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United States Life Tables, 2009

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Abstract

Objectives—This report presents complete period life tables for the United States by race, Hispanic origin, and sex based on age-specific death rates in 2009.

Methods—Data used to prepare the 2009 life tables are 2009 final mortality statistics; July 1, 2009, population estimates based on the 2000 decennial census; and 2009 Medicare data for persons aged 66–99. The methodology used to estimate the 2009 life tables is the same as that used for data year 2008, which was revised from that used for data years 2000–2007. The methodology used to estimate the life tables for the Hispanic population remains unchanged from that developed for the publication of life tables by Hispanic origin for data year 2006.

Results—In 2009, the overall expectation of life at birth was 78.5 years. Between 2008 and 2009, life expectancy at birth increased for all groups considered. Life expectancy increased for both males (from 75.6 to 76.0) and females (80.6 to 80.9) and for the white population (78.5 to 78.8), the black population (74.0 to 74.5), the Hispanic population (81.0 to 81.2), the non-Hispanic white population (78.4 to 78.7), and the non-Hispanic black population (73.7 to 74.2).

Keywords: life expectancy • survival • death rates • race

Introduction

There are two types of U.S. life tables: the cohort (or generation) life table and the period (or current) life table. The cohort life table presents the mortality experience of a particular birth cohort—all persons born in the year 1900, for example—from the moment of birth through consecutive ages in successive calendar years. Based on age-specific death rates observed through consecutive calendar years, the cohort life table reflects the mortality experience of an actual cohort from birth until no lives remain in the group. To prepare just a single complete cohort life table requires data over many years. It is usually not feasible to construct cohort life tables entirely on the basis of observed data for real cohorts due to data unavailability or incompleteness (1). For example, a life table representation of the

mortality experience of a cohort of persons born in 1970 would require the use of data projection techniques to estimate deaths into the future (2,3).

Unlike the cohort life table, the period life table does not represent the mortality experience of an actual birth cohort. Rather, the period life table presents what would happen to a hypothetical cohort if it experienced throughout its entire life the mortality conditions of a particular period in time. For example, a period life table for 2009 assumes a hypothetical cohort that is subject throughout its lifetime to the age-specific death rates prevailing for the actual population in 2009. The period life table may thus be characterized as rendering a “snapshot” of current mortality experience and showing the long-range implications of a set of age-specific death rates that prevailed in a given year. In this report, the term “life table” refers only to the period life table and not to the cohort life table.

Life tables can be classified in two ways according to the length of the age interval in which data are presented. A complete life table contains data for every single year of age. An abridged life table typically contains data by 5- or 10-year age intervals. A complete life table, of course, can easily be aggregated into 5- or 10-year age groups (refer to [Technical Notes](#) at the end of this report for instructions). Other than the decennial life tables, U.S. life tables based on data prior to 1997 are abridged life tables constructed by reference to a standard table (4). This report presents complete period life tables by race, Hispanic origin, race for the non-Hispanic population, and sex.

Data and Methods

The data used to prepare the U.S. life tables for 2009 are final numbers of deaths for the year 2009, postcensal population estimates for the year 2009, and age-specific death and population counts for Medicare beneficiaries aged 66–99 for the year 2009 from the Centers for Medicare & Medicaid Services. Data from the Medicare program are used to supplement vital statistics and census data for ages 66 and over. (See [Technical Notes](#) for a detailed description of the data sets used.)



Table 2. Life table for males: United States, 2009Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/NVSR/62_07/Table02.xls.

Age (years)	Probability of dying between ages x and $x + 1$	Number surviving to age x	Number dying between ages x and $x + 1$	Person-years lived between ages x and $x + 1$	Total number of person-years lived above age x	Expectation of life at age x
	q_x	l_x	d_x	L_x	T_x	e_x
0-1	0.006989	100,000	699	99,391	7,596,099	76.0
1-2	0.000442	99,301	44	99,279	7,496,709	75.5
2-3	0.000303	99,257	30	99,242	7,397,429	74.5
3-4	0.000233	99,227	23	99,216	7,298,187	73.6
4-5	0.000174	99,204	17	99,195	7,198,972	72.6
5-6	0.000164	99,187	16	99,179	7,099,776	71.6
6-7	0.000149	99,171	15	99,163	7,000,598	70.6
7-8	0.000135	99,156	13	99,149	6,901,435	69.6
8-9	0.000117	99,142	12	99,137	6,802,286	68.6
9-10	0.000097	99,131	10	99,126	6,703,149	67.6
10-11	0.000082	99,121	8	99,117	6,604,023	66.6
11-12	0.000089	99,113	9	99,109	6,504,906	65.6
12-13	0.000136	99,104	14	99,097	6,405,797	64.6
13-14	0.000232	99,091	23	99,079	6,306,700	63.6
14-15	0.000359	99,068	36	99,050	6,207,621	62.7
15-16	0.000490	99,032	49	99,008	6,108,571	61.7
16-17	0.000613	98,984	61	98,953	6,009,563	60.7
17-18	0.000737	98,923	73	98,886	5,910,610	59.7
18-19	0.000861	98,850	85	98,807	5,811,724	58.8
19-20	0.000984	98,765	97	98,716	5,712,916	57.8
20-21	0.001116	98,668	110	98,613	5,614,200	56.9
21-22	0.001238	98,557	122	98,496	5,515,588	56.0
22-23	0.001322	98,435	130	98,370	5,417,091	55.0
23-24	0.001351	98,305	133	98,239	5,318,721	54.1
24-25	0.001341	98,172	132	98,107	5,220,482	53.2
25-26	0.001317	98,041	129	97,976	5,122,375	52.2
26-27	0.001302	97,912	128	97,848	5,024,399	51.3
27-28	0.001296	97,784	127	97,721	4,926,551	50.4
28-29	0.001306	97,657	128	97,594	4,828,830	49.4
29-30	0.001331	97,530	130	97,465	4,731,236	48.5
30-31	0.001363	97,400	133	97,334	4,633,771	47.6
31-32	0.001399	97,267	136	97,199	4,536,438	46.6
32-33	0.001441	97,131	140	97,061	4,439,238	45.7
33-34	0.001489	96,991	144	96,919	4,342,177	44.8
34-35	0.001544	96,847	150	96,772	4,245,258	43.8
35-36	0.001612	96,698	156	96,620	4,148,485	42.9
36-37	0.001696	96,542	164	96,460	4,051,866	42.0
37-38	0.001794	96,378	173	96,291	3,955,406	41.0
38-39	0.001910	96,205	184	96,113	3,859,114	40.1
39-40	0.002047	96,021	197	95,923	3,763,001	39.2
40-41	0.002203	95,825	211	95,719	3,667,078	38.3
41-42	0.002384	95,614	228	95,500	3,571,359	37.4
42-43	0.002602	95,386	248	95,262	3,475,859	36.4
43-44	0.002855	95,137	272	95,002	3,380,598	35.5
44-45	0.003133	94,866	297	94,717	3,285,596	34.6
45-46	0.003412	94,569	323	94,407	3,190,879	33.7
46-47	0.003702	94,246	349	94,072	3,096,471	32.9
47-48	0.004036	93,897	379	93,708	3,002,400	32.0
48-49	0.004434	93,518	415	93,311	2,908,692	31.1
49-50	0.004891	93,103	455	92,876	2,815,381	30.2
50-51	0.005388	92,648	499	92,399	2,722,506	29.4
51-52	0.005898	92,149	543	91,877	2,630,107	28.5
52-53	0.006413	91,605	588	91,312	2,538,230	27.7
53-54	0.006924	91,018	630	90,703	2,446,918	26.9
54-55	0.007440	90,388	672	90,051	2,356,216	26.1
55-56	0.007994	89,715	717	89,357	2,266,164	25.3
56-57	0.008599	88,998	765	88,615	2,176,807	24.5
57-58	0.009234	88,233	815	87,825	2,088,192	23.7
58-59	0.009893	87,418	865	86,986	2,000,366	22.9
59-60	0.010579	86,553	916	86,095	1,913,381	22.1
60-61	0.011303	85,638	968	85,154	1,827,285	21.3
61-62	0.012087	84,670	1,023	84,158	1,742,132	20.6

See footnote at end of table.

Table 2. Life table for males: United States, 2009—Con.Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/NVSR/62_07/Table02.xls.

Age (years)	Probability of dying between ages x and $x + 1$	Number surviving to age x	Number dying between ages x and $x + 1$	Person-years lived between ages x and $x + 1$	Total number of person-years lived above age x	Expectation of life at age x
	q_x	l_x	d_x	L_x	T_x	e_x
62-63	0.012952	83,646	1,083	83,105	1,657,974	19.8
63-64	0.013937	82,563	1,151	81,988	1,574,870	19.1
64-65	0.015068	81,412	1,227	80,799	1,492,882	18.3
65-66	0.016389	80,185	1,314	79,528	1,412,083	17.6
66-67	0.017866	78,871	1,409	78,167	1,332,555	16.9
67-68	0.019423	77,462	1,505	76,710	1,254,388	16.2
68-69	0.021006	75,958	1,596	75,160	1,177,678	15.5
69-70	0.022610	74,362	1,681	73,521	1,102,518	14.8
70-71	0.024369	72,681	1,771	71,795	1,028,997	14.2
71-72	0.026382	70,910	1,871	69,974	957,202	13.5
72-73	0.028664	69,039	1,979	68,049	887,227	12.9
73-74	0.031394	67,060	2,105	66,007	819,178	12.2
74-75	0.034398	64,955	2,234	63,838	753,171	11.6
75-76	0.037521	62,720	2,353	61,544	689,333	11.0
76-77	0.041012	60,367	2,476	59,129	627,789	10.4
77-78	0.045093	57,891	2,610	56,586	568,660	9.8
78-79	0.049743	55,281	2,750	53,906	512,074	9.3
79-80	0.054791	52,531	2,878	51,092	458,168	8.7
80-81	0.060380	49,653	2,998	48,154	407,076	8.2
81-82	0.066415	46,655	3,099	45,105	358,923	7.7
82-83	0.073358	43,556	3,195	41,959	313,817	7.2
83-84	0.081063	40,361	3,272	38,725	271,859	6.7
84-85	0.089641	37,089	3,325	35,427	233,134	6.3
85-86	0.101322	33,764	3,421	32,054	197,707	5.9
86-87	0.112341	30,343	3,409	28,639	165,653	5.5
87-88	0.124296	26,935	3,348	25,261	137,014	5.1
88-89	0.137207	23,587	3,236	21,969	111,753	4.7
89-90	0.151086	20,350	3,075	18,813	89,785	4.4
90-91	0.165929	17,276	2,867	15,843	70,972	4.1
91-92	0.181716	14,409	2,618	13,100	55,129	3.8
92-93	0.198410	11,791	2,339	10,621	42,029	3.6
93-94	0.215955	9,451	2,041	8,431	31,408	3.3
94-95	0.234275	7,410	1,736	6,542	22,977	3.1
95-96	0.253276	5,674	1,437	4,956	16,435	2.9
96-97	0.272845	4,237	1,156	3,659	11,479	2.7
97-98	0.292856	3,081	902	2,630	7,820	2.5
98-99	0.313166	2,179	682	1,838	5,190	2.4
99-100	0.333629	1,496	499	1,247	3,352	2.2
100 and over	1.000000	997	997	2,106	2,106	2.1

SOURCE: CDC/NCHS, National Vital Statistics System.

Table 3. Life table for females: United States, 2009Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/NVSR/62_07/Table03.xls.

Age (years)	Probability of dying between ages x and $x + 1$	Number surviving to age x	Number dying between ages x and $x + 1$	Person-years lived between ages x and $x + 1$	Total number of person-years lived above age x	Expectation of life at age x
	q_x	l_x	d_x	L_x	T_x	e_x
0-1	0.005726	100,000	573	99,500	8,088,922	80.9
1-2	0.000369	99,427	37	99,409	7,989,422	80.4
2-3	0.000243	99,391	24	99,379	7,890,013	79.4
3-4	0.000185	99,367	18	99,357	7,790,634	78.4
4-5	0.000147	99,348	15	99,341	7,691,277	77.4
5-6	0.000134	99,334	13	99,327	7,591,936	76.4
6-7	0.000120	99,320	12	99,314	7,492,609	75.4
7-8	0.000109	99,308	11	99,303	7,393,295	74.4
8-9	0.000101	99,298	10	99,293	7,293,992	73.5
9-10	0.000094	99,288	9	99,283	7,194,699	72.5
10-11	0.000092	99,278	9	99,274	7,095,416	71.5
11-12	0.000098	99,269	10	99,264	6,996,143	70.5
12-13	0.000117	99,259	12	99,254	6,896,878	69.5
13-14	0.000151	99,248	15	99,240	6,797,625	68.5
14-15	0.000195	99,233	19	99,223	6,698,385	67.5
15-16	0.000242	99,213	24	99,201	6,599,162	66.5
16-17	0.000287	99,189	28	99,175	6,499,960	65.5
17-18	0.000326	99,161	32	99,145	6,400,785	64.5
18-19	0.000356	99,129	35	99,111	6,301,640	63.6
19-20	0.000380	99,093	38	99,074	6,202,529	62.6
20-21	0.000405	99,056	40	99,036	6,103,455	61.6
21-22	0.000432	99,015	43	98,994	6,004,419	60.6
22-23	0.000458	98,973	45	98,950	5,905,425	59.7
23-24	0.000481	98,927	48	98,904	5,806,475	58.7
24-25	0.000502	98,880	50	98,855	5,707,572	57.7
25-26	0.000524	98,830	52	98,804	5,608,717	56.8
26-27	0.000548	98,778	54	98,751	5,509,912	55.8
27-28	0.000571	98,724	56	98,696	5,411,161	54.8
28-29	0.000595	98,668	59	98,639	5,312,465	53.8
29-30	0.000622	98,609	61	98,578	5,213,826	52.9
30-31	0.000655	98,548	65	98,515	5,115,248	51.9
31-32	0.000695	98,483	68	98,449	5,016,733	50.9
32-33	0.000738	98,415	73	98,378	4,918,284	50.0
33-34	0.000786	98,342	77	98,303	4,819,905	49.0
34-35	0.000837	98,265	82	98,224	4,721,602	48.0
35-36	0.000894	98,182	88	98,139	4,623,378	47.1
36-37	0.000962	98,095	94	98,047	4,525,240	46.1
37-38	0.001039	98,000	102	97,949	4,427,192	45.2
38-39	0.001129	97,898	111	97,843	4,329,243	44.2
39-40	0.001234	97,788	121	97,728	4,231,400	43.3
40-41	0.001348	97,667	132	97,601	4,133,672	42.3
41-42	0.001476	97,536	144	97,464	4,036,071	41.4
42-43	0.001629	97,392	159	97,312	3,938,607	40.4
43-44	0.001806	97,233	176	97,145	3,841,294	39.5
44-45	0.001996	97,057	194	96,961	3,744,149	38.6
45-46	0.002186	96,864	212	96,758	3,647,189	37.7
46-47	0.002375	96,652	230	96,537	3,550,431	36.7
47-48	0.002577	96,422	249	96,298	3,453,894	35.8
48-49	0.002801	96,174	269	96,039	3,357,595	34.9
49-50	0.003046	95,905	292	95,758	3,261,556	34.0
50-51	0.003317	95,612	317	95,454	3,165,798	33.1
51-52	0.003596	95,295	343	95,124	3,070,344	32.2
52-53	0.003868	94,953	367	94,769	2,975,220	31.3
53-54	0.004124	94,585	390	94,390	2,880,451	30.5
54-55	0.004376	94,195	412	93,989	2,786,061	29.6
55-56	0.004641	93,783	435	93,565	2,692,072	28.7
56-57	0.004947	93,348	462	93,117	2,598,506	27.8
57-58	0.005313	92,886	493	92,639	2,505,389	27.0
58-59	0.005753	92,392	532	92,127	2,412,750	26.1
59-60	0.006262	91,861	575	91,573	2,320,623	25.3
60-61	0.006826	91,286	623	90,974	2,229,050	24.4
61-62	0.007429	90,663	674	90,326	2,138,076	23.6

See footnote at end of table.

Table 3. Life table for females: United States, 2009—Con.Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/NVSR/62_07/Table03.xls.

Age (years)	Probability of dying between ages x and $x + 1$	Number surviving to age x	Number dying between ages x and $x + 1$	Person-years lived between ages x and $x + 1$	Total number of person-years lived above age x	Expectation of life at age x
	q_x	l_x	d_x	L_x	T_x	e_x
62-63	0.008073	89,989	726	89,626	2,047,750	22.8
63-64	0.008763	89,263	782	88,872	1,958,124	21.9
64-65	0.009524	88,480	843	88,059	1,869,253	21.1
65-66	0.010410	87,638	912	87,182	1,781,194	20.3
66-67	0.011422	86,725	991	86,230	1,694,012	19.5
67-68	0.012511	85,735	1,073	85,199	1,607,782	18.8
68-69	0.013652	84,662	1,156	84,084	1,522,583	18.0
69-70	0.014847	83,506	1,240	82,887	1,438,499	17.2
70-71	0.016200	82,267	1,333	81,600	1,355,612	16.5
71-72	0.017783	80,934	1,439	80,214	1,274,012	15.7
72-73	0.019504	79,495	1,550	78,719	1,193,798	15.0
73-74	0.021466	77,944	1,673	77,108	1,115,078	14.3
74-75	0.023697	76,271	1,807	75,367	1,037,971	13.6
75-76	0.025997	74,464	1,936	73,496	962,603	12.9
76-77	0.028517	72,528	2,068	71,494	889,107	12.3
77-78	0.031445	70,460	2,216	69,352	817,614	11.6
78-79	0.034904	68,244	2,382	67,053	748,262	11.0
79-80	0.038790	65,862	2,555	64,585	681,209	10.3
80-81	0.042869	63,307	2,714	61,950	616,624	9.7
81-82	0.047338	60,593	2,868	59,159	554,674	9.2
82-83	0.052844	57,725	3,050	56,200	495,515	8.6
83-84	0.059186	54,675	3,236	53,057	439,315	8.0
84-85	0.066164	51,439	3,403	49,737	386,258	7.5
85-86	0.074211	48,035	3,565	46,253	336,522	7.0
86-87	0.083667	44,470	3,721	42,610	290,269	6.5
87-88	0.093608	40,750	3,815	38,843	247,659	6.1
88-89	0.104520	36,935	3,860	35,005	208,816	5.7
89-90	0.116444	33,075	3,851	31,149	173,811	5.3
90-91	0.129416	29,223	3,782	27,332	142,662	4.9
91-92	0.143456	25,441	3,650	23,617	115,329	4.5
92-93	0.158570	21,792	3,456	20,064	91,713	4.2
93-94	0.174744	18,336	3,204	16,734	71,649	3.9
94-95	0.191945	15,132	2,905	13,680	54,915	3.6
95-96	0.210116	12,228	2,569	10,943	41,235	3.4
96-97	0.229176	9,658	2,213	8,552	30,292	3.1
97-98	0.249023	7,445	1,854	6,518	21,740	2.9
98-99	0.269529	5,591	1,507	4,837	15,222	2.7
99-100	0.290550	4,084	1,187	3,491	10,385	2.5
100 and over	1.000000	2,897	2,897	6,894	6,894	2.4

SOURCE: CDC/NCHS, National Vital Statistics System.