

Abridged Decennial Life Tables
By
Race and Gender:
Arkansas 2000



Gregory L. Hamilton, Ph.D.

**Demographic Research
Institute for Economic Advancement
University of Arkansas at Little Rock**

July 2003

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This report summarizes the major differences in the life expectancy found in the abridged decennial life tables by race and gender for persons living in Arkansas. Since both the method and data used to construct the abridged life tables for 2000 are consistent with Swanson and McGehee's (1992) 1970, 1980, and 1990 abridged life table for Arkansas, comparisons of life expectancy by gender and race are made over these periods. For an overview of the method and data used to construct the life tables, see the article by Hamilton (2003).

Life Expectancy in Arkansas

Table 1 summarizes differences in life expectancy by race and gender for a new born in 1970, 1980, 1990, and 2000. The italic numbers are the standard errors of the estimated life expectancy, and they measure the random mortality variation in life expectancy. The smaller the standard error the more certainty there is about the calculated life expectancy.

Table 1 Life Expectancy at Birth By Race and Gender, Arkansas 1970, 1980, 1990, 2000*						
Year	Black		Nonwhite		White	
	Female	Male	Female	Male	Female	Male
2000	74.23 <i>0.37</i>	66.03 <i>0.37</i>	75.13 <i>0.32</i>	68.84 <i>0.33</i>	79.75 <i>0.14</i>	73.16 <i>0.15</i>
1990	73.67 <i>0.39</i>	64.46 <i>0.41</i>	74.37 <i>0.38</i>	65.30 <i>0.40</i>	79.17 <i>0.15</i>	71.88 <i>0.15</i>
1980	73.12 <i>0.41</i>	64.88 <i>0.43</i>	73.64 <i>0.39</i>	65.6 <i>0.42</i>	78.79 <i>0.15</i>	70.40 <i>0.16</i>
1970	na <i>na</i>	na <i>na</i>	70.72 <i>0.45</i>	62.81 <i>0.46</i>	76.91 <i>0.17</i>	67.86 <i>0.18</i>
*The standard error of the life expectancy is given in italics.						
Source: Swanson D.A. and M. McGehee, Abridged Decennial Life Tables by Race and Gender Arkansas, 1970, 1980, and 1990. Institute for Economic Advancement, University of Arkansas at Little Rock, Publication 92-17, December 1992.						

Females have higher life expectancy than males regardless of race at all four points in time. White females continued to have the highest life expectancy in 2000 as they did in 1970, 1980, and 1990. Nonwhite females have a greater of life expectancy than black females at all point in time.

Among the male gender, white males have the greatest life expectancy at all points in time. Nonwhite male life expectancy exceeded black male life expectancy during these periods.

Provided in the Appendix are the life tables corresponding to each of the race and gender combinations found in Table 1 for 2000.

Changes in Life Expectancy by Gender and Race

Table 1 shows increasing life expectancy by race and gender groups between 1990 and 2000. With the exception of black males during the 1980-1990 period, this increasing longevity by race and gender is a continuation of the similar trends in 1970-1980 and 1980-1990 periods. During the 1990-2000 period, nonwhite males experienced the largest increase in life expectancy (3.54 years), followed by black males (1.57 years), and then white males (1.28 years).

Differences in life expectancies between females and males continued to narrow during 1990-2000. For black males and black females, the life expectancy gap narrowed by 1.01 years. The nonwhite gender life expectancy gap narrowed by 2.78 years between 1999 and 2000. For whites, the gap declined by 0.7 years.

Life Expectancy Comparisons

The number of years a newborn lives can be regarded as a random variable having a mean equal to the life expectancy of a newborn and the random variation in the number of years lived, measured by a standard error of life expectancy. Because of this random variation in life expectancy, direct comparisons of life expectancy by race or gender are inappropriate. Comparisons of life expectancies need to be subject to statistical tests of inference. When two life expectancies are found to be statistically different, the calculated life expectancy values should be viewed as probably different; otherwise, the value should be viewed as probably equal. The details of a statistical test of inference are available in Chiang (1984).

Table 2 compares the life expectancy of newborns by race and gender for 2000 found in Table 1. Each cell of this table corresponds to a particular gender race combination and the results from a Z-test designed to test for significant differences in life expectancies are shown. There is a statistical difference in the life expectancy of newborn black female (74.2 years) and black males (66.0years) in 2000. Examination of Table 2 indicates that all race and gender life expectancy combinations differ statistically except between black females and nonwhite females in 2000.

Table 3 compares the life expectancy of newborns between 1990 and 2000 by race and gender. The columns in this table are the gender and race groups for 2000, and the rows are the gender and race groups for 1990. Each cell of the table corresponds to a particular comparison of life expectancies by gender and race between 1990 and 2000

Table 2						
Results of a 1-tailed Z-Test for Differences in Life Expectancies by Race and Gender: 2000 to 2000 Comparisons						
Level of significance at set at 1%		Life Expectancy 2000				
		Black Female	Black Male	Nonwhite Female	Nonwhite Male	White Female
Life Expectancy 2000	Black Male	Statistically Different				
	Nonwhite Female	No Difference	Statistically Different			
	Nonwhite Male	Statistically Different	Statistically Different	Statistically Different		
	White Female	Statistically Different	Statistically Different	Statistically Different	Statistically Different	
	White Male	Statistically Different	Statistically Different	Statistically Different	Statistically Different	Statistically Different

Table 3							
Results of a 1-tailed Z-Test for Differences in Life Expectancies by Race and Gender: 1990 to 2000 Comparisons							
Level of significance at set at 1%		Life Expectancy 2000					
		Black Female	Black Male	Nonwhite Female	Nonwhite Male	White Female	White Male
Life Expectancy 1990	Black Female	No Difference	Statistically Different	No Difference	Statistically Different	Statistically Different	Statistically Different
	Black Male	Statistically Different	Statistically Different	Statistically Different	No Difference	Statistically Different	Statistically Different
	Nonwhite Female	Statistically Different	Statistically Different	No Difference	Statistically Different	Statistically Different	Statistically Different
	Nonwhite Male	Statistically Different	Statistically Different	Statistically Different	Statistically Different	Statistically Different	Statistically Different
	White Female	Statistically Different	Statistically Different	Statistically Different	Statistically Different	Statistically Different	Statistically Different
	White Male	No Difference	Statistically Different	Statistically Different	Statistically Different	Statistically Different	Statistically Different

period, and the cell indicates the results from a Z-test designed to test for significant differences in life expectancies. The diagonal cells in this table show the results from comparisons in life expectancies between the same gender and race group. For black females and nonwhite females, there are no differences in life expectancies between 1990

and 2000. For all males, white, nonwhite, and black, life expectancies have increased over the 1990 to 2000 period. This is also true for white females over this period. The off-diagonal cells show the statistical findings from comparisons of different life expectancies by all possible race and gender combinations over this period. As indicated by these findings, race and gender differences are major factors in explaining differences in life expectancies.

Life Expectancies of the Older Population

The life expectancy for persons reaching their 65th and 85th birthdays are shown in Table 4 for 1990 and 2000. For persons reaching age 85, their life expectancy improved over the 1990 to 2000 period. However, the change in life expectancy of people reaching age 65 was mixed. For black females, black males, and nonwhite males reaching their 65th birthday, life expectancy declined in 2000. Swason and McChee (1992) cite two factors that can account for this change. One factor is age misreporting and other data errors for these gender race groups. A second factor may be a “cross-over” effect. This effect maintains that in disadvantaged populations the vulnerable die at an early ages and the strong survive to older age. When living conditions improve, both the vulnerable and strong live to older age where they become more susceptible to illness and injuries.

Table 4				
Life Expectancy at age 65 and 85 1990 and 2000				
(Average numbers of years remaining)				
Race/Gender	1990		2000	
	65	85	65	85
Black Female	17.9	7.6	17.2	7.8
Black Male	13.5	5.2	12.7	5.3
Nonwhite Female	18.2	8	17.1	6.3
Nonwhite Male	13.7	5.3	13.9	5.7
White Female	19.4	7	19.6	7.6
White Male	15.1	5.5	15.6	5.6

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APPENDIX

Abridged Life Tables By Race and Gender

Life Table for Arkansas: 2000							
Geography: State Total, Race: White, Gender: Male							
Age Group	n_m_x	n_q_x	l_x	n_d_x	nL_x	T_x	e_x
<1	0.0090	0.0083	100,000	826	99,275	7,316,348	73.2
1 to 4	0.0005	0.0021	99,174	205	396,313	7,217,073	72.8
5 to 9	0.0003	0.0015	98,969	153	494,493	6,820,760	68.9
10 to 14	0.0004	0.0019	98,816	190	493,641	6,326,267	64
15 to 19	0.0013	0.0066	98,625	648	491,634	5,832,626	59.1
20 to 24	0.0016	0.0079	97,977	774	488,102	5,340,992	54.5
25 to 29	0.0016	0.0081	97,203	784	484,208	4,852,890	49.9
30 to 34	0.0021	0.0102	96,419	985	479,823	4,368,682	45.3
35 to 39	0.0023	0.0115	95,434	1,102	474,627	3,888,858	40.7
40 to 44	0.0030	0.0151	94,332	1,423	468,374	3,414,231	36.2
45 to 49	0.0043	0.0212	92,909	1,966	459,999	2,945,857	31.7
50 to 54	0.0059	0.0293	90,942	2,662	448,551	2,485,858	27.3
55 to 59	0.0099	0.0486	88,280	4,288	431,442	2,037,307	23.1
60 to 64	0.0173	0.0832	83,992	6,990	403,618	1,605,866	19.1
65 to 69	0.0272	0.1278	77,002	9,841	361,799	1,202,248	15.6
70 to 74	0.0416	0.1893	67,161	12,716	305,430	840,449	12.5
75 to 79	0.0606	0.2642	54,445	14,386	237,291	535,019	9.8
80 to 84	0.0965	0.3885	40,059	15,564	161,337	297,729	7.4
85+	0.1796	1.0000	24,495	24,495	136,391	136,391	5.6

Life Table for Arkansas: 2000							
Geography: State Total, Race: Black, Gender: Male							
Age Group	n_m_x	n_q_x	l_x	n_d_x	nL_x	T_x	e_x
<1	0.0173	0.0154	100,000	1,540	98,646	6,603,392	66.0
1 to 4	0.0008	0.0031	98,460	309	393,262	6,504,746	66.1
5 to 9	0.0004	0.0018	98,151	172	490,359	6,111,484	62.3
10 to 14	0.0006	0.0029	97,979	281	489,245	5,621,125	57.4
15 to 19	0.0019	0.0094	97,697	915	486,377	5,131,880	52.5
20 to 24	0.0030	0.0150	96,782	1,452	480,560	4,645,503	48.0
25 to 29	0.0035	0.0175	95,330	1,667	472,803	4,164,943	43.7
30 to 34	0.0042	0.0210	93,664	1,964	463,780	3,692,140	39.4
35 to 39	0.0045	0.0224	91,700	2,054	453,752	3,228,360	35.2
40 to 44	0.0061	0.0300	89,646	2,690	442,003	2,774,609	31.0
45 to 49	0.0078	0.0383	86,956	3,331	427,055	2,332,606	26.8
50 to 54	0.0108	0.0526	83,624	4,401	407,893	1,905,551	22.8
55 to 59	0.0195	0.0931	79,224	7,372	378,850	1,497,658	18.9
60 to 64	0.0309	0.1440	71,852	10,347	334,775	1,118,808	15.6
65 to 69	0.0431	0.1955	61,505	12,023	278,768	784,034	12.7
70 to 74	0.0646	0.2790	49,482	13,807	213,769	505,266	10.2
75 to 79	0.0884	0.3624	35,676	12,928	146,236	291,497	8.2
80 to 84	0.1333	0.4959	22,748	11,281	84,636	145,261	6.4
85+	0.1891	1.0000	11,467	11,467	60,624	60,624	5.3

Life Table for Arkansas: 2000							
Geography: State Total, Race: Nonwhite, Gender: Male							
Age Group	$n m_x$	$n q_x$	l_x	$n d_x$	$n L_x$	T_x	e_x
<1	0.0127	0.0138	100,000	1,384	98,786	6,883,918	68.8
1 to 4	0.0006	0.0024	98,616	235	394,022	6,785,132	68.8
5 to 9	0.0003	0.0014	98,381	140	491,582	6,391,110	65.0
10 to 14	0.0005	0.0024	98,241	234	490,664	5,899,528	60.1
15 to 19	0.0015	0.0075	98,006	736	488,337	5,408,864	55.2
20 to 24	0.0022	0.0112	97,271	1,087	483,846	4,920,528	50.6
25 to 29	0.0025	0.0127	96,184	1,218	478,108	4,436,681	46.1
30 to 34	0.0031	0.0155	94,966	1,473	471,429	3,958,573	41.7
35 to 39	0.0036	0.0176	93,493	1,650	463,654	3,487,144	37.3
40 to 44	0.0049	0.0240	91,843	2,208	454,109	3,023,490	32.9
45 to 49	0.0064	0.0316	89,635	2,834	441,613	2,569,381	28.7
50 to 54	0.0087	0.0426	86,801	3,695	425,432	2,127,768	24.5
55 to 59	0.0156	0.0755	83,106	6,273	400,883	1,702,336	20.5
60 to 64	0.0254	0.1199	76,833	9,209	362,475	1,301,453	16.9
65 to 69	0.0361	0.1663	67,623	11,249	311,375	938,977	13.9
70 to 74	0.0552	0.2436	56,375	13,735	248,673	627,602	11.1
75 to 79	0.0772	0.3244	42,639	13,834	179,123	378,930	8.9
80 to 84	0.1193	0.4572	28,805	13,170	110,436	199,806	6.9
85+	0.1750	1.0000	15,636	15,636	89,370	89,370	5.7

Life Table for Arkansas: 2000							
Geography: State Total, Race: White, Gender: Female							
Age Group	$n m_x$	$n q_x$	l_x	$n d_x$	$n L_x$	T_x	e_x
<1	0.0071	0.0064	100,000	639	99,438	7,974,847	79.7
1 to 4	0.0004	0.0016	99,361	158	397,148	7,875,408	79.3
5 to 9	0.0002	0.0010	99,203	102	495,780	7,478,261	75.4
10 to 14	0.0002	0.0012	99,101	118	495,232	6,982,481	70.5
15 to 19	0.0006	0.0030	98,982	300	494,221	6,487,249	65.5
20 to 24	0.0006	0.0031	98,683	306	492,707	5,993,028	60.7
25 to 29	0.0007	0.0034	98,376	338	491,104	5,500,320	55.9
30 to 34	0.0010	0.0048	98,039	473	489,103	5,009,216	51.1
35 to 39	0.0012	0.0059	97,565	575	486,503	4,520,113	46.3
40 to 44	0.0016	0.0080	96,991	772	483,173	4,033,610	41.6
45 to 49	0.0024	0.0120	96,219	1,151	478,437	3,550,437	36.9
50 to 54	0.0035	0.0173	95,068	1,643	471,544	3,071,999	32.3
55 to 59	0.0057	0.0281	93,425	2,622	461,056	2,600,455	27.8
60 to 64	0.0096	0.0467	90,803	4,245	444,156	2,139,399	23.6
65 to 69	0.0159	0.0765	86,558	6,624	417,321	1,695,243	19.6
70 to 74	0.0246	0.1164	79,934	9,303	377,777	1,277,922	16.0
75 to 79	0.0373	0.1711	70,631	12,086	324,395	900,145	12.7
80 to 84	0.0630	0.2732	58,545	15,997	253,800	575,750	9.8
85+	0.1322	1.0000	42,549	42,549	321,950	321,950	7.6

Life Table for Arkansas: 2000							
Geography: State Total, Race: Black, Gender: Female							
Age Group	$n m_x$	$n q_x$	l_x	$n d_x$	$n L_x$	T_x	e_x
<1	0.0145	0.0134	100,000	1,341	98,826	7,423,329	74.2
1 to 4	0.0007	0.0028	98,659	276	394,119	7,324,503	74.2
5 to 9	0.0003	0.0015	98,383	144	491,585	6,930,384	70.4
10 to 14	0.0003	0.0015	98,240	144	490,867	6,438,799	65.5
15 to 19	0.0005	0.0027	98,096	260	489,880	5,947,932	60.6
20 to 24	0.0010	0.0048	97,836	474	488,085	5,458,052	55.8
25 to 29	0.0014	0.0069	97,361	674	485,252	4,969,967	51.0
30 to 34	0.0018	0.0091	96,687	876	481,416	4,484,715	46.4
35 to 39	0.0023	0.0116	95,811	1,112	476,493	4,003,298	41.8
40 to 44	0.0032	0.0160	94,700	1,512	470,009	3,526,806	37.2
45 to 49	0.0043	0.0215	93,188	2,005	461,307	3,056,797	32.8
50 to 54	0.0063	0.0312	91,183	2,844	449,331	2,595,490	28.5
55 to 59	0.0111	0.0542	88,339	4,785	430,568	2,146,159	24.3
60 to 64	0.0180	0.0862	83,554	7,204	400,915	1,715,591	20.5
65 to 69	0.0279	0.1308	76,350	9,985	358,183	1,314,676	17.2
70 to 74	0.0357	0.1646	66,365	10,925	305,862	956,493	14.4
75 to 79	0.0521	0.2313	55,440	12,822	246,294	650,631	11.7
80 to 84	0.0761	0.3204	42,619	13,653	179,499	404,337	9.5
85+	0.1288	1.0000	28,966	28,966	224,838	224,838	7.8

Life Table for Arkansas: 2000							
Geography: State Total, Race: Nonwhite, Gender: Female							
Age Group	$n m_x$	$n q_x$	l_x	$n d_x$	$n L_x$	T_x	e_x
<1	0.0099	0.0112	100,000	1,125	99,023	7,513,355	75.1
1 to 4	0.0004	0.0017	98,875	169	395,183	7,414,332	75.0
5 to 9	0.0002	0.0012	98,706	114	493,266	7,019,148	71.1
10 to 14	0.0002	0.0012	98,591	120	492,681	6,525,882	66.2
15 to 19	0.0005	0.0026	98,472	251	491,779	6,033,201	61.3
20 to 24	0.0007	0.0037	98,220	365	490,260	5,541,422	56.4
25 to 29	0.0010	0.0048	97,855	469	488,193	5,051,162	51.6
30 to 34	0.0014	0.0070	97,386	686	485,347	4,562,969	46.9
35 to 39	0.0021	0.0106	96,700	1,027	481,131	4,077,622	42.2
40 to 44	0.0030	0.0150	95,673	1,438	475,045	3,596,491	37.6
45 to 49	0.0042	0.0209	94,235	1,973	466,616	3,121,446	33.1
50 to 54	0.0060	0.0297	92,262	2,745	454,959	2,654,830	28.8
55 to 59	0.0103	0.0503	89,518	4,502	437,128	2,199,871	24.6
60 to 64	0.0149	0.0718	85,016	6,102	410,842	1,762,743	20.7
65 to 69	0.0230	0.1090	78,914	8,601	374,357	1,351,901	17.1
70 to 74	0.0334	0.1548	70,313	10,886	325,746	977,544	13.9
75 to 79	0.0513	0.2284	59,427	13,570	264,442	651,799	11.0
80 to 84	0.0767	0.3225	45,856	14,790	192,871	387,356	8.4
85+	0.1597	1.0000	31,066	31,066	194,485	194,485	6.3

Life table definitions and functions include:

x to $x + n$: the period of life between two exact ages.

${}_n m_x$: the age-specific death rate.

${}_n q_x$: the proportion of persons in the cohort alive at the beginning of the age interval (x) and dying before reaching the end of the age interval ($x + n$).

l_x : the number of persons living at the beginning of the indicated age interval (x) out of a beginning cohort of 100,000 live births.

${}_n d_x$: the number of deaths between the age x and $x + n$, out of the number of persons alive at the beginning of that age interval.

${}_n L_x$: the number of person-years that would be lived within the age interval (x to $x + n$) by an assumed cohort of 100,000 births.

T_x : the total of person-years that would be lived after the beginning of the indicated age interval (x) by the cohort of 100,000 births.

e_x : the expectation of remaining life time (in years) that a person who survives to the beginning of the indicated age interval.

