	80,431	1,293	79,785	1,567,910	19.49
63–64	0.017148	79,138	1,357	78,460	1,488,126	18.80

Table 9. Life table for black females: United States, 1996—Con.

Age	Proportion dying during age interval *q* (*x*)	Number living at beginning of age interval *l* (*x*)	Number dying during age interval *d*(*x*)	Stationary population in the age interval *L*(*x*)	Stationary population in this and all subsequent age intervals *T*(*x*)	Life expectancy at beginning of age interval *e* (*x*)
64–65	0.018119	77,781	1,409	77,076	1,409,666	18.12
65–66	0.018976	76,372	1,449	75,647	1,332,590	17.45
66–67	0.019943	74,922	1,494	74,175	1,256,943	16.78
67–68	0.021323	73,428	1,566	72,645	1,182,767	16.11
68–69	0.023362	71,863	1,679	71,023	1,110,122	15.45
69–70	0.026021	70,184	1,826	69,271	1,039,099	14.81
70–71	0.029193	68,357	1,996	67,360	969,828	14.19
71–72	0.032468	66,362	2,155	65,285	902,469	13.60
72–73	0.035491	64,207	2,279	63,068	837,184	13.04
73–74	0.037818	61,928	2,342	60,757	774,116	12.50
74–75	0.039562	59,586	2,357	58,408	713,359	11.97
75–76	0.041087	57,229	2,351	56,053	654,951	11.44
76–77	0.042975	54,878	2,358	53,698	598,898	10.91
77–78	0.045537	52,519	2,392	51,324	545,199	10.38
78–79	0.049264	50,128	2,469	48,893	493,876	9.85
79–80	0.054161	47,658	2,581	46,368	444,983	9.34
80–81	0.059912	45,077	2,701	43,727	398,615	8.84
81–82	0.066033	42,376	2,798	40,977	354,889	8.37
82–83	0.072470	39,578	2,868	38,144	313,911	7.93
83–84	0.078841	36,710	2,894	35,263	275,767	7.51
84–85	0.085181	33,816	2,880	32,375	240,505	7.11
85–86	0.092237	30,935	2,853	29,509	208,129	6.73
86–87	0.099905	28,082	2,806	26,679	178,621	6.36
87–88	0.108167	25,276	2,734	23,909	151,942	6.01
88–89	0.117011	22,542	2,638	21,223	128,032	5.68
89–90	0.126449	19,905	2,517	18,646	106,809	5.37
90–91	0.136428	17,388	2,372	16,202	88,163	5.07
91–92	0.146888	15,015	2,206	13,913	71,961	4.79
92–93	0.157787	12,810	2,021	11,799	58,049	4.53
93–94	0.169085	10,789	1,824	9,877	46,249	4.29
94–95	0.180752	8,964	1,620	8,154	36,373	4.06
95–96	0.192745	7,344	1,416	6,636	28,218	3.84
96–97	0.205046	5,929	1,216	5,321	21,582	3.64
97–98	0.217642	4,713	1,026	4,200	16,261	3.45
98–99	0.230505	3,687	850	3,262	12,061	3.27
99–100	0.243613	2,837	691	2,492	8,799	3.10
100+	1.00000	2,146	2,146	6,307	6,307	2.94

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