

## Cardiovascular Diseases

Cardiovascular diseases affect an estimated 79.4 million adults (1 in 3) in the United States, 47% of whom are estimated to be  $\geq 65$  years of age (Table 122).<sup>218</sup> The direct and indirect costs of cardiovascular diseases in 2007 were estimated at \$431.8 billion. In Missouri during 2005, hospital charges for heart disease and stroke were \$3 billion and \$500 million, respectively.<sup>219</sup> Also, in Missouri, the indirect costs due to lost productivity from premature deaths from heart disease and stroke were estimated at \$1.75 billion and \$252 million, respectively. Given various dynamics, eg, aging population, obesity epidemic, underuse of prevention strategies, and suboptimal control of risk factors, the future burden of cardiovascular diseases could be exacerbated.<sup>220 221</sup>

**Table 122 Prevalence estimates for cardiovascular diseases in Americans**

	White, non-Hispanic	Black, non-Hispanic	Hispanics	Native Americans	Asians	Native Hawaiians/Pacific Islanders
Heart disease	11.9%	9.6%	9.2%	11.6%	6.7%	13.8%
Coronary heart disease	6.6%	5.2%	6.0%	7.6%	4.2%	13.8%
Hypertension	21.2%	29.2%	19.6%	25.4%	16.9%	20.7%
Stroke	2.5%	3.2%	2.8%	5.1%	2.4%	8.1%

Of the different components of the rubric known as cardiovascular diseases, this report will address only heart disease in general, coronary heart disease, stroke, and hypertension. Blood pressure is a prevailing issue for these diseases. For example, low risk for coronary heart disease is defined as blood pressure <120/80 mm Hg, cholesterol <200 mg/dL and the absence of current smoking.<sup>222</sup> Persons with blood pressure <120/80 mm Hg have about half the lifetime risk of stroke as those with hypertension.<sup>223</sup>

<sup>218</sup> Rosamond W et al. Heart disease and stroke statistics-2007 update. *Circulation* 2007;115:e69-171.

<sup>219</sup> Missouri Department of Health and Senior Services.. The Burden of Heart Disease and Stroke in Missouri. 2008. [www.dhss.mo.gov/HeartandStroke/HeartStrokeBurdenReport2008.pdf](http://www.dhss.mo.gov/HeartandStroke/HeartStrokeBurdenReport2008.pdf)

<sup>220</sup> Mensah GA, Brown DW. An overview of cardiovascular disease burden in the United States *Health Aff* 2007;26:38-48.

<sup>221</sup> Abell JE et al. Differences in cardiovascular disease mortality associated with body mass between black and white persons. *Am J Public Health* 2008;98:63-66.

<sup>222</sup> Manolio TA et al. US trends in prevalence of low coronary risk: National Health and Nutrition Examination Surveys. *Circulation* 2004;109:32.

<sup>223</sup> Seshadri S et al. The lifetime risk of stroke estimates: from the Framingham study. *Stroke* 2006;37:345-350.

## Heart disease

Heart disease is typically thought of as coronary heart disease (syn: coronary artery disease), but this is just one type of cardiovascular disease. Other conditions can affect the structures or function of the heart such as abnormal heart rhythms or arrhythmias, heart failure, valve disease, congenital heart disease, heart muscle disease (cardiomyopathy), pericardial disease, aorta disease and Marfan syndrome, and vascular disease (blood vessel disease). People with coronary heart have significantly poorer health related quality of life compared to persons without coronary heart disease and women have a lower quality of life compared to men.<sup>224</sup>

## Prevalence

According to the National Health Interview Survey 2006, 10.9% of adults  $\geq 18$  years of age have some sort of heart disease, with 6.4% having coronary heart disease.<sup>225</sup> Males had a higher prevalence of both heart disease overall and coronary heart disease than females. Prevalence rates increased with age, were inversely associated with educational attainment, income and poverty status, and were highest in the Midwest and South regions of the country. The 2007 Missouri Behavioral Risk Factor Surveillance System (BRFSS) revealed that 4.7% of adults (6.0% of males; 3.6% of women) reported that a doctor had ever told them that they had had a heart attack.<sup>226</sup>

## Mortality

The long-term decreasing trends in death from heart disease and stroke continued in 2006, with heart disease remaining the number one cause of death for Americans.<sup>227</sup> Mortality has been declining since 1950, although a review of the trend in heart disease mortality clearly demonstrates the decline in males is not observed in females.<sup>228</sup> Nationally, the 2005 age-adjusted death rate declined 2.7% from that observed in 2004. However, recent studies suggest that the decline in mortality is ending.<sup>229 230</sup>

<sup>224</sup> Ford ES et al. Gender differences in coronary heart disease and health-related quality of life: findings from 10 states from 2004 Behavioral Risk Factor Surveillance System. *J Women's Health* 2008;17:757-768.

<sup>225</sup> Pleis JR, Lethbridge-Cejku M. Summary health statistics for US adults: National Health Interview Survey 2006. *NCHS Vital Health Stat* 2007;10(235). [www.cdc.gov/nchs](http://www.cdc.gov/nchs)

<sup>226</sup> Missouri Department of Health and Senior Services. 2007 Behavioral Risk Factor Surveillance System. [www.dhss.mo.gov/BRFSS](http://www.dhss.mo.gov/BRFSS)

<sup>227</sup> Heron MP et al. Deaths preliminary data for 2006. *Natl Vital Stat Rep* 2008;56(16). [www.cdc.gov/nchs](http://www.cdc.gov/nchs)

<sup>228</sup> Lerman A, Sopko G. Women and cardiovascular heart disease: clinical implications from the Women's Ischemia Syndrome Evaluation (WISE) study. Are we smarter? *J Am Coll Cardiol* 2006;47:59-62.

<sup>229</sup> Nemetz PN et al. Recent trends in the prevalence of coronary disease: a population-based autopsy study of nonnatural deaths. *Arch Intern Med* 2008;168:264-270.

<sup>230</sup> Ford ES, Capewell S. Coronary heart disease mortality among young adults in the U.S. from 1980 through 2002: concealed leveling of mortality rates. *J Am Coll Cardiol* 2007;50:2128-2132.

In Missouri, the death rates for heart disease and stroke declined 27% and 24%, respectively, between 1995 and 2005.

Decreases in coronary heart disease mortality have been attributed almost equally to reductions in risk factors and to medical therapies.<sup>231</sup> Despite the attribution of half of the decline to reductions in risk factors, the National Center for Health Statistics found no appreciable difference in the distribution of 10-year risk for developing coronary heart disease.<sup>232</sup> This observation may have to do with individuals not truly making life-style changes in their behaviors such as diet.<sup>233</sup> Also, a high serum cholesterol level indicates a potential increased risk for heart disease and 16% of adults  $\geq 20$  years of age who participated in National Health and Nutrition Examination Surveys (NHANES) during 2005-2006, had serum total cholesterol levels  $\geq 240$  mg/dL.<sup>234</sup>

While heart disease and cancer are the top two causes of death in the nation, for some age groups cancer is replacing heart disease as the leading cause of death. According to the American Cancer Society,<sup>235</sup> since 1999, cancer has been the leading cause of death for persons  $< 85$  years of age; Kansas City data support that observation.

Among persons experiencing heart attacks, those with chronic health conditions have diminished chances of surviving to hospital discharge, about 16% less for each chronic condition.<sup>236</sup>

## Stroke

Stroke is a cerebrovascular accident that results in the sudden death of a portion of the brain; symptoms vary depending on the area of the brain affected. An estimated half million Americans suffer strokes each year and nearly 4 million are survivors of stroke, although many are disabled as a result.

## Prevalence

According to the 2006 National Health Interview Survey, 2.6% of adults  $\geq 18$  years of age have experienced a stroke. The prevalence was higher among males, increased with age, was inversely associated with educational attainment, income and poverty status, and was highest in the South. Blacks

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<sup>231</sup> Ford ES et al. Explaining the decrease in US deaths from coronary disease, 1980-2000. *New Engl J Med* 2007;356:2388-2398.

<sup>232</sup> Ajani UA, Ford ES. Has the risk for coronary heart disease changed among US adults? *J Am Coll Cardiol* 2006;48:1177-1182.

<sup>233</sup> Ma years et al. Dietary quality 1 year after diagnosis of coronary heart disease. *J Am Diet Ass* 2008;108:240-246.

<sup>234</sup> Schober SE et al. High serum total cholesterol – an indicator for monitoring cholesterol lowering efforts: US adults, 2005-2006. *NCHS . Data Brief* 2007;2. [www.cdc.gov/nchs](http://www.cdc.gov/nchs)

<sup>235</sup> American Cancer Society. *Cancer Facts & Figures 2008*. [www.cancer.org](http://www.cancer.org)

<sup>236</sup> Carew HT et al. Chronic health conditions and survival after out-of-hospital ventricular fibrillation cardiac arrest. *Heart*. 2007;93:728-731.

have a higher incidence of stroke and more severe strokes than whites,<sup>237 238</sup> and among stroke survivors, blacks experience greater activity limitations than whites.<sup>239</sup> It has been reported that middle aged women in the US have had a tripling in strokes attributed to the obesity epidemic.<sup>240</sup> High body mass index or BMI also has been linked to strokes in men.<sup>241</sup> And, among postmenopausal women, those who sleep more than 9 hours a night are reported to be at increased risk of stroke.<sup>242</sup> Exposure to cigarette smoke also is a risk factor. Moderate smoking has been associated with a 4.3 times higher risk of stroke in young women while heavy smoking carried a 9.1 times greater risk.<sup>243</sup> Smoking cessation has been associated with significant reductions in the risk of stroke and myocardial infarction, but simply reducing the number of cigarettes smoked does not significantly reduce either risk.<sup>244</sup> In addition, non-smokers married to smokers have a 42% greater risk of stroke compared to non-smokers married to non-smokers.<sup>245</sup>

The Kansas City Stroke Study reported that there were differences by sex in stroke recovery and that prestroke physical functioning and symptoms of depression were important factors that influenced recovery.<sup>246</sup> Lower recovery of activities of daily living and physical function was found among women.

An estimated 780,000 Americans will experience a stroke in 2008, 150,000 are projected to die, and 15-30% of stroke survivors will be permanently disabled.<sup>247</sup>

## Mortality

In 2005, stroke was the 3<sup>rd</sup> leading cause of death in the US and Missouri Nationally, the age adjusted death rate for stroke declined 6.8% from that in 2004. Nearly 50% of stroke deaths occur prior to

<sup>237</sup> Bravata DM et al. Racial disparities in stroke risk factors. The impact of socioeconomic status. *Stroke* 2005;36:1507-1511.

<sup>238</sup> Howard G et al. Regional differences in African Americans' high risk for stroke: the remarkable burden of stroke for southern African Americans. *Ann Epidemiol* 2007;17:689-696.

<sup>239</sup> McGruder HF et al. Differences in disability among black and white stroke survivors – United States, 2000-2001. *MMWR Morb Mortal Wkly Rep* 2005;54:3-6.

<sup>240</sup> Towfighi A et al. A midlife stroke surge among women in the United States. *Neurology* 2007;69:1898-1904.

<sup>241</sup> Zhou M et al. Body mass index, blood pressure, and mortality from stroke: a nationally representative prospective study of 212 000 Chinese men. *Stroke*. 2008;39:753-759

<sup>242</sup> Chen JC et al. Sleep duration and risk of ischemic stroke in postmenopausal women. *Stroke* 2008;July 17<sup>th</sup> [epub ahead of print]

<sup>243</sup> Bhat VM et al. Dose-response relationship between cigarette smoking and risk of ischemic stroke in young women. *Stroke* 2008;39:2439-2443.

<sup>244</sup> Song Ym, Cho Hj. Risk of stroke and myocardial infarction after reduction or cessation of cigarette smoking: a cohort study of Korean men. *Stroke* 2008;39:2431-2438.

<sup>245</sup> Glymour MM et al. Spousal smoking and incidence of first stroke the health and retirement study. *Am J Prev Med* 2008;35:245-248.

<sup>246</sup> Lai, S et al. Sex differences in stroke recovery. *Prev Chronic Dis* 2005;2(3): [www.cdc.gov/pcd/issues/2005/jul/04\\_0137.htm](http://www.cdc.gov/pcd/issues/2005/jul/04_0137.htm).

<sup>247</sup> American Heart Association. Heart disease and stroke statistics. 2008 update. [www.americanheart.org](http://www.americanheart.org)

transport to a hospital (35% in nursing homes and 14% in the decedents home or other location).<sup>248</sup> The proportion of pre-transport deaths increases with age and is higher among females, whites, and non-Hispanics. Blacks have the highest proportion of deaths that occur in emergency departments and the same is true for Hispanics compared to non-Hispanics. Asians have the highest proportion of post-transport deaths that occur in a hospital.

### ***Heart disease and stroke in Missouri***

According to the Missouri Department of Health and Senior Services, the death rates for heart disease and stroke declined 27% and 24%, respectively, between 1995 and 2005. Of the 50 states in 2005, Missouri ranked 9<sup>th</sup> highest in the prevalence of heart disease and 7<sup>th</sup> highest in the prevalence of stroke. Death rates for blacks from heart disease and stroke were 25-33% higher than for whites.

### ***Heart disease and stroke in Kansas City***

In 2006, heart disease was the 2<sup>nd</sup> leading cause of death behind cancer and stroke was the 5<sup>th</sup> leading cause of death behind chronic lower respiratory diseases and infectious diseases. A total of 810 Kansas Citians died as the result of heart disease, while another 196 died from stroke (Table 123). The age-adjusted death rates show that men were 68% more likely to die from heart disease and 11% more likely to die from stroke. Among all males who died in 2006, 21.3% died from heart disease and 4.1% from stroke. For females, 21.5% died from heart disease and 6.3% from stroke. In the bi-state metropolitan area, in 2006, 11.4% of persons  $\geq 45$  years of age reported that they had coronary heart disease and 5.2% reported having had a stroke.<sup>249</sup>

The non-Hispanic black:non-Hispanic white disparity ratios for deaths from heart disease and stroke were 1:5 and 2.3, respectively. The disparity ratios for heart disease and stroke were larger among females (1.6 and 3.0, respectively) than for males (1.4 and 1.4, respectively).

During 2002-2006, of deaths among women, 23.4% of those among non-Hispanic blacks were due to heart disease and 7.4% were due to stroke. For non-Hispanic white women the rates were 24.3% and 6.8%, respectively. For males, 22.6% of deaths among non-Hispanic blacks were from heart disease and 4.9% from stroke, compared to 24.1% and 4.5%, respectively, for non-Hispanic whites.

While the average age of death in 2006 for Kansas Citians was 74.7 years for heart disease and 75.7 years for stroke, a significant proportion of the deaths were premature (prior to age 65 y) (Table 124). In Kansas City, the percentages of men who died prematurely from heart disease (33.9%) and stroke (31.6%) were higher than among women (14.6% for heart disease, 16.2% for stroke). Statewide, in 2006, premature deaths from heart disease and stroke occurred at lower rates — 27.4% for heart disease

<sup>248</sup> Harris C et al. Place of death after stroke – United States, 1999-2002. *MMWR Morb Mortal Wkly Rep* 2006;55:529-532.

<sup>249</sup> Kilmer G et al. Surveillance of certain health behaviors and conditions among states and selected local areas – Behavioral Risk Factor Surveillance System (BRFSS), United States, 2006. *MMWR Surv Summ* 2008;57:SS-7.

and 19.0% for stroke among males and 12.2% for heart disease and 9.8% for stroke among females. Figure 82 summarizes premature deaths from heart disease and stroke among Kansas Citians for the years 2002 through 2006.

**Table 123 Deaths and age-adjusted deaths rates from heart disease and stroke, by sex and race, Kansas City, Mo, 2006**

	Heart disease		Stroke	
	Deaths	Rate	Deaths	Rate
<b>All</b>				
Total	810	196	196	48
White, non-Hispanic	525	174	107	35
Black, non-Hispanic	258	254	80	79
Hispanic	16	NC <sup>1</sup>	5	NC
Asian	4	NC	2	NC
Native American	5	NC	2	NC
<b>Male</b>				
Total	407	259	79	50
White, non-Hispanic	245	235	43	43
Black, non-Hispanic	157	327	22	62
Hispanic	10	NC	3	NC
Asian	1	NC	0	NC
Native American	3	NC	1	NC
<b>Female</b>				
Total	403	154	117	45
White, non-Hispanic	278	132	69	29
Black, non-Hispanic	135	206	39	86
Hispanic	6	NC	2	NC
Asian	3	NC	2	NC
Native American	2	NC	1	NC

<sup>1</sup> NC = not calculated due to low number of deaths

**Table 124 Percent of deaths occurring prematurely (prior to age 65 years old) from heart disease and stroke, 2006**

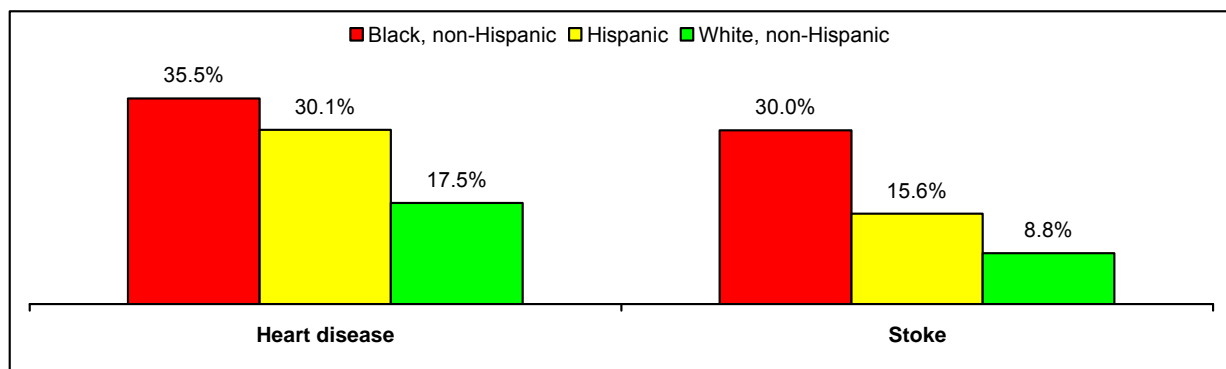
	Total		White, non-Hispanic		Black, non-Hispanic	
	Male	Female	Male	Female	Male	Female
<b>Missouri</b>						
Heart disease	27.4%	12.2%	25.3%	10.8%	44.7%	24.9%
Stroke	19.0%	9.8%	14.5%	7.2%	48.2%	29.7%
<b>Kansas City</b>						
Heart disease	33.9%	14.6%	27.5%	9.9%	45.8%	23.6%
Stroke	31.6%	16.2%	18.8%	3.4%	51.9%	28.3%

During 2006, 258 non-Hispanic black Kansas Citians died from heart disease and 80 from stroke (31.9% of heart disease deaths, 40.8% of stroke deaths). However, higher percentages of non-Hispanic black males and females died prematurely from heart disease and stroke than did non-Hispanic whites.

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The proportions of non-Hispanic black males and females dying prematurely from heart disease and stroke were significantly higher than for non-Hispanic white males and females. For both non-Hispanic whites and non-Hispanic blacks, males died prematurely from heart disease at disproportionately higher rates than females. The same held true for non-Hispanic white males and stroke; there was no difference between non-Hispanic black males and females.

**Figure 82** Percent of premature deaths among Kansas City, Mo, residents by race/ethnicity for heart disease and stroke, 2002-2006



An examination of premature deaths among Hispanics in Kansas City requires data for 2002-2006; 93 heart disease deaths and 32 stroke deaths. Of the deaths due to heart disease, 30.1% were premature while for stroke 15.6% were premature. Males were significantly more likely to die prematurely from heart disease than females (43.4% for males, 12.5% for females), but there was no statistically significant difference in premature deaths due to stroke (23.1% for males, 10.5% for females).

## Heart disease

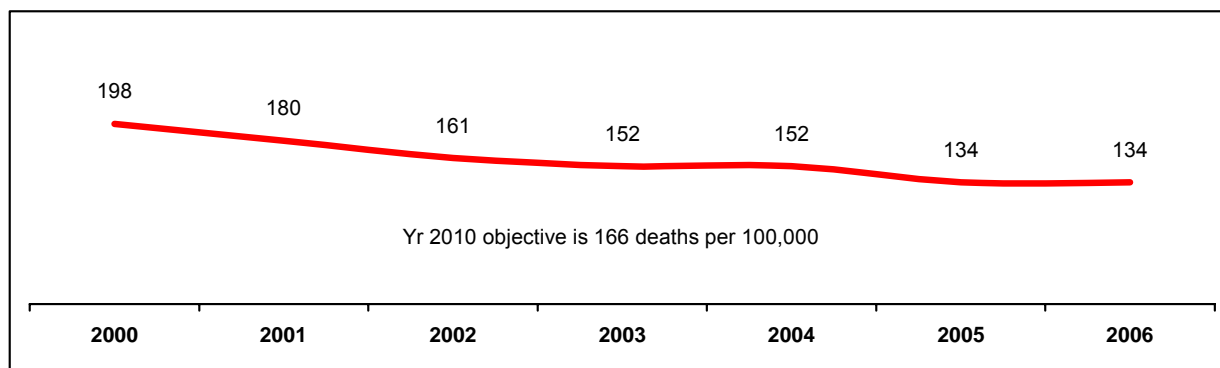
In Kansas City, the overall age-adjusted death rate from coronary heart disease decreased 32.3% between 2000 and 2006 and has been below the *Healthy People 2010* national objective since 2002 (Figure 83). A little over two-thirds of all deaths from heart disease are due to coronary disease (Tables 125).

In 2006, 810 Kansas City residents died from diseases of the heart (Table 126). Of these deaths, 79.3% (643) occurred among residents of the Jackson County portion of the City, 15.2% (123) among those living in the Clay County portion, and 5.4% (44) for those in the Platte County portion. The death rate from heart disease per 10,000 residents in the different areas of Kansas City was highest for residents in Jackson County, followed by those in Clay and Platte counties (Table 127). The distribution



of heart disease deaths by zip code is shown in Table 128 and by zip code and rate per 1,000 residents in Table 129. The highest death rates for both heart disease and stroke per 10,000 residents were in those zip codes with median family incomes between \$60,000 and \$79,999 (Figure 84).

**Figure 83 Age-adjusted death rates per 100,000 population due to coronary heart disease, Kansas City, Mo**



**Table 125 Distribution of deaths from all heart disease and from coronary heart disease by age for selected race/ethnic groups, Kansas City, Mo, 2002-2006**

Age (years)	Total deaths	White, non-Hispanic		Black, non-Hispanic		Hispanic	
		All	Coronary	All	Coronary	All	Coronary
<1	5	4	0	2	0	0	0
1-4	3	1	0	1	0	1	0
5-14	3	2	0	1	1	0	0
15-24	14	2	0	12	3	0	0
25-34	39	12	6	23	7	2	1
35-44	142	60	40	78	42	4	2
45-54	341	165	129	163	111	10	8
55-64	510	261	210	230	160	11	8
65-74	695	401	295	270	194	14	11
75-84	1,366	936	647	391	265	36	26
≥85	1,327	1,046	636	263	177	15	6
Not listed	8	1	1	1	1	0	0
<b>Total</b>	<b>4,453</b>	<b>2,891</b>	<b>1,964</b>	<b>1,435</b>	<b>961</b>	<b>93</b>	<b>62</b>
<b>Percent coronary heart disease</b>		<b>67.9%</b>		<b>67.0%</b>		<b>66.7%</b>	

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**Table 126 Classification of deaths from heart disease, Kansas City, Mo, 2006**

Cause listed on death certificate	Number of deaths
Acute rheumatic fever and chronic rheumatic heart diseases	5
Hypertensive heart disease	55
Hypertensive heart and renal disease	6
Acute myocardial infarction	215
Atherosclerotic cardiovascular disease, so described	38
All other forms of chronic ischemic heart disease	236
Heart failure	85
All other forms of heart disease	170
<b>Total deaths from heart disease</b>	<b>810</b>

**Table 127 Death rates per 10,000 population (July 2006 population estimates) for heart disease and stroke in different areas of Kansas City, Mo, 2006**

Cause of death	Clay County			Jackson County			Platte County		
	Pop.	Deaths	Rate	Pop.	Deaths	Rate	Pop.	Deaths	Rate
Heart disease	94,045	123	13.1	314,523	643	20.4	38,602	44	11.4
Stroke	94,045	21	2.2	314,523	164	5.2	38,602	11	2.8



**Table 128 Deaths due to heart disease among Kansas City, Mo, residents by zip code, 2002-2006**

Zip code	Deaths	Male	Female	White, non-Hispanic	Black, non-Hispanic
64101	2	2	0	2	0
64102	2	0	2	0	2
64105	30	15	15	22	5
64106	64	33	31	38	21
64108	51	28	23	17	19
64109	135	60	75	20	111
64110	137	65	72	39	95
64111	240	106	134	176	52
64112	58	24	34	52	4
64113	95	54	41	92	2
64114	401	166	235	386	11
64116	81	40	41	75	2
64117	119	65	54	113	3
64118	130	71	59	122	6
64119	140	74	66	129	6
64120	5	4	1	3	0
64123	105	56	49	94	4
64124	102	49	53	86	9
64125	21	13	8	19	0
64126	70	33	37	51	13
64127	222	106	116	70	146
64128	195	100	95	12	179
64129	107	62	45	75	28
64130	368	205	163	18	348
64131	230	121	109	139	86
64132	159	90	69	40	117
64133	165	90	75	143	20
64134	201	121	80	131	67
64136	15	5	10	13	2
64137	97	38	59	61	35
64138	110	56	54	90	17
64139	33	6	27	30	3
64145	125	39	86	113	10
64146	18	9	9	18	0
64147	0	0	0	0	0
64149	3	2	1	2	1
64151	123	61	62	119	3
64152	36	17	19	33	2
64153	25	9	16	24	0
64154	89	38	51	86	2
64155	110	51	59	108	1
64156	6	5	1	6	0
64157	13	8	5	11	1
64158	4	3	1	4	0
64160	0	0	0	0	0
64161	3	1	2	3	0
64163	1	1	0	1	0
64164	1	1	0	1	0
64165	1	0	1	1	0
64166	0	0	0	0	0
64167	0	0	0	0	0
64192	0	0	0	0	0
All others <sup>1</sup>	5	3	2	3	2
<b>Total</b>	<b>4,453</b>	<b>2,206</b>	<b>2,247</b>	<b>2,891</b>	<b>1,435</b>

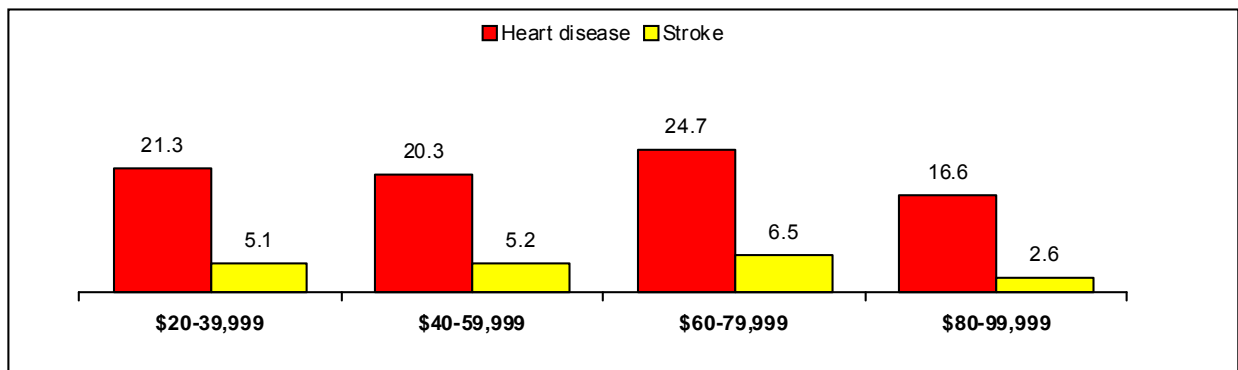
<sup>1</sup> Zip codes 64121, 64141, 64148, 64168, 64171, 64172, 64179, 64188, 64190, 64191, 64195, 64196, and 64199 are associated with post office box numbers; zip codes 64144, 64170, 64180, 64183, 64184, 64185, 64187, 64193, 64194, 64197, 64198, 64944, and 64999 are associated with unique entities, and zip codes 64012, 64030, 64079, and 64081 are associated with Belton, Grandview, Platte City, and Lee's Summit, respectively.

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**Table 129 Distribution of heart disease deaths by zip code and rate per 1,000 population, Kansas City, Mo, 2002-2006**

Rate per 1,000 population					
0.0-1.9	2.0-3.9	4.0-5.9	6.0-7.9	8.0-9.9	=>10.0
64012	64102	64101	64110	64106	64030
64079		64120	64112	64108	64105
64081		64152	64116	64113	64109
64147		64156	64118	64117	64111
64158		64157	64124	64119	64114
64166			64151	64131	64123
64167			64153	64132	64125
64192			64155	64134	64126
			64163	64137	64127
				64138	64128
				64149	64129
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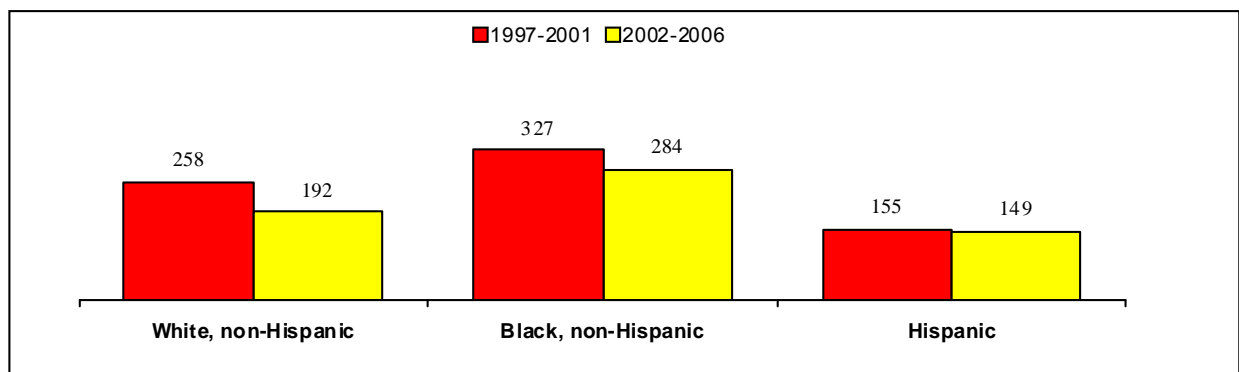
**Figure 84 Annualized heart disease and stroke death rates per 10,000 population by zip code median family income levels, Kansas City, Mo, 2002-2006**



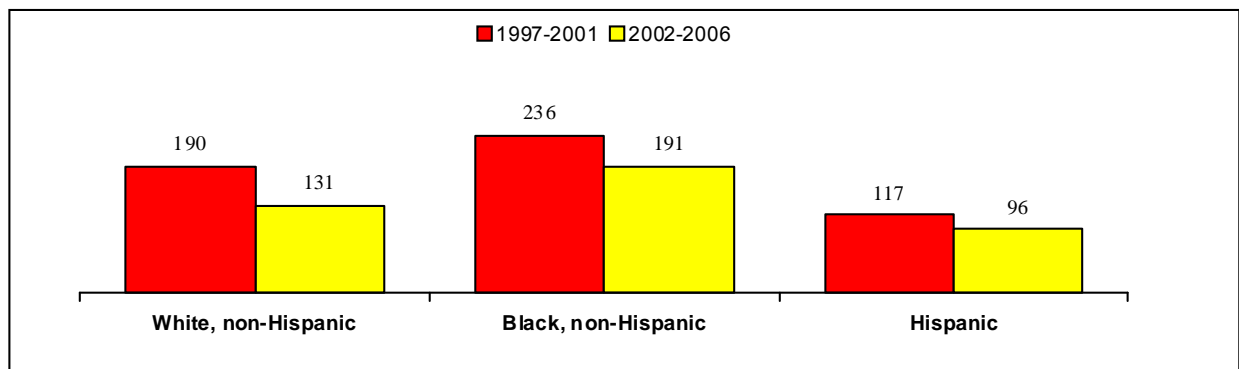
Age-adjusted heart disease death rates, overall and for coronary heart disease, declined from 1997-2001 to 2002-2006 (Figures 85 and 86). The declines were the largest for non-Hispanic whites (25.6% overall, 31.1% coronary) and lowest for Hispanics (3.9% overall, 17.9% coronary). Non-Hispanic black rates were intermediate (13.1% overall, 19.1% coronary).

In 2006, Kansas City residents made 1,309 visits to emergency departments because of heart disease and experienced 5,869 hospitalizations. Heart disease increased in importance for emergency department visits with increasing age however, overall it did not qualify as a top 10 reason for emergency department visits, Heart disease was the 2<sup>nd</sup> leading reason for hospitalization following complications of pregnancy and birth. By age group, heart disease was the leading reason for hospitalization for individuals  $\geq 45$  years old. Between 2000 and 2006, there were significant reductions in hospitalizations for both heart disease and stroke (Figure 87). The quality of hospital care for persons experiencing heart attacks or heart failure in Kansas City can be assessed at [www.healthykansascity.org](http://www.healthykansascity.org).

**Figure 85** Age-adjusted death rates per 100,000 population due to heart disease by race/ethnicity, Kansas City, Mo

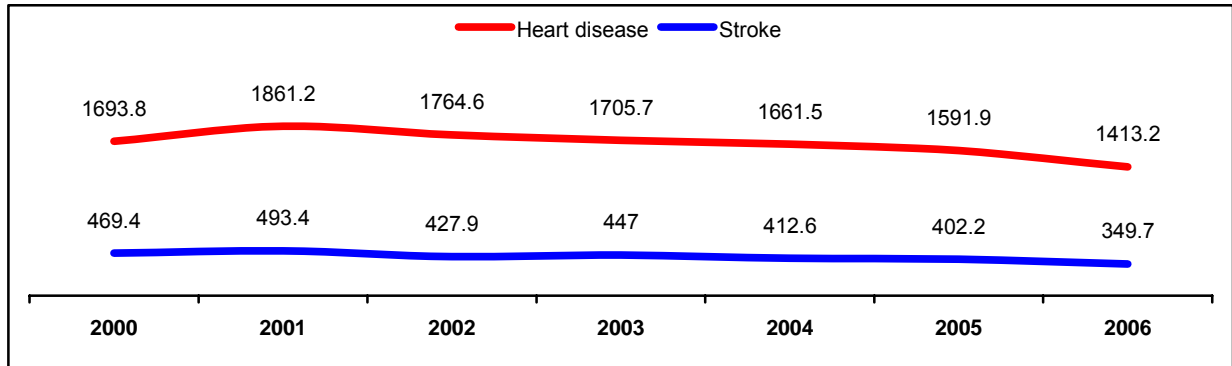


**Figure 86** Age-adjusted death rates per 100,000 population due to coronary heart disease, Kansas City, Mo



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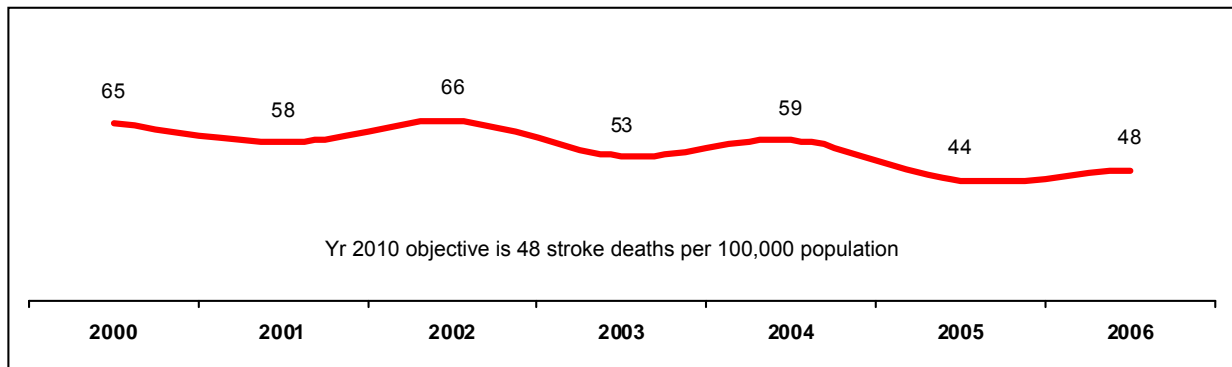
**Figure 87** Age-adjusted rates per 100,000 population for hospitalization due to heart disease and stroke, Kansas City, Mo



### Stroke

It is estimated that 147,000 Missourians  $\geq 18$  years of age have a history of stroke.<sup>250</sup> Among Kansas City residents, the age-adjusted death rates for stroke fluctuated annually between 2000 and 2006, although there has been a statistically significant decline that is approaching the *Healthy People 2010* national objective (Figure 88).

**Figure 88** Age-adjusted stroke death rate per 100,000 population, Kansas City, Mo



Tables 122 to 124 contained the information on stroke deaths by sex, race/ethnicity, and percent premature while the distribution of stroke deaths by county was in Table 127. Table 130

<sup>250</sup> Neyer JR et al. Prevalence of stroke – United States, 2005. *MMWR Morb Mortal Wkly Rep* 2007;56:469-474.



summarizes the age distribution of stroke deaths by race/ethnicity for 2002-2006, while Tables 131 and 132 show the distribution of deaths by zip code. As shown in Figure 84 above, the highest annualized death rate per 10,000 population was for those zip codes with a median family income of \$60,000 to \$79,999.

For the periods 1997-2001 and 2002-2006, both non-Hispanic whites and non-Hispanic blacks experienced a decrease in their age-adjusted death rates of 21.4% and 4.9%, respectively, while Hispanics had a 1.8% increase (Figure 89).

In 2006, stroke was the 9<sup>th</sup> leading overall cause for hospitalization in Kansas City with 1,450 admissions and there had been a significant drop in hospitalizations for stroke since 2000. By age-groups, stroke does not appear in the top 10 leading causes for hospitalization for persons <45 years of age. Kansas City is home to two Joint Commission on Accreditation of Healthcare Organizations certified primary stroke centers – Research Medical Center and St Luke’s Hospital. There are 3 other certified primary stroke centers in the Kansas City metropolitan area - Lee’s Summit Medical Center, Menorah Medical Center, and University of Kansas Hospital Authority.

**Table 130 Deaths from stroke by age for selected racial/ethnic groups, Kansas City, Mo, 2002-2006**

Age (years)	Deaths	White, non-Hispanic	Black, non-Hispanic	Hispanic
5-14	1	0	1	0
15-24	0	0	0	0
25-34	2	1	1	0
35-44	21	7	13	1
45-54	60	20	39	1
55-64	94	32	59	3
65-74	163	79	76	8
75-84	376	255	112	9
>85	373	285	78	10
Not listed	1	0	1	0
<b>Total</b>	<b>1,091</b>	<b>679</b>	<b>380</b>	<b>32</b>

**Table 131 Deaths due to stroke among Kansas City, Mo, residents by zip code, 2002-2006**

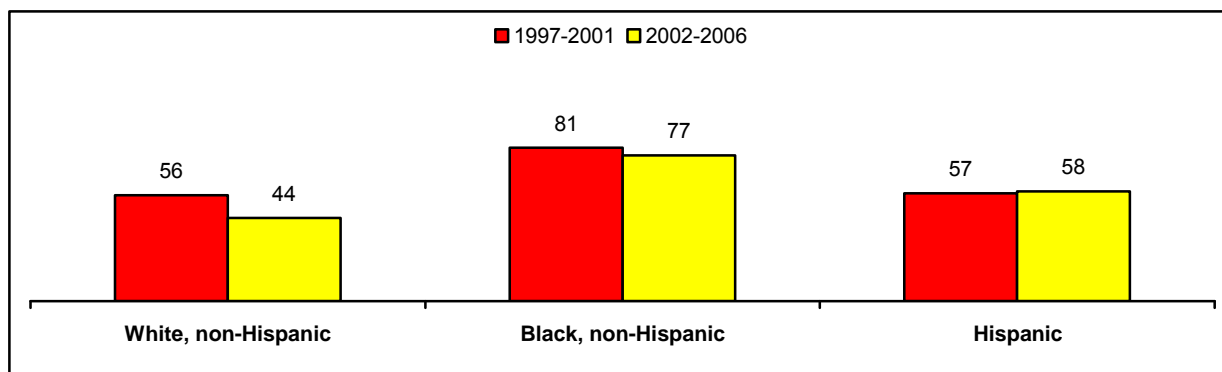
Zip code	Deaths	Male	Female	White, non-Hispanic	Black, non-Hispanic
64101	0	0	0	0	0
64102	0	0	0	0	0
64105	5	1	4	4	1
64106	18	6	12	8	5
64108	17	8	9	3	6
64109	35	11	24	7	28
64110	30	12	18	5	24
64111	39	14	25	25	12
64112	11	3	8	11	0
64113	15	5	10	14	1
64114	145	50	95	136	8
64116	18	7	11	16	0
64117	19	9	10	19	0
64118	35	11	24	31	4
64119	26	12	14	24	0
64120	1	0	1	1	0
64123	24	11	13	21	2
64124	28	11	17	20	2
64125	5	2	3	5	0
64126	10	8	2	7	1
64127	52	24	28	13	38
64128	45	21	24	1	44
64129	20	11	9	13	6
64130	100	41	59	9	90
64131	69	28	41	34	33
64132	35	15	20	6	27
64133	38	17	21	34	4
64134	48	23	25	28	19
64136	3	1	2	3	0
64137	20	8	12	14	4
64138	35	15	20	24	10
64139	11	2	9	8	3
64145	43	14	29	38	4
64146	2	0	2	2	0
64147	0	0	0	0	0
64149	2	2	0	2	0
64151	27	10	17	25	2
64152	9	2	7	8	0
64153	1	0	1	1	0
64154	21	7	14	19	2
64155	37	15	22	36	0
64156	1	0	1	1	0
64157	1	0	1	1	0
64158	1	0	1	1	0
64160	0	0	0	0	0
64161	0	0	0	0	0
64163	0	0	0	0	0
64164	0	0	0	0	0
64165	0	0	0	0	0
64166	0	0	0	0	0
64167	0	0	0	0	0
64192	0	0	0	0	0
All others <sup>1</sup>	1	0	1	1	0
<b>Total</b>	<b>1,103</b>	<b>437</b>	<b>666</b>	<b>679</b>	<b>380</b>

<sup>1</sup> Zip codes 64121, 64141, 64148, 64168, 64171, 64172, 64179, 64188, 64190, 64191, 64195, 64196, and 64199 are associated with post office box numbers; zip codes 64144, 64170, 64180, 64183, 64184, 64185, 64187, 64193, 64194, 64197, 64198, 64944, and 64999 are associated with unique entities, and zip codes 64012, 64030, 64079, and 64081 are associated with Belton, Grandview, Platte City, and Lee's Summit, respectively.

**Table 132** Distribution of stroke deaths by zip code and rate per 1,000 population, Kansas City, Mo, 2002-2006

		Rate per 1,000 population				
0.0-0.9	1.0-1.9	2.0-2.9	3.0-3.9	4.0-4.9	=>5.0	
64012	64110	64105	64128	64154	64114	
64030	64112	64106	64130		64139	
64079	64113	64108	64147		64145	
64081	64116	64109			64149	
64101	64117	64111			64152	
64102	64118	64.23				
64153	64119	64124				
64156	64120	64125				
64157	64126	64127				
64158	64137	64129				
64161	64146	64131				
64163	64151	64132				
64164		64133				
64165		64134				
64166		64136				
64167		64138				
64192		64155				

**Figure 89** Age-adjusted death rates for stroke per 100,000 population by race/ethnicity, Kansas City, Mo



## Hypertension

Hypertension is high blood pressure generally defined as systolic/diastolic blood pressure measurements of equal to or greater than 140/90 mm Hg. Nationally, the age-adjusted prevalence of hypertension varied only slightly between 28% and 30% during the period 1999 and 2006.<sup>251</sup> Prevalence increases with age and is inversely correlated with educational attainment and poverty status. Blacks

<sup>251</sup> Ostecheaga years et al. Hypertension awareness, treatment, and control – continued disparities in adults: United States, 2005-2006. *NCHS Data Brief* 2008;3. [www.cdc.gov/nchs](http://www.cdc.gov/nchs)

have the highest age-adjusted prevalence rate while Asians have the lowest.

Economically, hypertension is 5<sup>th</sup> among the top 15 health care problems accounting for the rise in medical care costs in this country.<sup>252</sup> It is the most frequent chronic condition resulting in doctor and hospital outpatient visits.<sup>253 254</sup> Hospitalizations for hypertension are more prevalent among blacks and Hispanics.<sup>255</sup>

Hypertension is a major modifiable risk factor for many diseases, such as heart disease, stroke, damage to blood vessels, aortic dissection, kidney damage and failure, and vision loss. Conversely, favorable blood pressure levels are associated with a greater probability of survival to age 85 as well as increased longevity without major co-morbidities.<sup>256</sup>

In addition to high blood pressure there is prehypertension which affects about 37% of persons  $\geq 20$  years old.<sup>257</sup> It is defined as a systolic blood pressure between 120 and 139 mm Hg or diastolic blood pressure between 80 and 89 mm Hg. Also there is residual hypertension which is a systolic pressure of 140 mm Hg or higher despite treatment. Beginning at a blood pressure of 115/75 mm Hg, the risk of cardiovascular disease doubles with each increment of 20/10 mm Hg.

Prehypertension is considered a significant health problem associated with increased risk for myocardial infarction and coronary artery disease, but not stroke.<sup>258</sup> Men have a higher age-adjusted prevalence of prehypertension than women. Non-Hispanic blacks, 20-39 years old, had a higher prevalence of prehypertension than whites and Hispanics, but their prevalence is lower at older ages because of a higher prevalence of hypertension. Persons with prehypertension are 1.7 times more likely to have at least 1 other adverse risk factor for heart disease and stroke than those with normal blood pressure.

Blood pressure itself can be affected by many factors including genetics, volume of water in the body, salt content of the body, kidney function, and blood vessel health. "Essential" hypertension comprises over 95% of all high blood pressure cases and has no identifiable cause. "Secondary" hypertension is high blood pressure caused by other disorders such as tumors, kidney disorders, medications, oral contraceptives, etc. A 12 to 13 point reduction in blood pressure among people with

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<sup>252</sup> Thorpe KE et al. Which medical conditions account for the rise in health care spending? *Health Aff* 2004;W4:437-445.

<sup>253</sup> Cherry DK et al. National ambulatory medical care survey: 2005 summary. *NCHS Adv Data Vital Health Stat* 2007;387. [www.cdc.gov/nchs](http://www.cdc.gov/nchs)

<sup>254</sup> Middleton K, et al. National hospital ambulatory medical care survey: 2005 outpatient department summary. *NCHS Adv Data Vital Health Stat.* 2007;389. [www.cdc.gov/nchs](http://www.cdc.gov/nchs)

<sup>255</sup> Laditka JN, Laditka SB. Race, ethnicity and hospitalization for six chronic ambulatory care sensitive conditions in the USA. *Ethnicity Health* 2006;11:247-263.

<sup>256</sup> Terry DF et al. Cardiovascular risk factors predictive for survival and morbidity-free survival in the oldest-old Framingham Heart Study participants. *J Am Geriatr Soc* 2005;53:1944-1950.

<sup>257</sup> Qureshi AI, et al. Prevalence and trends of prehypertension and hypertension in United States: National Health and Nutrition Examination Surveys 1976 to 2000. *Med Sci Monit* 2005;11:CR403-409.

<sup>258</sup> Qureshi AI et al. Is prehypertension a risk factor for cardiovascular diseases. *Stroke* 2005;36:1859-1863.

hypertension can reduce heart attacks by 21%, strokes by 37%, and total cardiovascular disease deaths by 25%.<sup>259</sup>

Usually, persons with hypertension have no symptoms, but very high and dangerously high (termed malignant) hypertension generally are associated with symptoms such as severe headache, confusion, tiredness, vision changes, etc. According to NHANES findings, overall, 78% of persons with hypertension were aware of their condition although this varied by age, sex, and race/ethnicity. Only 6.6% of persons with high blood pressure claimed to have never been told of their condition.

Hypertension is controllable with treatment, requiring life long monitoring, and the treatment may require adjustments periodically. From NHANES data, 68% of persons with hypertension were treated with antihypertensive medication. Only 64% of these individuals (or 44% overall) had successfully controlled their blood pressure, meaning that 56% of persons with hypertension did not have it controlled.

## Hypertension in Kansas City

According to the 2007 Missouri BRFSS data, 29.4% of Missourians have hypertension (29.8% of males; 29.1% of females).<sup>260</sup> And, the 2007 Missouri County-Level Study found a prevalence rate of 19.6% statewide and prevalence rates of 17.3%, 18.0%, and 15.7%, in Clay, Jackson, and Platte counties, respectively, which were not statistically different from the statewide prevalence rate ([www.dhss.mo.gov/CommunityDataProfiles](http://www.dhss.mo.gov/CommunityDataProfiles)) The most recent data for Kansas City comes from the 2004 health assessment survey, commissioned by the Kansas City Health Department which reported that 29.5% of respondents suffered from hypertension ([www.kcmo.org/health](http://www.kcmo.org/health)).

Between 2002 and 2006, 220 Kansas City residents died from hypertension (Table 133). The death rate per 10,000 population was 75% higher for females. Non-Hispanic black men and women had the highest rates, with males having a rate 27.3% higher than females.

Hypertension and prehypertension prevalence rates of 6.9%-24.6% and 8.6%, respectively have been reported among adolescents, with higher prevalences among the overweight and obese.<sup>261 262</sup> In Kansas City, the *Score 1 for Health* project examined school-aged children 5-13 years of age using National Heart Lung and Blood Institute criteria for elevated blood pressure.<sup>263</sup> *Score 1* referred 2.2% of white, 2.0% of Asian, 1.9% of black, and 1.4% of Hispanic students because of elevated blood pressure

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<sup>259</sup> Centers for Disease Control and Prevention. The burden of chronic diseases and their risk factors. National and state perspectives. 2004. [www.cdc.gov/nccdphp](http://www.cdc.gov/nccdphp).

<sup>260</sup> Missouri Department of Health and Senior Services. 2007 Behavioral Risk Factor Surveillance System. [www.dhss.mo.gov/BRFSS](http://www.dhss.mo.gov/BRFSS)

<sup>261</sup> Jago R et al. Prevalence of abnormal lipid and blood pressure values among an ethnically diverse population of eighth grade adolescents and screening implications. *Pediatrics* 2006;1117:2065-2073.

<sup>262</sup> Din-Dzietham R et al. High blood pressure trends in children and adolescents in national surveys, 1963-2002. *Circulation* 2007;116:1488-1496.

<sup>263</sup> Campbell A, Sterling TK. *Score 1 for Health. 2007 Community Report.* [www.kcumb.edu/Score1CommunityReport](http://www.kcumb.edu/Score1CommunityReport)

readings.

**Table 133 Deaths and annualized death rates per 10,000 from hypertension, Kansas City, Mo, 2002-2006**

Race/ethnicity	Males		Females	
	Deaths	Rate	Deaths	Rate
White, non-Hispanic	35	0.6	61	0.9
Black, non-Hispanic	45	1.4	73	2.0
Hispanic	0	0	4	0.6
Asian	0	0	0	0
Native American	1	1.9	1	1.8
<b>Total</b>	<b>81</b>	<b>0.8</b>	<b>139</b>	<b>1.2</b>

## Risk factors

Certain modifiable risk factors, including high blood pressure, high cholesterol, diabetes, tobacco use, obesity, and lack of exercise are the main targets for primary and secondary prevention of heart disease and stroke.<sup>264 265 266</sup> Improving diet and lifestyle is a critical component of the American Heart Association's strategy for cardiovascular disease risk reduction in the general population.<sup>267</sup> All forms of tobacco use (smoking, chewing, and inhalation of second hand smoke) should be discouraged to prevent cardiovascular disease.<sup>268</sup>

A substantial proportion of the population has multiple risk factors, increasing their likelihood of heart disease and stroke.<sup>269</sup> Nationally, blacks and Native Americans have the highest prevalences of multiple risk factors, 48.7% and 45.7%, respectively, followed by Hispanics, 39.6%, whites, 35.5%, and Asians, 25.9%. There were no differences between men and women but differences existed by income and educational attainment. A recent study reported no difference in traditional risk factors for cardiovascular mortality among blacks and whites of the same sex.<sup>270</sup> In Missouri, 38.9% of persons

<sup>264</sup> Mensah GA et al. State of disparities in cardiovascular health in the United States. *Circulation* 2005;111:1233-1241.

<sup>265</sup> Carnethon MR et al. Prevalence and cardiovascular disease correlates of low cardiopulmonary fitness in adolescents and adults. *J Am Med Ass* 2005;294:2981-2988.

<sup>266</sup> Kokotailo RA, Hill MD. Coding of stroke and stroke risk factors using International Classification of Diseases, revisions 9 and 10. *Stroke* 2005;36:1776-1781.

<sup>267</sup> Lichtenstein AH et al. Diet and Lifestyle Recommendations Revision 2006. A scientific statement from the American Heart Association Nutrition Committee. *Circulation* 2006;114:82-96.

<sup>268</sup> Teo KK et al. Tobacco use and risk of myocardial infarction in 52 countries in the INTERHEART study: a case-control study. *Lancet* 2006;368:647-658.

<sup>269</sup> Hayes DK et al. Racial/ethnic and socioeconomic disparities in multiple risk factors for heart disease and stroke – United States, 2003. *MMWR Morb Mortal Wkly Rep* 2005;54:113-117.

<sup>270</sup> Carnethon MR et al. Comparison of risk factors for cardiovascular mortality in black and white adults. *Arch Intern Med* 2006;166:1196-1202.

surveyed had multiple risk factors.

Modest reductions in major risk factors for heart disease, for example, can lead to gains in life-years 4 times higher than cardiological treatments.<sup>271</sup> Except for diabetes, cardiovascular risk factors have declined considerably over the past 40 years among adults with different body mass indexes (BMI).<sup>272</sup> Although obese persons have higher risk factor levels than lean persons, the levels of these risk factors are much lower than in previous decades.

Based on the 2003 Behavioral Risk Factor Surveillance System (BRFSS) data for the Kansas City region, the prevalence of various risk factors for heart disease and stroke are shown in Table 134. The prevalence of obesity among Kansas City residents and of high cholesterol levels among Jackson County residents were significantly above the statewide prevalence rates.

**Table 134 Risk factors for heart disease and stroke among respondents to Missouri’s 2003 BRFSS**

Risk Factor	Kansas City	Clay County	Jackson County	Platte County	Statewide
Physically inactive	26.2%	20.6%	29.0%	20.6%	24.0%
Current smoker	27.9%	22.1%	26.0%	22.1%	26.4%
Obese	34.0%	32.0%	25.3%	32.0%	23.4%
Hypertensive	34.4%	27.4%	30.3%	27.4%	28.9%
High cholesterol <sup>1</sup>	43.8%	37.2%	48.6%	37.2%	37.1%
Diabetes	10.3%	4.7%	8.1%	4.7%	7.2%

<sup>1</sup>High cholesterol in persons ≥35 years old

High blood cholesterol is a major modifiable risk factor for atherosclerotic cardiovascular disease. In Missouri, 70.8% of persons ≥20 years of age participating in the 2003 BRFSS survey reported having their cholesterol level tested in the prior 5 years 30.6% of those who were ever screened had been diagnosed as having high cholesterol levels.<sup>273</sup> Also, from the BRFSS data shown above, 44% of Kansas Citians and 49% of Jackson County residents reported having high cholesterol levels. These levels are 2.6-2.9 times higher than the *Healthy People 2010* national objective of 17% of adults having high cholesterol levels. Despite increases in cholesterol screening and awareness, the percentage of Americans with high cholesterol has not changed since 1995. NHANES data for 1999-2002, revealed that 24.6% of Americans had high cholesterol levels.<sup>274</sup> There were racial/ethnic, age, and sex disparities in

<sup>271</sup> Unal B et al. Life-years gained from modern cardiological treatments and population risk factor changes in England and Wales, 1981-2000. *Am J Public Health* 2005;95:103-108.

<sup>272</sup> Gregg EW et al. Secular trends in cardiovascular disease risk factors according to body mass index in US adults. *J Am Med Ass* 2005;293:1868-1874.

<sup>273</sup> Saddlemire AE et al. Trends in cholesterol screening and awareness of high blood cholesterol – United States, 1991-2003. *MMWR Morb Mortal Wkly Rep* 2005;54:865-870.

<sup>274</sup> Fan AZ et al. Disparities in screening for and awareness of high blood cholesterol – United States, 1999-2002. *MMWR Morb Mortal Wkly Rep* 2005;54:117-119.

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terms of having been screened for high cholesterol in the prior 5 years and in awareness of having high cholesterol levels.

Diabetes is a major risk factor influencing survival among persons with cardiovascular disease. The risk of dying for diabetics is twice that for non-diabetics.<sup>275</sup> And, among diabetics who suffer a heart attack keeping their blood sugar levels under control influences their chances of dying.<sup>276</sup>

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<sup>275</sup> Fox CS et al. Trends in cardiovascular complications of diabetes. *J Am Med Ass* 2004;292:2495-2499.

<sup>276</sup> Malmberg K et al. Intense metabolic controls by means of insulin in patients with diabetes mellitus and acute myocardial infarction (DIGAMI 2): effects on mortality and morbidity. *Eur Heart J* 2005;26:650-661.