

U.S. Department of Health and Human Services: Life table for the black population: United States, 2009. In: National Vital Statistics Reports, Vol. 62, No. 7, 2014, p. 23-26, URL: http://www.cdc.gov/nchs/data/nvsr/nvsr62/nvsr62_07.pdf (30.07.2014).

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 8. Life table for black males: United States, 2009Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/NVSR/62_07/Table08.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	0.014052	100,000	1,405	98,766	7,106,323	71.1
1-2	0.000624	98,595	62	98,564	7,007,557	71.1
2-3	0.000478	98,533	47	98,510	6,908,993	70.1
3-4	0.000304	98,486	30	98,471	6,810,483	69.2
4-5	0.000234	98,456	23	98,445	6,712,012	68.2
5-6	0.000245	98,433	24	98,421	6,613,567	67.2
6-7	0.000227	98,409	22	98,398	6,515,146	66.2
7-8	0.000208	98,387	20	98,377	6,416,748	65.2
8-9	0.000180	98,366	18	98,358	6,318,371	64.2
9-10	0.000144	98,349	14	98,342	6,220,013	63.2
10-11	0.000116	98,335	11	98,329	6,121,672	62.3
11-12	0.000122	98,323	12	98,317	6,023,343	61.3
12-13	0.000190	98,311	19	98,302	5,925,026	60.3
13-14	0.000334	98,292	33	98,276	5,826,724	59.3
14-15	0.000523	98,260	51	98,234	5,728,448	58.3
15-16	0.000714	98,208	70	98,173	5,630,214	57.3
16-17	0.000887	98,138	87	98,095	5,532,041	56.4
17-18	0.001057	98,051	104	97,999	5,433,946	55.4
18-19	0.001228	97,947	120	97,887	5,335,947	54.5
19-20	0.001401	97,827	137	97,759	5,238,060	53.5
20-21	0.001594	97,690	156	97,612	5,140,301	52.6
21-22	0.001783	97,534	174	97,447	5,042,689	51.7
22-23	0.001921	97,360	187	97,267	4,945,242	50.8
23-24	0.001979	97,173	192	97,077	4,847,975	49.9
24-25	0.001976	96,981	192	96,885	4,750,898	49.0
25-26	0.001950	96,789	189	96,695	4,654,012	48.1
26-27	0.001938	96,601	187	96,507	4,557,317	47.2
27-28	0.001944	96,413	187	96,320	4,460,810	46.3
28-29	0.001985	96,226	191	96,131	4,364,490	45.4
29-30	0.002058	96,035	198	95,936	4,268,360	44.4
30-31	0.002148	95,837	206	95,734	4,172,424	43.5
31-32	0.002238	95,632	214	95,525	4,076,689	42.6
32-33	0.002357	95,417	225	95,305	3,981,165	41.7
33-34	0.002407	95,193	229	95,078	3,885,860	40.8
34-35	0.002480	94,963	235	94,846	3,790,782	39.9
35-36	0.002562	94,728	243	94,607	3,695,936	39.0
36-37	0.002669	94,485	252	94,359	3,601,329	38.1
37-38	0.002803	94,233	264	94,101	3,506,970	37.2
38-39	0.002973	93,969	279	93,829	3,412,869	36.3
39-40	0.003181	93,690	298	93,541	3,319,040	35.4
40-41	0.003424	93,392	320	93,232	3,225,500	34.5
41-42	0.003697	93,072	344	92,900	3,132,268	33.7
42-43	0.003999	92,728	371	92,542	3,039,368	32.8
43-44	0.004320	92,357	399	92,157	2,946,826	31.9
44-45	0.004663	91,958	429	91,744	2,854,669	31.0
45-46	0.005003	91,529	458	91,300	2,762,925	30.2
46-47	0.005386	91,071	491	90,826	2,671,625	29.3
47-48	0.005889	90,581	533	90,314	2,580,799	28.5
48-49	0.006562	90,047	591	89,752	2,490,485	27.7
49-50	0.007385	89,456	661	89,126	2,400,733	26.8
50-51	0.008285	88,796	736	88,428	2,311,607	26.0
51-52	0.009206	88,060	811	87,655	2,223,180	25.2
52-53	0.010178	87,249	888	86,805	2,135,525	24.5
53-54	0.011190	86,361	966	85,878	2,048,720	23.7
54-55	0.012246	85,395	1,046	84,872	1,962,842	23.0
55-56	0.013415	84,349	1,132	83,783	1,877,970	22.3
56-57	0.014662	83,217	1,220	82,607	1,794,187	21.6
57-58	0.015863	81,997	1,301	81,347	1,711,579	20.9
58-59	0.016945	80,697	1,367	80,013	1,630,232	20.2
59-60	0.017946	79,329	1,424	78,617	1,550,219	19.5
60-61	0.018972	77,906	1,478	77,167	1,471,602	18.9
61-62	0.020124	76,428	1,538	75,658	1,394,435	18.2

See footnote at end of table.

Table 8. Life table for black males: United States, 2009—Con.Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/NVSR/62_07/Table08.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	0.021411	74,889	1,603	74,088	1,318,777	17.6
63–64	0.022884	73,286	1,677	72,447	1,244,689	17.0
64–65	0.024543	71,609	1,757	70,730	1,172,242	16.4
65–66	0.026407	69,851	1,845	68,929	1,101,511	15.8
66–67	0.028381	68,007	1,930	67,042	1,032,582	15.2
67–68	0.030276	66,077	2,001	65,077	965,540	14.6
68–69	0.032061	64,076	2,054	63,049	900,464	14.1
69–70	0.033752	62,022	2,093	60,975	837,415	13.5
70–71	0.035243	59,929	2,112	58,872	776,440	13.0
71–72	0.036906	57,816	2,134	56,750	717,567	12.4
72–73	0.038865	55,683	2,164	54,601	660,818	11.9
73–74	0.041476	53,519	2,220	52,409	606,217	11.3
74–75	0.044510	51,299	2,283	50,157	553,808	10.8
75–76	0.047901	49,016	2,348	47,842	503,651	10.3
76–77	0.051942	46,668	2,424	45,456	455,809	9.8
77–78	0.055729	44,244	2,466	43,011	410,354	9.3
78–79	0.060349	41,778	2,521	40,517	367,343	8.8
79–80	0.066008	39,257	2,591	37,961	326,826	8.3
80–81	0.070883	36,665	2,599	35,366	288,865	7.9
81–82	0.076436	34,066	2,604	32,765	253,499	7.4
82–83	0.084314	31,463	2,653	30,136	220,734	7.0
83–84	0.092714	28,810	2,671	27,474	190,598	6.6
84–85	0.100815	26,139	2,635	24,821	163,124	6.2
85–86	0.109489	23,504	2,573	22,217	138,302	5.9
86–87	0.118753	20,930	2,486	19,687	116,085	5.5
87–88	0.128620	18,445	2,372	17,259	96,398	5.2
88–89	0.139098	16,072	2,236	14,955	79,139	4.9
89–90	0.150192	13,837	2,078	12,798	64,185	4.6
90–91	0.161899	11,759	1,904	10,807	51,387	4.4
91–92	0.174211	9,855	1,717	8,996	40,581	4.1
92–93	0.187111	8,138	1,523	7,377	31,584	3.9
93–94	0.200579	6,615	1,327	5,952	24,207	3.7
94–95	0.214581	5,288	1,135	4,721	18,256	3.5
95–96	0.229081	4,154	952	3,678	13,535	3.3
96–97	0.244032	3,202	781	2,811	9,857	3.1
97–98	0.259380	2,421	628	2,107	7,045	2.9
98–99	0.275065	1,793	493	1,546	4,938	2.8
99–100	0.291021	1,300	378	1,111	3,392	2.6
100 and over	1.000000	921	921	2,282	2,282	2.5

SOURCE: CDC/NCHS, National Vital Statistics System.

Table 9. Life table for black females: United States, 2009Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/NVSR/62_07/Table09.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	0.011121	100,000	1,112	99,030	7,761,433	77.6
1-2	0.000605	98,888	60	98,858	7,662,403	77.5
2-3	0.000350	98,828	35	98,811	7,563,545	76.5
3-4	0.000284	98,794	28	98,780	7,464,734	75.6
4-5	0.000239	98,766	24	98,754	7,365,955	74.6
5-6	0.000201	98,742	20	98,732	7,267,201	73.6
6-7	0.000172	98,722	17	98,714	7,168,469	72.6
7-8	0.000152	98,705	15	98,698	7,069,756	71.6
8-9	0.000141	98,690	14	98,683	6,971,058	70.6
9-10	0.000137	98,676	14	98,669	6,872,375	69.6
10-11	0.000141	98,663	14	98,656	6,773,705	68.7
11-12	0.000154	98,649	15	98,641	6,675,050	67.7
12-13	0.000176	98,633	17	98,625	6,576,409	66.7
13-14	0.000205	98,616	20	98,606	6,477,784	65.7
14-15	0.000238	98,596	23	98,584	6,379,178	64.7
15-16	0.000273	98,572	27	98,559	6,280,594	63.7
16-17	0.000310	98,546	31	98,530	6,182,035	62.7
17-18	0.000350	98,515	34	98,498	6,083,504	61.8
18-19	0.000396	98,481	39	98,461	5,985,007	60.8
19-20	0.000448	98,442	44	98,420	5,886,545	59.8
20-21	0.000507	98,398	50	98,373	5,788,126	58.8
21-22	0.000569	98,348	56	98,320	5,689,753	57.9
22-23	0.000625	98,292	61	98,261	5,591,434	56.9
23-24	0.000671	98,230	66	98,197	5,493,172	55.9
24-25	0.000708	98,164	69	98,130	5,394,975	55.0
25-26	0.000746	98,095	73	98,058	5,296,845	54.0
26-27	0.000788	98,022	77	97,983	5,198,787	53.0
27-28	0.000831	97,944	81	97,904	5,100,804	52.1
28-29	0.000876	97,863	86	97,820	5,002,900	51.1
29-30	0.000924	97,777	90	97,732	4,905,080	50.2
30-31	0.000982	97,687	96	97,639	4,807,348	49.2
31-32	0.001049	97,591	102	97,540	4,709,709	48.3
32-33	0.001130	97,489	110	97,434	4,612,169	47.3
33-34	0.001203	97,379	117	97,320	4,514,735	46.4
34-35	0.001288	97,261	125	97,199	4,417,415	45.4
35-36	0.001383	97,136	134	97,069	4,320,217	44.5
36-37	0.001493	97,002	145	96,929	4,223,148	43.5
37-38	0.001617	96,857	157	96,779	4,126,218	42.6
38-39	0.001762	96,700	170	96,615	4,029,440	41.7
39-40	0.001930	96,530	186	96,437	3,932,824	40.7
40-41	0.002113	96,344	204	96,242	3,836,388	39.8
41-42	0.002316	96,140	223	96,029	3,740,146	38.9
42-43	0.002557	95,917	245	95,795	3,644,117	38.0
43-44	0.002833	95,672	271	95,537	3,548,322	37.1
44-45	0.003130	95,401	299	95,252	3,452,785	36.2
45-46	0.003425	95,103	326	94,940	3,357,533	35.3
46-47	0.003724	94,777	353	94,600	3,262,594	34.4
47-48	0.004054	94,424	383	94,232	3,167,993	33.6
48-49	0.004434	94,041	417	93,833	3,073,761	32.7
49-50	0.004862	93,624	455	93,396	2,979,928	31.8
50-51	0.005327	93,169	496	92,921	2,886,532	31.0
51-52	0.005802	92,673	538	92,404	2,793,611	30.1
52-53	0.006267	92,135	577	91,846	2,701,207	29.3
53-54	0.006704	91,558	614	91,251	2,609,361	28.5
54-55	0.007129	90,944	648	90,620	2,518,111	27.7
55-56	0.007575	90,295	684	89,953	2,427,491	26.9
56-57	0.008068	89,611	723	89,250	2,337,538	26.1
57-58	0.008599	88,888	764	88,506	2,248,288	25.3
58-59	0.009181	88,124	809	87,720	2,159,782	24.5
59-60	0.009823	87,315	858	86,886	2,072,062	23.7
60-61	0.010538	86,457	911	86,002	1,985,176	23.0
61-62	0.011327	85,546	969	85,062	1,899,174	22.2

See footnote at end of table.

Table 9. Life table for black females: United States, 2009—Con.Spreadsheet version available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/NVSR/62_07/Table09.xls.

	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
Age (years)	q_x	l_x	d_x	L_x	T_x	e_x
62–63	0.012174	84,577	1,030	84,062	1,814,112	21.4
63–64	0.013067	83,548	1,092	83,002	1,730,050	20.7
64–65	0.014017	82,456	1,156	81,878	1,647,048	20.0
65–66	0.015069	81,300	1,225	80,688	1,565,170	19.3
66–67	0.016236	80,075	1,300	79,425	1,484,482	18.5
67–68	0.017515	78,775	1,380	78,085	1,405,057	17.8
68–69	0.018823	77,395	1,457	76,667	1,326,972	17.1
69–70	0.020120	75,938	1,528	75,174	1,250,305	16.5
70–71	0.021622	74,411	1,609	73,606	1,175,131	15.8
71–72	0.023318	72,802	1,698	71,953	1,101,525	15.1
72–73	0.024937	71,104	1,773	70,217	1,029,572	14.5
73–74	0.026793	69,331	1,858	68,402	959,354	13.8
74–75	0.029093	67,473	1,963	66,492	890,952	13.2
75–76	0.031623	65,510	2,072	64,474	824,461	12.6
76–77	0.033938	63,439	2,153	62,362	759,986	12.0
77–78	0.036595	61,286	2,243	60,164	697,624	11.4
78–79	0.040217	59,043	2,375	57,856	637,460	10.8
79–80	0.044497	56,668	2,522	55,408	579,604	10.2
80–81	0.048781	54,147	2,641	52,826	524,196	9.7
81–82	0.053418	51,505	2,751	50,130	471,370	9.2
82–83	0.059455	48,754	2,899	47,305	421,240	8.6
83–84	0.065396	45,855	2,999	44,356	373,936	8.2
84–85	0.071252	42,857	3,054	41,330	329,580	7.7
85–86	0.078477	39,803	3,124	38,241	288,250	7.2
86–87	0.086078	36,679	3,157	35,101	250,008	6.8
87–88	0.094296	33,522	3,161	31,942	214,908	6.4
88–89	0.103159	30,361	3,132	28,795	182,966	6.0
89–90	0.112691	27,229	3,068	25,695	154,171	5.7
90–91	0.122912	24,161	2,970	22,676	128,476	5.3
91–92	0.133837	21,191	2,836	19,773	105,800	5.0
92–93	0.145472	18,355	2,670	17,020	86,027	4.7
93–94	0.157819	15,685	2,475	14,447	69,007	4.4
94–95	0.170871	13,209	2,257	12,081	54,560	4.1
95–96	0.184610	10,952	2,022	9,941	42,479	3.9
96–97	0.199011	8,930	1,777	8,042	32,538	3.6
97–98	0.214036	7,153	1,531	6,388	24,496	3.4
98–99	0.229639	5,622	1,291	4,977	18,109	3.2
99–100	0.245762	4,331	1,064	3,799	13,132	3.0
100 and over	1.000000	3,267	3,267	9,333	9,333	2.9

SOURCE: CDC/NCHS, National Vital Statistics System.