

KSDC

Kentucky State Data Center

**Kentucky
County
Population
Projections**

**Methodology
Assumptions**

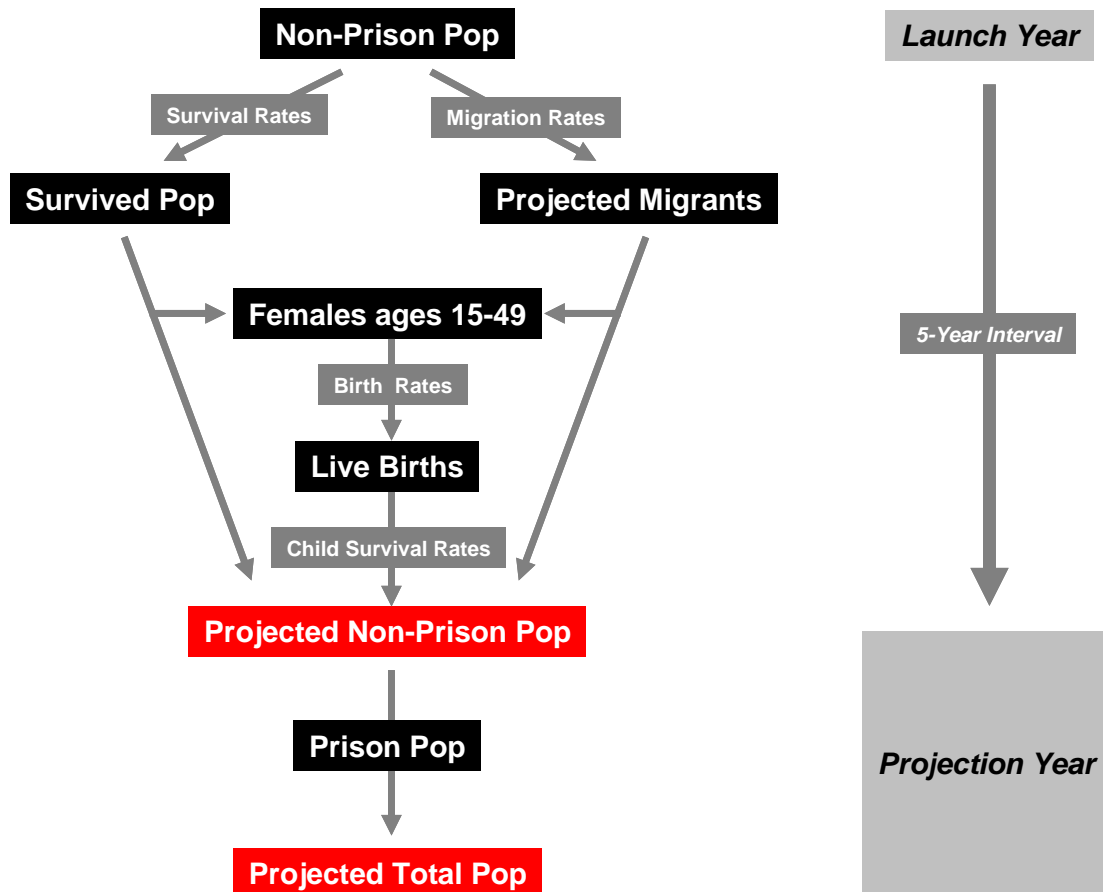
**Kentucky State Data Center
University of Louisville**

August, 2009

This report was produced by Michael Price and Thomas Sawyer of the Kentucky State Data Center at the University of Louisville. Sarah Walsh of KSDC provided the county thematic maps. Special thanks to Martye Scobee, now retired, for her major contributions to the KSDC projection model.

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Kentucky County Population Projection Model



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Overview

KSDC provides projections of the total population by age and sex and components of change—live births, deaths, and net migration—for all 120 Kentucky counties. In addition, in the 17 counties where major prisons are located, projections of the non-prison population are provided. Prison inmates are defined as residents of the county where the prison is located, and they are included in the total population projections. The non-prison population includes persons living in households and those residing in non-prison group quarters—for examples, college dormitories, military barracks, and nursing homes.

A demographic cohort-component model is used to project the non-prison populations. Based on historical data-driven assumptions, population growth is forecast from estimates of future mortality (deaths and survivorship), fertility (live births), and migration. Age-sex cohorts are projected for 5-year intervals starting in 2005 and ending in 2050. Knowledge of future developments which will impact local population growth—for example, military and civilian employment growth at Fort Knox—is considered in developing the migration assumptions. Projections of the state and Area Development District populations are obtained by summing the county population projections.

The prison population is housed in 18 facilities—federal, state, and private—located in 17 counties and 10 Area Development Districts. An inmate census of these facilities was recently obtained from telephone interviews and updated information posted on facility websites. No attempt is made to project the future size of the prison population beyond this recent canvassing.

Launch Year Populations

County total population estimates for the launch year of 2005 were obtained from the U.S. Census Bureau estimate series released March, 2009. Prison populations were removed to derive the non-prison populations. Age-sex composition was produced by KSDC

from Kentucky official birth and death records and migration estimates. These estimates of net migration were derived from residual calculations, Census Bureau estimates, 2000 Census data, and more recent data from the American Community Survey. Age detail is provided in 5-year age groups through 85 years and above.

Mortality Assumptions

Death rates and life expectancy vary significantly across the Commonwealth. During the initial projection interval (2005-2010), the average years of life expected from birth will range across counties from 77.9 years to 81.6 years for females and from 71.3 years to 74.7 years for males. Although life expectancy is projected to improve in all counties, the majority of counties will remain below the national average in years expected to live from birth.

Counties were divided into four groups based on their level of mortality shown in Table 1 and map. The sequence of improvement in life expectancy and survival rates in 5-year intervals is presented in Table 2. Each mortality group of counties begins the sequence at a different stage. Fifty-two counties in the high mortality group have the lowest initial life expectancy and begin the sequence at stage 2. Launching at stage 3, 54 counties comprise a high to moderate mortality group. Ten counties have moderate mortality and launch at stage 4. With low mortality among Kentucky counties, Boone, Hardin, Marshall, and Oldham launch at stage 6. Life expectancy in these four counties was comparable to average life expectancy in the U.S. (Arias et al, 2008).

Mortality assumptions were derived from analysis of 17 years of Kentucky official death records (1990-2006) and national life tables (Heron et al, 2009; Arias et al, 2008; Arias, 2002). Projected improvement in life expectancy and survival rates for Kentucky counties are consistent with the mortality assumptions of the most recent national population projections (U.S. Census Bureau, 2004).

Table 1. Kentucky Counties by Level of Mortality

High Mortality		High/Moderate Mortality		Moderate Mortality	Low Mortality
Ballard	Lawrence	Adair	Laurel	Anderson	Boone
Bath	Lee	Allen	Livingston	Bullitt	Hardin
Bell	Leslie	Barren	Marion	Calloway	Marshall
Boyd	Letcher	Bourbon	McCracken	Daviess	Oldham
Bracken	Lewis	Boyle	Meade	Edmonson	
Breathitt	Lincoln	Breckinridge	Mercer	Fayette	
Butler	Logan	Campbell	Metcalfe	Green	
Caldwell	Magoffin	Carlisle	Morgan	Lyon	
Carroll	Martin	Clark	Muhlenberg	Madison	
Carter	Mason	Clinton	Nelson	Spencer	
Casey	McCreary	Elliott	Nicholas		
Christian	McLean	Franklin	Ohio		
Clay	Menifee	Gallatin	Owen		
Crittenden	Monroe	Garrard	Pulaski		
Cumberland	Montgomery	Grant	Robertson		
Estill	Owsley	Graves	Rowan		
Fleming	Pendleton	Grayson	Russell		
Floyd	Perry	Greenup	Scott		
Fulton	Pike	Hancock	Shelby		
Harlan	Powell	Henderson	Simpson		
Harrison	Rockcastle	Hickman	Taylor		
Hart	Todd	Hopkins	Trigg		
Henry	Union	Jefferson	Trimble		
Jackson	Webster	Jessamine	Warren		
Johnson	Whitley	Kenton	Washington		
Knox	Wolfe	Knott	Wayne		
		Larue	Woodford		

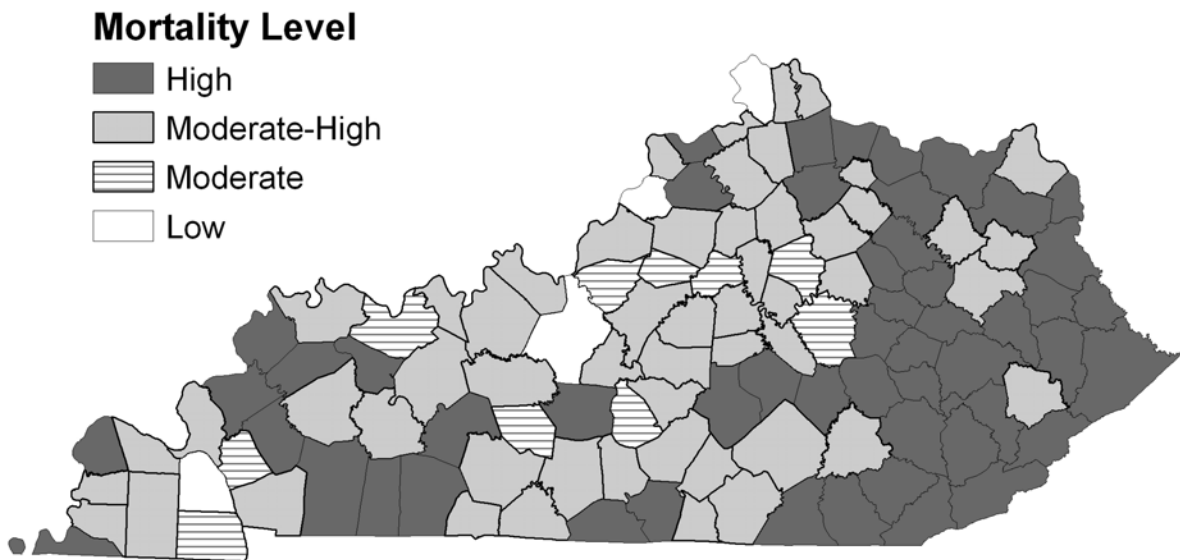


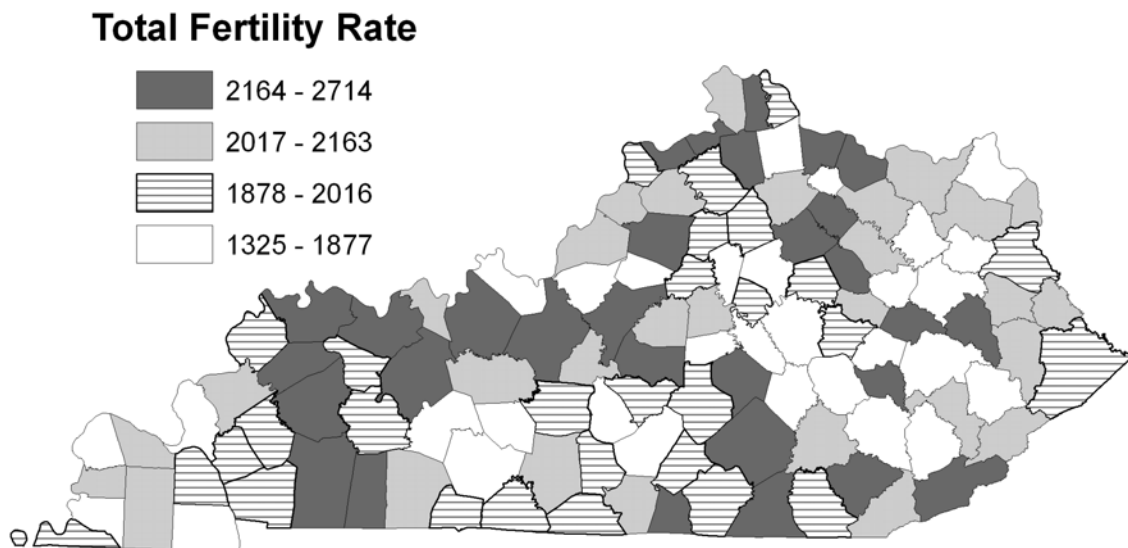
Table 2. Life Expectancy and Five-Year Survival Rates in Sequence of Five-Year Time Intervals

Females		1	2	3	4	5	6	7
Life expectancy from birth		76.9	77.9	78.9	79.9	80.8	81.6	82.3
Beginning Age	Ending Age	Number surviving per 1,000						
Live births*	0-4	993.0	993.4	993.8	994.2	994.6	994.9	995.3
0-4	5-9	997.3	997.5	997.8	998.1	998.3	998.6	998.9
5-9	10-14	999.0	999.2	999.4	999.6	999.8	999.9	999.9
10-14	15-19	998.0	998.5	999.0	999.5	999.9	999.9	999.9
15-19	20-24	996.7	997.3	998.0	998.6	999.3	999.9	999.9
20-24	25-29	996.6	997.4	998.2	998.9	999.7	999.9	999.9
25-29	30-34	995.0	996.6	998.3	999.0	999.5	999.9	999.9
30-34	35-39	992.9	995.3	997.6	999.0	999.5	999.9	999.9
35-39	40-44	991.1	993.2	995.4	997.0	999.0	999.9	999.9
40-44	45-49	987.7	989.1	990.5	991.9	993.3	994.8	996.2
45-49	50-54	982.0	983.5	985.1	986.6	988.2	989.7	991.3
50-54	55-59	970.4	973.0	975.7	978.3	980.9	983.6	986.2
55-59	60-64	952.5	957.0	961.4	965.8	970.2	974.6	979.0
60-64	65-69	926.0	932.0	937.9	943.8	949.7	955.6	961.5
65-69	70-74	890.1	897.0	903.9	910.8	917.7	924.5	931.4
70-74	75-79	843.1	850.4	857.7	865.1	872.4	879.7	887.1
75-79	80-84	759.9	765.3	770.7	776.1	781.5	786.9	792.3
80-84	85-89	633.4	637.3	641.1	644.9	648.7	652.5	656.3
85+	90+	379.5	381.4	385.2	389.1	392.9	396.7	400.5
Males		70.6	71.3	72.1	73.0	73.8	74.7	75.5
Beginning Age	Ending Age	Number surviving per 1,000						
Live births*	0-4	992.0	992.4	992.8	993.2	993.6	993.9	994.3
0-4	5-9	996.4	996.7	996.9	997.2	997.5	997.7	998.0
5-9	10-14	998.6	998.8	999.0	999.2	999.4	999.6	999.8
10-14	15-19	996.7	997.2	997.7	998.2	998.7	999.2	999.6
15-19	20-24	992.3	992.9	993.6	994.2	994.9	995.5	996.2
20-24	25-29	992.1	992.9	993.7	994.5	995.3	996.1	996.8
25-29	30-34	990.2	991.8	993.4	995.1	996.7	998.3	999.9
30-34	35-39	987.3	989.6	992.0	994.3	996.6	998.9	999.9
35-39	40-44	983.8	985.9	988.1	990.3	992.5	994.7	996.9
40-44	45-49	978.9	980.3	981.7	983.1	984.6	986.0	987.4
45-49	50-54	969.4	970.9	972.5	974.0	975.5	977.1	978.6
50-54	55-59	951.4	954.0	956.7	959.3	961.9	964.6	967.2
55-59	60-64	921.2	925.6	930.0	934.4	938.8	943.2	947.6
60-64	65-69	877.1	883.0	888.9	894.8	900.7	906.6	912.5
65-69	70-74	816.7	823.6	830.4	837.3	844.2	851.1	858.0
70-74	75-79	743.4	750.8	758.1	765.4	772.8	780.1	787.4
75-79	80-84	633.8	639.2	644.6	650.0	655.4	660.8	666.2
80-84	85-89	494.7	498.5	502.3	506.2	510.0	513.8	517.6
85+	90+	295.7	297.6	301.4	305.2	309.0	312.8	316.7

*Total live births during five years.

Fertility Assumptions

Fertility across the Commonwealth varies significantly based on regional differences in birth rates and in the size and age composition of the child-bearing population (females ages 15-49). Age-cohort fertility rates, shown in Table 3 ([click here](#)), depict for each county the number of live births to female age cohorts over a 5-year interval. These rates were derived from Kentucky official birth records, 1990-2006, and are used to predict county fertility throughout the forecast periods. The map below displays county-level total fertility rates—representing the total live births expected to 1,000 females throughout their *fertility years*.

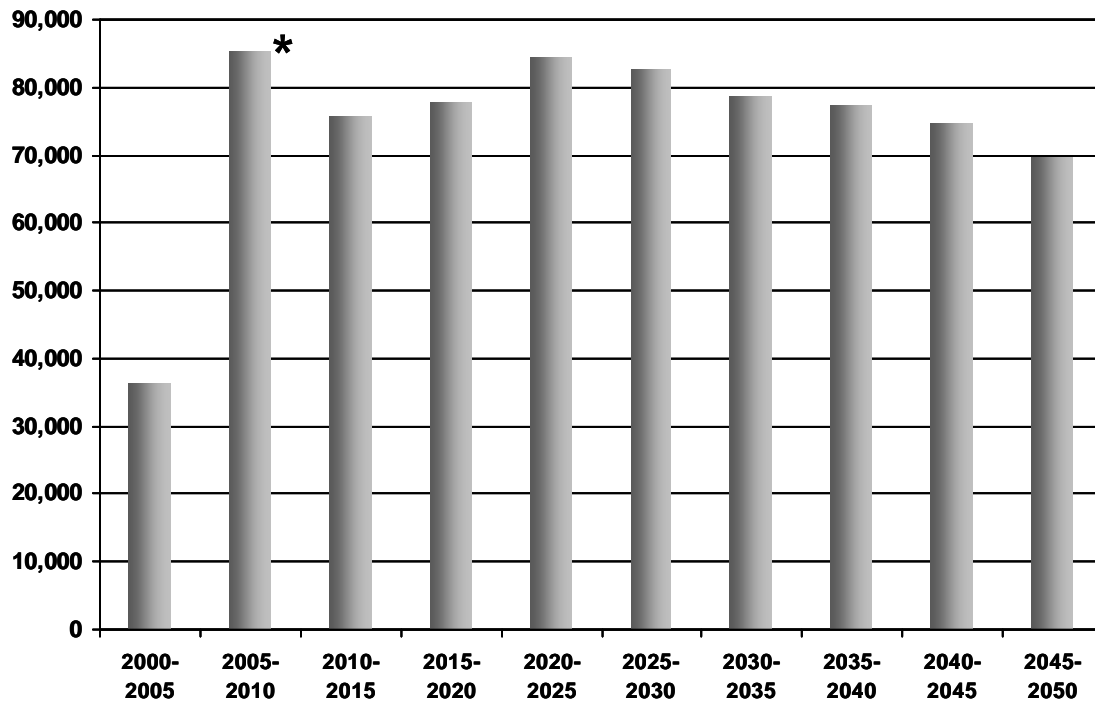


Migration Assumptions

Migration in Kentucky counties will vary by age and sex and how it impacts population growth. Projected rates of net migration by age and sex were derived from historical estimates over four periods—1990-1995, 1995-2000, 2000-2005, and 2005-2008. During the initial projection period (2005-2010), net migration is an extrapolation of the 2005-2008 estimate. In addition, Hardin and neighboring counties are expected to be significantly impacted by the projected

employment growth at Fort Knox (Workforce Associates, Inc. and Thomas P. Miller and Associates, 2007). Over the next three projection periods, net migration is derived from central tendencies from multiple historical periods. In general, the farther we project into the future, more historical data are considered. Following 2025, net migration rates are reduced by 0.5 percent (5 per 1,000) in each subsequent projection period. State net migration—the accumulation of county-specific migration patterns—is shown in the chart below. Table 4 ([click here](#)) presents state and county projected net migration by age.

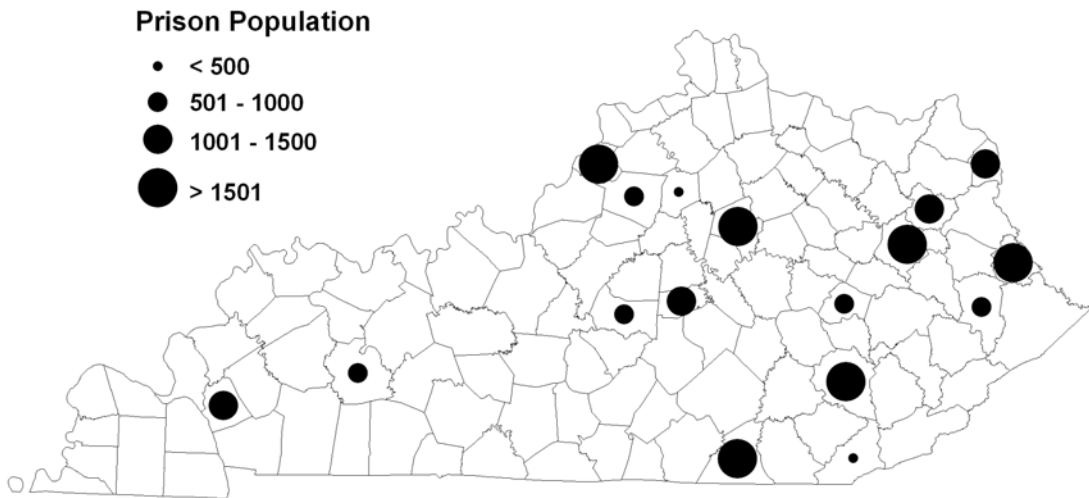
Kentucky Projected Net Migration



* Includes impact of major employment growth at Fort Knox.

Prison Population

A census of the state's inmate population residing the 18 federal and state institutions located in 17 counties was obtained by telephone, email, or information on institution websites in April, 2009. Age composition was base on 2000 Census group quarters data. Table 5 ([click here](#)) provides state and county prison populations by sex and age. The map below shows the size of county prison populations.



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